Cultural Responses to the Medieval Warm Period on the Northeastern Plains: the example from the Lockport Site (EaLf-1)

BY

CATHERINE M. FLYNN

A Thesis
Submitted to the Faculty of Graduate Studies
in Partial Fulfillment of the Requirements
for the Degree of

MASTER OF ARTS

Department of Anthropology
University of Manitoba
Winnipeg, Manitoba

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To Brett and Breandan,
with all my love

ABSTRACT

This thesis examines the relationship between migration and environmental change among Precontact peoples of the Northeastern Plains of North America. Here, the northward expansion of maize horticulture accompanied the Medieval Warm Period (ca. 800-1400 AD) and probably ended with the onset of the Little Ice Age (ca. 1400-1850 AD). Archaeological evidence for escalating inter-group conflict and endemic food stress on the Northeastern Plains of North America beginning ca. 1150-1200 AD suggests that migration was probably an attractive option; therefore, populations moved away from areas of the greatest economic and social stress between approximately 1200-1400 AD.

Some of these people moved north along the Red River to the east bank of the Red River in southeastern Manitoba, Canada between the late 14th to mid-15th centuries AD. Here, the Lockport site (EaLf-1) contains maize, bell-shaped storage pits, bison scapula hoes, and unusual pottery attributable to the migration of southern maize growers. This occupation marks the northern terminus of maize horticulture in North America; it also coincides with the latter portion of the Medieval Warm Period and with evidence for widespread political realignment to the south in Minnesota, North Dakota and Iowa. Evidence from this site and from adjacent regions is used to demonstrate that the movement of foreign groups into southeastern Manitoba is driven by a combination of socio-cultural and climatic factors.

Within archaeology there has been a movement to reject models that invoke climate change as a cause of cultural change, dismissing them as oversimplified and deterministic. The approach used here treats socio-political

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As usual, any errors, omissions, and interpretations are entirely my own. The typos, on the other hand, are the fault of the typo gnomes who crept in every night to insert more of them whilst I slept.

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LIST OF ABBREVIATIONS

Abbreviation	Meaning
AMS	Accelerator Mass Spectrometry
BC	Before Christ
BCE	Before the Common Era
BP	Before Present (1950 AD)
C	degrees Celsius
CWOI	Cord-wrapped Object Impressed
CM	Centimeters
F	degrees Fahrenheit
HRB	Province of Manitoba Historic Resources Branch
IMM	Initial Middle Missouri (Variant)
LIA	Little Ice Age
MFA	Mouth Flare Angle
MWP	Medieval Warm Period
MM	Millimeters
N/A	Not Applicable
NEP	Northeastern Plains
NEPV	Northeastern Plains Village
PV	Plains Village
US	United States
WFI	Winnipeg Fabric Impressed

SECTION 1

Theoretical Orientation

1. Introduction
2. Climate Change
3. Risk Buffering
4. Migration

CHAPTER 1
SETTING THE STAGE

1.1 INTRODUCTION

Coping with environmental change is currently one of humanity's greatest challenges. The causes and impacts of species extinctions, widespread destruction of the natural environment, the collapse of primary resources, and climate change are pervasive and hotly debated topics. Global warming has been blamed for everything from floods and droughts to unprecedented El Nino-Southern Oscillation events and the collapse of oceanic coral reef eco-systems (Cronin 1999). Such concerns have resulted in huge funding increases for climate research over the last decade and a half (Cronin 1999). While research dedicated to ascertaining the potential scope of present climate change has relied heavily on the study of paleoclimatic proxy data spanning the last several thousand years, these studies frequently ignore the cultural repercussions of large scale climatic changes even though there is no doubt that climate, environment, and human cultural evolution are inextricably intertwined.

So, what are the effects of widespread environmental changes on human populations? We recognize that catastrophic climatic episodes can stimulate large-scale population movements since there is no shortage of historically documented massive population movements in the 19th and 20th centuries brought on by climate-induced environmental catastrophes. The Irish Potato Famine, the Dirty Thirties, and the Ethiopian Drought, for instance produced large scale migrations brought about, at least in part, by short term catastrophic climatic change. Yet, there is little evidence in the archaeological literature that is

currently interpreted as a record of similar migrations. We do not know the point at which environmental change induces population movement. Obviously people leave for greener pastures where the environment has been seriously impacted. But what about areas where the environment is less severely affected: will people still leave, and for what reasons? What makes a population choose a new area, to perceive it as a more attractive place in which to dwell?

The period spanning the 12th to the 14th centuries AD marks a turbulent time in North America's past. During this 300-year interval, many of the existing Precontact Period subsistence-settlement systems undergo radical transformation. We see the end of hunting and gathering in many areas accompanied by the widespread adoption of maize horticulture, population aggregation, the development of fortified settlements, and evidence for increased inter-group conflict. During the latter portion of this period, it is also common to see the abandonment of large areas, some of which remain unoccupied until contact with Europeans. This period of cultural and political upheaval in North America coincides with a time when the global climate was warmer on average than it had been for thousands of years. However, whether these climatic and cultural processes are related has not been established. Fortunately, recent trends in archaeological theory have better equipped us to assess this complicated dynamic.

There is considerable evidence for increased warfare, sudden social collapse, major changes in subsistence and settlement patterns, and abandonment over many portions of North America, such as Northwestern Ontario (Lenius and Olinyk 1990), the Plains (Zimmerman and Bradley 1993), the American Southwest (Jones et al. 1999; Lipe 1995; Stone 1999), the American

Bottom (Porter 1984), and Coastal California (Raab and Larson 1997). This is a scenario that is repeated in many different parts of the continent between ca. 1200-1300 AD. However, the nature of the relationship between these visible cultural processes and environmental change are less clear due to the absence of written historical documents. Archaeological data can help bridge this gap and provide insight into the nature of the relationship between these processes.

1.2 THE RESEARCH PROBLEM

The Lockport site (EaLf-1), on the eastern bank of the Red River, north of Winnipeg, Manitoba represents the northernmost extension of Precontact Period maize farming on the North American continent. Here, the experiment with horticulture was brief and the evidence for appears to be nestled between two locally consistent Late Woodland hunter-gatherer occupations. This brief flirtation with maize at its northern terminus coincides with the end the Medieval Warm Period (or MWP, ca. 800-1350 AD) which sees significant demographic and cultural transformation on the Northeastern Plains as well as other portions of North America. What is the relationship between the MWP, this apparent cultural disorder in central North America, and the brief appearance of maize at EaLf-1? Is it simply that Lockport represents the termination of maize's northward march? Or, is it possible that the appearance of maize farming at EaLf-1 is driven by a complex series of cultural responses to environmental stress precipitated by the MWP? Certainly the latter idea is more compelling, but the relationship between culture and climate is complex.

If the arrival of maize at Lockport was driven by environmental changes

caused by the MWP and early LIA, we should expect to see a number of things. First, the horticultural component should be sudden and intrusive rather than indigenous. If maize cultivation is a local development, then it may be that maize merely reached its northern limit at this time. In this case, maize horticulture would be visible as a subsistence innovation within an indigenous artifact complex, perhaps showing some evidence of outside influence. However, if the horticultural occupation at the Lockport site is intrusive, then we should see suite of artifacts in this component showing greater similarities with non-local, contemporary maize-growing areas to the south than with adjacent Late Woodland sites to the north and east. We should also be able to identify a possible "homeland", or source area, for the intrusive component. Ideally, there might be archaeological evidence of the route that these migrants took on their way to EaLf-1. If the MWP does, in fact, induce a disruptive series of environmental changes, then we should be able to detect some of these in the archaeological record. These might include: evidence for sudden migrations, areas of abandonment, evidence for environmental change, increased inter-group hostility, and major subsistence and settlement changes all occurring in a comparatively short period of time.

In fact, the abrupt appearance of this suite of artifacts and features associated with the horticultural component clearly marks the horticultural occupation as a product of demographic expansion and contraction -- a migration into and out of the region by horticultural groups from elsewhere -- likely from points south where maize growing was a common subsistence endeavour. What drove this process? Where did the migrants come from and why?

The movement of these horticulturalists coincides with MWP, but it is not known whether this migration was driven directly by environmental degradation resulting from climatic changes brought on by the MWP. The problem, therefore, is to ascertain some of the environmental effects of the MWP within the Red River valley and the surrounding area and the possible repercussions for cultural groups that inhabited these environs. Clearly, a simple cause and effect explanation is inadequate. While environmental degradation may be a contributing factor in a migration, with the exception of dramatic instances that virtually destroy subsistence, there are frequently other factors that contribute to a people's choice to leave familiar territory. In this particular instance, social, economic, and political aspects of life in and around the Red River Valley and adjacent areas may have played a role in the decision to occupy another area. What were the regional effects of the MWP? What environmental impacts did it have on this area and what was the relationship between this climatic interval, environmental changes, and the overall stability of resident groups?

The Lockport site is poised at the northern fringes of these developments and at the outer limit of the distribution of Precontact Period maize horticulture. It is also at the northern edge of the economic and political innovations that accompanied the introduction of maize to the Northeastern Plains. As such, the site provides a valuable case study for the effects of MWP on Northeastern Plains cultural groups. Here, horticulture arrived late and stayed briefly. But in order to understand processes at the fringes, we also need to understand contemporary developments in adjacent areas. The emphasis here is on the social and political responses to climatic change in the upper midwestern portion of North America

as they affected the Lockport site. Particular emphasis is placed on muti-causal explanations and the interconnectedness of cultural groups; that is, changes in one area will precipitate changes in another, even though the different areas are not directly connected. Because social systems do not exist in isolation they can be affected by changes in geographically distant social systems.

1.3 The Relationship Between People and Their Environment: Theoretical Background

While the relationship between people and their environment has constituted an important theme in archaeology for many decades, the importance of explanations which employ catastrophic environmental changes as a cause of cultural change has waxed and waned with current trends in archaeological theory. Julian Steward was the first anthropologist to treat the environment as an important force in the development of human cultures (Trigger 1989). He believed that archaeologists were too focussed on cultural minutiae and typological systems and that the discipline should place more emphasis on cultural process. Steward treated culture as a functionally integrated system that responded regularly and predictably to sets of environmental parameters (Harris 1968; Trigger 1989). This approach, which became known as cultural ecology, set the stage for the New Archaeology, popularized in typically confrontational style by Lewis Binford. Process, as defined by Binford (1968: 269):

> ...refers to dynamic relationships (causes and effects) operative among components of a system or between systemic components and the environment. In order to deal with process we must seek explanations for observed phenomena and it is only through

> explanations of our observations that we gain any knowledge of the past.

Processual archaeology viewed cultures as adaptive systems in which technology, social organization, and ideology played supporting roles in the search for general laws governing human behaviour (Trigger 1989). A strict processualist approach reduced groups of people to an adaptive cultural system, then examined environmental variables to ascertain their impacts on the whole system. Social, political, and ideological details of human interaction would have been dismissed as idiosyncratic -- flies in the ointment of the scientific search for general laws. Any consideration of individuals, their beliefs, or their part in historical process would have been regarded as hopelessly outmoded in the modern, empirical approach to archaeology.

In a total reversal of this trend, the Post-processualist school of the late 1980's and early 1990's maintained the primacy of history, individuals, and ideology based on the conclusion that:

> 1) Material culture is meaningfully constituted;
> 2) The individual must be a part of theories of material culture and social change; and
> 3) Despite the independent existence of archaeology, its closest ties are with history.
>
> (Hodder 1986:1)

Hodder felt that the New Archaeology oversimplified the relationship between cultural remains and behavior. Explanations that relied heavily on environmental processes were dismissed as overly deterministic. In Hodder's view "human behavior" implied the intervention of cultural attitudes and meanings rather than simple mechanical responses to external stimuli. In his

view, all archaeological remains possessed a symbolic dimension -- a dimension that was, by and large, ignored by processualists (Hodder 1986).

As a result, internal social dynamics were given pre-eminence as forces of social transformation, and an individual's negotiation of the political landscape, based on variables such as economic class, race, political faction, and gender (Brumfiel 1992), outweighed any role the environment might play. Environments change all the time but groups frequently muddled through relatively unharmed (Anfinson and Wright 1990; Rosen 1995); therefore, the environment could not play a prominent role in the rise and fall of social systems. Rather, society's own internal processes, the ongoing negotiations of power between conflicting classes, contests between various political factions, and the failure of the ruling class to successfully negotiate these struggles and provide for their people are proximate causes for the downfall of social systems (Brumfiel 1990). Environmental changes, if they have a role to play at all, merely accentuate pre-existing instabilities.

The Post-processualist assertion that explanations of culture change rely too heavily on climate and neglect to consider the mitigating effects of cultural factors is valid; it is not surprising then to note that during the 1980's and 1990's climatic and environmental explanations in archaeology came under heavy fire even where it was obvious that they had significant roles to play (see Anfinson and Wright 1990; Bamforth 1990; Leckson and Cameron 1995; Stone 1999). As a result, archaeologists were compelled to beat a hasty retreat from any study of the relationship between environmental and cultural change; yet, during this same period of time, paleoclimatological research was enjoying unprecedented funding increases due to growing governmental concerns over

the potential impacts of global warming.

Dramatic episodes of climatic and environmental change can and do have significant impacts on society and have an unfortunate disregard for the vociferous and sometimes ascerbic arguments originating from the anti-climate factions in archaeology. During the last few years, there has been a tentative resurgence of environmental models of culture change; this time tempered by lessons learned from both Processual and Post-processualist theory. Previous explanations of culture change which relied upon the strict application of hard-core processualism are now justifiably viewed as reductionist, over-simplified, and deterministic (Jones et al. 1999). The most recent theories are more comprehensive and more multi-causal; human beings are no longer the puppets of a capricious environment, but active players in a dynamic system where choice and cultural processes have a role to play in the management of external stress (Jones et al. 1999; Raab and Larson 1997; Rosen 1995).

Rosen (1995), borrowing from Butzer (1982), argues that societies are generally in a state of equilibrium and that environmental stress alone will not drive a social system to collapse. However, Jones et al. (1999) point out that a wholesale rejection of environmental explanations is foolish because of the inextricable link between human settlement-subsistence systems and the physical environment in which they operate. In fact, archaeology's enhanced sensitivity to socio-cultural factors has now resulted in attempts to formulate models that meld both the political and physical landscapes (Jones et al. 1999; Rosen 1995). This permits groups not only to survive, but also to thrive during episodes of climatic instability if they make sound choices. Thus, we see regional variation not only in the severity of climatic and environmental change, but also in the

cultural responses visible in the archaeological record. The time has now come to re-evaluate archaeological evidence for the relationship between climate and culture -- a process currently in its nascent stages in archaeology (see Rosen 1995 and Jones et al. 1999), but which has not yet been applied to the study area.

It is clear then that not only the environmental changes themselves, but also the cultural responses to them vary over time and space according to the intensity of these changes. Since not all geographic areas are equally affected by environmental change, there are regions that frequently maintain some subsistence potential. Therefore, not every group meets its demise during even the most severe episode of climatic change. In areas where environmental effects are least severe, resident groups may remain largely unaffected, perhaps even flourishing -- expanding in size or occupied area -- during an interval of environmental degradation. Generalized subsistence systems tend to fare better than those that are more specialized, and some groups adapt to their altered circumstances, while others exploit their neighbors' misfortune. Therefore, less affected areas may show only peripheral cultural repercussions from more severely devastated areas beyond their boundaries. This variation in cultural responses to climatic instability seems to confuse some archaeologists, since evidence of local occupational continuity is frequently used to counter models that invoke environmental causes for cultural change. However, it is important to remember that where there is large-scale, long-term environmental disaster precipitated by climatic change, groups do not merely "adapt". Such severe environmental catastrophes will leave visible traces in the archaeological record, but it is up to us to identify and interpret them.

There are many variables to consider when attempting to establish a

relationship between climate, environment and culture change. Obstacles to the easy identification of these traces are numerous because not all lend themselves to easy resolution. Synchroneity is one such variable: are the cultural and environmental changes occurring at the same time? This is never easy to establish, different projects employ different dating methods with varying levels of accuracy. Paleoclimatology and archaeology employ different means of evaluating chronology as well. Scale is also important. What are the geographic and temporal parameters of the hypothesized crisis? Is the event within the parameters of other known disasters? If so, it is more likely that the group in question will have an established coping strategy for this round of environmental change. Moreover, most groups have the means to survive one or two seasons of food stress (Colson 1979). When the crisis exceeds this buffer, other strategies, if they exist, must come into play (Colson 1979; Dirks 1980; Rowley-Conwy and Zvelebil 1989). However, if the magnitude of the crisis falls outside the realm of a group's collective experience, critical factors that determine their ability to survive include the duration, severity, and regional scope of the catastrophe. Is the subsistence base devastated or merely negatively impacted? Are there exploitable secondary resources? Can the group cope by making more extensive use of so-called "famine foods"? Are there other places to go? Can they impose on neighboring groups with which they have nurtured reciprocal kin or friendship ties? Alternatively, can they simply move to a region with better subsistence potential? What is the nature of the environmental change? Is it a consistent linear trend or one with considerable temporal and spatial variability making it harder to develop an effective coping strategy?

In fact, when trying to assess the potential effects of catastrophic

environmental change, there is a set of reasonably predictable responses to serious food stress established by Dirks (1980) (see chapter 3 for a more detailed review). It is not clear whether they are rooted in human social behaviour, psychology, biology, or some mix of the three. Nevertheless, human responses to catastrophic environmental changes, the sort that create serious food stress, manifest themselves in every aspect of life; social, economic, political, physical, and technological components of society are all affected during an environmental crisis and changes in these vary with the severity of the crisis. One response to environmental crisis is simply to leave the affected area -- to migrate.

1.3.1 Migration: an intermediary between people and their environment

The concept of migration has a long history in archaeology. For the current generation of archaeologists, it is considered somewhat distasteful as an explanatory mechanism because it is seen as outmoded and inherently unpredictable (Anthony 1990, 1997) -- something to be avoided if possible. However, the reasons for this attitude also have a long, complex history; therefore, an understanding of the history of the migration concept is critical to the debate on its effectiveness as an explanation.

In a review of migration, Anthony (1990) attributes the processualist aversion to migration to the fact that it is viewed as an idiosyncratic process that does not enhance our search for scientific explanations of human behaviour. Anthony (1990) calls for the development of a coherent set of methods to identify migration, many of which already exist in other disciplines such as demography and geography. Such methods allow for a more complete

understanding of the circumstances which underlie the decision to migrate and permit us to identify migrations in the archaeological record, even where the proximate causes may no longer be identifiable (Anthony 1990).

There are a few salient features of these that should be noted briefly. First, migrations usually operate in two streams, an initial migration followed by a subsequent stream of returning immigrants. Second, there is a predictable set of factors which operates on any given set of potential migrants. "Push" factors prompt people to leave their home while "pull" factors make the destination area more attractive. Migrations occur through the interplay of negative "push" factors at home and positive "pull" factors originating from the destination. These can be analyzed since push and pull factors are frequently economic, mediated by transport costs, intervening obstacles, and the transmission of salient information. Some of this information will be preserved in the archaeological record.

It is important to realize migrations as a real and an important part of the human cultural milieu. Like environmental explanations, the rejection of the migration concept in archaeology has been driven largely by political and historical considerations, as well as faulty applications of the concept, rather than by a lack of evidence for migrations themselves. Both environment and migration are due for a return to archaeological explanation, especially since dominant theoretical paradigms rather than any inherent lack of validity have driven their rejection.

1.4 Environmental Background and Evidence for the MWP and LIA

The 1990's have seen paleoclimatological research transformed from a

series of disjointed, special-interest studies in a variety of disciplines, to a full-fledged sub-discipline (Cronin 1999). At the same time, recent Holocene climatic changes, previously relegated to the fringes of paleoclimatic research, have come under heavy scrutiny (Cronin 1999). This is especially true of the Medieval Warm Period (also known as the Little Climatic Optimum or Medieval Warm Epoch) (Hughes and Diaz 1994) and the subsequent Little Ice Age (ca. 1450 - 1850 AD). These two intervals are now being studied for insights into the mechanisms that drive global-scale, centuries-long climatic anomalies. The potential social and economic ramifications of such changes are also important to governments trying to anticipate the potential impacts of climate change on areas within their pervue.

The Medieval Warm Period (MWP) is an identifiable climatic interval that may have had far reaching consequences for large portions of North America. First identified through an extensive compilation of historical data from northern Europe and Greenland (Lamb 1965), this interval spans roughly the ninth to the fourteenth centuries (800 to 1350 AD). The timing of this episode varies both regionally and according to the climatic proxy data being used (Hughes and Diaz 1994). As a result, there is no general agreement concerning the MWP as a uniform global phenomenon (Hughes and Diaz 1994).

The Little Ice Age follows the MWP and is also the subject of some controversy since its effects, like those of the MWP, were neither uniform, nor global. In general, however, this was an extended period of cooler, wetter weather identified in Europe through a combination of historical records and glacial advance (Cronin 1999; Lamb 1982). The LIA, like most identified intervals of climatic change, was not one of sustained, global cooling (Cronin 1999); and,

like the MWP, its effects were both regionally and temporally variable. Nevertheless, it is a convenient device with which to examine regional climatic and environmental changes within a pre-defined period of time.

While it is true these two climatic intervals have been the subject of a great deal of scrutiny over the last fifteen years, (Cronin 1999); the social and economic ramifications of the accompanying environmental changes have not. Large scale, decades to centuries long climatic warming result in regionally variable environmental responses that can be studied through various proxy data such as tree rings, glacial ice cores, sedimentological and pollen data. The major concern for human beings, though, is the ability of a given environment to effectively sustain its population -- supply food, water, plant materials, game animals, and other raw materials necessary for survival. Severe environmental change may alter the distribution of these resources; some areas will have improved subsistence potential, others will be only marginally affected, while still others will be severely impacted.

1.5 CONTEXT

1.5.1 The region

Central North America is an area with historically demonstrated sensitivity to climatic changes. The ability to effectively farm in this region is heavily dependent on climatic variables such as annual precipitation and number of frost-free days. Severe droughts accompanied a slight warming trend during the 1930's; although it was significantly exacerbated by farming practices inappropriate to the region, this remains a decade which stands out in living

memory as one of the most severe and dramatic climatic intervals in the recorded history of North America. Stories of massive population displacement, unemployment, crop failure and famine are still told by those who lived through that era. The Medieval Warm Period, or at least portions of it in certain areas, was significantly warmer and drier than the 1930's. What types of changes might this climatic interval have brought to the Precontact Period inhabitants of the Plains? Are any of the cultural processes visible in the archaeological record of the ninth to the thirteenth centuries related to environmental changes brought about by the MWP?

1.5.2 The sub-area

The Northeastern Plains is a sub-area of the Great Plains of North America; once regarded as a sparsely populated, static, cultural backwater, barely a player in the Precontact Period history of North America, it has experienced something of a research renaissance over the last three decades. Recent work has shown that the period between approximately 900 and 1500 AD saw some dramatic changes here as well.

During this time, many cultural groups in the area shifted from a nomadic hunter-gatherer lifestyle with heavy reliance on communal bison hunts to large, fortified, semi-sedentary villages focussed on the cultivation of maize, beans, squash and other indigenous cultivars. Some areas were completely abandoned and evidence for warfare becomes both more striking and more prevalent. This period is a fascinating and dynamic chapter in the pre-European history of North America. The changes that occurred during those 500 years are remarkable for both their scale and rapidity, leaving many unanswered questions in their wake.

Why was the spread of maize so rapid and widespread? Why did cultures quickly shift from small, dispersed settlements to larger, aggregated settlements concentrated in river valleys? Why the sudden appearance of fortifications and cemeteries full of victims of violent conflict? Why were so many areas abandoned just prior to contact?

There is also little doubt that these areas experienced an interval of severe climatic disruption (Gregg 1994; Jones et al. 1999; Raab and Larson 1997; Larson et al. 1996). During the latter part of the MWP, the central portion of the North American continent, the Great Plains, Great Basin, American Southwest and, to a lesser extent, the Northeastern Plains, experienced significant environmental devastation as a result of severe, long-term droughts. There is also evidence of considerable deglaciation in the Canadian Rockies at this time (Grove and Swistur 1994). Major portions of the American Southwest were abandoned (Larson and Michaelson 1990; Larson et al. 1996; Lipe 1995) and there is evidence of similar abandonment on the uplands of the central and northern Plains (Gregg 1994).

Clearly the variation in both the scale and duration of climate-driven processes will create inconsistent signatures from paleoenvironmental proxy data. However, there is evidence to suggest that the central portion of the continent did, in fact, experience severe desiccation during the latter part of the MWP equal to or greater than that of the 1930's. Based on maps of dustbowl effects, boreal forest and woodland areas to the east may have been less seriously affected. It is possible, however, that these areas saw secondary effects such as increased frequency of forest fires, expansion of grassland areas, more severe weather, and alterations of water levels in the rivers and lakes (Anfinson

1982; Anfinson and Wright 1990). Thus, the woodlands may not have been disastrously affected, and some portions might actually have been improved. For instance, a higher frequency of forest fires in the boreal forest might improve primary productivity and therefore hunter-gatherers' subsistence base (Lewis 1982). Areas in the central portion of the continent, areas that are normally considered marginal because they have low annual precipitation, would probably show the most dramatic effects of climatic warming during the late-MWP -- long term droughts, widespread environmental devastation, and catastrophically reduced subsistence potential.

1.5.3 The site

The Lockport Site (EaLf-1), located at the northern edge of the Northeastern Plains, is a large, multi-component site on the east bank of the Red River in town of Lockport, situated between Winnipeg and Selkirk, Manitoba. The site is a deep, well-stratified, multi-component site intermittently occupied between the pre-ceramic Archaic period up to and including the present day. Over the thousands of years of site occupation, the single unifying theme has been the plentiful supply of fish offered by the river at this location. Abundant fresh water, the many species of fish in the river, nearby sources of workable pottery clay, and excellent cherts all commended this site to its Precontact Period inhabitants.

EaLf-1 was excavated under the auspices of the Province of Manitoba Department of Culture Heritage and Recreation between 1984 and 1988; however, the site has a lengthy history of both excavation and surface collection which pre-dates this project. Due to changes in the research strategy over the

five years of excavation, only the materials from the final two seasons are being considered for analysis. It should also be noted that there is site directly across the river, Lockport West, which is not being discussed here.

This site is exceptional and relevant for this study because of the sudden appearance of maize horticulture at the Lockport site -- a problem that has not yet seen detailed examination in the literature. The occupation in question is a single layer dating to approximately 1400 AD which contains an array of charred maize kernels, bison scapula hoes, deep bell-shaped storage pits, and exotic ceramics. The sudden appearance of maize horticulture at EaLf-1, together with this suite of unusual features and artifacts, clearly distinguishes the horticultural component from all the others occupations there.

1.5.4 The data

In the Post-processualist theoretical milieu, it is critical that any interpretation of culture change is also sensitive to the interplay between the physical and cultural environments. In order to examine this inter-relationship in an archaeological context, we require certain specific types of information. Ideally speaking we require:

> 1) A discrete climatic interval with recognizable environmental effects;
>
> 2) An environment that is sensitive to the climatic changes accompanying the interval;
>
> 3) Archaeological sites that contain components dating to this interval and components bracketing it to provide a comparative baseline with which to identify any cultural affects of climate change;
>
> 4) Artifactual evidence conducive to the interpretation of

social, political and economic processes;

5) Environmental proxy data for the region during the interval in question; and

6) Enough information from adjacent regions to provide a context for processes visible at the site

Together, the region, the site, and the horticultural occupation chosen for this study fulfill these pre-requisites almost perfectly. The Lockport Site horticultural component gives us:

1) A discrete climatic interval with recognizable environmental effects in the form of the Medieval Warm Period;

2) A location on the northern Great Plains which has a known history of environmental sensitivity to increased warmth and aridity (e.g.: the 1930's);

3) The multi-component Lockport site whose intrusive horticultural component is bounded by local Late Woodland components;

4) Ceramic evidence, which is well suited to this type of research, question;

5) Unfortunately the lack of deep, continuously wet bodies of water in the immediate area precludes the possibility of detailed and applicable pollen studies for Lockport and environs, therefore this study relies on climatic data from adjacent areas such as North Dakota and Minnesota, areas in which the climate is similar but by no means identical; and

6) A range of sites and other archaeological data indicative of "interesting times" in the surrounding region.

1.5.4.1 Ceramic data

As a class of artifacts suitable for the analysis of major cultural shifts, ceramics are ideal. Clay is plastic and responsive to the hand of the individual artist as well as to cultural aesthetic standards which, fortunately, tend to be conservative enough to effectively demonstrate major cultural shifts (Arnold

1985; Trigger 1989).

For the purposes of this thesis, the ceramic data set consists of rim sherds recovered from the three most recent Precontact Period layers during the final two years of excavation at the site. The nature of the horticultural layer was such that it was only recognized and treated as a separate occupation during the final two seasons. Prior to 1986, two occupation layers, the horticultural layer and the Late Woodland occupation immediately beneath it, were excavated together. Unfortunately, the ceramic assemblage from the first three seasons represents a mixture of horticultural and Late Woodland artifacts.

The sample consists of 148 rims from three separate occupation layers at EaLf-1 -- the horticultural layer and the two Late Woodland occupations that bracket it. The scapula hoes, maize plant remains, and storage pit features from this layer will also be discussed although they will not be analyzed in detail. The lithics and fauna will not be discussed as part of this thesis.

1.5.4.2 Climatalogical studies

Supporting data for this project comes in the form of archaeological and climatological studies from central North America. Information from these sources is used to support the existence of a lengthy and severe drought just prior to the spread of agriculture to Lockport. Moreover, maize agriculture appears to reach its northern limits near the end of the Medieval Warm Period. While the existence of a global warm interval has recently been called into question, climatic upheaval in central North America at this time is well documented. Widespread site abandonment, loess layers on the Plains, and tree ring sequences from central portions of the continent all point towards the

existence of a prolonged drought in the thirteenth century. Since climatic and environmental change may be important stimuli in the decision to migrate it is necessary to examine the literature to establish the existence of potential "push-pull factors".

Cultural historical data from various regions outside the immediate site area provide a comparative base by which to establish the potential origin of the migrants. Faced with an assemblage of ostensibly "foreign" ceramic artifacts, the most effective way to ascertain the homeland of their makers is to conduct an extensive literature search and produce a comparative culture history for the northern Northeastern Plains; these, then, are two important aspects of the supporting data set.

1.5.5.Methods

1.5.5.1 Literature search

The first component of the project involves a literature search covering both cultural and climatological developments in central North America between 1000 and 1500 AD. The pertinent area spans the Northeastern Plains as well as immediately adjacent areas. Roughly speaking, this includes the area between the northern Great Lakes of northwestern Ontario, Michigan and Wisconsin on the east to the Middle Missouri sub-area of North and South Dakota in the west. The northern part of the study area is bounded by central Manitoba and Saskatchewan and extends southwards to northern South Dakota.

Important topics examined in the literature include migration, human socio-cultural responses to food stress, famine, and drought, archaeological occupations in selected portions of North America dating to an interval of MWP-

induced aridity, and paleoclimatological data pertinent to the Medieval Warm Period. The literature search establishes whether or not the Medieval Warm Period brought about environmental changes sufficient to impel populations to move. Economic factors are a critical consideration when people are weighing the pros and cons of migrating from their home (Anthony 1990). Clearly, in a pre-industrial society, climate and environment are major economic determinants.

1.5.5.2 Comparative cultural historical overview

An important outcome of the literature search will be the production of a comparative culture history of the later Precontact Period on the Northeastern Plains. This involves looking at similar sites that date to approximately the same time period, both in the Red River valley and on the Northeastern Plains as a whole. In this vein, the archaeological cultures of Manitoba, eastern Saskatchewan, northwestern Ontario, eastern North Dakota, northeastern South Dakota, Minnesota, and northwestern Iowa are examined.

This provides essential data on changes in ceramic assemblages through time and space that furnishes the context for the horticultural component at EaLf-1. The data will be used to verify the intrusive nature of the horticultural component from EaLf-1. Having established the existence of a migrant population, an extensive comparative culture history will supply analogues for the EaLf-1 horticultural occupation.

This research will also permit an assessment of cultural process operating in the area during the late Precontact Period. Such data are critical for establishing the socio-cultural context of the late Precontact Period on the

Northeastern Plains. In asking what elements produce a "push" towards the decision to leave an area, social and political, as well as economic factors play an important role. What would prompt a group of people to leave their home, move north to Lockport, and grow corn in an ostensibly marginal environment when more suitable horticultural areas can be found closer to home?

1.5.5.3 Artifact analysis

The third component of the thesis is an analysis of approximately 150 ceramic rim sherds from the three uppermost occupation layers of EaLf-1 (Bed B, the horticultural occupation, and Bed CDE). This investigation focuses on the middle layer, the horticultural component itself, and the two layers that lie immediately above and below it; these will be analyzed for changes in ceramic attributes to determine the possible origins of horticulture at this site.

Analysis of the ceramic data includes a detailed examination of vessel characteristics such as sherd thickness, temper size and density, rim form, lip shape, decorative motif, and others (see chapter 6: Methods). The results from the three layers will be compared to ascertain whether they share a similar cultural origin; such a discovery would strongly suggest the introduction of horticulture to the area was a local development. Conversely, a major disjunction in the ceramics would suggest population movements accompanied the obvious shift in subsistence seen in the horticultural occupation. The results of this ceramic analysis will be used as supporting evidence for the remainder of the study.

1.6 CONCLUSIONS

This project takes a necessarily wide of view of the problem, incorporating many different elements of archaeological research. As such, it can potentially make contributions to many areas of the discipline.

1.6.1 Theoretical contribution

While environmental models for cultural change came under heavy fire during the 1990's, this was a necessary step in their maturation process. Environmental models are re-emerging, taking fuller account of the socio-political and economic factors that mediate the human-environment relationship. Although environmental models in archaeology still take a back seat to explanations invoking chaos theory, information exchange, and neo-Darwinian evolutionary processes, environmental models that take a more holistic view of the historical milieu in which they operate reassert the importance of the relationship between climate, environment, culture, and humanity.

Moreover, given recent concerns over environmental change, specifically global warming, it is critical to examine the single, identifiable historical instance in which the climate was similar to the one we are apparently creating. Paleoclimatologists are scrambling to construct scenarios that provide insight into the consequences of global warming. Models of past human behaviour during the Medieval Warm Period have much to offer, yet remain largely unconsidered. It is impossible to predict with any certainty which regions will profit and which will lose by global climatic warming. But by examining the effects of previous episodes of climatic change in different regions, we can begin to formulate well-constructed, testable hypotheses.

1.6.2 Methodological contribution

The approach used here is a synthetic one. Paleoenvironmental, archaeological, and ceramic data, an intensive cross-regional literature search, and paleoclimatic data are all used to examine the impacts of climate, environment, and political process at a relatively small site on the edges of the Northeastern Plains. As such, the interpretation transcends the local focus that frequently dominates site reporting in the current consultant-driven milieu. It is only by examining the wider regional context that we can really understand the demographic expansion that brings maize, however briefly, to its northern terminus. Furthermore, synthesizing ceramic, environmental, climatic, and social data in order to arrive at a solution to an apparently small problem brings a broader perspective to what could have been a simple site report. This is an approach that we are frequently enjoined to use but which is less frequently attempted.

1.6.3 Contribution of the data

Finally, Lockport is an important part of the cultural dynamics of the central continent during the Medieval Warm Period. This climatic interval contributed to enormous cultural disruption immediately prior to the arrival of the Europeans. Population dislocation, disease, food stress, and warfare set the stage for the arrival of the traders, missionaries, warriors, and explorers intent on exploiting a newly discovered land for their own purposes. These pre-existing difficulties helped to create a cultural milieu in which a foreign power was capable of initiating the ultimate disturbance in an already tumultuous time. This

disequilibrium may help explain why Europeans were able to conquer an entire continent with what seemed like comparatively little resistance.

The Lockport site is the only site in Manitoba to contain unequivocal evidence of Precontact Period maize horticulture. Yet, due to a set of unfortunate circumstances, no final publication has ever been produced for the project. It is critical to analyze and publish this material for both the public and the archaeological community and to provide an interpretation of this unique horticultural component. This thesis will address some of this void.

Furthermore, EaLf-1 is a critical link in the late Precontact Period history of the Northeastern Plains. The presence of maize at this northerly latitude provides an important clue in the cultural and environmental changes occurring immediately prior to contact with Europeans. This thesis contributes to our knowledge of a larger area, the Northeastern Plains, an area that is overlooked and under-researched.

People, climate change, environmental degradation, conflict, disease, and migration – together these are a compelling mix. The relationship between them is an inherently interesting on many levels. Climatically, as a comparison for modern global warming, we may be looking at the only historical analogue for the potential impacts to the breadbasket of the nation. Politically, the results of environmental change seem to have certain predictable effects on human society that should serve as a warning to students of social and human history. Archaeologically, the time is ripe to welcome environmental models for culture change to the mainstream once again.

CHAPTER 2
ENVIRONMENTAL BACKGROUND: THE MEDIEVAL WARM PERIOD AND THE LITTLE ICE AGE

2.1 CLIMATE AND ARCHAEOLOGY: BACKGROUND

Anfinson and Wright (1990) cite J. B. Griffin as one of the first midwestern archaeologists to make explicit links between climate and culture change in the 1960's. He used evidence from Europe and the Midwestern United States to suggest that there were similar climatic trends operative on the plains which were then linked to visible changes in early agricultural societies such as the Hopewell and the Oneota (Anfinson and Wright 1990). Subsequently, a variety of others postulated a model of climate change drawing heavily on the European Blytt-Sernander Holocene climatic sequence (Bryson and Baerreis 1968; Bryson, Baerreis and Wendland 1970; Bryson and Wendland 1967). This model has since become regularly and, one might venture to say, over-cited in the literature. As a result, climate change has become a convenient explanatory category for much of the culture change visible in the archaeological record.

Throughout the late 1980's and well into the 1990's there was a widespread rejection of climate change as an explanation for culture change (e.g.: Bamforth 1990; Lensink 1993). It was argued that climate and/or environmental change had become a catchall explanation for all cultural changes or disjunctions in the archaeological record. Unfortunately, they were largely correct. Climate fell into the very trap migration had landed a mere thirty years earlier. The search for externally verifiable causes of cultural change combined with an anti-migration zeal encouraged archaeologists to seek in situ developmental sequences and made climate change a very attractive explanation for culture

change. Unfortunately, many of the climatic sequences presented throughout the 1970's and early 1980's were highly theoretical and lacked a supporting body of empirical data. Furthermore, the growing momentum of the Post-processualist school resulted in the frequent assertion that Processualists had been negligent in their refusal to acknowledge political and social variables as motivators of significant culture change (e.g., Brumfiel 1992). Interestingly, Post-processualists have not been the only advocates of moderation; climatologists themselves also recognize the dangers of over-applying climate:

> ... (A)s a convenient scapegoat for historical events that may have much more plausible explanations in political and cultural institutions ... Paleoclimatologists should proceed with caution as they integrate increasingly sophisticated reconstructions of paleoclimate histories ... with efforts to understand the causal factors behind past human history and future climate change.
>
> (Cronin 1999: 303)

It is unfortunate that archaeologists interested in the relationship between climate and human culture have inherited the stigma induced by a legacy of misuse. Climate change, while over-applied as an explanation in the past, is still an important factor; this is especially true in marginal or difficult environments. Nevertheless, the critiques of the Post-processualists were both valid and important. As a result of their contributions, there have been recent calls for a more judicious use of climate change as an explanation, and suggestions that it only be employed as an agent of culture change in the presence of adequate empirical data. Such models must also give due consideration to political, social, and economic components of society since these can be just as complex and confabulating as environmental factors.

Before proceeding further, however, we require an overview of the climatic changes associated with the Late Precontact Period of the Northeastern Plains and adjacent areas. Such changes had a direct impact on the growth and development of late Precontact Period horticulture and the environmental and climatic context sets the stage for many important cultural changes that occurred at this time. In fact, it is not really possible to fully understand the spread of maize or the accompanying demographic changes without some knowledge of the Medieval Warm Period. This section of the review is designed to provide a basic outline of the Medieval Warm Period and the Little Ice Age. The initial outline of these two climatic intervals is mainly derived from European records, since they were defined mainly on this basis. The MWP and LIA, however, also affected North America. Specific evidence from this continent follows in a later section.

2.2 THE MEDIEVAL WARM PERIOD: INTRODUCTION

The Holocene Epoch begins with the termination of the last major episode of continental glaciations in Europe and North America. This is not some arbitrary temporal classification but one based on real differences in pre - and post-glacial climate and environment (Cronin 1999). In the largest sense, this is a period in which there has been a prolonged period of post-glacial warming combined with unusual stability. Indeed, the degree of global Holocene climatic variability is relatively small and therefore more difficult to study (Cronin 1999). In the absence of significant variations in the post-glacial climate, the four most important climatic forcing mechanisms in the post-glacial period are identified as

volcanism, variations in solar irradiance, in oceanic circulation, and in atmospheric trace gases.

However, let us skip over the early post-glacial period and the Altithermal, to the last four thousand years. A later Holocene cooling trend, known to climatologists as Neoglaciation (Cronin 1999), has marked these latter millennia. This period has seen significant advances in alpine glaciers and continental ice sheets in Greenland and the Antarctic. It is not, however, a simple cooling trend. There have been episodes marked by both cooler and warmer global temperatures. One such warm episode is the Medieval Warm Period, which lasts from approximately the ninth to the fourteenth centuries AD.

Identified by Lamb (1965, 1982) as the warmest climatic interval of post-glacial times, the Medieval Warm Period has become a hotly debated topic in climatic research. Lamb (1982) mustered an impressive array of both documentary and proxy data, including records of alpine glacial retreat, advancing tree lines, northward shifts in the limits of cultivation, tree ring sequences in Europe and North America, and identifiable shifts in the archaeological record to bolster his argument. However, subsequent refinements in climatological data collection and interpretation led to questions about his initial interpretations. While Hughes and Diaz (1994) have recently concluded that current evidence for the Medieval Warm Period does not support the existence of a uniform, centuries long, global warm epoch, there was however, a great deal of evidence in support of warmer temperatures in many distant regions around the world. Cronin (1999) finds this global "all-or-nothing" attitude towards Holocene climatic change "mysterious" and states that we should not expect recent climatic oscillations such as MWP to be either globally

synchronous or measurably uniform. Paleoclimatic patterns are complex, a complexity which is only compounded by intricate feedback from all the myriad elements of the climate system. The fact that this period is neither entirely uniform, nor entirely global should not detract from it as an interval with a measurable impact in many areas. It remains a useful means by which to stimulate research and discuss the broader significance of identifiable climatic phenomena (Cronin 1999).

2.2.1 European Evidence for the MWP

Beginning with observations of pack ice by seafaring Irish monks between 500 and 800 AD, Lamb (1982) cites subsequent observations by Norse raiders during the 11th and 12th centuries, in which there is no mention of any ice whatsoever. In fact, Lamb (1982) attributes the early success of their westward expansion into Greenland and North America to the retreat of northern sea ice and subsidence of severe Atlantic storms at this time. He also cites Norse burials on Greenland, now well within the permafrost zone, and the historically documented presence of cod in waters now too cold for them to inhabit as further evidence of warming during the MWP.

In Europe, historic records indicate that the northern limit for the cultivation of grain advanced significantly northwards, and in Iceland there is evidence of large tree stumps grown to a size impossible since that time. There are records of barley and wheat being grown at nearly seventy degrees latitude, and prosperous farms in valleys now glacier-filled. Vineyards were prosperous in England, indicating an increase there in average summer temperatures of approximately one full degree Celsius, accompanied by an extension of the frost-

free period. Insect evidence shows the presence of organisms who's known climatic tolerances indicate increased temperatures. There is evidence for severe drought in Switzerland during the 11th century, the warmest part of the MWP. There are also records of higher sea levels and coastal flooding in England, Belgium, and Netherlands at this time, presumably as a result of glacial melting.

Subsequent examinations of supporting climatic data for the MWP found the period to be more variable than Lamb (1982) first suggested. There were also criticisms of his interpretation of historical records (Hughes and Diaz 1994). However, refinements in the methods and interpretation of climatic proxy data have not managed to disprove the existence of a significant warming trend. What these refinements do indicate, however, is that the warming was not uniform but interrupted by periodic cooler intervals, nor did all areas experience this increased warmth (Lamb never argued that this was the case anyhow). In any case, there remains a substantial body of data that supports the existence of at least some warming during this interval, especially during the three hundred years between approximately 900 and 1200 AD. At this time, Northern Europe, the North Atlantic, southern Greenland, and Iceland experienced a prolonged warm interval (the areas for which Lamb initially argued the case) (Hughes and Diaz 1994). Western Europe also shows evidence of significant glacial retreat, as do the Canadian Rockies, an area which also shows significant advances in temperate and alpine forests (Hughes and Diaz 1994). In fact, there is evidence now being revealed from underneath retreating Canadian glaciers of forests that filled glacial valleys during the MWP (Grove and Swistur 1994). The period between 900 AD and ca. 1200 AD appears to have been an interval of higher than average lake stands in the Southwest (United States), as well. There are also

significant warm anomalies evident in the tree ring records from areas as diverse as the Sierra Nevadas, Tasmania, the Polar Urals, and northwestern Europe for the period between 900 and approximately 1200 AD, although they do not show evidence for uniform, sustained warming (Hughes and Diaz 1994). Studies of glacial retreat and re-advance, insofar as this evidence shows the existence of warm summers, demonstrate trends consistent with widespread warming between 900-1250 AD, a period warmer than any time immediately before, or for the following seven hundred years (Hughes and Diaz 1994). In fact, it appears that these episodes of glacial retreat are synchronous between the northern and southern hemispheres (Jirikowic and Damon 1994) which does suggest that, at least for those two hundred to three hundred years, the extent of the warming trend was large indeed.

At this stage, the mechanisms driving this apparently widespread warming trend have not been satisfactorily identified. What is known is that the Medieval Warm Period also corresponds to an interval of unusually high solar activity known as the Medieval Maximum which lasted from 1100-1250 AD, a condition which is currently being repeated in the Modern Maximum. These warmer periods do apparently correspond to major shifts in sunspot activity. Higher numbers of sunspots results in periods of greater solar irradiance; thus, changes in solar activity can be identified by studying ratios of carbon isotopes preserved in tree ring sequences and ice cores, much as archaeologists do for C14 dating (Cronin 1999). Ironically, the production of these radioactive isotopes varies inversely with the strength of the solar wind. Therefore, solar minima are associated with the highest production of these isotopes in the earth's atmosphere (Jirikowic and Damon 1994). Jirikowic and Damon (1994) argue that

this increased solar activity could have been responsible for a rise in global surface temperatures by as much as 0.8 degrees Celsius, a significant increase but not sufficient to account for all the observed warming. At this point, it appears that all the causes of the evident warming during the Medieval Warm Period have not been identified.

2.3 THE LITTLE ICE AGE

The Little Ice Age is identified at least in part, by its relationship to the Medieval Warm Period. Originally developed to describe a period of appreciable glacial advance in Europe (Cronin 1999), it is now generally viewed as a period of colder than average temperatures, especially in the Northern Hemisphere. This period occurs during an historically low period of sunspot activity that occurred in three major intervals known as the Wolf, Spoerer, and Maunder Minima. These extend from 1290-1350 AD, 1400-1510 AD, and 1645-1715 AD, respectively (Cronin 1999). Jirikowic and Damon (1994) identify the entire period as one of monumentally low solar activity beginning in the late thirteenth century and continuing as late as the end of the nineteenth century. The LIA is considered part of a larger series of post-glacial cooling trends that occur between 8800-7800 BCE, 6100-5000 BCE, 3100-2400 BCE, and 600 BCE to present (Cronin 1999). Like the MWP, this cannot be identified as a single sustained period of global cooling. There is evidence of regional asynchroneity, as well as lags in the cooling following the solar minima, which shows that solar activity is probably only one of a complex series of climate forcing mechanisms that contributed to cooler temperatures at this time. Thus, to identify either the MWP or the LIA as a

simple, sustained, global temperature trend is a "gross oversimplification" of a complex series of processes that characterize the climate of the last millennium (Cronin 1999).

2.3.1 European evidence for the LIA

Beginning around 1200 AD in Europe, the climate appears to have cooled rapidly. Evidence for this comes from records of sea ice incursions around Norse settlements in Greenland, the harvest records of European vineyards, the destruction of major shellfish beds by reduced sea temperatures, and the lack of winter fodder for domesticated animals, to name a few (Lamb 1982). The trend appears to peak during the 1300's and 1400's at which time historical records note repeated outbreaks of ergot, bubonic plague, starvation, and flooding (Lamb 1982), all of which are aggravated by cold, damp conditions. Historically, the records show repeated episodes of conquest and abandonment by agriculturalists in marginal areas which relate to dominant temperature and moisture regimes. In Norway, as much as sixty percent of the farms had to be abandoned due to adverse growing conditions, and in some districts this figure was as high as ninety five per cent. The most extreme example of this comes from Kuisker Farm in Iceland where a once profitable farm was nearly covered by an advancing glacier, a problem which first began to manifest itself during this cold, wet period of the late middle ages (Lamb 1982). This was also a widespread problem throughout many of the alpine valleys in Switzerland during the Little Ice age, the historical records of which report repeated pleas to various bureaucracies for tax relief due to poor harvests and damage from advancing glaciers (Fagan 2000; Lamb 1982). In much of Europe, there is a

recorded shift from the cultivation of wheat to that of barley, oats, and rye, all of which are better suited to cold, damp conditions than wheat which requires consistently warm summers. The Norse settlements in Greenland suffer terribly at this time from episodes of conflict, starvation, disease, and ultimately abandonment (Lamb 1982).

From the fifteenth through the nineteenth centuries, Iceland's largest icecap, Vantnajøkull, was subject to advances so rapid and dramatic they could be heard over a sixty-kilometer radius. These advances are recorded in historic photos and engravings as well as written accounts (Cronin 1999). Traditional sailing routes between Iceland and Greenland had to be shifted southwards because of increases in sea ice. Grain growing in Norse settlements was abandoned, and there are record increases in the presence of polar bears during the late 1200's through the 1400's AD. Northerly latitudes appear to have been hit first, in the early 1200's, while evidence of more severe climatic conditions are visible in Europe later, during the thirteenth century, as seen in records of severe flooding in 1240 and 1362 AD along the Danish coast. Severe flooding also occurs along the Dutch and German coastlines at this time (Lamb 1982). Death tolls from North Sea flooding reaches into the hundreds of thousands during the centuries between 1200 and 1600, evidence Lamb (1982) interprets as reflecting real Atlantic storm maxima at that time. There are records from continental Europe which show that the tree line moved down 100-200 metres in altitude between 1300 and 1400 AD. While German vineyards had to be brought down approximately 200 meters as well (Lamb 1982). To enumerate all the evidence and effects of the LIA in Europe would take many pages; Brian Fagan (2000) has dedicated an entire book to the subject. Here, he details the devastation of the

European economy, laid low by a long succession of poor harvests, storms, floods, disease, advancing glaciers, and unseasonable cold.

Once again, as with the MWP, the exact causes of the LIA have not been identified. However, the co-occurrence decreased solar activity after 1250AD (Jirikowic and Damon 1994) with these unusually cold years seems more than coincidental. In fact, from the end of the Medieval Maximum until the end of the nineteenth century "... solar activity remained profoundly depressed." (Jirikowic and Damon 1994: 314) to the point where sunspots and aurora borealis were vanishingly rare phenomena (Fagan 2000). Historically speaking, this is almost unheard of.

2.4 CONCLUSIONS

While there is no general agreement on the exact scope and duration of the MWP and LIA, it is clear that there were definite climatic anomalies at this time when measured against the backdrop of more general Holocene climatic trends. The MWP is probably the warmest overall climatic period for the last few thousand years rivaled only by the Altithermal and modern climatic warming. Even to critics of the concept, the years between 1100 and 1200 AD stand out as unusually warm, and those between 1300-1400 as cooler by comparison. The LIA, on the other hand, appears as a cold anomaly in many places. Although Lamb's interpretation of the documentary evidence has been criticized and subjected to reanalysis, subsequent reviews show good evidence for the existence of anomalous weather patterns over the last millennium. The more recent reviews seem to demand a level of global uniformity that is simply

unrealistic given the variability that has been induced by modern increases in global temperatures. Dates for these various different intervals will vary from place to place, and are heavily dependent on the proxy data being used. Different processes yield different date ranges for the MWP and LIA and these climatic intervals had their maximum effects in different areas at different times. For instance, glacial retreat and tree line data will not show as rapid a response as sediment cores and tree rings. So ,while they do vary in their effects on various regions across the globe, and in the timing of these effects, this should not detract from the fact that the MWP and LIA were both periods of anomalously warm and cold weather respectively. It is important to regard these changes as setting in motion a series of cultural responses -- a process if you will. What remains, then, is to unravel the different cultural responses to these changes.

CHAPTER 3
COPING WITH CLIMATE CHANGE: HUMAN RESPONSES TO FOOD STRESS AND FAMINE

3.1 THE FIRST LINE OF DEFENSE: RISK BUFFERING

Within archaeology the topics of risk management and cultural adaptation to periodic resource stress have been reviewed in some depth (Colson 1979; Halstead and O'Shea 1989; Rosen 1995; Rowley-Conwy and Zvelebil 1989). Yet, on the Northeastern Plains, the socio-cultural ramifications of climatic catastrophes and food shortages have not gained widespread attention even though both these phenomena would have figured prominently in the lives of Aboriginal peoples there. In fact, without means of buffering variation in resource availability inherent to the area, it would have been impossible to survive.

Resource variability is an inherent quality of the quest for food but, in general, variability tends to be greater in temperate climates where there is greater seasonal contrast. Resource variability varies in both the temporal and the spatial dimensions, it may be either predictable or unpredictable, and may also vary in intensity (Halstead and O'Shea 1989). Temporal variability may occur between different seasons, although it may also manifest itself in less predictable environmental phenomena such as drought, or short growing seasons. Spatial variability has many manifestations: predictably rich salmon streams, seasonally abundant berry patches, or wild rice beds for instance, while less predictable components of resource variability may include such things as wildfires, hail, and floods. Risk buffering strategies, therefore, are an important aspect of virtually all cultural systems: "Indeed, within a given environment, a

society's ability to cope successfully with such regular and predictable kinds of variation may be viewed as the minimum necessary conditions for survival and, as such, integral to normal existence." (Halstead and O'Shea 1989: 3)

While there is a great deal of diversity in risk-buffering responses, there are certain cross-cultural regularities which Halstead and O'Shea (1989) and Rowley-Conwy and Zvelebil (1989) break down into four basic categories: mobility, diversification, storage, and exchange. To this list, Colson (1979) adds the storage and transmission of information on "famine foods". The regular and institutionalized use of these devices is a requirement for human survival. One or more of will be (has been) employed by all human groups, the specific manifestation of which depends on specific social and environmental factors in any given setting. Food shortages are a strong selective mechanism, Halstead and O'Shea (1989) argue, yet the strategies used to buffer environmental risk and variability are cultural, rather than biological. Thus, successful risk management tactics are highly adaptive and quickly become entrenched within a social system where they act as powerful agents of social change. There they generally remain, although any subsequent episodes of severe food stress may cause abrupt and permanent shifts in these strategies that then have serious ramifications for the social system as a whole.

In this scenario, mobility is the simplest strategy; it effectively buffers both seasonal and temporal variability by moving the group away from scarcity and towards greater abundance (Halstead and O'Shea 1989). However, mobility also functions as a landscape monitoring strategy, a vehicle with which to gather a greater diversity of resources, and the primary means by which to cultivate long distance social relationships (Halstead and O'Shea 1989, Rowley-Conwy and

Zvelebil 1989). This helps explain the near ubiquitous existence of vast networks of kin and social relations within temperate hunter-gatherer societies.

Diversity (especially when combined with mobility) and exchange are more effective strategies for dealing with seasonal and yearly resource fluctuations than simple mobility alone (Halstead and O'Shea 1989; Rowley-Conwy and Zvelebil 1989). Broadening the number of exploited resources, the regions, and seasons in which they are exploited, or cultivating a wide variety of crops, buffers the risk of catastrophic failure in any single resource with potential abundance in others (Colson 1979; Halstead and O'Shea 1989; Rowley-Conwy and Zvelebil 1989). Colson (1979) argues that diversification, effectively used by hunter-gatherers, pastoralists, and agriculturalists alike, is the most effective risk-buffering strategy over the long term. Specialization, an overly narrow focus on single resource, "... increases the immediate output at the expense of long-term support. The more vulnerable the environment, the more diversified the activities of its population appear to be" (Colson 1979: 23). Groups then, frequently stress strategies and technologies that do not provide immediate maximum returns, but rather reasonable returns under a wide variety of conditions.

It is generally agreed that of all these buffering strategies, storage is the least effective for a variety of reasons. First, storage can only cushion a group against one or two bad years and is, therefore, not effective against long terms scarcity. Second, seasonal and annual variations in resource abundance mitigate against adequate storage. Third, storage requires the group to accurately anticipate the quantity of stored resources required for the coming year(s) (Colson 1979; Rowley-Conwy and Zvelebil 1989). However, the physical storage

of food is only one aspect of this strategy since storage can be viewed in a much broader context. Food may be converted into non-perishable items such as status goods or currency. This reduces food to a compact, transportable form that does not spoil. Labour can be "stored" in the form of tools and technology, while storage may also take place in the social realm through networks of kin and reciprocal social obligations. This permits "food storage" with groups in other, less affected regions who may provide food, refuge, or both during times of scarcity (Halstead and O'Shea 1989; Rowley-Conwy and Zvelebil 1989). This strategy goes hand in hand with exchange and the two are often hard to separate. Knowledge of famine foods and resource distributions in distant regions may also be viewed as a form of "storage" (although Halstead and O'Shea (1989) include this under "diversification"). As such, group elders and oral tradition become important repositories of information on environmental change, resource variability, and coping strategies during bad years (Colson 1979).

Closely linked to this is the concept of exchange. Trade, sharing, and reciprocity can also be viewed as "social storage", a strategy which allows abundance to be converted into a combination of social obligations and trade goods which then move between groups in distant regions (Colson 1979; Halstead and O'Shea 1989). Trade, gift giving, reciprocity, and kinship create a network of exchange/social storage over a wider region than would be possible if the group was dependent on mobility alone. Thievery and raiding may also be included in this category as "non-voluntary" forms of exchange (Halstead and O'Shea 1989).

Exchange, as risk buffering strategy, relates closely to our propensity to

convert food into prestige items that can be converted back into food during times of need (Colson 1979; Halstead and O'Shea 1989; Rowley-Conwy and Zvelebil 1989). Prestige items can also be used to grease the wheels of social storage both by creating social obligations between individuals and by facilitating redistribution. Thus, there is a strong link between the perception of real or potential food shortages and the accumulation of status goods (Rowley-Conwy and Zvelebil 1989).

In their most basic forms, mobility, storage, diversification, and exchange are inadequate for coping with large-scale, catastrophic resource failures. These consist of regional level shortages that are both long lasting and widespread. Halstead and O'Shea (1989) point out that this type of unpredictable variation is much harder to buffer Complex organizational structures, higher level coping mechanisms not generally present in hunter-gatherer economies, are required to mitigate large scale resource failure (Rowley-Conwy and Zvelebil 1989). Coping mechanisms include a series of social constructs equipped to organize surplus production, exchanges, and redistribution on a large scale. While these mechanisms are vital in times of severe shortage, it is also easy for a society to lose or forget them because they are used so infrequently. In order to remain within the repertoire of risk buffering strategies they must become deeply embedded in the social structure as a whole. These buffering mechanisms have wide reaching social implications as they are maintained within the system because they often come at a cost to other kinds of systemic efficiency. Such mechanisms help create and perpetuate a system predicated on social inequality since there will be always be one group that develops within the larger society to channel, store, and redistribute large surpluses as a hedge against lean years.

This group has greater access to food and prestige items and may quickly become an entrenched and parasitic social elite (Halstead and O'Shea 1989).

Small scale agricultural economies in the New World developed specific buffering strategies to cope with the absence of large domesticated animals that would otherwise have provided traction, secondary products such as milk, cheese, and wool, and an important contingency food source when crops failed. O'Shea (1989) outlines two basic risk buffering strategies for these systems.

The first of these is a simple system in which the economy is basically self-sufficient. Here, agriculture is incorporated into a diversified hunting and gathering economy in which the exploitation of wild resources remains a crucial aspect of the subsistence system. But there is a critical juncture, according to O'Shea (1989), that occurs when a society derives forty percent or more of its diet from agriculture and domestic animals. In these cases, a catastrophic crop failure will create serious food shortages that must be made up with the intensive harvesting of wild foods which, in a predominantly agricultural economy, entails a profound restructuring of the entire social system. In order to avoid this sort of systemic disruption, simple New World agricultural systems tended to maintain their emphasis on wild foods. This is a direct result of the absence of large herds of domestic animals that, in the Old World, provide the necessary buffer against poor harvests. O'Shea (1989: 59) states that this particular strategy would be prevalent in the most marginal areas: "... near the geographical and climatological margins of viable agriculture -- areas of the most marked inter-annual variation in crop yields." In order to effectively buffer New World agricultural economies such resources had to occur in dense patches, be storable, vary independently of agricultural harvests, and be available in a way that was

compatible with the existing system. Bison, anadromous fish, nuts, and wild rice apparently meet these prerequisites (O'Shea 1989).

Unfortunately, long term, broad scale catastrophes such as drought tend to affect both agricultural yields and the wild resource base simultaneously (O'Shea 1989). Mobility is one coping strategy for such a contingency; this may be either temporary, as in a circular migration, or permanent, as in the complete abandonment of an area. Other buffering strategies involve the development of what O'Shea (1989) terms "complex systems" in which two or more social or cultural groups become economically interdependent. This can be seen when agricultural communities regularly trade their produce with hunter-gatherers in exchange for wild food resources, a strategy O'Shea (1989) believes would have been more than adequate to buffer the effects of regular, predictable shortfalls but which would not compensate for catastrophic crop failures. In fact, a short succession of bad years would be enough to completely overwhelm these systems. While some of these difficulties might be overcome using an effective system of exchange, this strategy would be easily disrupted, and hence rendered ineffectual, by other perturbations such as disease and warfare.

Simple systems are inherently more stable because they are both more flexible and under the direct control of the local population. However, because gardens, settlements, and stored food must be left unattended for long periods to allow for the seasonal exploitation of wild resources. This means that either the settlement or the wild resource extraction zone is vulnerable to incursions by hostile neighbors. Therefore, the maintenance of simple systems is entirely dependent on the existence of both an ample land base and peaceful co-existence with one's neighbors. In the absence of neighbourly goodwill, "territorial

integrity" is compromised and the system either becomes a complex system or collapses (O'Shea 1989).

3.2 When the First Line of Defense Fails: Coping with Catastrophe

Catastrophic regional resource failures engender a whole suite of psychological, physiological, and cultural responses that appear to be invariable over time and space. Dirks (1980) outlines a series of effects which have been observed in both human and primate societies. Long-term, widespread resource failures provoke a predictable series of responses that become more and more extreme as the crisis continues.

There is no single moment at which wholesale "famine" begins. Rather, it occurs in a series of stages that can be arrested at any time should the situation improve. Dirks (1980), looking at the documentary evidence gathered from historic records as well as contemporary famines, sees many cross-cultural regularities during times of extreme food shortages. Based on this information, he outlines a series of predictable responses in the adaptation to severe food stress. This involves two major types of change, which he labels "progressive", and "recursive".

Progressive changes are precautionary, preventative measures that develop quickly in societies exposed to famine. These include such things as a seasonal de-emphasis on hunting in favour of gathering more reliable and abundant resources such as nuts, the institutionalization of voluntary days of fasting, in the hoarding of food, or in the acquisition status goods. In fact, a severe famine can quickly and completely obliterate a previously existing social

system. "Recursive" (also called "recurrent") changes are those that emerge with the onset of famine in order to deal with severe seasonal food shortages. They consist of ad hoc coping strategies such as slowdowns in work, play, and other aspects of group social life. While most recursive changes occur in the social realm they are also universal across time and space, leading Dirks (1980) to suggest that they may be partly neurophysical in origin.

The recursive changes that characterize severe food shortages occur in three sequential phases: alarm, resistance, and exhaustion. Alarm reactions are observable at many crises and include "hyperactivation", intensified social interaction, peoples being drawn together and unstable emotional states. However, bigger problems occur when hungry people, who tend to be very irritable, begin to cluster. Political strife can arise quickly, manifesting itself as civil unrest, or even the overthrow of existing governments. In fact, Dirks (1980) states that rebellion and revolution are most likely in the early stages of famine when people are only mildly hungry because political action takes organizational energy that seriously famished people lack. This phase is also characterized by increases in ritual activity since serious catastrophes are frequently interpreted as products of divine disfavour.

The second phase, resistance, sees a reversal of many of the trends visible during the alarm phase. Where increased activity, increased reciprocity, and much other positive (as well as negative) social behaviour mark alarm, the resistance phase is one in which people have reduced energy. Social ties beyond those of immediate family are weakened or broken, reciprocity is withdrawn between all but close kin, physical activity drops, strenuous work ceases, and people sleep a great deal (Dirks 1980). Visitors are suspected of trying to mooch

a free meal, people will forage in smaller and smaller groups, and famine foods become important. The food quest becomes the all-consuming activity at this point; hoarding begins, and food is sought in unfamiliar niches. Both competition and interpersonal violence increase. Serious political upheaval is not a concern at this time because individuals are focussed almost exclusively on their own survival.

While political unrest is less of a concern, random acts of violence, hostile interactions, and aggressive behaviour increase around areas where food may be found. "It seems fair to conclude that aggression is enhanced only in situations where food concentrations present hungry individuals with attractive and defensible sites." (Dirks 1980: 29). Where there is sufficient room for people to spread out and forage in smaller groups, the frequency of hostile interactions can be reduced, but where this is not possible this ultimately leads to an overall impression of disorder and social chaos that creates lasting emotional scars in survivors. Religious observance may decrease or cease altogether at this point, except where participation is rewarded with food. "One of the principal responses (at this stage) is increased attraction to authority as a source of stability and control" (Dirks 1980: 30). That is, at this point people will voluntarily submit to authority because they believe that this reduce the level of chaos and manage the crisis. Where this authority continues to remain strong, generally by virtue of control over the resources that still exist, there will be increased subordination. This pattern may continue once the crisis abates.

The total collapse of the family and the cessation of all reciprocity mark exhaustion. Individuals now forage alone, focussed only on their own survival. This phase sees the onset of utter selfishness -- selling family members for food,

and the abandonment of children. In its most extreme form, people sit silently in groups, huddling together, waiting for death or for food.

Colson (1979), without providing such a specific series of stages, outlines a similar progressive erosion of social behaviour. She suggests that after shifting to bulkier foods and more conservative food preparation techniques (those which waste less food and include more non-nutritious bulk), people will first cease communal food processing, preparation, and consumption. Grindstones, food storage, and ovens move indoors, for instance. Meals are consumed inside private residences rather than outdoors or communally. Next, the total number of meals served in the household decreases, then the household moves to nuclear, rather than extended families. Groups begin to trade with other regions for food, crafters attempt to trade their wares for food, and family possessions may be sold for food. At this stage, the price of food becomes inflated and the value of non-food trade items sinks very low. This has the effect of increasing the riches of the already wealthy and the destitution of the already poor. People begin to steal from public and/or unguarded stores of food. Therefore, gardens, storage facilities, and granaries must be constantly guarded. Raids are conducted on weaker villages and settlements disintegrate as people move off in search of food. People search for wild sources of food and, if the food crisis continues long enough, the family unit disintegrates (Colson 1979).

These behaviours are very similar to those outlined by Dirks (1980) above for the various stages of famine. What is immediately striking is the relationship between food stress and the development of certain social and political institutions. Food crises will increase the wealth and prestige of areas with better resources since these can act as redistribution centers, accept trade goods for

food, and host feasts, all of which contributes to increased social status. While this ultimately does provide some balance in the food supply, it also contributes to unbalance in the system of social obligations (Rowley-Conwy and Zvelebil 1989). Some groups will be more consistently needy, while others are more consistently well off, ultimately creating a self-perpetuating system of social disequilibrium (Rowley-Conwy and Zvelebil 1989). Over time, strategies that develop during a crisis become entrenched cultural institutions. Social stratification, authoritarian power structures, a redistributive social elite, ritual fasting and feasting days, nuclear families, and food hoarding for instance, may all become part of the society's political and religious character, sometimes to the point where these become counterproductive (especially in the case of a parasitic social elite) (Halstead and O'Shea 1989). What remains is a series of permanent social institutions that were initially designed to cope with a crisis.

3.2.1 Food Crisis Determinism?

This all sounds very deterministic, when in fact, Dirks (1980) argues that there is no fixed response to serious catastrophe. "Disaster research does not support the contention that catastrophe triggers equal stress in all organizations and systems affected ... there exists neither theoretical nor empirical grounds for supposing that the situation is any different with respect to starvation." (Dirks 1980: 24) There are many factors that may effect a group's response. Prior exposure to food stress or famine will boost subsequent resistance. In addition, certain individuals and classes of individuals respond differently to severe food stress: women fare better than men, adults do better than children, and the young do better than the old (Dirks 1980). Different societies also show varying

degrees of resistance to food stress based on things such as initial causes, demographics, political factors, perception, nutritional background of the population, aggravating factors such as water shortages and disease, as well as access to alternative food stores, resource areas, or sources of relief.

It is important to understand that most societies can weather a great deal of stress without serious consequences. For resource shortages to have a measurable impact on the social system they must exceed regular and predictable levels (Dirks 1980). Recurrent droughts or seasonal food shortages are not a problem because they are expected and, to a limited extent, predictable. Problems arise when long-term, widespread catastrophes surpass the level to which the system and its members have adapted. Ultimately, every human group on the planet has encountered or will encounter such a crisis (Halstead and O'Shea 1989)

Of these many variables, one that has received some attention recently is the notion of perception. Stone (1999) argues that this is an important factor in any social response to a crisis. That is, the character of the response and the types of social changes that ensue will be driven in a large part by the perceptions of individual participants in the system. Disruptions in the social system can be either dampened or amplified depending on whether the overall perception is one of instability or stability. Rosen (1995) too, argues that catastrophes, in and of themselves, do not induce social collapse unless there is another pre-existing stressor within the system that is amplified by the crisis. Therefore, failure to adapt to a difficult situation may be as much a social problem as a technological one (Rosen 1995). Since environmental disruptions and climatic catastrophes are frequently interpreted as divine wrath, she cites "higher order regulators" as one

such social problem. Higher order regulators are powerful social institutions that stress strict conformity even in situations where innovation would be more adaptive. Therefore, systemic social collapse may be precipitated by an institution such as a strong theocracy in the same situation where another, less rigid socio-religious system would have weathered the same crisis reasonably well. A strong controlling elite may be adaptive for surviving periodic short term droughts since they function as an entrenched social welfare and redistributive system; but this same system simultaneously reduces resilience by buffering society from smaller crises.

> ... (S)ocieties that have a social and economic investment in prescribed methods of surviving periodic drought may be slower to change their response to a major catastrophic desiccation especially given their previous adaptational success. By the time the severity of the situation is acknowledged, it may be too late to successfully cope with the circumstances.
>
> (Rosen 1995: 39)

The severity of the situation must be acknowledged early or the responses will be inadequate (Rosen 1995). This meshes well with Colson's (1979) argument that in order to successfully survive a major food crisis, the group must make important decisions, such as shifting to more conservative food preparation techniques, very early on.

Climatic catastrophe, droughts, severe food shortages and the attempts by human society to weather them obviously have serious repercussions for society and culture as a whole. To summarize briefly, food crises and the concomitant risk buffering strategies that accompany them tend to precipitate:

1) diversified economies;
2) food storage;
3) use of status goods as compact food storage and systems of exchange;
4) cultivation of inter-regional social relationships;
5) shift from mobility/diversity system to storage/exchange system;
6) initial increases in ritual observance;
7) voluntary submission to authorities viewed as capable of managing crisis;
8) development of wealthy classes and regions;
9) development of nuclear family as primary social unit;
10) interior food preparation, consumption and storage;
11) increased interpersonal violence, raiding and warfare;
12) full time guards or fortifications to gardens and food storage facilities;
13) political upheaval, overthrow of existing political system;
14) migrations away from central areas of disturbance;

Yet, what ultimately determines who survives a crisis and who doesn't, which civilization collapses and which continues, is the human variable -- human perception, human choices, human action. These colour our response to the situation and allow us to choose how we respond to a crisis. Will we hunker down, offer up sacrifices to the Gods, resent and refuse changes on the assumption that they will only rain down more misfortune? Will we raid or aid our neighbors? Or, worse, will we hide our heads in the sand, assume that everything is working perfectly and wait for the roof to collapse while another society analyzes, finds solutions, innovates, and rewards the mavericks? Finally, when all the mechanisms for coping on a local level have failed, a group may choose to leave. Can this group pick up and move elsewhere or will they be forced to weather the crisis in a seriously denuded home territory? Is someone in the group aware of another area they might move to? Do they have supportive kin relations in another area? Are the obstacles on the way insurmountable? Is there an area with sufficient resources that is also similar enough to the home territory that they will be able to continue to use existing

technology and subsistence strategies when they get there? Is this area already settled? By whom? How many? Hostile or friendly? Does everyone move or just a segment of the population? These are difficult choices, ones that ultimately determine the difference between survival and collapse; yet these decisions are not entirely those of the individual. Sometimes our social and political system makes these choices for us. As we examine the processes that brought horticulture to EaLf-1 it should become clear that it is precisely these sorts of choices that had serious ramifications for groups on the Northeastern Plains.

CHAPTER 4
PUSH COMES TO SHOVE: THE REJECTION, REVIVAL, AND THEORETICAL FRAMEWORK OF MIGRATION IN ARCHAEOLOGY

> ...(O)ur understanding of history and prehistory alters dramatically with the realization that its actors were not sedentary. Migration is not an exception, but a constant; it is embedded in the human social and economic organization and is one of the principal strategies through which individual and kinship groups compete for positions of power and prestige. If archaeological cultures have any social meaning ... they have meaning as regional migration networks. Migration is one of the principal prehistoric behaviors through which regional artifactual styles were created and maintained. Migration is a central fact of social life. As such, it deserves the renewed attention it is receiving from archaeologists.
>
> (Anthony 1997:31)

4.1 INTRODUCTION

The decision to leave one's home territory is a difficult choice that may have serious ramifications for a group, especially when we consider what is required to survive in a particular area. The group in question must have extensive and detailed knowledge of their environment in all seasons. What food animals are available, in which seasons, and how are they best caught? When do the birds migrate and where do they congregate? When is spawning season and where are the most productive spawning runs? Which plants make the best cordage, where are they, and in what season are they best collected -- before or after the first frost? Spring, summer or autumn? Which plants can be used for medicine, rituals, and nutritional supplements? How long is winter, how much food to store? Where are usable sources of clay and lithic raw materials? Which woods are good for cooking fires or smoking meat? Who are your neighbors? Are they friends or foe? Where is the best drinking water? The most productive

sites to settle? The decision to move away from known territory could never have been an easy one, and yet human history is peppered with migrations -- a phenomenon with which archaeologists have sometimes had some difficulty coping.

4.2 Migration and Diffusion: Historical Background

The concept of migration has had a lengthy, if not illustrious, past in archaeology. Venerated or demonized as the times dictated, either way it is intimately connected to the development of the entire corpus of anthropological theory. During the mid-1800's the application of Darwinian theory to human culture promoted the view that white Europeans were the pinnacle of the evolutionary process. "Primitive" cultures, on the other hand, were static and unchanging; therefore change had to originate with external forces, such as migration. Within archaeology this meant that all visible changes in the archaeological record had to be explained by movements of people rather than internal cultural development; thus population replacement and displacement -- repeated, and largely random movements of people -- became the almost the only explanation for cultural change (Trigger 1989).

Migrationism and Diffusionism are not the same thing although they are frequently treated as such. During the 19th century, Tylor separated the concept of culture from society; it is at this point diffusion and migration became separate entities and diffusion began to supplant migration as the preferred explanation for cultural change (Adams et al. 1978). Diffusionists shared with the Evolutionists the notion that all behaviour was biologically determined, they also

therefore regarded change as contrary to human nature. Diffusionists argued that the odds were impossibly small that any major invention had been created more than once. Unlike migration, which involves the movement of people, diffusion only requires the movement of an idea. The basic principle taught that all ideas and inventions moved outward from their centers, or cores, towards peripheries (Trigger 1989), Diffusion and migration were both regarded as random and unpredictable processes but, simultaneously, became the only way to explain changes in the archaeological record. Together, these became the dominant paradigms and, while they were not always effective explanations, they did begin to provide a conceptual framework with which to address temporal as well as spatial variation in human culture (Trigger 1989).

The concept of diffusion contributed directly to the creation and development of the culture area concept in North America. Boas introduced culture areas --blocks of similar cultural adaptations adjacent to each other -- to North American anthropology during the latter part of the nineteenth century. Diffusion was an important tenet of the Boasian school because it could be used to critique, and ultimately displace nineteenth century evolutionary thinking in anthropology (Harris 1968; Trigger 1989). In his opposition to evolutionism, Boas argued that every culture was inherently unique and could not be explained by applying universal developmental sequences. This argument was used to counter the Evolutionary typologies (savagery, barbarism, and civilization) which dominated museums at the time (Harris 1968; Trigger 1989). The diffusion of cultural traits was then used to map and classify ethnographic groups in North and South America.

Mason and Kroeber were among the first to employ a geographical

classification system for their "American Indian" ethnological work (Harris 1968). Unfortunately, this way of thinking was prone to becoming geographic determinism, which could map cultural similarities and differences, but could not address their causes. One could define a cultural center, identify its key traits, and then propose that these traits simply diffused outward from their center (Harris 1968).

The most extreme form of migrationism, Hyper-diffusionism, promoted the idea of a single source for all humanity's greatest inventions which then moved outward from this central source. Hyper-diffusionists attempted to prove that all traits had been invented only once, generally in Egypt, and had then spread from there to the rest of the world. While in Germany this concept was endorsed by the Catholic clergy in order to allow a reconciliation between anthropological concepts and the Book of Genesis (Harris 1968).

4.2.1 Boas and the development of culture history

In North America, ethnographic cultures became the unit of study; the use of diffusion as a primary cause of culture change encouraged idea that Native Americans were capable of change. This Boasian pre-occupation with ethnicity ultimately filtered into archaeology where they began to correlate the spatially bounded artifact types in the archaeological record with distinctive styles of objects associated with different ethnographic groups. These geographically and temporally restricted artifact assemblages were identified with past cultures, which could then be equated with extant ethnic groups (Trigger 1989). The most common explanations for cultural change continued to be diffusion and migration and there was very little concern for patterns of life or culture process.

Into this milieu marches V. Gordon Childe who argued that each culture should be defined in both time and space, first by looking at its geographical distribution then by aligning these distributions chronologically using scientific techniques such stratigraphic analysis and seriation. He attempted to accomplish this by examining what he considered diagnostic classes of artifacts and treating them as functional components of a whole culture. He could then use these "index fossils" to trace the origins, movements, and interactions of archaeological cultures (Trigger 1989). Diffusion and migration were still employed to explain cultural differences and similarities, while archaeologists who applied an Evolutionary approach were criticized for treating the artifacts as static and dead rather than expressions of once vibrant cultures. Childe believed archaeologists should pay less attention to the artifacts themselves and more to the people who made them. But, in order to do this, archaeologists needed to look to history. He called his approach Culture history. Trigger (1989) argues that his approach was still rooted in a negative perception of human creativity since migration and diffusion, external agents of culture change, retained their favoured status as explanatory mechanisms. Chronological control quickly became a major pre-occupation in archaeology. This resulted in great strides on the methodological front as seriation, stratigraphic interpretation, typology, classification, and more stringent excavation methods were emphasized to enhance chronological accuracy. Unfortunately, Culture history itself maintained a preoccupation with trait lists, typologies, and the refinement of chronological schemes (Trigger 1989) which did nothing to enhance our understanding of culture process.

4.3 Criticisms of the Migration Concept

Migration was effectively banned from the realms of serious academic discourse in archaeology for over thirty years largely due to the programmatic advocation of in situ cultural developmental schemes (Kristiansen 1989; Snow 1995). However, the reasons for this are complex and rooted in the historical rejection of a concept which was judged ill-thought out, inherently racist, over-used, and devoid of theoretical content.

4.3.1 Lack of data and theoretical principles

Migration, as it was used by "traditional" archaeologists, involved no clearly articulated theoretical principles and was invoked any time there were anomalous sites or trait distributions. Diffusion, on the other hand, became the preferred choice where an immediately adjacent source area for the anomalous trait could be readily identified (Adams et al. 1978). Such explanations were frequently based on trait distributions rather than the content of entire assemblages (Huffman 1989) leading to persistent and premature assessments of cultural disjunction.

Two tendencies led archaeologists to see cultural disjunction, and hence migration, where it did not necessarily exist. The first of these was an over-reliance on "index fossils", while the second occurred when culture histories were formulated using fragmentary evidence. Both promoted the illusion of discontinuity that was easily rectified with the collection of better data. The progressive accumulation of archaeological evidence throughout the latter part of the twentieth century clearly demonstrated that cultural disjunction was over-emphasized and arguments for migration were overturned in favour of

explanations involving in situ development (Adams et al. 1978), to the virtual exclusion of any other explanation.

The most severe problem with migration, however, lay in the near total absence of an accompanying body of theory; there was no consideration of the mechanisms that might induce population movements, of the potential archaeological evidence thereof, and of social and cultural correlates for migration. It did not help that migration has been, and continues to be "... the only explanation for culture change which is fully congruent with a creationist world view" (Adams et al. 1978: 497), something which is anathema to mainstream archaeologists.

4.3.2 The Processualist critique

Many features of Processual Archaeology contributed to a hostile climate for migration-based explanations. First, Processual archaeology was at least in part, a reaction to "traditional" archaeology which, in the Processualists' view, had put far too much emphasis on migration in the first place (Trigger 1989). Calling migration and diffusion "non-explanations" (Adams et al. 1978), Processualists objected to any alignment with history on the grounds that it was idiosyncratic and unpredictable, something the Migrationists and Diffusionists had themselves stated more than once. The Processual school was dogmatic in the assertion that only science could properly address cultural trends and contribute to meaningful generalization about human behaviour, a paradigm in which there was no room for haphazard historical circumstance (Trigger 1989). That is, history was particularizing, and therefore in opposition to science which was generalizing. This helped create a climate in which foreign influences were

reduced to the level of historical accident (Adams et al. 1978). Migration became a random process, not amenable to testing or the formulation of general laws of human behaviour; migration was summarily removed from the bastions of science, subsumed within the realm of the idiosyncratic, and dismissed (Chapman and Hamerow 1997; Trigger 1989).

Because existing migration models did not articulate well with the theoretical agenda of the Processualists, any shortcomings in the data for migration-based explanations were viewed as a failure of the models themselves (Chapman and Hamerow 1997). Moreover, the poor results of previous applications of migration-based explanations, combined with the predispositions of pre-eminent archaeologists to accept certain kinds of explanations to the exclusion of all others helped migration on the road to obscurity (Chapman 1997). Falling just short of labeling Processualism a personality cult, Adams et al. (1978) argue that what has been accomplished is an opposing paradigm in which it is agreed that migration can be ignored from the outset and that stylistic phenomena are irrelevant. It is only in the Post-processualist theoretical milieu, with its heavily criticisms of logical positivism, universal laws, and systems theory, that migration models can enjoy a resurgence. The Post-processual emphasis on archaeology's close ties with history, the contextualization of archaeological data within detailed local histories, and the empowerment of the individual within society has allowed migration out of the store room and back on stage, albeit somewhat tentatively (Chapman and Hammerow 1997).

4.3.3 Relationship to contemporary socio-political climates

However, prevailing attitudes towards migration models are not just deeply embedded in the rise and fall of dominant theoretical paradigms in archaeology (as discussed above), they are also be tied to social perceptions of contemporary migrations and invasions, and to the subjective experience of individual scholars, which plays an important role in the character of their writings and explanations (Chapman 1997). Chapman and Hamerow (1997) believe that it is no coincidence that migration models are enjoying a resurgence precisely at a time when endemic homelessness, floods of refugees, and warfare receive daily coverage in the news (Chapman and Hamerow 1997).

Our current perception of migration models is complicated by a distaste for nineteenth century Social Darwinism which provided convenient justification for colonial expansion, imperialism, and the conquest of foreign peoples. This doctrine taught that civilized ones would wipe out lesser "races"; the notion that this extinction was both natural and inevitable was congruent with the systematic repression of indigenous peoples (Harris 1968; Trigger 1989). Migration and diffusion were also used to prove that cultural accomplishments by colonized peoples were entirely due to European influence, thus supporting the conviction that the aboriginal inhabitants of Africa, North America, Australia, and the South Pacific were primitive, incapable of change, and therefore doomed (Trigger 1989). To counter this entrenched racist bias, it became important to search for explanations that emphasized internal cultural dynamics to avoid accusations of entrenched racism. However, in some cases the dogmatic repudiation of migration was and still is politically motivated -- especially in areas where there has been a strong emphasis on cultural autonomy or isolation

(Adams et al. 1978).

Historically, the preference for migration as an explanation can also be tied to political climates which favour war and colonization, while models favouring in situ cultural development take hold in climates of peace, de-colonization, international cooperation, and the growth of national insularity (Chapman 1997; Kristiansen 1989). Not coincidentally, our attitudes to migrationist explanations are directly related to the prevalence of inter-continental migrations and the context in which they occur (Chapman 1997). It is interesting to note that the most vehement attacks on migration-based explanations in archaeology occurred in countries that remained free of invasion in both world wars. While the upsurge of migrationism in these very same countries is directly correlated with increasing numbers of economic migrants later in the twentieth century (Chapman 1997).

4.4 THE RE-INTEGRATION OF MIGRATION: RECENT THEORETICAL DEVELOPMENTS

Chapman (1997) argues that it was not so much the migration concept itself, but rather the utter lack of supporting evidence for it that Processualists rejected. It is due to their heavy criticism of these concepts that archaeology has been slow to accept diffusion and migration as valid theoretical constructs. It was easy to criticize early migration models as inadequate, especially when in situ models of cultural development could more effectively account for cultural change by examining scientifically verifiable causes such as social and ecological stress (Kristiansen 1989). This past baggage, combined with the near total lack of

theoretical and methodological underpinnings for migration, has forced archaeologists to dismiss migration, which has been detrimental to the entire discipline (Adams et al. 1978; Anthony 1990, 1997; Kristiansen 1989). Fortunately a number of scholars have managed to rise above these sentiments to call for a re-evaluation of the concept, employing methods and theory that make its re-introduction more palatable to the archaeological mainstream.

Anthony (1990, 1997) points out that a corpus of method and theory already exists in other disciplines which could be adapted to archaeology. He outlines a fairly specific set of parameters that allow us to utilize migration effectively and appropriately. Migration is a patterned social process that can both result in, and be the result of social and economic disruption, geographical displacement, and warfare. Migration, however, must be treated as a symptom, not a cause (Kristiansen 1989).

If we are to treat migration seriously then we must also be able to identify it in the archaeological record. However, in order to avoid repeating past mistakes, the identification of migration must entail rigorous examination of all available evidence and these events must be placed within a detailed historical context so that archaeologists can properly identify and explain migration (Kristiansen 1989). The most vocal spokesperson for the re-acceptance of migration to respectable archaeological discourse is David Anthony (1990, 1997), who argues that migrations are patterned processes that can be approached through the application of general principles. Unlike earlier supporters of migration, he believes that migration is neither random nor idiosyncratic, but a structured social phenomenon that operates under predictable rules. Data on modern migrations and theoretical principles from other disciplines indicate that

migration generally occurs within well-defined cultural sub-groups that are structured along kinship lines and that once migration is underway it develops in a predictable fashion. Migrating groups have specific goals, target known destinations, and use familiar routes. For this reason, a group's access to information provides one of the keys to understanding the underlying mechanisms of migrations (Anthony 1997). However, migration should only be invoked in situations where there is:

> 1) Clear evidence for discontinuity in such things as ceramic styles and settlement patterns, which would point towards an intrusion of new peoples;
>
> 2) The ability to identify a homeland and ideally a migration route for the intrusive occupation;
>
> 3) A known source culture which must also be earlier than the intrusive, migrant culture;
>
> 4) Evidence of some adaptive advantage that allows for displacement of the indigenous population
>
> (Adams et al 1978; Kristiansen 1989; Snow 1995)

The actual identification of a migration from archaeological data is a different matter since evidence of cultural disjuncture alone is not sufficient evidence. In order for migration to be accurately identified in an archaeological context, we must be first prepared to create valid cultural-historical and chronological frameworks. Secondly, we must be able to identify any links between these units. In this, Anthony (1990, 1997) appears to be calling for a return to the very foundations of archaeological research which, at first glance, flies in the face of Processualist archaeology and their rejection of Culture history. Fancy models are all well and good, but in the absence of sound regional

culture-histories they are fundamentally unsupportable. However, and here Anthony belies his apparent cultural-historical bent, archaeologists cannot rely only on classificatory schemes, they must also understand how migrations work.

Migrations occur through the interplay of negative "push" factors at home, and positive "pull" factors emanating from the intended terminus. "Push/pull factors" are frequently economic, but are mediated by transport costs, the severity of intervening obstacles, and the transmission of information. It happens often, and in diverse contexts, that access to privilege and prestige is a powerful motivator where it is perceived that migration offers the best hope for improved circumstances. Access to mates, social prestige, and economic opportunity can be compelling push factors when they are not available in home community (Anthony 1997). Migration, therefore, is not used to escape an existing social system, but to improve one's position within it. First-comers gain control of critical resources, higher ranking positions, and important ceremonies which, in a stratified social system, translates directly into political and economic power, while in less stratified societies this might mean control over the most productive land (Anthony 1997). The perception of however improved opportunities elsewhere has the effect of lowering tolerances for negative conditions at home and will drastically lower the threshold at which migrations occur. Warfare, ideology, and politics are also important push factors. Pushes, pulls, information flow, and transport costs are all mediated through family and extended kinship networks as well as household requirements and the local economy.

Access to information is absolutely critical to the cultural perception of pull factors. Pull factors can only apply to destinations about which information is

available; people will not migrate to regions about which they have no information. The desire to migrate correlates directly with knowledge of a potential destination. This will be determined in a large part, by the past history of migration between the two areas. For instance, migration is more likely if earlier migrants have returned home with information on a destination, the best routes to take, obstacles on the way, and the social setting in the new location. The perceived attractiveness of the destination is also important and may include such factors as the amount of arable land and the level of hostility of the indigenous population. The likelihood of migration increases dramatically when travel costs between home and destination are low and, since travel costs vary with distance and available technology, any significant developments in this arena will therefore reduce the threshold at which migration occurs. After the flow between two destinations has been established it is likely to continue even after the conditions that stimulated initial migration have altered. Therefore, we can predict that migrants move places that are both familiar and that offer a level social support, rather than to ones that are the most effective economic choice.

Subsistence strategy is also important because groups with specialized, focal economies may rapidly deplete critical resources and thus can reach the migration threshold more quickly than those with generalized economies. Societies with broad-spectrum economies move more often but over shorter distances, while specialized agricultural economies are more likely to engage in long distance migration. The majority of past migrations then, would have consisted of short-distance movements in well-defined areas containing regularly interacting social groups. Many of these movements would have involved marital residence changes.

Unfortunately, however, long distance migrations probably leave few archaeological traces of the actual migration itself, although there should be evidence of distinct changes in the archaeological record as a result of these migrations. For instance, given that the occurrence of long distance migrations depends on the existence of information about potential destinations, combined with the fact that this type of migration is more likely to occur among those involved in focal subsistence strategies, it may be that such societies developed long distance networks to enhance the flow of information. These patterns indicate that migration may be visible archaeologically in shared artifact styles and systems of exchange (Anthony 1997). Such networks would show up in the archaeological record as the patterned interregional flow of material culture. Kristiansen (1989) asserts that the most difficult aspect of migration to identify archaeologically will be the route itself, since migrant populations will leave recognizable habitation sites in their new home, whereas sites along the route probably only consist of scattered traces.

Anthony (1997) outlines a migration typology which he says can be used to identify different types of migrations in the archaeological record. Some of these include local migrations, circular or tethered migration, and chain migration. Local migration describes the vast majority of migrations; these occur within a well-defined home range containing familiar places and people. "Local" migration may actually involve considerable distances but always remain within a familiar social network, geography and economic system. "This kind of movement is important in the creation and maintenance of regional cultures, including archaeological cultures." (Anthony 1997: 26)

Circular or tethered migration involves regular, sometimes annual movements out of a familiar range to achieve a specific goal but with the intention to return. The motivation for tethered migration is almost always an increase in wealth or prestige and includes known economic migrants such as labourers, raiders, mercenaries, trade delegations, and travelling artisans. However, circular migrants may remain at their destinations and become "first comers" in a subsequent chain migration (Anthony 1997).

Chain migrants follow earlier migrants to an unfamiliar destination with the intent to stay. Anthony (1990) labeled this phenomenon "leapfrogging". The motivation for such migrations may be either economic or the desire for increased security. Migration occurs from a specific area, over a known route to join kin, and unfamiliar areas between the source and destination will be leapt over or "leapfrogged". This choice is strongly affected by information flow; potential migrants must have data on the destination and the route to be taken, this comes either through scouts, or prior migrants. This phenomenon has important implications for population structure at the destination since kinship relations determine the pool of migrants. This type of migration may create a kin-defined group of immigrants so closely knit that the first few individuals can be used to predict the ethnic origin of all subsequent migrants. (Anthony 1990). This also has important implications for archaeology insofar as the artifact types in the destination area may reflect a regional sub-group of migrants rather than that of the entire population. This can potentially result in a sort of artifactual "founder effect" (Anthony 1990, 1997). Archaeologically we may also be able to see isolated pockets of new settlements far from home territory which develop as a result of a series of chain migrations.

Anthony (1990) also identifies migration streams. These are long distance migrations that follow initial population movements because the first ones through will clear obstacles for subsequent migrations. For this reason, subsequent population movements will follow the initial stream potentially creating artifact distributions along a specific path. However, such sites might be small, transitory, and difficult to identify archaeologically. In terms of settlement patterns, this type of migration might show itself as islands of settlement at key, desirable locations with significant expanses of empty territory in between.

Anthony (1990, 1997) asserts that migrations almost always work in two directions -- an outward moving stream, followed by a counter stream of returning migrants. The causes of these movements are extremely complex, but are also subject to a few basic generalizations. The fewer differences there are between the economic opportunities at home and at the new destination, the greater will be the stream of return migrants. This stream will be reduced if highly negative "push" factors were the motivator for the initial migration. Return migrants frequently transfer much of their new wealth to the home community; this suggests that there may be archaeological evidence that has been interpreted as long distance trade which is in fact evidence for return migration (Anthony 1990).

Recent calls for the re-introduction of migration have outlined a well-articulated series of testable principles under which migrations are presumed to operate. It remains for us to apply them in our work and discover the archaeological correlates for past population movements. In this the legacy of the Processual-Post-processual rivalry has been an amalgamation of the fundamental principles of both, combined with a call for a return to basics. Let us

then define detailed regional cultural-historical and chronological frameworks, develop and test generalizations about human migratory behaviour, and place these within their proper historical contexts in order to develop our understanding of migrations, invasions, and the circumstances that drive them. Presumably this accomplishment will have important applications to the study of human history and to modern migrations too. both of which are riddled with these phenomena.

4.5 MIGRATION: TESTABLE HYPOTHESES FOR EALF-1

Applying these basic principles to Lockport suggests that, if a migration has occurred, at the very least we should be able to identify a cultural disjunction at the site, as well as a possible home for the incoming population, a route for this migration, and some adaptive advantage to settling in a new area. There might also be some evidence or suggestion of prior contact between these two areas. Push/pull factors should be identifiable by contextualizing the data and might include a variety of climatic, environmental and socio-political factors. Any evidence of cultural disjunction must occur at the level of the assemblage although, when compared to the source area, we may expect to see some attenuation of the complex owing to Anthony's (1990, 1997) posited archaeological "founder's effect". It is likely that there may be evidence, perhaps as yet undiscovered, of a return migration, since unidirectional migrations are comparatively rare. Regional site data, should such exist, should suggest a relatively narrow path for this migration, perhaps in the form of restricted distributions of unusual sites within a narrow area. If the migration is identified

as having occurred over a comparatively long distance then we may expect the subsistence base of these migrants to be more narrowly focussed than that of the standard diversified Late Woodland hunter-gatherer. The next step is to examine the regional cultural historical framework, the site, and the data from it. The regional Culture history provides the basis for ascertaining a potential homeland and migratory path as well as the push-pull factors that might have induced a population movement in the first place.

SECTION 2

Case Study: The Lockport Site (EaLf-1)

5. Regional Context
6. The Site
7. Methods and Data Description
8. Analysis

CHAPTER 5
REGIONAL CONTEXT: CLIMATE, ENVIRONMENT, AND THE MEDIEVAL WARM PERIOD ON THE NORTHEASTERN PLAINS

5.1 THE NORTHEASTERN PLAINS: DEFINITION

The Northeastern Plains is a large cultural sub-area which, historically, has been treated as distinct from both the Middle Missouri sub-area and from the Woodlands and Boreal Forest to the east. The Northeastern Plains encompasses the areas between west central Iowa in the south to southern Manitoba and southeastern Saskatchewan in the north. Its western boundary lies at the eastern edge of the Middle Missouri sub-area and extends to the prairie-forest border zone of Minnesota in the west (figure 1) (Shay 1990) although it is clear that cultural influences exceed these boundaries.

5.2 HISTORICAL BACKGROUND

The designation "Northeastern Plains" is comparatively recent. In early syntheses of North American archaeology (e.g. Willey 1966), the "Northern Periphery" of the Plains occupied a vast area about which little, if anything, was known. Only two sites from Manitoba (one of which is EaLf-1) were included on Willey's (1966) map of archaeological sites; both were left unnamed and were clearly taken from MacNeish's *Prehistory of Southeastern Manitoba* (1958). Based on this map, the entire expanse of land between the Middle Missouri and the Arctic appeared to be almost entirely unoccupied, and in his text Willey (1966) says nothing of culture, adaptation, or chronology in this area.

To some extent, this perspective still exists outside the region. The term 'Northeastern Periphery' was rejected in favour of 'Northeastern Plains' in the 1980's (Anfinson 1982). Yet, one need not travel far from the Northeastern Plains to hear the word 'periphery' bandied about, or to encounter the unfortunate belief that prior to European Contact nothing of great importance occurred north of the Missouri River drainage between the Great Lakes and the Great Plains. As late as 1979, even Anfinson could argue that is was unlikely that there was any year-round occupation of the Red River valley which he believed was used only on a sporadic, seasonal basis by bison hunters from the adjacent Woodlands and Prairies.

Since 1966, there has been a great deal of research on the Northeastern Plains, but the late Precontact Period is still not well understood, especially in the Red River valley. The reasons for this are many. First, the assumption that the area was 'peripheral' resulted in further assumptions about archaeological utility of research here even before much work had been done. This hampered later efforts with the stigma of marginality and, as a result, there is still not enough research going on in the area (Michlovic 1983). In 1979, Anfinson was still able to postulate that the area around the Red River Valley had not been intensively inhabited and perhaps saw only short term, sporadically occupied seasonal camps during the Precontact Period. This perception was likely due, as much to the lack of existing research as it was a genuine scarcity of inhabitants. Recently, this situation has begun to change for the better under the influence of such individuals as Fred Schneider, Michael Michlovic and Michael Gregg.

Unfortunately, the lack of cross-border communication across both state and international boundaries has limited subsequent growth of knowledge in

the area. Michlovic (1983) points out that two very different types of archaeology are done in Canada and in the United States and that there has been a lack of communication between researchers in the different countries. Ultimately though, research goals are not so different. It seems evident that even though the Red, James, and Sheyenne rivers are critical areas for the whole region, the lack of communication between Manitoba, North Dakota, and Minnesota, or perhaps different political milieus and research agendas have hampered what should otherwise have been a collective effort.

5.3 ENVIRONMENT

The Northeastern Plains encompasses a fair amount of climatic and environmental variability. Southern Manitoba, at the northern end of the Northeastern Plains, is dominated by the flat, highly seasonal, semi-arid Glacial Lake Agassiz lowlands with a frost-free period of 95-100 days (Deck 1988). Further south on the Northeastern Plains, these lowlands grade into the warm, dry uplands of South Dakota with a longer frost-free period of 150-160 days. The prairie-forest border of Minnesota has a similar frost free period to that of South Dakota, but with comparatively greater annual precipitation averaging 60 cm/year (Shay 1990). Vegetation varies from one of the only true stands of tall grass prairie in Canada which occurs within the Red River valley (Scott 1995) to aspen parkland in the north to oak savanna in the east and mixed to short grass prairie in the west. River valley bottoms tend to be forested (Shay 1990), while uplands, away from the river valleys, tend to be more arid.

There are many rivers within the study area. In fact, this area comprises

three major drainage systems including the Mississippi headwaters and the Minnesota River; the Missouri River and tributaries such as the James and Big Sioux; and the southern portion of the Hudson Bay drainage system including the Red River and its tributaries, such as the Sheyenne and the Maple, as well as the Assiniboine River to the west, and the Souris River to the south and west. Inhabitants of the Northeastern Plains would have had access to all three drainage systems -- Mississippi, Missouri and Hudson Bay -- three of the largest drainage basins on the continent. These are strikingly different and yet are remarkably close to one another along the modern border between Minnesota and South Dakota. The Great Lakes drainage system too, is not far away. Precontact Period inhabitants would have had access to Lake Superior through the Rainy River, which lies along the border between Minnesota and northwestern Ontario.

Historically, the Northeastern Plains was inhabited by a variety of Algonkian speaking groups such as the Cree, Ojibwa and Chippewa in the north, and Siouan speakers in the south -- Dakota, Nakota (Assiniboine), Lakota and perhaps Winnebago in the east. Syms (1977) cites early reports which also state that mobile groups of Hidatsa and Mandan, Saulteaux/Chippewa, Gros Ventre, and Plains Cree also frequented the area at various times. However, to what extent this pattern might hold true for the Precontact Period is a matter of some debate (Walde et al 1995).

5.4 THE NORTHERN NORTHEASTERN PLAINS AND THE RED RIVER VALLEY

5.4.1 Location

The Red River valley forms the modern political border between Minnesota and the Dakotas. The southern, or upper end of the valley, is located between South Dakota and Minnesota, along the northeastern edge of South Dakota. From its headwaters, the river flows north, draining into the southern end of Lake Winnipeg, Manitoba, part of the expansive Hudson Bay drainage system.

5.4.2 Modern climate

The climate of the Red River valley changes over its lengthy, north-south traverse. The details given here pertain to its northern end, but the reader should bear in mind that the climate at its southern end is (by northern standards) considerably milder. Many of the pertinent details concerning hours of sunlight, amount of precipitation and local flora and fauna are available in EaLf-1 field season reports (Buchner 1986) and there is no need to repeat them all here. However, it is important to note that the modern frost-free period averages 95-100 days (Deck 1988) and yearly precipitation averages approximately 47 cm (Deck 1988). The local climate is semi-arid (Shay 1990) and highly continental, notable for its extreme variations in temperature, humidity, and precipitation. These extremes are a product of the variation in, and influence of, dominant air masses, which are changeable within seasons, from season to season, and from year to year (Buchner 1986). Continentality is apparent in the differences between summer highs and winter lows; thirty degrees Celsius in mid-summer is not unusual, nor is minus thirty degrees Celsius on a winter's day. Seasonal

averages are inconsistent, at least in the short term. For instance, January may be bitterly cold, minus forty degrees Celsius, or it may rain although the latter is a rare occurrence. Average summer temperatures can also be inconsistent; June temperatures may range from the low thirties (Celsius) to just below freezing. Precipitation levels are also quite variable in both summer and winter (Buchner 1986). The factors which influence climate are complex and numerous and while the long-term averages are relatively stable, this stability is achieved by a balance in wide-ranging extremes. For more detailed analyses of the local climate the reader is referred to material by Shay (1990), Deck (1988), and Gregg (1990).

5.5 ASPEN PARKLAND: DESCRIPTION

The aspen parkland is a broad zone which extends from east of Winnipeg to west of Edmonton (Scott 1995) (figure 2). It is an area in which grassland and deciduous forest intermingle in a transitional ecosystem between the two zones (Bird 1961; Scott 1995). These forested areas are composed mainly of trembling *aspen (Populus tremuloides)* balsam poplar (*P. balsamifera*), and burr oak (*Quercus macrocarpa*) although burr oak is really only common in the southern portions of the parkland (Scott 1995). These forests surround small lakes and sloughs, which are in turn separated by patches of prairie. During droughts, the sloughs tend to dry up and are invaded by the aspen forests, while the forests, in turn, recede somewhat from the prairie (Bird 1961). Aspens spread very rapidly through sucker growth, therefore the size of these forests is heavily dependent on local moisture and fire regimes. To the north, the aspen parkland also includes white spruce, which eventually grades to the coniferous forests of the Canadian Shield.

Flood plains contain a variety of trees including Manitoba maple, ash, elm, cottonwood, and basswood (Bird 1961). Drier portions of the parkland contain wolf willow (*Elaeagnus commutata*) and chokecherry (*Prunus virginiana*) (Scott 1995) while the more open areas include communities of burr oak. Other floral regimes include tamarack swamp, the sand hills of south central Manitoba, and dense stands of various species of willow (Bird 1961). These plant communities include numerous food species including choke and pin cherry, saskatoon berry, wild strawberry, raspberry, high bush cranberry, hazelnut, and wild rose. Many of these species respond positively to burning (Bird 1961). In fact, Precontact Native peoples may have used burning to manage, and even increase the size of the prairies relative to the forests (Lewis 1982). There is evidence that since the beginning of European settlement there has been a considerable advancement of the aspen forests at the expanses of mixed grass prairie. This spread of aspens has been attributed to a combination of greatly curtailed grazing by large herds of bison, the reduction of large scale prairie fires, and the aspens ability to spread rapidly through suckering. In fact most of Manitoba's mixed grass prairie has now either succumbed to agricultural cultivation or to aspen encroachment (Scott 1995).

Large game animals within the aspen parkland prior to contact included bison, elk, moose, and antelope. Smaller game included hare, muskrat, and beaver. There were also predators, such as wolf, coyote, lynx, bear, cougar, and wolverine. Fire was used extensively by the Natives to keep the environment at a sub-climax optimum and it is believed that the area would probably have been well forested were it not for frequent controlled burning (Bird 1961). Birds were, and are abundant. The area is located along one of the major continental

migratory flyways and the frequent patches of wetland which existed prior to cultivation provided excellent nesting areas and feeding stations for the birds and excellent hunting grounds for Native peoples. Huge migrations of geese, ducks, raptors, and songbirds take place in the spring and fall, and there are resident bird populations, which include owls and certain hawks, as well as grouse, both ruffed, and sharp-tailed (Bird 1961).

Bodies of water that maintained themselves at a fairly constant depth of 14 feet or more would have contained fish year round. Common species include sucker (*Catostomidae*), perch, pike (*Esox*), walleye (*Stizostedion*), catfish (*Ictalurus*) and burbot (*Lota lota*). Other aquatic species include various mollusks, reptiles, and shore birds.

All told, the aspen parkland encompasses a rich and varied habitat which includes prairie, both tall and mixed grass, a variety of forests, oak savanna, swamps, sloughs, lakes, rivers, river valley bottoms, and sand hills. The flora and fauna reflect this variation and, prior to the extensive cultivation that altered this ecotone, food would have been abundant in most seasons (Syms 1977). More detailed discussions of this environment are available in Scott (1995), Bird (1961), and Syms (1977).

5.6 Location of EaLf-1 in Relation of Site to Regional Setting

Lockport is located at the extreme northern end of the Northeastern Plains along the banks of the lower Red River, in southeastern Manitoba (figure3), far to the north of its headwaters which lie along the border between Minnesota and South Dakota. Technically, this area is neither true forest nor true

prairie, although it certainly contains pockets of both. Lying between the boreal forests of the Pre-Cambrian shield and the Great Plains, this area grades from forest to grassland and sits within the Aspen Parkland ecotone in Manitoba. Ecotones have traditionally been regarded as areas of greater biodiversity than the adjacent biomes that border them. These ecotones often contain aspects of the flora and fauna of both the adjacent communities, creating a rich and varied habitat for all the inhabitants, human or animal (Syms 1977).

At the Lockport site, the Red River provided a stable aquatic resource base, an abundant supply of usable pottery clay, lithic raw materials, a permanent water supply, and a transportation corridor which allowed passage directly to the south and north, access to the west via the Assiniboine River, and access to the boreal forest zone to the north and east through Lake Winnipeg and the Winnipeg River. Inhabitants of the Red River valley would also have had access to the Missouri, and Mississippi systems by crossing the heights of land at the southern end of the Red, in the present states of Minnesota and South Dakota. The grassland biome lies west and south of Lockport, and the boreal forest biome begins just east of Lake Winnipeg (figure 2). Temperature, moisture, fire regimes, and grazing have all affected the location of these boundaries, causing a certain amount of fluctuation in their location through time (Scott 1995). This would have altered the composition of the biotic communities around Lockport and caused the subsistence base of the immediate area to fluctuate accordingly.

The Red River valley as a whole, however, is not merely a modern political boundary. While it currently serves to demarcate the border between Minnesota and the Dakotas, the modern state line merely recapitulates a long-

standing natural division that is also expressed in the artifact assemblages from archaeological sites in this area. Being neither true forest nor true prairie, the Red River valley occupies a unique position on the Northeastern Plains. Related to this, or perhaps because of it, the Precontact cultural dynamics there are complex and prone to periodic shifts which are difficult to recognize and categorize archaeologically (Michlovic 1990). Increasingly, we see the recognition that past interpretations have been over-simplified with attendant calls for a consideration of inter-regional relationships (Haury and Schneider 1986; Joyes 1970; Lenius and Olynick 1990; Michlovic 1983, 1990; Nicholson 1990; Shay 1990; Syms 1977, 1980, 1985). Recent archaeological investigations (Michlovic and Schneider 1988, 1993) have shown that this area demonstrates a surprising degree of cultural complexity during the later Precontact Period. This will be discussed in greater detail in subsequent chapters.

5.7 THE MEDIEVAL WARM PERIOD ON THE NORTHEASTERN PLAINS AND ADJACENT REGIONS CA. 1000-1400 AD

In North Dakota, the early part of the Medieval Warm Period is manifest as a warmer and more moist interval between 600-1050 AD and is generally regarded as time conducive to the rapid spread of horticulture (Gregg 1985, 1990). This trend is supported by palynological and stratigraphic evidence for the expansion of the woodland biome and the development of stable, humic land surfaces on the plains at this time (Gregg 1985). By way of contrast, the following period, ca. 1200 AD, appears to be quite "droughty"; layers of aeolian sediments frequently blanket sites on the plains dating to this time. Tree ring sequences also

support the existence of a period of drier than normal climate, a period which may have lasted for as long as 26 years possibly resulting in abandonment of some areas (Gregg 1985; 1990). Shay (1990) also states that the climate of the Northeastern Plains was relatively moist in the period from approximately 850-1250 AD and that this was followed by a comparatively dry period. However, he believes that evidence for this trend is not as solid as he would like since detailed palynological and climatic studies are not common on the Northeastern Plains. Nevertheless it does appear that the Northeastern Plains Village adaptation, as Gregg has christened it, developed at a time in which the climate was particularly favorable to the development and spread of maize horticulture (Gregg 1990).

There are good arguments to be made for the fact that much of the interior of the North American continent experienced similar climatic and environmental changes at this time because many other areas of North America show evidence of similar climatic trends. In the Virgin River region of the American Southwest, there is solid evidence for a period of population growth in the years preceding 850 AD followed by a short, stressful, dry interval from 966-1015 AD. This is followed by further population growth during a moderate to wet interval from 1020-1120 AD after which the entire system comes to a crashing halt during a severe drought that begins about 1120 AD. This drought was probably the worst the region had experienced in over a thousand years. Unlike so many climatic models, this one is extremely well supported by empirical data (Larson and Michaelson 1990). The authors have correlated modern tree ring and stream flow volume data. They then use the relationship between the two to recreate the past climate of the region using Precontact tree ring data to estimate the volume of flowing water in the system at various times.

They believe that their reconstruction is reasonably accurate and "represent(s) faithfully what must have been major climatic events of *considerable spatial scale and severity*" (Larson and Michaelson 1990: 239, emphasis mine).

In central Texas there is a significant artifactual shift dating to the time around 1200-1300 AD which may be related to the effects of a major drying trend which is also seen there at this time (Skinner 1981). And on the Southern Plains, Drass and Flynn (no relation, 1990) suggest that there is strong evidence for a major drying trend on the uplands, ca. 1100-1300 AD, in which there is little or no impact on the major river valleys. In Arizona, the period immediately preceding 1100 AD sees increases in precipitation, temperature, and rate of population growth. Subsequently, precipitation drops off dramatically, temperatures remain high, soil depletion results, villages begin to nucleate, and population pressure increases (Berlin, Salas, and Geib 1990). After 1300 AD, fluvial deposition increases on the Southern Plains (Creel, Scott, and Collins 1990), possibly suggesting some relief from widespread desiccation at this time.

The eminent climate researcher H. H. Lamb (1982) places these changes within a larger perspective, seeing them as evidence for major global climatic changes which correspond to local trends recorded in the archaeological literature of North America. He suggests that the larger temperature and precipitation trends of North America were related to those in Europe for which he finds ample historical evidence. Starting around 700 AD, much of the North American continent was enjoying a warm, moist climate which came to an abrupt halt ca. 1200 AD. He believes this can be explained by a sudden shift in the flow of the westerlies which increased the rain shadow effect over large portions of North America, and by an increased thermal gradient over the continent as

the arctic region cooled rapidly (Lamb 1982).

Lamb (1982) states that in North America there are warming trends corresponding to those visible in Europe (discussed earlier), albeit without such historical documentary evidence to support the hypothesis. However, he believes that within North America the increased dominance of the westerlies, combined with an increased temperature gradient together created a major drying trend ca. 1200-1300 AD. It is at this time that settlement abandonment begins as smaller villages in the driest areas of the continent cease to function. There is also evidence for the nucleation of populations around larger village sites in major river valleys of the central continent, and by 1300 AD and even some of the largest centers (such as Cahokia, see above) begin their decline. Along the West Coast of North America, the California tree ring data support the existence of a warm period with maximum warmth between ca. 1100-1300 AD. And Lamb (1982) suggests that this dry period in North America may have lasted right through the fourteenth century AD. Lamb (1982) suggests that what the first explorers saw was, in fact, a much reduced and damaged Native North American population suffering from the repeated blows of food shortages, disease, warfare and cultural collapse.

Based on the example afforded by Kuisker Farm in Iceland it appears that the best places to look for the most extreme effects of climatic changes are those areas that are most marginal. In North America, such areas would include the Northeastern Plains and southern Manitoba, areas that are, even now, still quite marginal to practice of sustained agriculture.

In terms of the geomorphological effects of such a drought, the decade of the "Dirty Thirties" is the obvious and oft-cited analogue for such a climatic

period. During the 1930's, there was extensive soil deflation and aeolian sedimentation throughout the central part of North America. Housewives report being unable to hang laundry outside, or keep houses free of silt at that time. Massive black walls of drifting soil moved across the plains and were deposited over cars, houses, and farms. When rains did come, an enormous amount of soil was eroded and redeposited from the upper river terraces to the valley bottoms (Gregg 1985). By way of contrast, in the periods immediately before and after the 1930's drought, there was very little movement of sediment (Gregg 1985).

Anfinson and Wright (1990) suggest that the Dirty Thirties are not an appropriate analogue since the drought was exacerbated by exceedingly poor soil conservation practices and over farming, a situation which does not pertain during the Precontact Period. However, the 1930's was only the fourth driest decade since 1680 AD (Bamforth 1990), based on local tree ring studies, and none of these droughts would seem to compare in either duration or severity to that which occurred at the end of the Medieval Warm Period. Even during the late 1980s, the most recent drought of any severity, environmental desiccation in some parts of southwest Manitoba and southern Saskatchewan rendered indigenous vegetation dormant, exposing underlying soils to erosion and deflation. Moreover, the evidence for aeolian sedimentation from plains sites dating to the MWP certainly points towards extensive defoliation and deflation of the drier uplands (Gregg 1985). Indeed, Gregg (1985) believes that the drier uplands may have had no subsistence potential whatsoever.

Larson and Michaelson (1990) state that long term droughts, dry periods of three to five years, can have a profound effect on arid land farmers and require major shifts in adaptive strategy. It is interesting to note then, that every

recorded drought on the Northeastern Plains since AD 1680 has been nine years long (1816-25, 1735-44, 1696-1705, 1931-40) (Bamforth 1990). Moreover, Fawcett (1988) states that food can feasibly be stored for only two years. This is verified by the ethnographic record which states that the most prudent of plot managers kept seed corn for two years (Will and Hyde 1964 [1917]) and by studies of risk buffering strategies which cite food storage as a short term strategy only (Halstead and O'Shea 1989; Rowley-Conwy and Zvelebil 1989). A drought of two of more decades then would clearly have required dramatic readjustments in both subsistence and settlement patterns, and perhaps of social organization, in order to cope with such a difficult climatic interval.

Benn (1983) suggests that drought in the Prairie Peninsula would have significantly reduced the carrying capacity of the region and groups would have required access to alternate territories. Even so, there are areas within Minnesota where cultural occupations and horticulture both appear to continue more or less uninterrupted throughout this period (Anfinson and Wright 1990). This suggests that the environmental effects of this climatic episode were uneven. Grimm (1985) also sees Minnesota as relatively less affected by drought than either of the Dakotas and states that there is no palynological evidence for any significant climatic changes there after 2000 years ago -- the period encompassing both the rise and fall of the Mississippian Tradition. Others (e.g. Johnson 1978) argue that climatic changes that were not significant enough to have left their mark on the pollen record may still have had significant repercussions for specialised subsistence economies. So, while there are visible and dramatic shifts of population on the Northeastern Plains, in the Middle Missouri sub-area, and elsewhere where arid-land horticulture and agriculture are practiced, there are

also certain areas, such as the woodlands and Prairie Lakes region of Minnesota, which may have been less dramatically affected.

5.8 Environmental Consequences of Climate Change and the Development of Subsistence Crises

Anfinson and Wright (1990) believe that there has been a serious over-reliance on climate as an explanation for social change and, to a certain extent, they are correct. There has been a tendency to invoke climate any time major cultural disruption is in evidence, and to ignore the effects of sociopolitical and demographic change in these models. These authors also believe that the importance of drought has been overemphasized; in an area where cyclic drought was and is the norm rather than the exception it is reasonable to assume that the subsistence strategies of groups on the area would be specifically designed to cope with such droughts and not collapse under the strain of every dry climatic interval. This is also a common argument in the southwest whenever climate is invoked as an explanation for cultural change.

Climate change however, is not the only factor to consider since it is not climate change in and of itself that causes cultural distress. It is the secondary effects of climate change and the chain of events they put in motion that are of importance. Climate change may induce environmental changes which, in turn, result in serious food shortages. In fact, while it is known all human groups are adapted to cope with regular and predictable food stress, problems arise when an environmental crisis exceeds regular and predictable levels. When serious resource shortages ensue, the population in question may be forced to either make major structural adjustments or collapse. Moreover, the development of a

large-scale subsistence crisis has a number of different dimensions, not all of which are directly tied to climate change itself.

Schnirelman (1992) outlines several different types of crises that have an impact on subsistence. Many of these are only indirectly tied to climate change, if at all. Ecological crises may be due to both natural and anthropogenic causes or due to resettlement in a new area where the group's existing subsistence strategy is unsuitable. Demographic crises occur when there are major changes in a population's size, density, or structure; these can be precipitated in number of different ways -- disease, migration, and warfare, being a few of these. Technological crises arise when existing technological systems are not equipped to cope with new situations such as those that may occur during environmental or demographic crises. Where there is the destruction of a traditional system of trade, an exchange crisis may ensue, especially if one of the principal commodities was food. Social and fiscal factors may precipitate a subsistence crisis in complex society as a result of many different factors that may or may not be directly related to environmental factors. These may result in power struggles or out-migration as one group loses the struggle, and these in turn may result in resettlement, and subsequent demographic, or technological crises. Warfare may either result from, or be the cause of many of the types of crisis outlined above.

The point is that it is not the climate change itself which is the problem but the effects it has on the environment. It is these ensuing environmental changes that subsequently cause perturbations in a group's social system and it is the scope of these social changes that will see a group survive or collapse. In other words, climatic change that causes significant environmental degradation will

reduce the subsistence potential in a given area. This has an immediate impact on resident groups. Resultant resource shortages may bring about a subsistence crisis, bearing in mind that there is no single type of subsistence crisis and that there may be complex interrelationships and feedback between the various different types (Schnirelman 1992). It is through these various different subsistence crises that climate change may have more subtle and far-reaching effects than the simple reduction of an area's resource potential.

For example, at the point where survival is compromised, the group may choose to migrate to another area which might result in a technological crisis as they shift to a less familiar ecological zone, or it may cause a demographic crisis if they move into an already populated area. This may further result in warfare, disease, and ultimately, resources shortages in areas not directly affected by more severe environmental changes elsewhere. The more specialized the economy, the more severe the repercussions of these various other types of crisis. One can easily envision a scenario of cascading consequences as various social and political factors result from some fairly straightforward choices.

> ... (T)he ways and causes of modification of traditional economies were highly variable. ... It is apparent that it was much easier to overcome the problems caused by crises in those societies that practiced an opportunistic, broad-spectrum subsistence economy In contrast, a rigidly specialized subsistence was less capable of transformation within a reasonable time. ... Modification or improvement of the subsistence system was one of the possible ways to overcome crises, the other ways being represented by migrations, wars, or the development of systems of power, all of which could result in new pressures and stresses. ... A chain reaction could result, and events that took place in particular regions were able to affect other regions even at a great distance from the original ones.
>
> (Schnirelman 1992: 39)

In terms of the causes of a full-blown crisis, there are other considerations as well. Larson and Michaelson (1990) address the differential effects of catastrophic environmental change -- in this case, drought -- on populations within the same region but under different circumstances. Their research suggests that the most detrimental effects of drought occur when dry intervals are especially long and severe, following a period that has been especially favorable. This concatenation of circumstances results in an over-large population ill-equipped to cope with adverse conditions. That is, the climatically favorable period encourages rapid population growth due to an extended period of abundant, reliable crops; in a group with a specialized economy, this long favourable period has resulted in the loss or attenuation of successful coping mechanisms for prior subsistence crises. Drought thus finds the group unprepared, even unable to avail themselves of alternative subsistence strategies (Larson and Michaelson 1990). In fact, Colson (1979) also suggests that during especially long, favourable environmental intervals, long-held crisis management strategies may be lost through the extended period of disuse. Formerly adaptive strategies are perceived as wasteful or irrelevant, elders -- repositories of vital information -- fail to pass on knowledge of famine foods, myths and stories of lean times are no longer told. With sufficient time -- perhaps only a single generation -- societies lose their resilience and any ability to cope with environmental stress.

> The combination of an adverse climatic event following a period of moderate climate and rapid population growth can generate particularly serious problems ... Traditional strategies for coping with adverse conditions may not provide sufficient resources for the larger population, and during the period of moderate climate there may be no opportunity to assess realistically the risks

associated with new, resource intensive strategies.

(Larson and Michaelson 1990: 228)

This helps explain why dry land farmers, fully equipped to weather cyclic drought, survive for many generations and then suddenly fall apart during another drought for no apparent reason.

Anfinson and Wright (1990) have argued that the continuity of some archaeological cultures through the driest portion of the MWP proves the effects of climatic change were not severe, therefore the cultural dislocation evident on the plains and in the woodlands at this time is not attributable to environmental change. On the surface, this sounds perfectly reasonable. However, for anyone who witnessed the devastating effect of six years of drought on the prairies, the impact of temperature and precipitation changes on farmers in marginal areas cannot be underestimated. In point of fact, all droughts are not alike either in extent or severity and Anfinson and Wright (1990) do concede that populations in more arid areas such as North and South Dakota would probably have had to undergo significant alterations in their subsistence regime in order to survive. They believe that those with horticultural economies in more marginal areas were the most vulnerable. They also state that if these groups were, in any way, interdependent, then impacts felt in one region would certainly manifest themselves in another. Larson and Michaelson's (1990) work suggests that while some groups may be able to overcome adverse conditions, others cannot since social and political adaptations play a crucial role in the ability to manage population pressure, climatic change, and subsistence stress. Some of the archaeologically visible coping strategies for these droughts include increased

food storage, improved technology, intensification of labour, political reorganisation, and the extension of reciprocal relationships.

Anfinson and Wright (1990) believe that because groups such as the Oneota thrive throughout episodes of climatic change there is a general problem with the whole concept of climatic change effecting cultural change. Yet, they base their critique primarily on models postulated by Reid, Bryson and others (Bryson and Baerreis 1968; Bryson, Baerreis and Wendland 1970; Bryson and Wendland 1967) as well as their own (Anfinson and Wright's 1990) observations. It is arguable instead that the problem lies with the model as originally formulated, not with the concept as a whole. They correctly point out that all too often it is assumed that the effects of climate change on past cultures must necessarily be negative; therefore, one is limited to looking for the demise or decline of cultures wherever there is evidence for climatic change. Alternatively, changes in the climate and environment may simply affect cultures rather than destroy them. They go on to point out that, in addition to climate, one must also consider the diffusion of ideas, local innovation, the introduction of cultigens, and the effects of population pressure, political relationships, and migration (Anfinson and Wright 1990). These are important factors that all too often become lost in the frenzy of the search for an externally verifiable, uni-causal explanation. One must also keep in mind, however, that all of these are tied to the environment to some extent, that all have reciprocal effects on one another, and that changes in one area have far reaching consequences in areas which have not been directly affected by any climatic changes themselves. Therefore, the impacts of environmental change are not limited to the immediate areas in which they occur, nor are we constrained to the search for cultural collapse.

CHAPTER 6
EALF-1 IN DETAIL: PREVIOUS RESEARCH, EXCAVATION PROCEDURES, AND STRATIGRAPHY

6.1 THE LOCKPORT SITE: LOCATION

EaLf-1 is located on the east bank of the Red River approximately half way between the junction of the Red and Assiniboine rivers (at the city of Winnipeg) and Lake Winnipeg (figures 4 and 5). The site is presently situated on an eroding riverbank, downstream of the St. Andrew's Lock and Dam.

The site's location can be explained by:

1) Its proximity to a major permanent water course, important both as a source of water and as a major transportation corridor;

2) The limestone ridge which now supports the lock and dam supplied Selkirk chert, a raw material widely used throughout the region;

3) The rapids which provided an excellent fishing spot; and

4) The abundance of many other important natural resources such as workable pottery clay, wood, chert, fresh water, and a wide variety of plants and animals, to name just a few.

Lockport has remained both important and well known for many reasons, not the least of which being that it is still one of a few deep, well stratified sites in south-central Manitoba. The deposits are over three meters deep, reasonably consistent across the site, and contain at least ten and up to as many as fifteen identifiable natural layers.

The site is spread along the bank of the Red River and consists of a several distinct strata, each containing different cultural occupations (these will be discussed in greater detail later on). These occupations span the period from the

late Archaic up to the present. However, the final Native occupation probably comes to an end just prior to the initiation of the fur trade in this area since there are no European trade goods associated with Native artifacts. The uppermost stratum consists of the remains of a modern fishing camp, winter access road, construction debris from the building of the lock and dam, and the remains from the early homestead period.

6.2 General Overview

6.2.1 Previous research: early work at EaLf-1

The Lockport Site (EaLf-1) and its immediate area have figured prominently in the archaeology of Manitoba since the birth of the discipline in the province. Lockport was the first site at which archaeological remains were ever reported (Hlady 1970) and it has the longest history of excavation of any other in the province (Buchner 1986). Lockport was first excavated in 1885 by Charles N. Bell who recovered a large collection of stone tools. However, it was the burial mounds that attracted most of the attention. The nearby Fidler Mounds were excavated by a variety of individuals and organizations through the late nineteenth and early twentieth centuries until W.B. Nickerson of the Geological Survey of Canada arrived on the scene in 1915 and made the timely observation that the vast majority of retrievable information had already been retrieved and was now irretrievably lost (Capes 1963). In 1947, the Manitoba Museum Association and the Natural History Society of Manitoba launched yet another investigation under the direction of Walter Hlady and Thad Hecker (Hlady 1970), although no report was ever produced for this project.

The best known work at this site, however, is that of Richard S. MacNeish, then employed by the National Museum of Canada (now known as the Canadian Museum of Civilization). This excavation marked one of the first serious attempts to establish a workable chronology for the region (MacNeish 1958). During the period between 1950 to 1953, MacNeish surveyed and excavated eight sites in the province. This survey later became the basis of the cultural chronology for southeastern Manitoba. Of these sites, Lockport was one of the most important; it was the deepest, the best stratified, the best preserved, and contained the largest sample of artifacts (MacNeish 1958). MacNeish spent a portion of two field seasons at the Lockport Site during which he and his assistant were plagued by inclement weather and hostile landowners with heavy earth moving equipment. Still, he managed to identify ten strata, which he estimated dated between 1500, BC and 1750 AD and within which he placed five cultural foci: Larter, Anderson, Nutimik, Manitoba and Selkirk. This interpretation has undergone substantial revision in the past four decades, but constituted the standard reference on the chronology of the area for many years (Michlovic 1985b).

Construction of the Winnipeg floodway during the 1960's further endangered the site. Mitigation was undertaken under the direction of Dr. William Mayer-Oakes and his assistant Tim Fiske, then both of the University of Manitoba, during which they excavated a portion of the remaining Fidler Mounds, located on the edge of the proposed floodway. The following summer they excavated in an area approximately five hundred metres from MacNeish's old pits, and defined what later came to be known as the Floodway Village. The current opinion is that this and the Lockport Site are unrelated because the

cultural deposits do not appear to be continuous (Buchner 1986). However, this bears further study. Throughout the 1970's, Ealf-1 was used as a surface collection site by university archaeology classes and was also subject to vandalism by local children and adults (Buchner 1986).

6.2.2 Disturbance

The site has been subject to a certain amount of disturbance throughout its history. The area was under cultivation for a considerable period of time, there was disturbance from the construction of the lock and dam itself, and there were repeated archaeological investigations from the late nineteenth century to the present. There was also extensive damage to the bank during the great flood of 1950 (MacNeish 1958) and there has been ongoing damage to the bank due to several years of high spring and summer water levels during the 1990's. Remarkably, the site still retains some areas of undisturbed deposits although these are now confined to a narrow band along the riverbank.

The site is located on a riverbank that has been eroding heavily since at least 1950. Air and land photos taken prior to the flooding show a pleasant, gently sloping, grassy bank. After the 1950 flood, there is a sizable cutbank, in places over four meters high. Most recently, the construction, use, and maintenance of a public recreation area have further contributed to the degradation of the archaeological resources in this area (Buchner 1986). Successive flooding, summers of high rainfall, and high traffic from tourists and locals have exacerbated the erosion, which has only been worsened by the excavations themselves (Flynn 1987). There has been no attempt to quantify precisely the rate of erosion, but from 1984 to 1988 between three and five

metres of bank was lost for an average rate of approximately one metre per year (figure 6). After 1989, the rate of erosion stabilized and another river terrace began to form. This situation remained relatively stable until 1993 when unusually prolonged high water levels undid some of the stabilizing effects of the vegetation that had begun to grow there. During the 1990's, several years of high spring and summer water levels caused more bank erosion, largely due to heavy ice scouring immediately below the sod layer.

Other forms of disturbance are those normally expected at any site in the study area. These include action by burrowing rodents (mice, voles, pocket gophers, and the occasional badger), insects, worms, grass roots, tree roots, freeze-thaw, flooding, ice scour along the bank, and soil drying and cracking during dry years.

6.3 HISTORIC RESOURCES BRANCH EXCAVATIONS: 1984 TO 1988

6.3.1 Rationale for re-excavation

Even though the site had already undergone intermittent excavation in the past, the Lockport Site was selected for re-excavation in 1984 because it was a well-known, rich, and important site in the province. But even more important, in the bureaucratic scheme of things, was the implementation of the 1973 Agreement for Recreation and Conservation (A.R.C.), a policy designed to develop heritage conservation awareness and provide recreation opportunities around the province (Buchner 1986; Flynn 1987). Mitigation was begun to assess the effects of the construction of a park, picnic ground and interpretive centre. The excavations were also an adjunct display to the interpretive centre and, as

such, provided the public with an accessible view of an archaeological excavation. The crew gave tours to school groups, fisher folk and the general public in order to promote archaeology and the newly implemented heritage legislation.

6.3.2 Excavation strategy and research design

EaLf-1 was excavated in a succession of five summer field seasons from 1984 to 1988. During this time there were two separate directors: Dr. Anthony P. Buchner from 1984 to 1986 and David Hems for 1987 and 1988, both employed by the Manitoba Department of Culture Heritage and Recreation, Historic Resources Branch.

The site was excavated in a narrow band up the riverbank from the lock and dam in an area approximately 100 meters long on the north/south axis by 20 meters wide on the east/west axis. In total, ninety-eight one by one-meter units were excavated (figure 7). Almost half of these, forty-five of them, were arranged in three-by-three metre squares. All units were excavated to an average depth of approximately 2.4 metres, for a total excavated volume of about 245 cubic metres. Forty-four features were uncovered (figure 8), the majority of which were directly associated with the horticultural component. For a detailed record of excavation activity during the first three seasons at EaLf-1 the reader is referred to the 1984-1985, and 1986 end of season reports (Buchner 1986; Flynn 1987). However, a brief summary of the entire project is appropriate in order to establish the context for the rest of the thesis.

6.3.2.1 The 1984 to 1986 excavation seasons

The objectives of the first three seasons were:

1) To assess the degree of disturbance;
2) To assess the rate of erosion;
3) To examine the accuracy of MacNeish's work; and
4) To delineate the boundaries of the site

(Buchner 1986; Flynn 1987).

The first season saw a series of one-metre square test units stretching approximately sixty meters northward up the bank from the rear of the landowner's small fishing supply shop. This obstacle, now demolished, effectively limited the extent of our endeavors to the south, although there were both auger tests and one meter square test units closer to the lock and dam during the preliminary portion of the first field season (Buchner 1986). These were found to be too heavily disturbed by the construction of the lock and dam to yield much fruitful data (Buchner 1986). Therefore, this area was quickly abandoned.

During 1985 and 1986, the operative assumption was that the area of richest recoveries was closest to the bank approximately midway between the locks and the Winnipeg Floodway (Buchner 1986). Some preliminary testing was done higher up on the slope above the main portion of the site. Here, cultural material was recovered, but the area was not overly productive. Excavations laid out in a line running down the slope towards the river during the 1998 University of Manitoba Field School confirmed that the area up-slope of the first terrace is neither particularly deep nor particularly productive. While some Precontact Period material was recovered, the majority of the recoveries from this area related to the construction of the lock and dam during the early 20th Century.

Because of the assumption that the richest area was centrally located, the second and third field seasons (1985-86) saw further testing in the less disturbed areas to the north of the lock and dam, with concentration in areas that had been deemed most productive the previous year. This took the form of three by three-metre square excavation units in the central portion of the site. These were designed to reveal horizontal and vertical spatial relationships (Buchner 1986). The 3x3 units were excavated according to the "alternate squares method" as previously used by MacNeish during his 1950 and 1953 excavations at the site.

6.3.2.2 The 1987 and 1988 excavation seasons:

During the final two years, salvage and public education were the *raison d'etre* of the project (David Hems pers. comm. 1988). By 1987, excavatable areas within what had been designated as the "most fruitful" portion of the site were becoming increasingly scarce. Hence, the location of units was determined primarily by whether or not there was enough room to grid out a three by three-metre square. Also, those areas to the north that had been written off as badly disturbed were re-tested and units were placed in one area that had remained entirely untested. In the same year, three more one by one meter test units were opened to the north of the center of excavation in order to see if the northern end of the site could be more clearly defined.

In 1987, a magnetometer survey was conducted by Dr. Scott Hamilton, now of Lakehead University, which allowed us identify magnetic anomalies. Unfortunately, the results were unavailable until midway through the season. Thus testing of these results had to wait until the following summer.

The placement of units at the Lockport site in the final summer of

excavation was determined entirely by results of the previous season's magnetometer results. The goal was to explore as wide a variety of magnetic anomalies as possible. Therefore, each and every unit was placed over a different type of anomaly in order to ascertain whether magnetometer testing was useful for locating buried archaeological features. Interestingly, and a testament to the success of the survey, a feature was located in almost every unit that year (figure 9) the overwhelming majority of which occurred in the same stratigraphic layer (figure 10).

The excavation strategy over the five seasons appears to be somewhat haphazard. This is largely because at the end of each season there was always the lingering uncertainty as to whether or not we would return the following summer. This meant that, in order to facilitate site interpretation, the placement of units was dictated almost exclusively by the desire to maximize each season's recoveries. In hindsight, it would have been better to have opened up much larger areas, excavate by natural stratigraphic layers, and to leave these areas open until whole living floors were exposed. However, without any confidence that we would be back to complete what we started, this strategy seemed impossible. We never did locate any living structures and I think that their absence is partially attributable to this excavation strategy; I strongly recommend that anyone returning to the site employ a method designed to expose large, contiguous areas within the same stratigraphic layer. Had this been done in the first place, the recognition of the all-important "organic layer" (the stratigraphic layer containing the horticultural component) would not have had to wait until three years into the project.

6.3.2.3 Problem of site delineation

Even after five successive seasons of excavation, there is the persistent difficulty in the attempt to define the boundaries of a site which has seen so much occupation, so continuously for so long a period of time. The fact that so many different components are visible at the site is a testament to the lure of an abundant and reliable supply of food, water, and raw materials. In all likelihood, the Lockport Site is not a single site, but a palimpsest of "sites". Where one ends and another begins is an excruciating task at best and an impossible one at worst. Unfortunately, the land on the upper terrace was privately owned by an individual who was unwilling to permit testing there. There are local tales of points and pottery from the farmers' fields above the site, nothing can be said of their relationship to the material on the lower terrace. Greenfield (n.d.) performed a magnetometer survey of this area in 1998 that showed no evidence of sub-surface archaeological features.

The Fidler mounds above the first terrace have been regarded by many as associated with the Lockport Site. However, the adjacent Floodway Village is usually treated as a separate entity. The area closer to the lock and dam is too disturbed to yield any useful data and the field above the site has not been systematically tested.

The relationship between all the recoveries from the different parts of the site and its surrounding environment in terms of settlement patterns is beyond the scope of this project and would require much more extensive testing and controlled excavation. Nevertheless, it is clear from the frequency of just the pit and hearth features that the lowest terrace was the living site of at least one group, or perhaps several groups of people who used the site seasonally.

The west bank of the Red River, directly opposite EaLf-1, provides an interesting study. Roadway excavation by the rural municipality during the mid-1990's turned up an artifact assemblage, albeit disturbed, quite similar to that from the east bank where EaLf-1 sits. It has been known for some time that scapula hoes were recovered on the west bank. These reside in the personal collections of local avocational archaeologists, along with extensive collections of ceramics and stone tools. However, this more recent disturbance has also turned up unusual, "exotic looking" ceramics nearly identical to those recovered from the horticultural layer at EaLf-1 as well as a possible limestone grinding stone or metate. Because the area has been disturbed and there are no radiocarbon dates at this time, it is difficult to say anything about the relationship between these two sites but McKinley (2001) examines several different options in her thesis has analyzed the ceramics. The nature of the recoveries, together with tentative evidence for a similar stratigraphic relationship to that which exists on the east bank offers some tantalizing clues which point towards possibly contemporaneous occupations by the same or similar peoples or cultures on both sides of the river.

6.3.3 Excavation procedures

All units were excavated in either five or ten centimeter arbitrary levels based on depth from surface using the northwest corner as a datum and following the natural contours of the unit surface. When discrete stratigraphic units were clearly apparent, they were treated as separate entities and the artifacts were kept separate. Artifacts from features were always separated from recoveries from the rest of the unit and artifacts from rodent disturbances were

recorded as such whenever it was possible to do so.

6.4 STRATIGRAPHY

6.4.1 Overview

It is absolutely critical to have a clear conception of the site stratigraphy in order to understand the horticultural layer, its position within the site, and its relationship to the local chronology. Recent refinements in our understanding of the stratigraphy are fundamental to the interpretation of the horticultural occupation and its position relative to the other occupations at EaLf-1. Accordingly, this section outlines the various approaches to the geochronology of the site by the various directors. It also discusses the stratigraphic beds as they are presently understood, the nature of these layers, their relative positions, and the processes which may have laid these strata down.

There are some uncertainties surrounding the precise definitions of the stratigraphic layers because there were three separate directors (including MacNeish) with different understandings of the works of their predecessors. The following is a brief discussion of the three existing stratigraphic schemes: MacNeish (1958), Buchner (1986, 1988) and Hems/Flynn (Flynn 1992; Flynn and Kogan 1991). All three interpretations are important since each, in its time, provided the framework upon which rested each director's methods and interpretations. Finally, it is important to be aware that when one reads "Zone I" in MacNeish's report, "Bed I" in Buchner's report, and "Bed I" in the most recent revisions, that these terms do not always refer to exactly the same stratum.

6.4.2 Macneish's strata

There are problems here because the descriptions of the strata in MacNeish's original (1958) report are not unequivocal. In fact, his descriptions are characterized by vague phrases such as "sandy dark refuse". As it turns out, this is not at all a useful distinction. The cultural units associated with these layers are, by contrast, fairly clear cut.

MacNeish divided the site stratigraphy into 10 "zones" which he labeled with the letters 'A' to 'I' (table 1). This included one unlabelled zone between Zones E and F. MacNeish states that he originally intended to excavate using six inch arbitrary levels, but the strata were so clearly defined that he and his crew used a combination of natural and arbitrary levels. First, they removed a six-inch level of humus and refuse. Then, they removed the remaining "refuse" down to the sand; this was level 2 (MacNeish 1958:15). The sand was removed in either one or two levels, 3 and 4, and the material below was removed is a six or eight inch level called level 5. This level terminated in a thin sand stratum. Apparently, level 6 consisted of the material just above and below this thin sand layer. The material below this was removed in arbitrary six-inch levels until yellow clay was reached at level 7-10 (MacNeish 1958:15). Two layers of this clay were removed; level 11 was clay down to "the first burned floor" and level 12 was "well down below the second burned floor" (MacNeish 1958: 18).

6.4.3. Macneish's stratigraphic interpretation:

6.4.3.1 Zone A: Zone A consisted of the surface deposits above the underlying sandy deposits of subsequent zones. It was described as sandy, dark, clayey refuse overlain by humus. Level 1 was the excavation of the humus, and

level 2 was the excavation of the "refuse". Zone A contained Selkirk Focus cultural material. He states that fish bone dominated the faunal recoveries and that food had been stored in "deep bell-shaped pits lined with grass or bark" which may have been dug with bison scapula hoes (MacNeish 1958: 23). He also reports that there were "six fragments of shell-tempered cord-marked pottery, similar to some found in southern Minnesota and Wisconsin, and four sherds with wide-line incising, such as those found on Cambria Type B sherds of southern Minnesota" (MacNeish 1958: 26). He believed these materials were evidence of trade with these areas (MacNeish 1958).

6.4.3.2 Zone B: This is described as a series of "lenses or layers of sand and silt with occasional layers of refuse" (MacNeish 1958: 19). MacNeish suggested that the bedding in these layers was indicative of a series of floods. He states that in one profile he counted 28 separate layers which he took to mean 28 separate flood events "...which at the present rate of flooding of the Red River, if each strata (sic) represents a flood, would indicate a considerable period of time" (MacNeish 1958: 20). This layer was excavated in one or two levels, levels 3 and 4. This is the final Precontact Period occupation at the Lockport Site and it consisted of materials from the Selkirk Focus. MacNeish suggested that this layer represented a very brief occupation and that all the materials were water laid. He believed that occupation at the site in this period had been terminated by frequent flooding, perhaps as a product of a recent, wet climatic phase (MacNeish 1958).

6.4.3.3 Zone C: This layer was a sandy stratum capping Zone D. Level 5

was taken from the top of C and level 6 was the lower portion of Zone C. In two portions of this stratum, there were charcoal strata mixed with burned rock just below Zone B. Cultural materials here represent MacNeish's Manitoba Focus. He suggested that the cultural materials here were so radically different that there was probably a considerable gap between this and the following occupation. Subsistence consisted mainly of forest animals such as deer, beaver, muskrat, and hare as well as large amounts of fish. There was little bison bone represented in this occupation. Projectile points were of small common triangular varieties with and without side notches. He called these points Eastern Triangular (no notching) and Prairie and Plains Side-notched. Pottery was globular, paddle and anvil constructed with fabric marked bodies and cord wrapped object impressed pottery with bands of punctates. He called these ceramics Manitoba Ware, a local name for pottery identified elsewhere as Blackduck.

6.4.3.4 Zone D: This zone seems to have consisted of a well defined sandy layer which capped Zone E. Level 6 included all of Zone D. This layer does not appear to have an occupation within it.

6.4.3.5 Zone E: A layer of dark refuse composed of clay sand and charcoal made up Zone E (level 7 and a portion of level 6). This zone was separated from Zone F by patches of sand. This transitional layer was level 8 and seemed to include artifacts from the bottom of Zone E and the top of Zone F. Zone E contained cultural materials very much like those beneath it Zone F, but Zone E's recoveries were judged sufficiently different to be placed in a separate focus called Nutimik. All of the ceramics of Zone F were present (Lockport Plain,

Lockport Linear and Laurel Dentate), but these were augmented by incised, rocker stamped, and banded varieties. There were also sherds decorated with cord wrapped object impressions which he called Lockport corded. Projectile point types in this layer he judged were large and thus for darts, not arrows. Point types included Lockport Stemmed, Anderson Corner-notched, and Whiteshell Side-notched (MacNeish 1958).

6.4.3.6 Zone F: This zone was composed of "about a one-foot layer of brownish gray clay overlying the yellow clay of Zones G and H". These were his levels 9 and 10. Cultural materials here were of the Anderson Focus, indicated by the bones of animals more characteristic of the Aspen Parkland -- deer, hare, and wapiti faunal remains were recovered -- along with smooth surfaced, dentate stamped and coiled pottery which he called Lockport Plain, Lockport Linear, and Laurel Dentate. Stemmed points and Anderson corner notched points were also recovered from this Zone (MacNeish 1958).

6.4.3.7 Zone G and H: These layers consisted of thick, tight-knit yellow clay and were non-culture bearing to the south. They were thinner, with evidence of a burned floor to the north. This stratum was divided into two zones. The upper portion, called Zone G (level 11), was gray clay grading to yellow clay at its base, with patches of a burned floor within it. The lower portion of this stratum was designated Zone H (level 12) and was a "yellow clay overlain by a burned floor" (MacNeish 1958: 19). Floor 1, Zone H, level 12 held materials MacNeish saw as characteristic of the Larter Focus, bison bones, corner notched projectile points, and crudely worked stone tools, mostly of heavily patinated

white chert.

6.4.3.8 Zone I: This layer, level 13, consists of rounded boulders set in tight-knit yellow clay. It occurred 6-7 feet below the surface and was completely without any cultural material whatsoever. This layer, MacNeish stated, was closer to the surface north of the site and farther below it to the south. Table 1 outlines MacNeish's published description of the layers or "zones" and the excavation levels in which these occurred.

6.4.4 Buchner's stratigraphic interpretation

In 1984 the excavations were designed, in part, to delineate the extent of the site and to establish the validity of MacNeish's original interpretation. Based on his statement that the sterile "tight-knit yellow clay", ostensibly the end of the cultural deposits, occurred at approximately six feet below the surface, the 1984-86 excavations were halted at level forty, two meters below the surface. The presence of tight-knit, sterile, olive-yellow clay seemed to confirm that this was the correct course of action. However, the persistent use of one by one meter squares effectively limited understanding of the stratigraphy to the point where the discovery of thin but extensive stratigraphic layers was impossible.

In Buchner's (1988) published description of the geochronology of the site (table 2), Bed A is a shallow, sandy clay loam and Bed B is a clay loam. These two beds represent the Selkirk occupation. Beds C, D and E are sandy loam, dark clay loam and sandy loam, respectively. Together, they represent the Blackduck and horticultural occupations that are, in this scheme, synonymous although not entirely coterminous at their early end (Buchner 1988). Bed F is a clayey loam

and contains only Laurel associated artifacts. Bed G is a discontinuous silty loam and appears to represent the separation between the Laurel and Larter/Pelican Lake occupations. Bed H encompasses the pre-ceramic Larter/Pelican Lake occupation and is described as silty clay. Bed I has no cultural affiliation and is described simply as clay (Buchner 1988).

As it turns out, not only did the 1984-1986 excavations miss key cultural layers within the limits of the cultural deposits at that time, the excavations were also halted at least one meter too soon. Furthermore, when one begins to compare these layers with MacNeish's original work, the Historic Resources excavations are one layer behind those described by MacNeish from the beginning (1958). Due to a combination of the presence of a discontinuous, indistinct layer and an inaccurate description of the stratum by MacNeish, Buchner's "Bed F" encompasses only a portion of MacNeish's "Zone F". The final result of all this is the mistaken belief, recorded in the 1984-1985 and 1986 reports, that Bed H was both Larter and pre-ceramic and that Bed I was pre-cultural. These reports also show the Laurel occupation as occurring exclusively within Bed F and the horticultural layer as occurring within Bed CDE. These are critical errors when it comes time to interpret both the depositional processes and the occupational chronology at EaLf-1.

6.4.5 1987-1988 stratigraphic reinterpretation

It is difficult to over-emphasize the fact that the stratigraphic layers at EaLf-1 are, with experience, strikingly obvious. So, while errors can, and have been made in the past, it is not difficult to correlate what was found in 1987 and 1988 with what has been written by past project leaders. This also applies to the

field notes. Where bed designations may be called into question, one can return to the notes and correct the problem if the original excavator wrote even a moderately detailed description of the stratum. The stratigraphic reinterpretation, which resulted from the 1987 and 1988 field seasons arose out of a combination of necessity and curiosity. The following section outlines the result of the revision (table 3; figure 11).

Because a portion of the 87-88 stratigraphic reinterpretation is critical to my thesis, I will describe the strata and the associated artifact assemblages. (see table 4 for an explanation of the stratigraphic schemes and their relationships to one another). The 1987-88 reinterpretation did not involve any re-designation of Buchner's stratigraphic beds (figure 12), instead new layers were discovered and the cultural contents of the old ones were re-evaluated. The results of this work are discussed below.

According to the 1987-1988 excavations, from top to bottom the strata are labeled:

6.4.5.1 Bed A: Bed A, the uppermost bed, is described as a sandy clay loam horizon (Daly 1986). The humus aspect of this layer contains the present sod layer overlain by compact silty clay. It is safe to say that this is a buried remnant of the 1950 flood. This layer is unequivocally modern and contains all the refuse of, and disturbance associated with, a modern campground and fishing spot. There have been subsequent, smaller floods but the fact that there are no other buried sod horizons would indicate that other floods since 1950 have not left behind a thick enough layer of river silt to impede the growth of the grass.

Beneath the buried sod are the remains of an old gravel road whose

thickness and depth below surface vary predictably with the distance from both the river bank and the new gravel road. Closer to the bank, the roadbed is thinner, deeper, and more diffuse, becoming thicker towards the new road, which is further from the bank. It seems that this area has provided river access to successive generations of returning fisher folk who have kept the distance between the road and the riverbank relatively constant through time. Such constancy is likely dictated by a combination of memory, practicality, and safety. As the bank erodes, the roadbed moves eastward toward the current access.

Included in this layer is a portion of the underlying humus that shows that there has been some previous plow disturbance. The difference between lower Bed A (the plow zone) and upper Bed B is primarily textural and not detectable except by "feel". Soil color is identical, but the unplowed portion is blockier and better developed. This lowest portion of A, the textural distinction, is referred to in the notes as the plow zone, and is merely a repeatedly plowed bed B.

Cultural deposits in Bed A are primarily from the early homestead period through to the present. Evidence of disturbance is apparent in the mixing of Precontact Period artifacts with later historic materials.

6.4.5.2 Bed B: Bed B is described as a clay-loam horizon present across the entire extent of the site (Daly 1986). This bed is a blocky, well-developed organic stratum containing some clay, grass rootlets, and decayed tree roots. The cultural remains consist of homestead period artifacts in the upper portion of the layer and Late Precontact cultural remains that have been attributed to the Selkirk occupation (Buchner 1986, 1988). It should be pointed out that the whole concept of Selkirk as a phase, horizon, or ceramic unit has recently been reviewed

(Lenius and Olinyk 1990; Meyer and Russell 1987). In the investigation of the 1987-1988 materials, no classic "Selkirk" rims were identified (Flynn and Kogan 1991).

Bed B has only minor plow disturbance and contains the remains of the Precontact peoples who stayed there to fish. As Bed B terminates, it becomes markedly sandier, finally terminating in a very thin horizon of fish scale, bone, and other cultural detritus.

6.4.5.3 Bed B/C: This bed is not mentioned in any of the end of season reports up to and including 1986. Subsequent to 1986, it was referred to as the "organic layer". For the purposes of this study, this is the most critical stratum, and the one that was left undiscovered until 1987. In this thesis, this layer is referred to variously as the organic layer, the horticultural layer, or the horticultural occupation.

The organic layer occurs immediately beneath the overlying sandy transition zone. The stratum is very thin; but it is as distinct as it is thin when excavated correctly. It consists primarily of fish scale and bone mixed with other cultural deposits, including non-fish faunal remains, charcoal, ash, worked flakes, lithic microdebitage, finished stone tools, rim and body sherds, bison scapula hoes and hoe fragments, and other bone tools. Charred plant remains, including those identifiable as maize and the occasional charred maize kernel have been recovered as well. It is important to keep in mind that these artifacts are unique in both their number and association. Prior to their excavation at EaLf-1, maize, storage pits, scapula hoes, and unusual ceramics had not been recovered together at any other site in Manitoba. This set of associated artifacts is unique in

the province so far.

This organic layer occurs as a fairly evenly distributed sheetwash, described by Hems (1997) as a "widespread 'organic lens' ", across the length and breadth of the site. It caps virtually all of the features attributable to the horticultural component. In fact, if one examines the original feature records, field notes, and wall profiles from seasons prior to 1987, it is clear that this layer caps the majority of all features uncovered in the five years of excavation at the site. In the seasons preceding 1987, this layer was recognized as a series of separate features which were functionally identified as hearths, refuse dumps, or fish processing areas (Buchner 1986; Flynn 1987). It is now apparent that all of these features are merely different portions of the organic layer.

The importance of this apparently small error should not be underestimated. Prior to the discovery of this stratum in 1987, it was perfectly reasonable to state that the horticultural material was contained within the Blackduck layer, a non-horticultural Late Woodland occupation. The failure to recognize the organic layer as a discrete stratum made the two components appear as one. Once CDE and the organic layer are excavated separately, it is evident that the horticultural and Blackduck components are also quite separate and that the layers containing them are very different both culturally and depositionally.

The organic layer itself is composed largely of imbricated fish scale. However, none of the underlying material is well sorted, nor is it "clean" (i.e.: many sherds retain charred deposits on both the interior and exterior surfaces), or water rolled. These facts, taken together, suggest that neither the distance over which the material was transported nor the velocity of the floodwaters was

terribly great. It is likely that these materials were merely undulated and gently resorted. The material is probably the product of a midden or patchy camp refuse that has been subsequently distributed only very slightly downstream of its original location. The fact that this refuse caps so many associated features also supports this argument.

Where deposits of cultural material are thick, this layer is always referred to as the Organic Layer. Where these deposits are very scattered or absent, the layer is simply referred to as Bed B/C. Regardless of whether there are recognizable cultural deposits or not, it is still critically important to recognize and separate this layer from both the over- and underlying deposits.

This layer is composed of cultural remains that have been reworked and redistributed through the action of a considerably smaller flood than that which created the CDE deposits. A shallow sand layer mixed with Bed B deposits caps this layer. The distinction between the bottom of B and the top of C is somewhat blurred by the fact that people apparently moved onto the surface almost immediately after a flood. Subsequent bioturbation has further obscured the clarity of the distinction between these two beds.

6.4.5.4 Beds C, D, and E: Beneath the "Organic Layer" is a series of three beds whose individual distribution across the site tends to be somewhat variable. Hence these beds have been treated as a single unit in previous reports (Buchner 1986, 1988; Flynn 1987; Flynn and Kogan 1991). The beds can be effectively distinguished from one another by a combination of colour, texture, composition, and contents even though their presence is not entirely consistent from one excavation unit to the next. Bed C is a layer of finely laminated sands

and silty clays. Cultural remains within this layer are exceedingly rare. Bed D is composed of coarser deposits -- a mixture of clay, coarse and fine sands, and small gravel -- although this varies across the site (Daly 1986). Bed E consists of fine white sands with no cultural material whatsoever. This matrix is indicative of rising floodwaters. Bed D is likely the crest of this flooding. The size and mixing of the deposits indicates maximum water velocity and water containing materials both cultural and non-cultural scoured off of the surface of what is now called Bed F (Daly 1986). Bed C indicates retreating floodwaters. The silt layer represents the last and lightest of the scoured material from Bed F and only the occasional small artifact are present within it.

The overwhelming majority of cultural recoveries from Bed CDE are from Bed D and attributable to a Late Woodland occupation. This layer contains many larger rim and body sherds, stone tools, debitage, and larger faunal remains. Bed CDE is relatively thick, up to 50 cm deep in places, and according to Daly (1986), the deposit is consistent with a single flood event which removed a portion of the underlying stratum (Bed F) and redeposited it in CDE. The sherds and tools frequently emerge quite clean, without evidence of charring or any other deposits and some of the ceramics appear to show evidence of water transport; a small proportion of these are lightly abraded or rounded in appearance. The artifacts in Bed D are probably still local in origin. Daly (1986) suggests that they were present in the underlying Bed F up-slope of their present location. These artifacts do not represent a primary cultural deposit. This is a crucial point, since it clearly indicates that Bed D is not an occupation floor contrary to Buchner's interpretation (1986, 1988).

As already mentioned, Bed D is the result a very large flood. The

obviously high sediment load may be the product of precipitation following a prolonged period of drought. With desiccation, there is proportionally more soil available in the drainage basin for potential transport. The loss of vegetation and ground cover destabilizes the soil so that when rain finally does occur much material is carried away. The result is a much greater sediment load than might otherwise have been expected if the conditions were less arid (Hassan 1985).

Between Beds E and F is a very thin layer of charcoal, the interpretation of which is uncertain. This layer may indicate a large grass or forest fire or it may be the remains of a burned cultural layer. At no time was enough of this layer exposed to permit a reasonable interpretation and it was never given its own stratigraphic designation.

6.4.5.5 Bed F: With the exception of rodent disturbances, Bed E clearly ends where Bed F begins. Bed F is a very dark brown, rich, organic sand loam -- a developed paleosol with cultural deposits attributable to both Blackduck and Laurel occupations. There is Blackduck material in the upper half of Bed F, while the Laurel material tends to be in the lower half. This is not to say that there is no mixing of these two occupations, but the ceramic assemblages are fairly distinct. The rich, heavy, and organic nature of the Bed F deposits indicates a considerable period of soil stability. The cultural materials within this layer are evenly distributed throughout, and living floors are difficult to define. How much of Bed F was lost due to flooding is unknown.

6.4.5.6 Bed G: At the base of Bed F, the deposits become lighter in color, more compact, mottled, and disturbed looking. Deposits consist of mixed sands,

silts and clays and the layer itself is unevenly distributed across the length and breadth of the site (Buchner 1987; Daly 1986). There are few cultural remains within this layer. In 1987 and 1988, this bed was referred to as Bed G. Daly's 1986 soil report states that there are gravel deposits closer to the bank and that the stratum is indicative of a lesser beach formation. I am inclined to regard this as another episode of flooding, albeit less severe than that indicated by Bed CDE.

6.4.5.7 Bed H: This bed is relatively well understood and quite consistent (in its matrix at least) in all of the excavations occurring under the auspices of Historic Resources Branch. It is a tightly packed bed of olive-tan silty clay that becomes denser and more difficult to excavate the deeper one goes. Bed H has higher clay content than all the other beds. This is probably a combination of compaction and the greater period of time over which the organics have had to decay rather than greater absolute clay content.

Contrary to the 1984 - 1986 site reports, the cultural deposits within this layer are not Larter "culture" and the bed itself is by no means pre-ceramic. This error may be partially explained by the locations of the excavation units, since the earlier cultural deposits seem to increase somewhat in density towards the northern end of the site. The 1984-1986 excavations focussed primarily on areas marginally to the south of those in 1987 and 1988 so that the ceramics coming out of H were fairly easy to dismiss as "anomalous" and, therefore, insignificant. In 1986, enough ceramics were recovered to render the assertion that the stratum was pre-ceramic questionable. By 1987 and 1988, the ceramic evidence from Bed H became indisputable. It is now quite clear that both Beds G and H contain ceramics attributable to the Laurel complex. There is also pottery from

Bed H that appears to be different from the Laurel ceramics. The ceramics beneath the Laurel deposits remain unidentified. The sherds are morphologically similar to Laurel ware, but the body sherds are either cord roughened or net-impressed rather than smooth.

6.4.5.8 Bed I: In the earlier site reports and Daly's soil report (1986), this layer was supposed to represent glacial Lake Agassiz clays. However, the recovery of cultural deposits within and below this layer effectively negates this interpretation. Unlike Bed H, Bed I is clearly pre-ceramic and may represent the Archaic Larter/Pelican Lake occupations as originally described by MacNeish (1958). The stratum is composed of compact, yellow-gray clay that contains few cultural remains. The artifacts are entirely lithic and the vast majority of these are of Selkirk chert. There are no ceramics of any kind in this bed.

6.4.5.9 Beds Below Bed I: Because the 1984-1986 excavations stopped at level 40, the bed designations below Bed I were a product of excavations in cutbank exposures below the site. Thus, in 1987 and 1988, excavators encountered stratigraphic layers that were not described in the earlier Historic Resources Branch reports, yet were also clearly related to the National Museum's excavations of the 1950's. We were caught in a dilemma -- to continue on with letters through J, K and L which would further confuse the issue and possible duplicate already existing bed designations in Buchner's earlier reports, or we could stop with 'I' and distinguish the lower beds another way. We chose the latter.

Below I are Beds I1, I2 etc. These consist of alternating layers of flood,

burn, and cultural deposits. In one of these layers, at three meters below surface, we located a single feature containing highly decayed bone, charcoal, and non-diagnostic flakes of Selkirk chert. Unfortunately, there was nothing to permit assignation to a cultural phase or group.

One must bear in mind that many of the 1984-1986 radiocarbon dates are based on loose charcoal. Since rodent and flood disturbance are and were both ongoing on the site, the validity of some of these dates could be called into question. Later, a series of AMS dates were run specifically on recoveries from the horticultural occupation. These are more tightly clustered and possess much tighter standard deviations (table 5; figure 13)

6.4.6 Lockport as it was initially understood

Buchner (1988) saw the Lockport site as manifesting a standard northern Plains/Boreal forest chronology beginning with a Plains Archaic big game hunting culture (Larter) in Bed H, ranging from 1350 to 365 BC (uncorrected dates). Following this, the Middle Woodland Laurel culture dominated the site in Bed F from 200 BC to 832 AD. The Laurel-Blackduck transition took place ca. 800 AD, with Blackduck prevalent at the site in Beds C, D and E from 832 AD to 1488 AD. The Selkirk component at Lockport begins ca. 1400 AD and ends with contact (Buchner 1988). Buchner (1988: 30) also suggests that the Blackduck occupation is the richest and most productive at the site and that the horticultural occupation "occurs entirely within the Blackduck component". This occupation, he states, spans the period from 1150-1500 AD, while the stratigraphic position of this episode is from the Bed B/C interface to somewhere in the middle of Bed E. Finally, he also points out that Bed D is the most productive bed and, therefore,

representative of peak population densities. He believes that this is entirely consistent with a horticultural occupation. Buchner assigned the non-local ceramics present at EaLf-1 to Cambria Ware within the Initial Variant of the Middle Missouri Tradition (Buchner 1986, 1988).

Except for the fact that the names of the archaeological cultures have been updated, this interpretation reinforces the work of MacNeish at the site in the early 1950's. MacNeish's Selkirk Focus becomes the Selkirk Phase, both of which still reside in Bed or Zone A. The Manitoba Focus of Zone C becomes the Blackduck phase of Bed CDE. The Nutimik focus of Zone E becomes the Laurel phase of Bed F. The Anderson Focus is not accounted for, and the Larter Focus of Zone H becomes the Larter/Pelican Lake phase of Bed H. The major difference is that MacNeish suggested the bell-shaped pits, scapula hoes, and shell tempered pottery were part of the Selkirk Focus of Zone A. Buchner (1986, 1988), on the other hand, placed the horticultural occupation within the Blackduck occupation of Bed CDE. The problem, of course, is that MacNeish's stratigraphic designations were pasted onto a finer grained reading of the layers. Therefore, MacNeish's Zone A includes everything to the top of Buchner's Bed C. MacNeish's Zone B is, without doubt, Buchner's Bed C. His Zone C is Buchner's Bed D, Zone D is Buchner's Bed E, and Zone E is Buchner's Bed F. Buchner's Beds G and H are MacNeish's Zone F. Clearly Macintosh's pre-ceramic Larter Focus occupation does not occur until well into Buchner's Bed I, where there is clear evidence for alternating layers of clay and charcoal (MacNeish's "burned floors").

6.4.7 Revision of Lockport chronology

Based on this re-reading of MacNeish it is apparent that Bed H is not a Larter occupation as suggested by Buchner (1986, 1988). This occupation occurs much lower down in one of the beds below the top of Bed I. Bed H does possess ceramics although their affiliation has not yet been assigned. It is clear that these ceramics are either early or pre-Laurel. Bed G, a bed that was written off as too disturbed to be useful, actually contains Laurel artifacts. This fact is important because there were many interesting artifacts which were not included in the report because of the assumption that Bed G was disturbed. Bed F grades through Laurel to classic Blackduck and probably to transitional Blackduck/Rainy River Composite. Bed E is sterile sand. The bison scapula hoes from Bed E mentioned by Buchner and used to support his contention that the horticultural episode is nearly 400 years long could have been part of a sub-floor hoe cache. This could have been part of an unrecognized feature because the person who excavated these hoes was rather inexperienced and may have had some difficulty recognizing a feature. Unfortunately, there are no profiles for this unit, which would allow for confirmation of this hypothesis. However, Bed E is sterile virtually everywhere else on the site. Moreover, most of the horticulturally associated pit features cut through Bed E. These facts, combined with the knowledge that other horticultural sites have similar sub-floor caches, suggests that this may be the most reasonable explanation for the presence of hoes in an otherwise sterile layer.

Bed D consists of a mixed deposit of Blackduck and Rainy River materials. Bed C is sterile. Both are, as already discussed, part of the same flood event. Therefore, while Bed D remains the richest deposit of artifacts on the site, it is not

a living floor and its apparent richness may be a result of the removal of the finer fractions of the soil matrix by flooding.

Bed B/C and the Organic Layer contain the horticultural occupation which likely then spans far less than the 350 years suggested by Buchner (1986, 1988). The AMS dates for this layer suggest a possible range between mid 1300's to mid 1400's AD. Later, I present evidence that that this occupation is strongly affiliated with similar such sites on the upper Red River to the south in eastern North Dakota and western Minnesota. Bed B is a post-Blackduck Late Woodland occupation whose exact ceramic affiliation is in need of revision or at least reconsideration.

It is immediately apparent by comparing initial and revised understandings of the Lockport cultural chronology that the earlier interpretation, as one would expect in the early years of an extended project, was somewhat oversimplified and a little too stratigraphically convenient. The occupations do not lend themselves neatly to single, well-defined beds, making the absolute dating of these occupations somewhat more difficult. The whole idea of a neat, linear progression from one occupation into the next begins to fall apart in the revised version. This may be less archaeologically convenient, but does mesh better with what is known about human socio-cultural behaviour and about cultural dynamics on the Northeastern Plains. The relationship of the horticultural occupation is the focus of the ceramic analysis and the interpretations of this work will be discussed in greater detail in subsequent sections.

6.5 THE ORGANIC LAYER: IMPORTANCE

As already stated, this "organic layer" has provided the impetus for this research. The matrix material has already been discussed above (fish scale and bone, microdebitage, potsherds, stone tools, mammal bone, etc.). The sheer density of cultural material suggests that this layer may be the redistributed remains of a midden/middens or the remains of an intensively occupied campsite. The fish scales are imbricated and lie atop almost everything else. This suggests that low velocity water transport was the means by which the layer came to be redistributed across the site. However, the presence of fish scale, extremely small artifacts, and organics also indicates low water velocity. This counters any argument that the materials are anything other than local in origin. Moreover, this layer and the underlying features are very clearly associated. All of the organic layer, as well as the pit features and the hearths contain unusual, but stylistically similar ceramics, maize, maize plant fragments, and scapula hoes. Together, these features and the organic layer provide the bulk of the evidence for the horticultural occupation.

6.5.1 Evidence for horticulture

6.5.1.1 Artifacts

The ceramics are unusual for a number of reasons. First, with the exception of those directly across the river (McKinley 2001, Whaley and Dobson 1997), these are stylistically unlike those generally understood to be locally manufactured at that time. These differences are both morphologically and decoratively reminiscent of Northeastern Plains Village horticulturalists (figures 14 and 15). By way of contrast, the local Late Woodland ceramic sequence

generally exhibits a high degree of stylistic uniformity within each phase or composite, whereas the ceramics in the EaLf-1 horticultural occupation are highly variable in both morphology and decoration. While unusual, ostensibly non-local, ceramics are not in and of themselves evidence for horticulture, these ceramics occur in conjunction with other artifacts, such as scapula hoes (figure 16) and large storage pit features (figure 17) (discussed below). Together these represent a more or less typical horticultural assemblage from the Middle Missouri, Upper Mississippi, and upper Red River.

The other artifacts of interest are the numerous hoes made out of bison scapulae (Roberts 1991). While it is arguable that the presence of hoes does not necessarily mean the presence of maize growers, the recovery of the hoes with the other horticulturally associated items in the assemblage adds significant weight to the assertion that the maize recovered at EaLf-1 was locally grown. Scapula hoes are abundant at the Lockport Site (Roberts 1991). To date, they number over a dozen (including those recovered by MacNeish), but are extremely uncommon in the rest of Manitoba. The only other site with even the possibility of such hoes is the single "probable scapula hoe" (Nicholson and Hamilton 1997) from the Lovstrom site excavated by Bev Nicholson of Brandon University. As yet the Lovstrom site lacks any evidence of either storage pits or corn, and the distal or working end of the hoe is missing (Brett Waddell, pers. comm. 1991). For this reason, any solid assessment of the presence of maize horticulture at the Lovstrom site awaits further excavation there. At this point Lockport remains unique at this northerly latitude.

6.5.1.2 Features

Features found at EaLf-1 include the large (figure 17) and small bell-shaped storage pits (Buchner 1986; Flynn 1987; Hems 1997) (figure 18). Some of these have been back filled with site refuse, while others have simply been back-filled with soil. Hearths frequently contain unusual ceramics, as well as maize kernels, and maize plant fragments. The Organic Layer itself which may be regarded as a single, large feature -- sheet refuse -- contains unusual ceramics, bone and stone tools, scapula hoe fragments, and carbonized maize plant remains.

The storage pits, which include twelve excavated features at EaLf-1, have a size and shape very different from most other known storage pits at other sites in the province. There is a single similar example which has been reported from southwestern Manitoba at DgMg-15, a site dated ca. 1480-1740 AD, but it has only been suggested as a possible storage pit in tentative terms (Syms 1974).

6.5.1.3 Floral Evidence

The floral evidence for horticulture comes from soil samples collected throughout the duration of the project. Samples were collected from all stratigraphic layers including the organic layer according to guidelines provided to project staff by Dr. C. T. Shay. All of these samples were processed by Dr. Shay and his staff at the University of Manitoba using a flotation method developed by him especially for recovering small seeds and other plant remains from archaeological samples.

Work on the floral aspect of the analysis has been ongoing for nearly a decade and has revealed evidence for the local cultivation of maize in the form of

charred maize cupules and kernels (Deck 1988; Deck and Shay 1992). The most recent publication on the Lockport plant remains (Deck and Shay 1992) reports the results of sixty-one processed samples, forty-four of which were from the organic layer (Bed B/C). Within these 61 samples, maize was the only cultigen recovered. This maize has been identified as "the Eastern Complex eight-rowed variety" and consists of both charred kernels and plant cupules (Deck and Shay 1992: 38). Recoveries of maize came from two hearths, two of the bell-shaped pits, one basin-shaped pit, the organic layer itself, and from some of the non-feature samples from Bed B/C. Apparently, there was also one wild legume recovered which resembles a bean but it was too charred to permit proper identification (Deck and Shay 1992). So far, this discovery is unique at this northerly latitude during the Precontact period.

The typical configuration of species when maize is present is usually the well-known maize beans and squash triad. However, these are not common on the Northeastern Plains and, in this area at least, seem to be largely confined to sites in or near the Middle Missouri sub-area. Other domesticates common to the Middle Missouri sub-area, but which are not found here include sunflower and tobacco (Deck and Shay 1992). These omissions from the suite of domesticates may be significant and lend weight to the assertion that the people who brought maize to the Lockport site were probably not directly related to Middle Missouri groups such as the Mandan and Hidatsa.

There were many other plant species recovered from the Lockport samples. Apparently the most frequent seed type recovered was that of goosefoot or *Chenopodium*. This seed was recovered from all three of the major occupations in both its charred and uncharred state (Deck and Shay 1992). The

authors suggest that this plant was probably harvested for food since the seeds are very rich in protein. *Chenopodium* was domesticated in some parts of eastern North America for this reason. Other seed recoveries include hazelnut (*Corylus americana*), wild cherry (*Prunus sp.*), raspberry (*Rubus sp.*), and strawberry (*Fragaria sp.*). Pigweed (*Amaranthus*), dock (*Rumex*), and knotweed (*Polygonum*) were also recovered from Bed B/C and were considered food plants by Native Americans (Deck and Shay 1992).

This configuration of species is common to sites with maize horticulture in North and South Dakota. It can be seen in sites on the James River, a tributary of the Missouri, and at the Shea site on the Maple River, a tributary of the Red River in North Dakota (Deck and Shay 1992, Michlovic et al. 1995, Michlovic and Schneider 1993).

6.5.1.4 Associations

The features contain unusual ceramics, caches of hoes, and charred maize kernels (Buchner 1986; Flynn 1987; Hems 1997). The organic layer contains scapula hoe fragments, unusual ceramics, and charred maize plant fragments, as well as the occasional charred maize kernel (Flynn 1987; Hems 1997). The organic layer, as discussed above, caps the features containing these items. It is quite certain that the artifacts, the maize, and the pit and hearth features are all associated with the organic layer. Because this layer caps all these, their relationship to each other is well established and these items are distinct from both the over- and underlying occupations.

Both the organic layer and features contain excellent evidence for a maize growing complex, including the charred maize kernels and maize plant

fragments, the scapula hoes, and the "exotic" pottery. While it has been suggested that there are certain affinities with the Plains Village groups of the Middle Missouri sub-area (Buchner 1986), the precise cultural affiliations are not yet entirely clear. The most diagnostic artifact class in the Lockport horticultural assemblage is obviously the ceramics. At this point, the only proposed relationship has been to Cambria ware from southwestern Minnesota and southeastern North Dakota (Buchner 1986). In this portion of the Northeastern Plains, the Cambria phase spans approximately 300 years between 1000 and 1300 AD. Typical assemblages include bell shaped pits and scapula hoes (Anfinson 1979b). This phase is generally viewed as a brief Plains Village intrusion into the eastern Woodlands (Anfinson and Wright 1990). Unfortunately, this suite of artifacts -- bell shaped pits, scapula hoes, and maize, is not particularly definitive. These attributes characterize the maize growers of the Middle Missouri villages and many of the Mississippian horticultural sites as well. This set of associations can, therefore, be considered diagnostic only on the most general level.

One persistent problem remains the lack of any visible dwellings or fortifications. The form of both of these is important when attempting to ascertain the precise affiliation of a horticultural assemblage such as this. There are several alternative explanations for the lack of these features at EaLf-1:

1) These features were never present and the assemblage is representative of a less well understood horticultural group;

2) These features were present but remained undetected due to an excavation strategy not amenable to their discovery;

3) These features are still present and remain unexcavated in another portion of the site;

4) These features were removed unnoticed in an earlier phase of excavation;

5) These features were present on a portion of the site which was earlier destroyed either by flooding, fill removal, or by the extensive disturbance resulting from the construction of the lock and dam; and/or

6) These features are present somewhere else entirely and the site is only representative of the garden plot aspect of a fully horticultural village.

I am inclined to believe that there never were such remains at the site. Given that the burial mounds are well known even though plowing and excavation have mostly denuded them, there should have been some mention somewhere of fortification ditches and earthlodge pits at the site if they had been present. We have the storage pit features. If they correlate with the presence of dwellings, then there is no evidence of depressions associated with them. Nor is there any mention of it in the literature.

Because there is no evidence of dwellings at the site and because the other artifact classes (pits, hoes, and maize) are only loosely diagnostic, any assessment of cultural relationships at Ealf-1 must, of necessity, rely on the ceramics. The question then becomes to what other ceramic assemblage, if any, do the Lockport ceramics show the greatest similarity? It may be that the close relationships between all of these ceramics preclude any precise identification. However, ceramic styles, while by no means cut and dried, do show a certain degree of regional variation (Syms 1985). Recent research focussing largely on ceramics in North Dakota and Minnesota have resulted in significant advances in the interpretation of cultural dynamics on the Northeastern Plains and in the western Woodlands (Ahler 1984; Gregg 1985, 1990; Michlovic 1990; Michlovic and

Schneider 1993). Moreover, since no systematic analysis of the Lockport ceramic assemblage has been attempted, any examination of the ceramics has enormous potential to shed light on this problem. Still, Lockport's unique position on the threshold of a number of different environments renders the problem of untangling the nature of inter-group relationships especially interesting, if not more difficult.

6.6 Lockport and its Relationship to the Local Chronology

The relationship of EaLf-1 to the local chronology is not as simple as previously thought for three reasons:

> 1) The entire understanding of the later portion of the local chronology has been subject to recent major revision (Lenius and Olinyk 1990);
>
> 2) The initial interpretation of EaLf-1's cultural chronology was based on a misreading of MacNeish's work, and on an understanding of the stratigraphy which did not separate the organic layer from the underlying beds; and
>
> 3) It appears that the horticultural occupation at the Lockport site was at least briefly tied into an intricate mid-continental horticultural complex with a diverse set of correlations ranging east, west and south to the Oneota, Middle Missouri Plains Villagers and Middle Mississippian peoples, respectively, all of which are non-local cultural configurations.

6.7 Summary

During five consecutive field seasons from 1984 to 1988 a series of unusual recoveries and associations were unearthed within the so-called "organic layer" at EaLf-1 (Lockport, Manitoba). Maize, exotic-looking ceramics, large bell-shaped

storage pit features, and bison scapula hoes were all discovered in close stratigraphic association. It is important to note that such evidence such for the cultivation of maize is exceedingly rare north of the Missouri River drainage system and west of the Great Lakes. Within Manitoba itself, outside of EaLf-1, there is, as yet, no unequivocal evidence for Precontact maize horticulture. The evidence for Precontact horticulture at Lockport is confined to a single, thin, distinct stratum; this is an important consideration but one which was only recognized during the final two years of the project. Unfortunately, the preliminary report and its accompanying interpretation had already been released (Buchner 1986, 1988). The result of this has been the premature establishment in the literature of the development of maize horticulture within the in situ "Blackduck" occupation. This has been suggested to be the product of intermarriage between Late Woodland (presumably Blackduck) hunter-gatherer men and Middle Missouri Plains Village women (Buchner 1986, 1988; also see Kroker 1990).

With the subsequent recognition that the horticultural component is stratigraphically separate from the Buchner's Blackduck occupation, it becomes clear that the horticultural and Late Woodland occupations are distinct, not "one and the same" as previously believed (Buchner 1988). The unexpected discovery of a horticultural component on the lower Red River, together with a better understanding of the site chronology makes it possible to address and reinterpret regional cultural inter-relationships. It is also possible to forward a provisional explanation for this northerly manifestation of maize horticulture that embraces the complex and dynamic interactions that shaped the development of Precontact cultures within and around the Red River.

Preliminary analysis suggests that there is evidence for the influence of both Woodland and Plains-Woodland cultures in the EaLf-1 ceramic assemblage. This means the ceramics are not strictly Woodland, nor are they Plains in their morphology. However, the nature of the relationship between the Plains and the Woodlands is still poorly understood. Therefore, the unusual nature of the Lockport Site assemblage presents certain difficulties; the early assessments of the site (Buchner 1986; Flynn 1987) imposed the classic Woodland triad of Laurel, Blackduck, and Selkirk occupations. This imposition was premature and the site was committed to a strict Woodland chronology with too little consideration of the anomalies. In fact, the reinterpretation of the site stratigraphy presents clear evidence of a major disjunction in the artifact assemblage. The appearance of bison scapula hoes, corn horticulture, and unusual ceramics are restricted to a single thin occupational layer that also caps the storage pit and hearth features. Major disjunctions of this nature in the occupational history of a site certainly suggest the possibility of a migration. Ceramics, analyzed in the following chapter, should point to a potential home for the horticulturalists.

CHAPTER 7
METHODS AND TECHNIQUES

7.1 METHODS: POTTERY ANALYSIS

Archaeology has had a long affair with pottery, although the reasons for this affection have varied through time. Pottery lends itself to so many different types of analysis -- from the purely aesthetic to the purely chemical (Rice 1987). As one might expect, the archaeologists' view of pottery has changed as practical and theoretical priorities have changed within the discipline. This relationship began at a time when interest in pottery was primarily antiquarian and ceramic analysis was used provide proof of authenticity to collectors and museums (Rye 1981). As more data were collected, and archaeology became more scientific in its orientation, pottery was frequently employed as a chronology building tool (Rye 1981) to assist in the creation of regional culture histories at a time when culture history was one of archaeology's primary objectives. Throughout the middle decades of the twentieth century, while Processualism dominated the theoretical milieu, archaeologists used pottery to make behavioural inferences. It was also at this time that archaeologists realized the scientific potential of ceramics, and developed an impressive array of analytic techniques for use on potsherds (Rice 1987). Later, it also became the focus of debates about style versus function and, subsequently, about power dynamics within and between societies as Post-processualist archaeology came to the fore.

Among these many different perspectives, our concerns with discard behaviour, activity areas, residence patterns, style, function, migration, diffusion, mortuary behaviour, culture history and socio-politics, one thing has remained constant. While we recognize that ceramics are a very sensitive class of artifact

Braun (1983) points out that in examining the various changes in pottery traits we have often forgotten to ask ourselves why things change. Pots operate under a variety of mechanical, environmental, and social constraints (Braun 1983). Archaeologists often neglect to consider all of these factors, becoming lost in the detail of chronology building. With the eyes of a potter, Rye (1981) observes that archaeologists are almost always concerned with the artifact itself, the end product of a series of choices. Potters, on the other hand, are concerned with process. This is a critical, yet frequently ignored distinction since, as one quickly discovers when one puts hand to clay, very different processes and techniques can produce very similar end results. By ignoring the underlying processes in the creation of a pot, we risk missing critical details that distinguish superficially similar vessels. "Many details of the process cannot be differentiated in archaeological specimens ... culturally significant variables may be obscured and ... similar effects can be produced by different methods" (Rye 1981: 1).

In other words, the details over which archaeologists have spent so many hours in deep meditation, are frequently those that most lend themselves to replication by another potter. In my experience, I have found the easiest portions of a vessel to replicate are decorative elements and vessel shape. Conversely, the most difficult are the technical attributes such as surface treatment, temper size and density, paste texture, and the tool marks left behind during the manufacture of the vessel. If my goal is to distinguish vessels made by potters operating in different cultural milieus then these are the details on which I should focus my attention during the analysis.

Shepard (1956), Rye (1981), Arnold (1985), and Rice (1987) were among the first to produce publications on ceramics for archaeologists that gave

consideration of a potter's perspective. Not only did they avail themselves of some of the best technical literature available to potters at the time; they also endeavored to arrive at a reasonable understanding of ceramic manufacture itself. Recently, there have been increased efforts to obtain a clearer understanding of the actual production processes (Schiffer and Skibo 1997) but these are still largely theoretical and fall short of any real practical experiments.

Undertaking to make pottery directly engages us in the very process we are attempting to understand. Making a pot quickly leads one to the conclusion that archaeologists have been overly focussed on the external variation we generally regard as stylistic (decorative attributes, vessel shape etc.) while ignoring more subtle technical characteristics. While the former are certainly meaningful, there are less obvious features of sherd and vessel that are equally meaningful, if not more so. Attributes such as temper type, temper size, paste texture, exterior surface treatment, and wall thickness provide as much or more information about the potter and her milieu than some of the more obvious decorative elements.

Rice (1987) encourages archaeologists to pay close attention to these less flamboyant, technical attributes because they can reveal more about the actual means by which a pot is constructed. That is, they reveal information about the choices made by the potter as she determined her clay source, selected and processed the tempering material, made and used her tools, formed, decorated, and finally fired her vessel. Because this process not accidental or random, all the myriad choices made by the potter at each step along the way can reveal much about the culture and environment in which she operated. By extension, if we focus our attention on these details during the analysis itself, presumably we will

arrive at some understanding of the potters' choices; then, as these fundamental attributes change we can thereby detect certain changes in the cultural milieu.

Ceramic characterization is "the qualitative and quantitative description of the composition and structure of a ceramic so as to evaluate its properties and uses" (Rice 1987: 309). Since pottery technology exists at the juncture where cultural and environmental systems directly interact, it is possible to use the properties of pottery to answer many different questions (Rice 1987). Technological properties exist independently of vessel shape, decoration etc. -- qualities generally used by archaeologists in ceramic analysis. These properties are a useful tool with which to compare, create new, or test the validity of existing typological groupings (Rice 1987). The analysis of technological attributes is also effective in the absence of whole vessels since one is examining traits that are present in the fragments as well as the vessel. In fact, the physical properties of the pottery:

> ...include a broad range of characteristics that relate rather closely to the procedures of selecting and preparing resources and forming and firing a vessel, and to the vessel's final appearance and use. As such, they can be considered to reflect more directly the choices potters make from a range of alternatives.
>
> (Rice 1987: 326)

If we view pots as part of the technological environment of a group of people, that is, not just decorative but also functional parts of a tool kit, then changes in technical attributes take on a great deal of significance. Changes in temper size, temper type, surface treatment, wall thickness, rim and lip shape are not random or accidental, but arise out of deliberate choices made by potters to

achieve specific ends. That is, the pot is expected to "perform" in particular ways on a number of different levels (Schiffer and Skibo 1997).

In what amounts to a compact recapitulation of Arnold (1985) mingled with a healthy dose of Braun (1983), Schiffer and Skibo (1997) argue that clay cooking pots possess certain attributes which render them either more or less effective in the tasks to which the they are put. The potter creates these "Performance characteristics" through the technical choices she or he makes. These affect the formal properties of the pot, which then go to affect its performance characteristics in a complex relationship between materials, technique, potter, and the finished product. The creation of a pot with a desired set of performance characteristics requires careful negotiation between conflicting attributes. For instance, if one desired performance characteristic is efficient heat transfer, then thinner walls are a technical choice the potter must make. But thin walled vessels also have lower impact resistance (Braun 1983, Schiffer and Skibo 1997). Therefore, if a pot with efficient heat transfer is required for day to day use, the potter is forced to compromise on one or the other performance characteristic -- strength or heat transfer -- in order to create a pot that is appropriate and effective in the household. The successful creation of a pot, therefore, is achieved by years of experimentation and experience. The end result is a fine balance between conflicting technical choices. The potter, through years of accumulated technical experience, creates vessels with the requisite performance characteristics. Such a fine balance will shift only when the demands on the pot have also shifted. Therefore, seemingly small changes in technical attributes can be used to track larger changes in the social system as a whole (Braun 1983).

Technical choices give rise to formal properties, which give rise to performance characteristics, which in turn, feed back into subsequent technical choices. In this light, the formal properties of any given pot become a whole rather than a set of individual attributes. The dichotomy between function and style becomes irrelevant because the pot and its attributes must be regarded as part of a complex of social behaviours designed to achieve particular goals. As such, variations in the formal properties of ceramics arise out of problems solved in different behavioural, social, and natural environments and must be understood as such. "Only through this systematic research process can one explain artifact designs rigorously and achieve an understanding of technology as a social process..." (Schiffer and Skibo 1997).

For example, examining the relationship between ceramics and subsistence, Braun (1983: 123-4) suggests that temper particle size is an important diagnostic trait since this, combined with vessel wall thickness, can be used to manipulate both "flexural strength" and "resistance to thermal stress" in the finished vessel. These two characteristics must be carefully manipulated if the vessel is to function efficiently. In his sample, Braun (1983) sees a reduction in the density of any particles larger than 1 mm and towards an overall reduction in particle size. This is part of generally increased attention to thermal shock resistance by Precontact potters which Braun suggests is important in extracting digestible nutrients from domesticated plants (Braun 1983, 1987). Simply put, when the subsistence system shifts towards the exploitation of domesticated plants, the pottery must also change since porridges made of seeds must be boiled for a long time in order to make them palatable and digestible. If the pot is to withstand prolonged contact with high temperatures, it must have smaller,

more uniform inclusions or the vessel will break. The trend towards thinner walls therefore, is also part of this process, since thinner walls facilitate more efficient heat transfer between fire and vessel contents (Braun 1983; Schiffer and Skibo 1997). Moreover, temper particle size places certain constraints on wall thickness, the reduction in particle size then allows walls to become thinner by removing large particles in the paste that would otherwise demand a thicker vessel wall. Which comes first then, the reduction in wall thickness or the reduction in particle size?

Therefore, significant differences in the types, sizes, and quantities of different materials employed by potters represent deliberate, conscious choices on their part. These must then be interpreted within a framework in which technological properties are viewed as part of a system of "deliberate human action" which takes place within a broader cultural and historical context (Rice 1987). Raw materials are collected and used in ways dictated by society. These choices reflect larger trends within the social system as a whole; technological attributes may also contain information, messages about the group that made and used the pottery, and they must be interpreted appropriately. The society, its beliefs, rituals, economy, political system, inter-cultural relationships and broader environment must all form part of the analysis as well (Rice 1987), insofar as this is possible with the available information. Pottery analysis can reveal much, although what it reveals can vary greatly depending on the goals of the analyst. For this reason, Rice (1987) enjoins us to begin with a set of clear objectives so that we might choose a set of attributes and analytic methods that are most appropriate to our goals.

7.2 The Use of Ceramics on the Northeastern Plains

As in all areas of the world where archaeological sites contain pottery, both the culture-history and the interpretation of cultural dynamics have grown largely out of analyses of archaeological ceramics. The cultural-historical overview found in chapters ten and eleven provides the framework for the research that follows. By presenting a review of defined ceramic cultural units, and the associated chronology of the later Precontact Period of southern Manitoba (and adjoining regions throughout the Northeastern Plains) the historical, economic, and cultural context of the horticultural assemblage from the Lockport site (EaLf-1) can be better understood. However, it must be stated at the outset that this is not a thesis on the uses of style in archaeology. For more a detailed overview of some of the pertinent arguments, which have ensued in this branch of the discipline, please see McKinley's (2001) thesis on the ceramics from Lockport West.

For the purposes of archaeological study, ceramics in North America can and have been used in a variety of ways. They have been used, not only to sort out regional culture histories, but to look at changing manufacturing and technological expertise within and between archaeological cultures, to examine regional exchange networks, to study shifts in subsistence, and trends in aesthetics, style, and sociopolitical organisation.

One of the major problems with the analysis of ceramics is the persistent equation of ceramic "cultures" with ethnic cultures. This is no less the case on the Northeastern Plains. However, this tendency is not without justification since some ceramic wares have been correlated with individual linguistic and/or

cultural groups based on historic and ethno-historic data. For example, Oneota wares have been generally tied to Siouan linguistic stock (Michlovic and Schneider 1988), while Psinomani/Sandy Lake pottery has been associated with the Dakota (Michlovic 1985a). In addition, many ceramic types and wares of the Middle Missouri and Coalescent Traditions have been directly tied to the culture history of various branches of the proto-Hidatsa, Mandan, and Arikara. From there, these ceramics have been used to elucidate details of their Precontact Period culture history. In fact, Syms (1985) points out that Northeastern Plains ceramics are sometimes regional in their distribution to the point of mutual exclusion. This supports the notion that these styles do in fact have a certain ethno-linguistic reality. In a recent volume by Henry Glassie (1999), he states:

> Here is a jug, stoneware, ash glazed. The more we know, the more precisely we can located it, attributing it to America, the South, Georgia, Gillsville, the Hewells, and last to young Matthew. The values in this pot are the values in the man. ... Like Mattthew, the pot is committed to work and place and tradition ... At once useful and beautiful, ... the pot takes on history remembering the mixed vexed story of the South.
>
> (Glassie 1999: 47)

Anthony (1997) also believes that temporally and spatially bounded artifact distributions are reflective of at least some degree of cultural, linguistic and possibly even genetic reality. As with any form of analogy in archaeology, this reality decreases proportionally with increasing time depth. Still, for the late Pre-contact and Proto-historic Periods, these analogies are both useful and valid. There is also archaeological evidence that social disruption may manifest itself in the ceramic assemblage. For example, the initiation of the Knife River Phase (ca.

1750 AD) is marked by an abrupt shift in ceramic technology and, based on the historical evidence, this appears to coincide with a major disease epidemic (Lovick and Ahler 1982).

On the Northeastern Plains and in the Boreal Forest during the Woodland, ceramics are the most temporally sensitive artifact class. However, similarity, in other artifact classes such as projectile points may be as much reflective of a lack of typological refinement as it is of true homogeneity. Clearly the greater analytical emphasis has been on ceramics which have played a central role in chronological ordering and interpretation of cultural dynamics and group interrelationships. In fact, the history of cultural dynamics on the Northeastern Plains is based almost exclusively on changes in the ceramics.

In dealing with ceramics as markers of ethnic or cultural affiliation, it is possible to embark on a long, tangential consideration of the uses of style in archaeology; this is not the place for such a discussion. I share the view of many Northeastern Plains ceramic analysts (e.g. Deetz 1965; Gregg 1985, 1990; Michlovic 1981; Syms 1977, 1985) who believe that these artifacts are the result of patterned cultural behaviours transmitted from maker to pupil (Gregg 1985). Many of these authors view stylistic groups as a product of inter- and intra-societally generated relationships such as reciprocity and trade (on either an individual or social scale), as well as of sociopolitical phenomena such as ritual, mortuary behavior, and political dominance (Benn 1990; Deetz 1965; Gregg 1985). Admittedly, styles may both mark and cross ethnic boundaries (Gregg 1985). However, by studying decorative traits in combination with other, more utilitarian aspects of ceramics such as temper, paste, and vessel wall thickness, it is sometimes possible to elucidate the nature of these relationships. It is also

often possible to recognize imported vessels in an assemblage. Likewise, by studying these attributes one can sometimes discern vessels with anomalous decorative motifs that are the result of imitation by local artisans.

Gregg (1985) notes that wide geographic stability in styles is not possible without interaction in some form; standards are maintained by a desire for prestige (reciprocity, imitation, convention), and I further suggest that these are maintained by deeply embedded perception of what constitutes the "correct" form for a pot. The technical skills and motor habits required for the creation of a functional pottery vessel were learned early and would have formed a conditioned foundation that was difficult to overcome, call it a "mental template" if you will. Gregg (1985) further suggests that the conservatism of Woodland ceramics may be a part of complex network of individual exchange relationships although he acknowledges that stylistic distinctions do not always directly coincide with group boundaries and may include participants from more than one ethnic group or society. Styles may also be grouped on the basis of ritual or religion (see Benn 1989 on the study of stylistic manifestations of political dominance, inter-group interactions and relations of production). Benn (1989), for example, cites the example of the "Southern Cult", which involved a wide variety of groups who shared many aspects of symbolism and iconography. A number of examples of such representations have been recovered on the Northeastern Plains, which is a considerable distance from the core area of this cult. This same phenomenon has been observed with the Oneota Tradition and other related groups (see discussion on the Oneota Tradition).

As diagnostic artifacts, ceramics are heavily utilised for chronology building on the Plains and as a tool with which to study inter- and intra-group

interaction, interregional interaction, social organisation, demography, settlement systems reconstruction, and symbolic behavior. The story of population dynamics on the Northeastern Plains and in the Middle Missouri sub-area is, therefore, almost entirely drawn from changes in the ceramics. Thus, a basic understanding of the terms used to designate the different ceramics in the study area is absolutely critical to any understanding of population dynamics within these sub-areas. A detailed discussion of the ceramics and culture-history of the late Precontact Period on the Northeastern Plains follows in chapter 11 and is used to contextualize the data from EaLf-1.

The goal of this particular analysis was not to create a taxonomy, since one already exists for this area (e.g., Blackduck, Laurel, Bird Lake etc). Neither was the goal to refine the existing typology, since many of the sherds are too small to permit an accurate assessment of the type. The main goal was to analyze key attributes of the sherds in order to ascertain the possible existence of variation between different occupations. That is: are there significant differences between the identified stratigraphic/occupational layers at EaLf-1 and, if so, are these differences attributable to major cultural shifts? For this reason, I selected attributes that are subject to choice, custom, and preference but which are also technically important to the success of the final product. These include temper type, temper particle size, temper density, paste texture, surface finish, the form of the rim and lip, and orifice diameter, as well as decorative elements, and aspects of vessel shape such as lip and rim form. These attributes reflect both cultural preferences and technological requirements and, as such, have the capacity to reveal cultural changes through time.

In addition, the analysis form had space to record basic provenience

data, whether or not the sherd was already assignable to a previously existing type, if so, which type, whether or not the sherd exhibited any evidence of wear and many other details concerning characteristics of the individual sherd. Ultimately, such an examination of technological and stylistic attributes should reveal whether there are, in fact, significant differences between the identified cultural occupations at EaLf-1. Major disjunctions in key aspects of the ceramic assemblage from the different occupational layers would suggest that a major shift has indeed taken place whereas gradual change through time would suggest in situ evolution of pottery technology.

7.3 Sample Selection

Only the ceramics were selected for study for a number of reasons. First, they are the most culturally and temporally sensitive artifact class in the assemblage. Second, they are also the only artifact class that demonstrates a comparatively unambiguous level of regional variation. While other artifacts (projectile points, for example) can and do show this variation, no other class of artifact possesses the same degree of temporal and spatial sensitivity. Moreover, the sample of projectile points from EaLf-1 is not large and is generally restricted to late, small side-notched points of Knife River Flint. The combination of small sample size and limited spatial and temporal variability resulted in the decision to omit these from consideration. While a study of the hoes may have proved of some utility, it was decided that a study of the ceramics was a necessary prelude to the study of less culturally variable classes of artifacts.

The sample of sherds selected for this study is entirely from the last two

years of excavation at EaLf-1. This is for the simple reason that it was only during 1987 and 1988 that the Organic Layer was isolated and treated as a distinct occupation. Prior to 1987, the Organic Layer was not recognized as something that could be excavated and kept separate from the underlying Bed CDE. As a result, in all of the excavations at the site prior to 1987, the horticultural materials are mixed with the recoveries from previous occupations. This mixing of occupations, as discussed earlier, makes the horticultural and Late Woodland occupations appear to be one single occupation nestled within a local Late Woodland cultural context, and this is the way the site was interpreted in the literature (Buchner 1986, 1988). The indigenous Late Woodland and later horticultural occupations are probably not one and the same. With an enormous investment of time and effort, the mixing in the 1984, 1985, and 1986 collections could be addressed, but the amount of re-cataloguing and re-analysis of materials makes this a prohibitively large task. This is neither the time nor the place to engage in the resorting and re-cataloguing of the many thousands of artifacts from 1984-1986.

After this selection process, the notes and drawings from the various excavation units were examined to determine whether or not the quality of the stratigraphy had permitted proper excavation by bed. Some units were in areas that had undergone heavy past disturbance. Other units had no visible stratigraphy at all -- they were simply a jumble of mixed matrix from all the beds --which was clearly a result of previous digging. When this other digging might have taken place was impossible to ascertain because no feature outlines were ever distinguished. The material from such units was omitted in the interests of consistency.

After this screening process, the remaining artifacts were examined. All of the rim sherds were removed and laid out by unit and stratigraphic layer. Rim sherds were selected for analysis because while the body sherds have some culturally diagnostic traits, these are less amenable to analysis. At present, we lack both adequate techniques and the vocabulary to adequately describe and distinguish differences between body sherds. Furthermore, in the vast majority of cases, any decoration on these vessels is confined to the lip, rim, neck, and sometimes the shoulder. Although differences in paste and temper within the sample of body sherds can be analyzed, there is no reliable means of ascertaining the type of vessel from which these body sherds originated. Since a comparison of pottery types is also part of this study, and since decorative techniques and motifs on the upper portion of the vessels define these almost exclusively, the body sherds were excluded from the sample. The sample of rims from 1987 and 1988 numbers 148 individual specimens (the bulk of these from different vessels). These rims come from five different stratigraphic groupings: Bed B, Bed B/C-Organic, Bed CDE, and Bed F (table 6).

The sample chosen for analysis was selected from Beds B, B/C, and its associated features (the Organic Layer, the bell-shaped pits and various hearths), Beds CDE, and Bed F. Due to the paucity of ceramics from Bed B, all of the rim sherds, without exception, were included for study. Almost the entire rim sherd collection from Bed B/C was included, with the exception of sherds that were badly spalled, exhibited no diagnostic traits, or were simply too small to permit analysis (less than 1x1 cm^2). All rim sherds from the features were included. Of the relatively large collection of sherds from Bed CDE, all rim sherds larger than 1.5 x 1.5 cm. were included in the sample. Excluded were badly spalled/exfoliated

sherds and neck sherds. Since the purpose of this study is to compare the horticultural occupation with the overlying ("Selkirk") and underlying ("Blackduck") occupations, the Laurel sherds from the lower portions of Bed F were omitted and all the Blackduck sherds except spalled and tiny sherds were included. The final total was 148 rim sherds, almost all of which represented separate vessels. Because of the manner in which excavation proceeded (largely by one meter squares), it was very difficult to do any vessel reconstruction. Excavation was often in units separated by five meters or more. Any reconstruction that could be done had often been performed during the initial analysis. Sherds that were clearly from the same vessel or ones that could be articulated were treated as a single sherd in this analysis.

The operative assumption was that the under- and overlying occupations were local in origin, although the shortage of material from Bed B neither confirms nor contradicts this supposition. I also assumed that because the Organic Layer capped all of the features, the fill from inside these features was associated with the horticultural occupation. The sherd sample from these features and their fill was treated accordingly. However, the initial creation of many of these features in the Pre-contact period necessarily involved digging through past occupations. Therefore, some cultural mixing of older with more recent occupations is inevitable.

7.4 Techniques: Attribute Selection and Description

7.4.1 Attribute selection

The characteristics pertinent to the study were the observable physical

characteristics of the sherd such as paste, temper, surface finish, vessel morphology, decorative technique, and decorative motif. These characteristics are described below. The selection of these characteristics was based on their real or possible reflection of cultural variability. While it is generally recognized that vessel morphology and decoration tend to vary with cultural group, other characteristics such as temper and paste have been less consistently studied. Thus, some of these characteristics, while they may reflect certain broad trends, such as the distinction between plains and Mississippian wares (in the presence or absence of shell temper, for instance) were selected more for their potential to indicate regional variation than for their known sensitivity to variations in time and space within the study area. The rationale for the selection of these particular attributes has been described above.

7.4.2 Techniques

The ceramics were analyzed using a combination of visual inspection, the use of a low power hand lens, and examination under a low power Wild-Leitz binocular microscope at 64x. Fresh breaks were made on the corners of sherds with a pair of grozing pliers in order to facilitate examination of temper and paste. All techniques are explained in detail below. The data were coded into the spreadsheet program Microsoft Excel® using a Macintosh® personal computer. Sixty-two categories based on the ceramic analysis datasheet were created in Excel® for 148 sherds. The data in the Excel spreadsheet were manipulated using a combination of Excel's formula creation capacity and database functions.

7.4.3 Attribute description

All information was recorded on a three page analysis form. A sketch was made of every sherd for increased ease of identification and to mitigate against any possible confusion that might arise due to similarities between sherds or damaged catalogue numbers. Where it was possible to discern that sherds were from the same vessel, these were analyzed together, treated as a single sherd, and included on the same form. For detailed descriptions of each category refer to appendix III.

The majority of the categories in "Summary Provenience Data" are self-explanatory. These consist of information such as unit number, unit coordinates, level number, depth below surface, and stratigraphic bed. For reasons explained above, all of the ceramic materials examined in this report are from the years 1987 and 1988. Ideally, all of the materials from 1984-1986 should be resorted, reanalyzed, and grouped with the materials from 1987 and 1988. It would have been impossible to resort and re-catalogue all of these materials for this project, but I did not feel I could pick and choose materials and proveniences from those earlier years to include (or exclude) in the analysis. Conducting the analysis in this way would have compromised the results and the final argument, since the sample would have been open to accusations of tampering with the data.

"Summary Provenience Data" was included to allow Microsoft Excel to sort the data by year, stratigraphic bed, presence or absence of features, and location of features. "Type", "Affiliation", and "Tradition" refer to different taxonomic levels of classification of a given rim.

"Tradition" is the most general, inclusive level of classification and refers only to whether or not the sherd could be identified and placed in Late

Woodland, Plains, or Plains-Woodland categories. Gregg (1994: 72) sees Plains-Woodland as an archaeological tradition defined largely by its mode of subsistence. The Plains-Woodland tradition is "...primarily based upon hunting and gathering, but sometimes involv(es) gardening...". This is distinct from the Plains-Village Tradition, which shows, among other things, a much heavier reliance on gardening with only some reliance on hunting and gathering, and from the Woodland Tradition in which people relied entirely on hunting and gathering. "Affiliation" refers to the largest level of ceramic typological classification: Blackduck, Rainy River, Duck Bay, Winnipeg River, etc. "Type" was the lowest, most specific level of classification and refers to identifiable sub-divisions or ware types within the "Affiliation" category.

Where paste and temper were concerned, it was assumed that the potter intentionally added non-plastic inclusions. While non-plastics may occur naturally in clays, or may be subject to accidental inclusion during the preparation of the paste, most clays in the vicinity are riverine rather than primary and are therefore free of such inclusions. The visible inclusions in the sherds are not endogenous, with the possible exception of limestone. Local clay sources near the site have been examined and suitable pottery clays in the vicinity do not contain crushed granite. The most common inclusion in Lockport clays is calcium carbonate, which is both easily avoidable (by selecting clay from a different area) and which may render the clay unsuitable for firing. Therefore, the author felt secure in designating these non-plastic, granitic inclusions as intentionally added 'temper'.

In order to observe the paste and temper it was necessary to break off a small piece from the edge of each sherd to expose a fresh surface (Rice 1987: 322).

Wire cutters and grozing pliers were used to accomplish the delicate task of making a fresh break of approximately one-centimeter. The majority of the analysis was accomplished using a Wild Leitz M-3 binocular microscope at a power of 64x. Temper was examined and classified by type, density, size, and shape. Temper density was determined by applying a point count in a standard area to a scale adapted from Rice (1987: 349), based on the particle density as outlined in Rice (1987) closest to that observed average in the sherd in question (figure 19). Intermediate categories were created to accommodate those instances where particle density seemed to fall between the set categories outlined in Rice (1987: 349). It is important to note that these numeric categories are based on the diagrammatic representations shown in Rice (1987: 349) and not on relative weights of clay vs. aplastics, which would be a more accurate means of assessing relative percentages of paste and temper in the finished vessel.

Temper size was determined by measuring each particle in a defined standard area with sliding calipers and then calculating the average dimensions of the particles. Where particle sizes were highly variable, the size range was also recorded. The Wentworth scale was then applied to these values resulting in the standard dimensions outlined in figure 20 (Rice 1987). Intermediate categories were necessary to accommodate those sherds where particle size was moderately variable and tended to span more than one category. Where particle size was highly variable, as in sherds with grit and sand temper, temper size was simply designated as "mixed".

The shape of temper particles was described qualitatively using words such as rounded, granular, laminated, and gritty. Temper shape was largely a product of the material used (figure 21). For this reason mixed categories such as

granular and gritty, were used to accommodate mixed temper types such as grit and sand.

Paste texture was also described qualitatively based on the appearance of the paste under the microscope at 25x- 50x magnification. "Flaky" describes a loose and unstructured like pie crust, while the term" laminated" describes denser, more structured layers. Other terms include: "blocky" which looks rather like a developed clay-loam horizon in a dry wall profile; "gritty" which describes a paste tempered with sand; "grainy" which is denser and more finely textured than gritty paste; "compact" which is a paste with few visible layers or spaces; and "dense" which is a paste that appears hard and highly fired.

Paste colour was determined using a Munsell Soil Color Book (Munsell Color Company 1975). The colour was examined for the exterior, interior and core of each sherd. However, it was determined during the preliminary stages of analysis that color was of little diagnostic utility. As a result, this category was later dropped from the analysis form.

Hardness was determined using a Moh's scale of mineral hardness scratch test adapted from Rice (1987: 356). This attribute was also found to be non-diagnostic. Even though the information was recorded during the initial stages, it was not used in the final analysis.

Metric data were recorded for each sherd, including the thickness of the lip, rim, and shoulder, where possible. Generally, only enough of the sherd was present to allow for measurements on the lip and rim. A ratio of lip to rim thickness was generated to see if there were any meaningful trends through time.

The lip was measured at the lip-rim juncture (figure 22), except in the cases

of extreme rim thinning. In such cases, the choice of location for the measurement was a judgement call rather than a product of methodological rigour. The rim was measured at approximately midway between the lip and the neck although, due to the small size of some of the sherds, this too was sometimes guesswork. Consistency was always the goal even though the quality of sherds themselves sometimes mitigated against the effort. It seems that there is high rate of breakage in the Lockport ceramics, sherds from Bed CDE are quite small in comparison to other sites and even in comparison to sherds from the other stratigraphic beds at EaLf-1. There is presently no explanation for this phenomenon, but these rims appear to have suffered a much higher degree of fragmentation than have those at many other sites. Whether this is due to bioturbation, the strength or thickness of the original vessel, or some other undetermined factor is not known at this time.

"Sherd Weight", while on the analysis form, was not recorded as it was finally rejected as an analytic category. Weight does not appear to diagnostic of anything more than the size of the sherd.

"Forming" (method of manufacture) was also rejected since it was often impossible to analyze this attribute consistently using the available sample. This was due to the small size of many of the sherds.

"Surface Finish" was possibly the most difficult of all the categories and, by extension, probably one of the least consistent in terms of quality of observation. Many of the surface impressions were obliterated where they occurred at all. With the vast majority of rims there was too little of the sherd present to allow for any observation of surface finish. This was due to the fact that surface finish usually begins below the zone of decoration and most of the

sherds were broken somewhere within this decorated zone. This does not mean that surface treatment is not important. It is the unfortunate practice of ceramic analysts, at least in this part of the continent, to spend the bulk of their time on rim sherds. In my experience, surface treatment is by far the most difficult portion of the vessel to replicate. However, because this aspect of the vessel usually winds up in a big bag labeled "body sherds", we have neither the proper analytic techniques to address, nor the vocabulary to describe the visible variation in the surface treatments.

"Lip Orientation" describes the relationship of the lip surface to plane of the rim (figure 23a). Where there was too little of the sherd present to allow for a reasonably accurate orientation, the category was marked "unknown".

"Lip Eversion" describes the amount of flaring or thickening at the lip-rim juncture (figure 23b).

Lip Surface (figure 23c) describes the shape of the surface of the lip of the sherd -- whether it was flattened, concave, convex, or rounded. Where the shape of the lip surface was entirely obliterated by extreme modification the lip was simply listed as "modified".

"Rim Shape" (figure 24a) was analyzed by examining the rim in profile. If the sherd thickened visibly toward the lip, the sherd was listed as "thickened". Where the opposite occurred, it was listed as "thinned". If the sides of the sherd were parallel it was listed as "unthickened".

"Rim Height" is a quantitative measure taken from the lip-rim juncture to the neck inflection (figure 22). Clearly, this measurement was not possible on many sherds due to the aforementioned size problem.

"Rim Orientation" (figure 24b) expresses the degree of flaring or

curvature present in the rim. This trait was measured by laying the sherd lip side down on the table so that the surface of the lip was flat to the table. Where the sherd could not be properly oriented on the table due to the shape of the lip surface (rounding or extreme modification), a visual orientation was obtained by viewing the sherd so the lip surface lay in a horizontal plane. This requires a practiced eye and is clearly not as precise as the first method, but did allow for a reasonable assessment of rim orientation. Where neither of these methods were possible for whatever reason, the rim orientation was listed as "unknown".

"Rim/Body Angle" was measured quantitatively by drawing the exterior aspect of the sherd profile on a piece of paper and measuring the angle of the neck inflection with a protractor.

"Mouth Flare Angle" was also measured quantitatively by correctly orienting the rim on the table surface (as above under 'Rim Orientation'). This involved pressing a formagauge to the interior rim surface and measuring the degree of mouth flare from the angle on the gauge (see Lenius and Olynick 1984, for a detailed description of the technique).

"Estimated Vessel Circumference" is a quantitative attribute obtained by measuring the distance from established points on the rim. Measurements were taken from 'a' to ' b', and the distance from 'c' to 'd'. These measurements were called "a" and "c" respectively (for arc and chord lengths). This calculation yields an estimate of vessel where a sufficient portion of the vessel remains. The geometric proof of this formula is available in Rice (1987) (see p. 224, for a more detailed description of the technique).

The analysis of the arrangement of decorative techniques and motifs was arrived at by combining appropriate aspects of Deetz's (1965) ceramic analysis

with that of several local researchers (Lenius and Olinyk 1988; Dawson 1973). "Decorative Technique" describes the way decorations are made. This category employs established terms for the ceramic decorative techniques prevalent in this region, including cord-wrapped object impressions, punctates, stamps, trailed, and incised decorations all arranged in a series of zones over the interior rim, lip, exterior rim, neck, and shoulder (figure 25a)

Lip decorative techniques are more specialized. Decorations here may involve various arrangements of cwoi's, trailing or incising, but lip surfaces may also possess small tabs, notches and castellations.

"Decorative Motif" describes how these various techniques are arranged on the surface of the vessel: interior vs. exterior; horizontal vs. oblique; straight vs. curvilinear; crosshatched, chevrons, "tail of a thunderbird" etc. Changes in the motifs, their placement, arrangement on the surface of the vessel and method in which they are applied are diagnostic of both temporal and regional ceramic styles (please refer to the discussion on the regional culture history for more detail on this topic).

On the Northeastern Plains decorative motifs tend to be placed on the upper half of the vessel, frequently on the rim and shoulder. These are often arranged in distinct bands around the circumference of the vessel. Each of these bands was treated as separate in order to facilitate their description. The end result was a system of zones with loosely defined locations. This allowed for effective description of the observed variability in both vessel form (which would ordinarily define the location of the zones) and arrangement of the decorative motifs, which was highly variable between archaeological traditions such as "Blackduck" and the Plains-Woodland sherds. The end result was a

system of zones defined initially by their location on the sherd (zones 1, 2, and 3). Definable decorative bands were numbered in a succession of zones proceeding down the rim from the lip (Figure 25b). In the majority of cases there was little or no sherd below the rim. So, although there was room in the structure of the analysis for decoration below the rim, there were very few cases in which this zone had to be analyzed.

These categories were chosen in order to ascertain whether there were meaningful differences between the various stratigraphic beds. Conducting an analysis of both technical and decorative attributes should reveal changes in manufacturing technique as well as outward appearance, which lends itself to copying more effectively than characteristics such as temper type and size. Evidence of a disjuncture in traits such as temper, paste, lip form etc., in combination with a consideration of changes in other aspects of the total assemblage, can be taken to reveal a shift in population (Adams et al. 1978; Huffman 1989; Snow 1985) and not just a change in the appearance of the ceramics. The results of the analysis are presented in the following chapter.

CHAPTER 8
DATA DESCRIPTION AND ANALYSIS

8.1 STRATIGRAPHIC DIVISION AND ANALYSIS

Analysis of the ceramics was conducted by dividing the sample according to the stratigraphic beds. The stratigraphic bed designations, rather than the arbitrary five centimetre excavation levels were the most appropriate means by which to sort the sample for a number of reasons:

1) They provide an externally verifiable way of subdividing the sherds;

2) The beds offer convenient sampling units;

3) The arbitrary levels sometimes contain the interface between two different strata;

4) The stratigraphic beds are the means by which the occupations themselves have been distinguished and sorted;

5) Since much of the argument in this thesis hinges on the differences between the artifacts recovered from the different strata, it is necessary to ascertain if there are, in fact, any significant differences between the ceramic assemblages from these different beds.

The ceramic assemblage was divided according to the following bed designations (stratigraphically from earliest to latest occupation): Bed F, Bed CDE, Feature, Bed B/C-Organic Layer, and Bed B. Although there are earlier beds containing Middle Woodland ceramics, these were not included. The current objective is to search for differences between the Late Woodland and horticultural occupations to see whether they might offer insights into other aspects cultural behaviour, not to examine the differences between Middle and

Late Woodland ceramics.

Primary comparisons were based on B/C and Organic versus CDE and F sub-samples in order to determine whether the ceramics suggest that the presence of horticulture at EaLf-1 was an indigenous development or a result of external influence. Based on information derived from the stratigraphic reinterpretation of the late 1980's, as well as the obvious discontinuities between these layers, it was expected that the B/C and Organic layer ceramic sub-samples would demonstrate a clear break with the Bed CDE and F sub-samples.

On the other hand, it was expected that the Feature sub-sample might display more variability in ceramic traits than the bed sub-samples as a result of cultural and natural re-deposition. That is, when the storage pits were first created, the original excavator of this pit would have been forced to dig through prior occupation layers. This would have mixed contemporary soil with that from the past, mingling debris from different occupations. Through the initial excavation and subsequent in filling of the storage pits during their useful life, the various stratigraphic beds would have been mixed together. Furthermore, rodents display an unholy affinity for old, filled storage pits, perhaps because the fill is temporarily looser than the surrounding soil. As a result, it was expected that the combined effects of these various cultural and natural processes would create an assemblage of sherds from the features that would fall somewhere between the B/C- Organic and the CDE and F sub-samples.

8.2 Sample Size

The total number of rim sherds in the sample is 148 (photos of most

sherds are available in appendix IV). This is not a large sample by any means, but for this area it is quite respectable. The sample could be enlarged at a later date by including re-sorted and re-catalogued sherds from the 1984, 1985, and 1986 field seasons. The Bed CDE sub-sample, at 63 (42.6%), is by far the largest within the 1987-1988 rim assemblage, followed by the combined B/C-Organic sub-sample at n=38 (25.7%), and the Feature sub-sample at 24 (16.2%) (table 6).

When the rims from Bed B were assembled, they were so few (n=7) that no meaningful generalizations could be drawn from the results. Initially, adding materials from previous excavation seasons was considered to flesh out the sample. On further consideration, it was deemed inappropriate to selectively remove ceramics from the context of their excavation units in order to enlarge the small Bed B sample from 1987 and 1988. However, including entire samples of sherds from previous years would have required a prohibitive amount of preliminary re-cataloguing and re-analysis in order to ascertain the correct stratigraphic position of materials from earlier excavations. The Bed B results are included here, but the results are by the limited sample size.

The Bed B/C and Organic samples were grouped together since these constitute the same layer. Where the Organic layer was thinner and more diffuse, it was called the Bed B/C transition. The grouped Bed B/C-Organic sub-sample consists of thirty-eight rim sherds. The Bed CDE sub-sample consists of 63 rims, while the Bed F sub-sample contains 16 rims. For this the analysis, it might have been possible to group together Beds F and CDE in order to enhance the distinction between the horticultural and Late Woodland hunter-gatherer occupations. However, this could only be accomplished by obscuring gradual trends and possibly creating a false dichotomy between occupations. It was felt

that it would be more effective to examine these trends rather than create artificial groups.

All of the features included in the analysis originate either from the interface between Beds B and C, or were capped by the organic layer. Features not included in the analysis were 87-8, 88-9, 88-10a & 10b, 88-11, and 88-13. Most of these originate from Bed F or H. One feature of uncertain origin was omitted from the analysis.

There is obviously some difficulty with the small size of the sample. For this reason comparisons were carried out on the basis of the presence or absence of selected traits, variations in relative frequencies, the comparison of overall patterns within and between stratigraphic beds, and the relationship of these patterns to existing knowledge of Northeastern Plains ceramic assemblages. The sample size was not large enough to justify the use of complex statistical techniques.

8.3 RESULTS

The following section is a discussion of the results of the analysis arranged according the categories on the data analysis sheet.

8.3.1 General site information

Site number, unit number, layer, depth, catalogue number etc. were included for data management purposes only and were not subject to analysis.

8.3.2 Summary provenience data

"Year", "Bed" and "Origin of Feature" were used to track basic provenience information for each sherd. "Bed" is the only category that figures in the analysis; it is used to sort the materials by stratum. Bed designations have also been used to examine trends in the ceramic samples through time.

8.3.3 Cultural historical information

The terms "Type", "Affiliation", and "Tradition" are explained in the section "Attribute Selection and Description" in the previous chapter. These categories have been used to sort ceramics within the stratigraphic bed according to pre-existing classificatory schemes for this region.

Many of the sherds in the sample are too small to permit reliable "type" assignation. There simply is not enough of the vessel present to allow for any distinction between, for example, Blackduck and Rainy River rims, both of which are quite similar when only the lip and upper rim are present. Other sherds have been typed on a provisional basis because, while they are highly recognizable within the sample, they have not been encountered at sites in Manitoba before. They are unique to the site so far (with the possible exception of Lockport West), which means that even experienced local archaeologists have been unable to identify them. The lack of comparable sherds from other sites in the area means that they cannot be given an "affiliation" with any certainty either. Furthermore, since many of the sherds from the upper beds belong to wares that are foreign to this area, there is no local literature that contains references to such sherd types. For typological and chronological insight into this pottery, it has been necessary to turn to literature from North Dakota and Minnesota. Key

references consist mainly of site reports from the upper Red River, its tributaries and adjacent drainages (e.g.: Michlovic 1985b; Michlovic and Schneider 1988; 1993; Michlovic et al 1995; Michlovic and Swenson 1998). This state of taxonomic classification for this material can best be described as "in flux" pending discussions between researchers in this area. For the purposes of the analysis Michlovic and Swenson's (1998) recent revised classification was employed, with the full expectation that there will be changes in the near future.

8.3.3.1 Ceramic tradition

"Tradition" is the largest level of classification and is intended to distinguish Woodland from Plains wares. However, due to the level of interaction between these two areas it was necessary to employ an intermediate category, "Plains-Woodland", for sherds that appeared to be a hybrid of the two. Gregg (1994: 72) defines Plains-Woodland as an archaeological tradition determined largely by its mode of subsistence. The Plains-Woodland tradition is "...primarily based upon hunting and gathering, but sometimes involv(es) gardening..." This is distinct from the Plains Village Tradition which shows a much heavier reliance on gardening with less reliance on hunting and gathering, and from the Woodland tradition in which people relied almost entirely on hunting and gathering.

The analysis shows that the majority of the sherds, 63.5 % overall (36.8% in B/C-Organic, 33.3% in Feature; 84.1% in CDE; and 93.8 in F) are Woodland derived. The category Plains-Woodland encompasses 30.4% of the overall sample; however, within the beds themselves the distribution of Plains-Woodland pottery is interesting. It includes 60.5 % of the B/C-Organic sherds,

62.5 of the Feature sub-sample, but only 6.3% of the sherds from Bed CDE, and none whatsoever of the sherds from Bed F (table 7; figure 26). This has a certain amount of internal validity based on the observations above which would indicate that, as a researcher familiar primarily with Woodland ceramics, I would tend to view most anomalous sherds as Plains influenced. This was not the case. The majority of the anomalous sherds appear to be Plains-Woodland derived.

8.3.3.2 Ceramic affiliation

"Affiliation" is the only one of the three categories, Tradition, Affiliation and Type, which could be addressed with any consistency. This category is useful because the beds generally exhibit a low percentage of sherds that had to be relegated to the category "unknown". It is also useful because it encompasses the best understood and most widely used typological categories. Affiliation includes Laurel, Blackduck, Blackduck/Rainy River, Rainy River, Winnipeg River, and Northeastern Plains Village. Sherds that could not be placed in an established category were labeled "unknown".

Within the Bed B sub-sample there was a single sherd each of Rainy River and Winnipeg River, three of Northeastern Plains Village ceramics, and two that were relegated to the category "unknown" (figure 27). In terms of the sherds which could not be affiliated with any certainty, the percentage of unknown sherds for the B/C-Organic sample is 10.5% (n=4), and for the Feature sub-sample it is 20.5% (n=5). It is interesting to note that, in the B/C-Organic sub-sample, only 5.3% (n=2) have been defined for each of the Blackduck and Blackduck/Rainy River categories and 2.6% (n=1) for the Rainy River complex. Winnipeg River complex ceramics (assigned to the Rainy River Composite by

Lenius and Olinyk, 1990) appear in B/C, and account for 18.4% (n=7) of the sub-sample. Northeastern Plains Village (NEPV) ceramics constitute the largest single category and account for 58% (n=22) of the total in the B/C-Organic layer. The Feature sub-sample includes 25% (n=6) Blackduck/Rainy River rims and 54.2% (n=13) NEPV rims (table 7).

Bed CDE consists primarily of Blackduck (17.5%; n=11), Blackduck/Rainy River (44.4%; n=28), and Rainy River (12.7%; n=8) rims. Together, these indigenous Late Woodland types account for 75% of the sherds in Bed CDE. There were minute quantities of both Laurel (3.2%; n=2) and Northeastern Plains Village ceramics (4.8%; n=3) and only 17.5% (n=11) had to be relegated to the unknown category. In Bed F 87.6% of all sherds are assignable to Late Woodland Tradition affiliations, 56.3 (n=9) of which were Rainy River; 18.8% (n=3), and 12.5% (n=2) were assigned to Blackduck and Blackduck/Rainy River respectively. There were no NEPV sherds in Bed F whatsoever. There were also no Laurel sherds, which was unexpected.

8.3.3.3 Ware type

"Type" is the lowest and most specific taxonomic level, analogous to a component on a site. Therefore, it is also the category that is least likely to have been filled. While many sherds were recognizable at the level of both Affiliation and Tradition, Type was often unknown. This is attributable to the fact that many "types" of sherds within broader ceramic categories in this area remain undefined due to a lack of a comprehensive regional culture history. Unfortunately, cultural-historical approaches became unfashionable in archaeology long before there was a well-developed chronological sequence for

this area. This void has seriously hampered our ability to address larger theoretical questions in Manitoba. Also, as mentioned above, since many of the sherds were too small to permit classification at this level of analysis. Most of the Blackduck or Rainy River Composite sherds, especially those from Bed CDE, could not be typed accurately.

It must be stressed, however, that the goal of this project was not a typological analysis. The goal was to examine the rim sherds according to their technical attributes. Tradition, affiliation, and type were used here more as convenient sorting categories, and to assist in the assessment of differences between beds. I was not attempting to either create or define new types nor to assess the validity of old ones. For this reason, these categories do not figure prominently in the analysis.

The analysis of type by bed presents some initial problems. Nearly all (95.2%) of CDE sherds are from unknown ware types, while some 58% of the Bed B/C-Organic sherds are of unknown type. Within Bed F 100% of the sherds are of unknown type. The figure is 62.5% for the Feature sub-sample. These high frequencies of unknown types prevent any meaningful comparisons between the beds at this level.

The type level of analysis is predominantly unknown in CDE because many of the sherds are too small to type accurately. The type is better known in the B/C-Organic layer because many of the sherds from the B/C-Organic sample display very clear affinities with better defined Northeastern Plains Village Complex ceramics in North Dakota and Minnesota. "Grainger" is also a locally defined type (Buchner 1986) which does not occur in CDE and F. This combination of factors results in the comparatively lower number of unknown

types in this layer.

According to results of the analysis of these three categories, Bed B/C-Organic is predominantly Plains-Woodland, which is the product of a fairly heavy representation of NEPV-affiliated sherds. The same holds true for the Feature sub-sample. Both contain smaller quantities of Late Woodland Tradition ceramics the bulk of which are Blackduck, Rainy River and Blackduck/Rainy River in the feature and Winnipeg River in the Be B/C-Organic layer. In the case of the Bed B/C-Organic sub-sample, Blackduck, Rainy River and Blackduck/Rainy River sherds represent only a small proportion of the total ceramic assemblage, accounting for less than 13% of the sample. As expected, the number is somewhat higher in the Feature sub-sample, accounting for 25% of the final total. In the B/C-Organic Layer Winnipeg River sherds account for approximately 10% of the total. This is in stark contrast to underlying occupations in which ceramics attributable to Blackduck and Rainy River account for the bulk of the recoveries. Beds CDE and F, are overwhelmingly Late Woodland with little (in the case of Bed CDE) or no (in the case of Bed F) presence of the Plains-Woodland NEPV ceramics.

To put this in other terms: NEPV ceramics achieve their highest representation in the Bed B/C-Organic and Feature sub-samples with only a nominal presence in Bed CDE and none at all in Bed F. Blackduck is entirely absent in Bed B, appears in only tiny proportions in Bed B/C-Organic and in higher proportions in both Bed CDE and Bed F. The distribution of Blackduck/Rainy River pottery is very similar. It is absent in the Bed B and Feature sub-samples, appears in only small amounts in the B/C-Organic and Bed F sub-samples and comprises the bulk of the rims from Bed CDE. Rainy River

ceramics are present in smaller proportions in Beds B, B/C-Organic and CDE while forming the bulk of the sample from Bed F. Winnipeg River sherds, technically part of the Selkirk Composite, are present in small numbers in the Bed B and the B/C-Organic samples and are entirely absent in the Bed CDE and F sub-samples. I believe however that there is a problem with the Winnipeg River designation. Because Winnipeg River sherds are distinguished partly on the absence of decoration, it is possible to confuse some of the smaller, undecorated sherds with the undecorated portions of fabric impressed NEPV pottery.

While the reduction through time in the frequency of Blackduck sherds is expected, there is no corresponding increase in Rainy River or Selkirk Composite sherds. Instead, the Blackduck ceramics are replaced by Plains-Woodland Tradition pottery. As a result, the Feature and Bed B/C- Organic sub-samples contain unusually high frequencies of NEPV sherds for this area. If a "normal" Late Woodland cultural progression were operative here, one would expect increasingly higher frequencies of Rainy River Composite ceramics followed by those of the Selkirk Composite. However, this is not the case. Instead, Blackduck and Rainy River Composite materials are replaced by NEPV ceramics not generally considered indigenous to this area (or at least are very poorly represented here so far). Unfortunately, there is little to be said about the occupations which follow the B/C-Organic layer since the Bed B sub-sample is so meagre.

8.3.4 Physical characteristics

8.3.4.1 Temper type

For the purposes of this analysis it has been assumed that the aplastics are not the result of accidental or natural inclusion in the paste (see methods section) Temper type by bed (figure28) indicates that all of the sub-samples possess relatively high frequencies of grit temper. The frequency of grit temper for the entire sample consists of 78% (n=108) followed by grit and sand at approximately 20% (n=30). However, when the assemblage is broken down into its component sub-samples Beds CDE and F display noticeably higher frequencies of grit (15% to 30% higher) than the B/C, Organic, and Feature sub-samples. Correspondingly, the latter occupations also display consistently higher relative frequencies of grit and sand temper, 12-35% higher than Beds CDE and F. These beds exhibited only low frequencies of sand temper. The frequencies of the different temper types do vary meaningfully as sand is not a common additive to ceramic paste in this area -- grit is the overwhelming choice of local pre-contact potters. Moreover, the decrease in the average particle size through time (see below) is a general trend in ceramic samples where horticulture has been introduced or is being practiced (Braun 1987). For these reasons it is arguable that the aplastics are not the result of accidental or natural inclusion in the paste. Also, because the local clays are secondary, or sedimentary in origin, they are unlikely to include the small fragments of granite that can be present in primary clays (Shepard 1956).

In general, both grit and grit and sand temper account for almost 100% of the sherds in all beds. Within the horticulturally associated stratigraphic layers, there is a slight increase in the preference for grit and sand temper over grit

temper from approximately 10-12% grit-sand in CDE and F to approximately 25-30% grit-sand in the Feature, B/C, and Organic sub-samples.

8.3.4.2 Temper density

There is no significant difference in density of temper according to bed (table 7) since the majority of temper density in all beds ranges from 3 to 5% (figure 29). It is not felt that temper density is a particularly diagnostic category in this instance. It is possible that the low level of variation observable here is the result of testable structural limitations. That is, it may be structurally unfeasible to include much more than 3-5% grit in this type of paste. While systematic experimentation in this regard is beyond the scope of this project, in my experience, adding too much temper significantly compromises the plasticity of the clay, resulting in too many cracks during the construction phase, while adding too little results in structural failure during drying and firing. Unfortunately, I have not yet quantified what constitutes "too much" temper although Goltz (pers. comm 1997) has found that the local clays he prefers will accept as much as 35% temper by weight and this improved firing success dramatically. What constitutes the appropriate amount of temper is going to vary greatly between different clays and is also an important technical choice on the part of the individual potter. However, results here suggest that 6-10%, as assessed by Rice's (1987) diagram (and not raw material weights) may be "too much" in this instance since variability is so low.

8.3.4.3 Temper size

Few sherds contain grit in the granule size range (table 7). There are none

in Bed B, one in B/C-Organic, three in Bed CDE, one in Bed F and none in the features. This may reflect the possibility that sherds with very large inclusions break more easily and are not, therefore, represented in the ceramic assemblage. Alternatively, this may also reflect a recognized structural limitation, which results in the largest particles being removed from the temper. In the CDE sub-sample, 90% of the sherds fall within the very coarse to fine sand size range, with most of these (53.9%) concentrated in the coarse/course-very coarse categories. Bed F is similar, although more heavily concentrated in the coarse and very coarse size ranges (75%). The B/C sub-sample, on the other hand, clusters in the coarse to medium-coarse range (60%) indicating a preference for a smaller particle size than that which is evident in Beds CDE and F (figure 30). The single sherd which shows temper particles in the granule size range in a Late Woodland Blackduck sherd. Moreover, while temper size is somewhat similar in the B/C-Organic Layer sub-sample to that seen in the sherds from Bed CDE, the rims from the B/C-Organic Layer sub-sample are more tightly concentrated in a lower range of particle sizes than Bed CDE which is more variable. Interestingly, the Feature sub-sample is also quite variable and temper particle size is distributed almost evenly across most of the size range.

8.3.4.4 Temper shape

Temper shape shows absolutely no meaningful trends through time (figure 31). The shape reflects, as one might expect, the overwhelming preference for grit temper which is either 'granular' or 'granular and laminated' in shape. The 'laminated' aspect merely describes the mica which is often visible in grit tempered sherds.

8.3.4.5 Paste texture

The CDE and F sub-samples were found to contain far more sherds with flaky paste than the B/C, Organic, and Feature sub-samples, which were grittier (table 7). The beds were roughly similar in other texture categories. The texture categories reflect a gradually increasing level of compactness in the paste although the hardness tests seemed to indicate that there was little difference in hardness between any of the sherds. This may be as reflective of the crudeness of the hardness test as it is of any real variation (or lack of it) in hardness among the sherds. Shepard (1956) in fact argues that hardness tests are simply ineffective on "primitive" pottery and should not be used. The degree of compactness in the paste is not always reflective of firing temperature (Shepard 1956) but might be also construed as the product of both the material used and the workmanship involved.

On the whole, the paste texture category is one in which the distribution was more abrupt than gradual. The percentage of flaky paste is approximately 69% in the Bed F sub-sample, while in the Bed CDE sub-sample the same category is 52.4%. In the B/C-Organic sub-sample, however, the percentage of flaky paste drops to 25% and in the Feature sub-sample that amount is 12%. The percentages of gritty paste in the CDE and F sub-samples are minimal ranging between 3% and 6%; while this same paste type is significantly higher in the B/C- Organic, and Feature sub-samples (approximately 25-35%) (figure 32). This would indicate that there was some sort of shift in manufacturing technique, perhaps in the initial processing of the paste, in the degree of compaction during the manufacturing process, during the firing of the vessel itself, or some combination of these different variables. However, any such inferences are

hampered by a lack of ceramic characterization studies and empirical experiments with pottery manufacture in this region.

8.3.5 Metric data

8.3.5.1 Lip thickness

Lip thickness follows a linear trend through time (figure 33a). There appears to be small but steady reduction in lip thickness from the earliest to latest beds, although there is significant overlap between the sub-samples. The average lip thickness in the sample of B/C-Organic rims is 6.6mm (this figure becomes 6.2 with the removal of one exceptionally thick Blackduck rim from the sample). In Bed CDE this figure is 7.1mm, and in Bed F, 9.0mm. The Feature sub-sample shows an average lip thickness of 6.6mm. This may be partly attributable to the presence of common ware types within the different beds. Beds CDE and F are extremely variable, with the greatest degree of variation present in Bed CDE. This may be a product of the mixing of different occupations through fluvial re-deposition. Lip thickness becomes less variable and more tightly clustered around single values through time.

8.3.5.2 Rim thickness

Rim thickness follows a similar pattern to that of lip thickness, both between and within beds (figure 33b). The average rim thickness for the B/C-Organic sherds is 5.9mm, while it is 6.2mm for Bed CDE and 7.4mm for Bed F. Rims from the Feature sub-sample average 6.1mm in thickness.

8.3.5.3 Lip-rim ratio

The Lip-Rim ratio appears fairly consistent over time, exhibiting the same pattern between beds. CDE displays an unclustered distribution (figure 34) although it does appear more widely spread out that that from Bed B/C-Organic. This is probably at least in part a function of the relatively larger size of the sub-sample from that stratum. However, the observed consistent variation of CDE might also reflect:

a) Limitations of technology resulting in greater variation;
b) Less strict "rules" regarding construction and manufacture of pots;
c) Variation as a result of different ware types and occupations mixed within the same bed; and
d) Fewer structural constraints on the vessel through its useful lifetime.

This variability may also be partly a result of the intermingling of Blackduck, Blackduck/Rainy River transitional and Rainy River occupational debris in Bed CDE

8.3.5.4 Other metrics

The use of Height, Rim-Body Angle, Mouth-Flare Angle, and Estimated diameter were not useful because the sample size was less than 25 sherds for all beds combined. It might have been possible to combine the CDE and F and the B/C, Organic, and Feature sub-samples to arrive at an overall mean size trend, although this would not be statistically valid. The major problem here is the size of the rims themselves. Most sherds are very small, and even the larger ones do not often possess enough rim to permit the accurate measurement of these characteristics.

8.3.6 Wear/Abrasion

Analysis of surface wear and edge rounding as a result of water rolling corroborates Daly's (1986) sedimentological analysis of the Lockport site. While none of the beds exhibited any evidence of extensive wear, Bed CDE exhibited the highest percentage of slightly worn sherds (52.4%, n=33) (table 7). The B/C-Organic sub-sample possesses only 13.2% (n=5) worn sherds (figure 35). No bed displays much evidence of extreme wear. It is interesting to note that the Bed F, Feature, B/C, and Organic Layer sub-samples have extremely high percentages of sherds exhibiting no visible wear whatsoever (80%-90%). This confirms that Bed CDE materials are likely the result of local re-deposition due to fluvial activity. While water worn appearance is admittedly subjective, the CDE sub-sample does seem to bear out the interpretation presented in the sedimentological analysis (Daly 1986).

8.3.7 Charred deposits

The analysis of charred deposits on sherds was inconclusive. It was expected that this category might offer further insight into the nature of fluvial activity on the site. That is, it was assumed that fluvial activity would remove evidence of charred deposits; therefore, it was assumed that beds possessing low numbers of sherds with charred deposits would be those in which flood re-deposition had occurred. The rims from Bed B display no charred deposits whatsoever, although this may be partly accounted for the small sample size. A small percentage of sherds from every bed display charred deposits on either the interior or exterior surfaces although there does there appear to be any preference for the surface (interior versus exterior) on which charring is

deposited according to bed (figure 36). In Bed B/C-Organic nearly 82% of the sherds lacked these deposits on any surface. While roughly 75-85% of the rims in the remaining sub-samples possess charred remains on the lip surface only. In the end, this does not seem to be a meaningful category of analysis, although it is useful information to have recorded for possible future residue analysis.

8.3.8 Surface finish/treatment

Surface finish (which deserves to be sub-category of ceramic analysis in its own right) was subject to observer error for two main reasons:

1) The lack of suitable techniques and terminology; and
2) The lack of sherd area below the neck, where surface treatments are usually present.

The most common surface treatment in all beds is some variation on fabric/textile impressed or cord malleated surface treatments (table 7; figure 37) (textile, obliterated textile, Winnipeg Fabric Impressed, Obliterated WFI, and sprang). The Bed B, B/C- Organic, and Feature sub-samples all exhibit higher relative frequencies of both Plain Smooth and burnished surface treatments. This is significant since plain and smooth vessel surfaces are characteristic of Oneota, NEPV, and Plains Village ceramics, while Late Woodland ceramics are almost invariably characterized by some sort of textile impression on the exterior vessel surfaces.

8.3.9 Vessel morphology

8.3.9.1 Lip orientation

There appears to be a decrease in interiorly beveled lips from earlier to later beds with a corresponding increase in flat/straight lip orientation (table 7). In Bed F, 37.5% (n=6) of the sample are beveled inward while 44% (n=7) are flat or straight. In Bed CDE, 24% of the lips in the sample are interiorly beveled while 41% are flat of straight. In Bed B/C-Organic, 13% of the lips are interiorly beveled, and 71% are flat or straight. In the Feature sub-sample, 25% are interiorly beveled, while 63% are fat or straight. Lips of unknown orientation comprise a small proportion of the sherds from each bed (figure 38). This later shift to a flat or straight lip orientation may indicate a larger shift in rim and vessel morphology, unfortunately this is very difficult to assess without access to larger portions of the vessels themselves.

8.3.9.2 Lip eversion

The absence of lip eversion increased through time from 19% in the Bed F sub-sample to 22% in Bed CDE to 44% for the Bed B/C-Organic sub-sample (table 7) (figure 39). This indicates a fairly abrupt shift in lip form between the pre-dominantly Blackduck/Rainy River occupations in Beds CDE and F and the predominantly NEPV, horticultural occupation in the B/C-Organic layers. In the other sub-categories of Lip Eversion, the differences between bed sub-samples are minimal with the exception of the Feature sub-sample. Here, nearly 30% of the sample falls within the Slight Interior Eversion category. This frequency was unexpected, but can be explained by the presence of Rainy River Composite sherds, which, as already noted, possess the eversion characteristic of

other Late Woodland ceramics. It was expected that the sherds from the Feature sub-sample would share the lack of lip eversion present in the other horticulture-related sub-samples. The Beds CDE and F sub-samples also display a low frequency of Interior Extreme Everted sherds; as expected, none of these types occur in the horticulture-related sub-samples. The majority of Organic Layer and Bed B/C sherds also lack any flaring or eversion while the Beds CDE and F sub-samples are fairly evenly distributed across all the options within this category.

8.3.9.3 Lip surface

All of the sherds showing highly modified lips were recovered from the horticulture-related stratigraphic beds (table 7; figure 40). Unfortunately, all the highly modified lips are so deeply tool impressed that it is impossible to make any accurate assessment of the nature of the lip surface beyond this fact alone. Some of this lip modification takes the form of extremely deep cord wrapped object impressions on the lip surface, giving the impression of an archetypal castle wall. While the term "castellated" is not technically correct here, the author is at a loss for another term with which to effectively describe this type of modification. This degree of modification is interesting because similar lip treatments are present on certain of the NEPV pottery types, some Oneota pottery from sites outside the region, as well as a few sherds from the Aschkibokahn Duck Bay ceramic assemblage on Lake Winnipegosis in Manitoba. Some of the rims from such sites display similarly impressed and modified lips. Lip modification is also present on Plains Village ceramics, but is in general more massive and drastic. There are no other obvious trends through time in the form or modification of the lip surface. The vast majority of lip modification from the

non-horticultural occupations consists of cord-wrapped object impressions frequently, but not exclusively, in the form of obliques.

8.3.9.4 Rim shape

There appears to be a definite change in rim shape through time (table 7). Rims become increasingly unthickened and thinned in the Bed B/C-Organic Layer, and Feature sub-samples, accounting for over 80% of the rims in these samples; while these two rim types account for only 46% and 56% of Beds CDE and F sub-samples, respectively (figure 41). By way of contrast, thickened rims are present in the Bed B/C-Organic Layer and Feature sub-samples in only tiny frequencies (5.3% and 0% respectively). The rather high frequency of thinned and unthickened lips in Bed F (together they equal 56%) was unexpected since the thick, flared lips are generally found on Blackduck rims. It was expected that the rims in Bed F would generally thicken towards the lip. Lip profile drawings are available in appendix V.

8.3.9.5 Rim orientation

In all of the bed sub-samples, there is a high frequency of sherds with an unknown rim orientation (71% in Bed B, 56% in B/C-Organic, 65% in Bed CDE, 50% in Bed F and 39% in the features) (table 7). This is due once again to the small size of the sherds. This substantially reduced the sample sizes for this category in all beds frequently preventing any accurate analysis of rim orientation. Still, some basic trends were apparent. The Beds CDE, F, and Feature sub-samples produced relatively high frequencies of moderately outflared rims (20%-30%). The frequency of moderately outflared rims in the Feature sub-

sample was higher than expected probably due to the presence of Late Woodland Rainy River sherds. The B/C and Organic sub-samples display low frequencies of Incipient S-shaped rims, and moderate frequencies of vertically oriented rims. These are not present in Beds CDE and F. There does not appear to be any S-shaped rims in any beds. Three rolled rims recovered from Bed CDE, all of which were from NEPV pots. The overwhelming choice of rim shape throughout all beds involves some degree of outflaring and its continued presence throughout all sub-samples is not surprising as this is an extremely common rim form for household cooking pots throughout the woodlands and out onto the plains as well. In fact, the globular vessel form with a certain degree of flaring in the rim is extremely common all over the Northeastern Plains, in the Boreal Forest, the Eastern Woodlands, and in the Middle Missouri sub-area as well. During the Late Woodland Period this vessel shape constitutes the most basic and common form of cook pot and storage vessel.

8.3.10 Decoration

8.3.10.1 Presence or absence of decoration

The absence of decoration in this category indicates that there was no observable decoration on any portion of the sherd. The major trend which is apparent in this category is the visible increase in undecorated sherds through time from 6% in Bed F to 29% in Bed B/C-Organic to 43% in Bed B with the caveat of its admittedly small sample size (table 7; figure 42). This is, however, a problematic category because certain ware types, specifically the two "exotic" vessels that were recovered at EaLf-1 in 1985, only display decoration on portions of the shoulder and upper body. The rims themselves, with the

exception of the lip tabs, are completely undecorated. Therefore, if one is examining only rim sherds, an increase in "undecorated" rims may or may not indicate a corresponding increase in undecorated vessels. An analysis of the body sherds would not prove particularly informative since the vast majority of these vessel exteriors are undecorated. The incised and trailed line motifs characteristic of these exotic wares actually cover only a small portion of the vessel exterior around the shoulder and upper body regions. What is required for proper analysis is the recovery of whole or nearly whole reconstructable vessels such as those recovered from the storage pits at EaLf-1 in 1985. Unfortunately, such vessels are exceedingly rare. This does, however, cast the increase in undecorated rims in a slightly different light than it would if this component was clearly an indigenous Late Woodland occupation such as the Selkirk Composite.

8.3.10.2 Appendages (type, location, size, and number)

The sample of rims with appendages was too small to permit any valid generalization. Unfortunately the same problem pertains to this category as to the 'Decoration' category. A rim sherd without an appendage does not necessarily mean a vessel without an appendage since the proportion of the vessel to which the appendage adheres is usually less than 10% of that vessel. There are only four sherds in the entire collection which show evidence of possible appendages, two from Bed CDE and two from the Feature sub-sample. All of these are Plains-Woodland vessels. Unfortunately, the appendages themselves are long gone, only the roughened patches where they once adhered remain to show they were ever there. Nothing, then, can be said about the appendages themselves.

appendages themselves.

8.3.10.3 Stamps

The presence of stamps showed a slight tendency towards a decrease in number through time from Bed F (44%) to Bed CDE (17.5%). In Bed B/C-Organic Layer 21% of the rims had stamped decorations whereas only one of the sherds (4%) from the from the Feature sub-sample showed stamping. There were no stamps on any of the sherds from Bed B. while almost all the stamped rims in the B/C-Organic Layer were NEPV sherds. There were no visible trends in the technique, location, shape, or size of stamps across the different beds. Distribution across all categories was relatively even.

8.3.10.4 Decorative motif and technique

8.3.10.4.1 Motif, zone 1: interior rim

Few of the sherds from the Feature, Bed B/C, Organic, or Bed B sub-samples were decorated on the interior rim. There is a single rim with interior bossing in each of the Feature and Bed B sub-samples and none from the B/C-Organic Layer. However, 24% of the sherds in Bed CDE, and 44% of the sherds in Bed F were decorated in this zone. The majority of these possessed some sort of bossing (14% in CDE and 19% in F) which is merely the interior manifestation of a deep exterior punctate. Other forms of decoration included stamping, oblique cord-wrapped object impression, interior punctates, or perforation, perhaps accidental, by an exterior punctate.

8.3.10.4.2 Technique, zone 1: interior rim

In general, technique is a direct reflection of motif so it is not necessary

to discuss this category in any detail. For instance, if the technique is cord wrapped object impressions, the motif will probably be cord wrapped object obliques. Because of the way the motif is described, the technique is an embedded term. The only notable aspect of this category is that the designation "not observable" (filled in as N/A on the raw data) includes both those sherds which were broken in this zone and those sherds which were undecorated in this zone. On the other hand, the category "not observable" in Motif includes only those sherds that were broken at this zone, while the term "undecorated" was used to designate sherds with no decoration. Technique will not be discussed here, as it is sufficient to discuss motif.

8.3.10.4.3 Motif, zone 2: lip surface

Almost all of the lip decorated sherds in the Feature and B/C-Organic sub-samples possess some sort of castellation (21% in B/C-Organic; 12% in Feature) or cord-wrapped object oblique impression (34% in B/C- Organic 33% in Feature). In Bed B/C-Organic, three sherds are stamped and one had a small incipient tab on the lip; together these four sherds represent approximately 10% of the total B/C-Organic sub-sample. As expected, the Feature sub-sample was more variable than the B/C-Organic sub-sample. It also contains two sherds with rod impressed obliques, one with fingernail impressions and a variety of arrangements of cwoi, the bulk of which are Blackduck/Rainy River rims. All of the castellated rims and those with the rod-impressed obliques are NEPV rims. The majority of the remaining sherds from these sub-samples were undecorated. It should be noted here that castellations do not occur in Beds CDE or F. The majority (77% and 94% in Beds CDE and F, respectively) of the sherds in these

beds possess cord-wrapped object (cwoi) impressions on the lip, most of which are obliques. It is worth noting here that while the decorative motifs are very similar in their written descriptions (cord-wrapped object impressed oblique) in both the CDE-F and B/C-Organic-Feature sub-samples, there is an important qualitative difference here. In the CDE-F sub-samples, lip decoration is part of an overall pattern of cord wrapped object impressed decoration which often covers the entire rim, sometimes extending down onto the neck. In the horticulture-related sub-samples, where cord wrapped object impressing is present on the lip. It is often the *only* form of decoration and the sherd is completely undecorated below the lip. There are eight such rims in the B/C-Organic Layer and one in the Feature sub-sample. Overall, the frequency of undecorated sherds increases through time from 6% in Bed F, to 11% in Bed CDE, to 29% in B/C-Organic. The percentage of undecorated sherds in Bed B 43%, but this is a total of only three rims and so may not be very meaningful as part of the trend.

8.3.10.4.4 Motif, zone 3a: immediately below lip

In the B/C-Organic, and Feature sub-samples the majority of sherds are undecorated in this zone, where undecorated sherds constitute 60-70% of all observable rims. The majority of the Bed B sub-sample was also undecorated in this zone (71%). Only 6% of the Bed F and 19% of the CDE sub-sample sherds are undecorated in this zone. Notched lip rims constitute approximately 8% and 7% of the decorated rims in the Feature and B/C (n=2 in feature, n=3 in B/C-Organic) sub-samples respectively. There is only one such sherd in the Late Woodland (Bed CDE and F) sub-samples. Recovered from Bed CDE, it has been designated as NEPV. The majority of the decorated sherds in CDE and F

displayed cwoi right-to-left (approximately 60% in both cases) which is extremely common on both Blackduck and Rainy River rims.

8.3.10.4.5 Motif, zone 3b: immediately below 3a

The decorated sherds in this category become increasingly variable at this point. While sherds that are undecorated sherds in this zone represent a large portion of the sub-samples from the B/C-Organic (58%), and Feature (46%) sub-samples, there is only a small proportion of sherds that are not decorated in this zone from CDE and F (11-12%). In the upper beds, the combination of undecorated sherds and sherds which are broken, and therefore unobservable, at this point accounts for almost the entire sample of sherds in the B/C- Organic 87% layer and the bulk of the rims from the features (67%). Most of the sherds decorated in this zone are embellished with one or more rows of cwoi horizontals, regardless of what bed they are from.

8.3.10.4.6 Motif, zone 3c: immediately below 3b

By the time zone 3c is reached, three quarters or more of rims from the B/C-Organic (79%), and Feature (75%) sub-samples are broken either at or before this zone. These sherds, in combination with the undecorated category, account for almost all of the sherds in these beds (B/C-Organic - 97%; Feature 96%). The unobservable sherds account for 65% of the rims in Bed CDE, and 38% in Bed F. The decorated sherds in Beds CDE and F are mostly accounted for by the presence of one or more rows of cwoi horizontals (CDE - 9.5%; F - 31%) and the presence of stamps or punctates (CDE - 20.7%; F - 25%).

8.3.10.4.7 Motif, zone 3d: immediately below 3c

The vast majority of sherds in all beds are broken by this zone: Bed B = 100%; B/C-Organic = 97%; Feature = 83%; CDE = 97%; and F = 81%. In the Feature and B/C-Organic sub-samples, the remainder of the rims are undecorated. In the CDE and F sub-samples, the sherds are decorated with punctates, stamps or varying numbers of rows of cwoi horizontal bands. There is one undecorated sherd in the Bed F sub-sample for a relative percentage 10.7%.

8.3.10.4.8 Motif, zone 3e: immediately below 3d

There are only 8 rims in total with this zone present (three from the features, one from the Organic Layer, one from Bed CDE and three from Bed F). No meaningful generalizations are possible with such a small sample.

8.3.10.4.9 Motif, zone 4

Zone 4, if it were preserved on more sherds, would frequently be found quite far down the rim. Unfortunately, there is only a single rim with this zone present. It is found in Bed F -- a Rainy River sherd with rectilinear stamps.

8.4 Overview of General Trends and Observations

There are a number of general trends visible within the ceramic assemblage. First, there is a reduction in overall temper particle size without a major shift in temper type. This general reduction is accomplished by the

addition of sand to the grit, which continues as the temper material of choice. However, this may be a functional adaptation in the ceramics rather than a cultural preference as such. Temper particle size becomes more tightly controlled in the ceramics from the horticultural occupation, exhibiting smaller, less variable particle sizes than the pottery from the earlier Late Woodland occupations. This is accomplished in part through the elimination of particles in the largest size ranges.

Paste texture changes from the earlier to later beds displaying a shift from a friable, flaky paste to a more compact, gritty paste. However, in the absence of empirical tests, it is impossible to state whether or not this represents a significant change in ceramic technology. From experience, I can suggest a number of ways paste texture might be changed: first, in the selection of the clay itself since different sources can be differently textured. Second, in the way the paste is worked before the vessel is formed. Extra wedging will reduce lumps and increase uniformity in the clay before it is made into a pot. Third, the amount of paddling and scraping employed during the manufacture of the pot might affect the appearance of the paste since increased paddling will create a more compact wall. Finally, higher firing temperatures might decrease the flakiness and friability of the paste as well. Reduction in the size of the temper could also contribute to this change in paste texture. Unfortunately, in the absence of replicative work that specifically addresses these issues it is impossible to say which of these, or some combination thereof, might be responsible for improvements in the quality of the vessel fabric.

In addition, there is a general trend towards a reduction in vessel wall thickness at the lip and rim. Whether this is accompanied by a similar shift in the

vessel body is difficult to say. Here, a general analysis and comparison of the body sherds from all beds would be instructive. However, it is fair to predict that the body sherds undergo a corresponding decrease in thickness since a thin rim on a thick-walled body introduces an unnecessary and easily avoidable structural weakness. Such a discrepancy between the thickness of the body and the rim would make the finished vessel both less likely to survive the firing process and more likely to break during day to day use. Therefore, any decrease in thickness at the lip and rim should probably be taken to indicate an overall decrease in vessel wall thickness.

The continued predominance of textile impressions on vessel surfaces, as opposed to smoothed or burnished surface treatments, reinforces the suggestion that the predominant influence continues to be Woodland. This also suggests that if these ceramics are Oneota-related, that this influence is indirect since many Oneota vessel surfaces are smoothed or burnished. The same holds true for Plains Village ceramics -- many of the vessels from this area are smoothed or paddle/check stamped, rather than textile impressed. Interestingly, the vessels from the upper Red River region display the same trend as that visible at EaLf-1 -- Oneota influenced decorative motifs on vessels with textile impressed surfaces.

All of the dramatic lip modification is restricted to the B/C and Organic sub-samples. This is a direct reflection of the presence of lip notching, deep tool impressing, and Grainger-type sherds in these beds. Other more common forms of lip modification such as the cord wrapped object impressed obliques were not nearly as deep and did not prevent an analysis of the shape of the lip surface the way the Grainger lip impressions did.

Rim shape becomes more unthickened or thinned in the horticultural occupation as opposed to the thickened rims which characterize indigenous Late Woodland ceramics. There is also a shift to undecorated rims through time although, as already noted, this may not necessarily correlate with a shift to undecorated vessels.

The overall trend is towards an increase in vessels with a more tightly controlled, smaller average temper size and towards a more compact, gritty (possibly harder or better worked?) paste. Vessels become thinner at the lip and rim which is accompanied by a preference for flat or straight lips and thinned or unthickened rims as opposed to the beveled and flared, or everted, lips on thickened rims that are so characteristic of Late Woodland ceramics. We also see the introduction of greater variability in both the shape and decoration of the rims, accompanied by the introduction of many new ceramic forms shown in the NEPV ceramics. There is also a decrease over time in the presence of decoration on the rim. This may be accompanied by a shift in the preferred zone of decoration from the rim and upper neck to the lower neck and shoulder rather than a shift to undecorated vessels per se.

Taken together, the results show abrupt shifts in ceramic technology and formal characteristics between Bed CDE and the B/C-Organic layer. The general trend is from coarsely grit-tempered, thick-lipped, flared-rim, cord-wrapped object impressed ceramics with flaky friable paste in Beds CDE and F to thinner, flat-lipped, straight-rimmed ceramics with more variability in both form and decoration and greater emphasis on achieving thinner walls, smaller temper particle size and more compact paste. The former pattern is very typical of Blackduck-Rainy River ceramics while this latter assemblage is much more

typical of sites on the southern Red River valley and adjacent areas in Minnesota and the Dakotas (Michlovic et al 1995; Michlovic and Schneider 1993; Michlovic and Swenson 1998). This also shows shifts in performance characteristics that are typical of the shift to domesticated plants as a significant portion of the diet. It is not, in other words, a typical Late Woodland, hunter-gatherer pottery assemblage from this region.

These trends are not gradual but sudden and dramatic. Since household ceramics tend to be quite conservative in traditional societies (Arnold 1985; Rye 1981; Trigger 1989), abrupt discontinuities in the decorative and technological attributes of household pottery may be interpreted as representing a shift in population structure. The evidence suggests, therefore, that population movement was involved in the appearance of horticulture at Lockport, although the continued preference for grit tempered, fabric impressed ceramics suggests the taxon Plains-Woodland be used to describe this assemblage and its cousins to the south.

In the end, the distinctions between the ceramic assemblages from the different beds are approximately as expected. A certain amount of both intra-sample variation and similarity between sub-samples was expected due to the small size of the sample and of the sherds themselves, and to various taphonomic factors such as secondary re-deposition, rodent, plow, and tree root disturbance. The results of the analysis suggest that the cultural associations of the stratigraphic beds require only minor modification and are as follows:

8.4.1 Bed F:

Bed F contains classic Blackduck pottery, grading towards

Blackduck/Rainy River Composite transitional ceramics. It is a classic Late Woodland hunter-gatherer occupation and fits well within the classic cultural-historical sequence for this area.

8.4.2. Bed CDE:

This bed is a flood deposit as the evidence from the water wear category confirms. There is more mixing in CDE than was initially perceived. The ceramic assemblage consists of a few Blackduck sherds, mingled with transitional Blackduck/Rainy River and Rainy River sherds. Unfortunately, the small size of these rims makes it impossible to distinguish transitional from pure Rainy River Composite sherds. The small sherd size may be a result of breakage due to fluvial activity as the average size of the rims in Bed F is considerably larger.

8.4.3 Bed B/C-Organic:

This bed contains the horticultural occupation in which the ceramics show an extremely high degree of variability compared to the general predictability of Blackduck and Rainy River composite sherds. These ceramics are Plains-Woodland, likely part of the Northeastern Plains Village Ware Group as currently defined by Michlovic and Swenson (1998).

Some of the sherds in this bed possess lip treatments found on Oneota-related materials to the south and east of the study area. It should be made clear however, that the pottery from the horticultural occupation at EaLf-1Sites is NOT Oneota. It would be more accurate to characterize the EaLf-1 material as derivative rather than directly similar. Sites with ceramics recoveries bearing similar decoration (especially where the enigmatic Grainger ceramics are

concerned) include the Mero site (Mason 1966), the Kingston Oneota Site (Straffin 1971) and the Grant Oneota Village (McKusick 1973). In terms of the ceramic assemblage from the horticultural occupation at EaLf-1, the greatest overall similarity is with contemporaneous assemblages from sites in the southern Red River Valley and adjacent drainages in the James and Sheyenne (Michlovic et al. 1995; Michlovic and Schneider 1988; 1993, Michlovic and Swenson 1998). Again, there were important differences observed insofar as little Sandy Lake material was observed in the EaLf-1 assemblage. Sandy Lake ceramics seem to form the base in which "Red River ware" is nested on the Lower Red River. At EaLf-1, the base for these materials is also Late Woodland but appears to be Rainy River Composite, possibly Winnipeg River Complex.

8.4.4. Feature sub-sample:

As expected the feature sub-sample was a mix of all of these with a tendency towards the trends visible in the horticultural beds. This is due to disturbance of the matrix containing previous occupations while the original pits and hearths were being excavated and due to post-depositional factors such as rodent activity.

8.4.5 Bed B sub-sample

It is impossible to say much about this occupation due to the small size of the sample. A photo of all the sherds in this bed has been included for comparative purposes.

8.5 LOCKPORT CERAMIC ASSEMBLAGE ANALOGUES

8.5.1 Duck Bay Complex

A portion of the ceramic assemblage from the Aschkibokahn site exhibits smooth surface finish and unusual rim and lip profiles. These unusual profiles consist of unthickened or thinned rims and lips as well as straight or incipient S-rim profiles. Such "anomalies" have been pointed out by many and have generally regarded as "Plains-like" characteristics (Lenius and Olinyk 1990; Nicholson 1987). To place this in a new light, I suggest that these "Plains-like" vessels at Aschkibokahn may be manifestations of Red River ware, or NEPV complex pottery, and direct the reader to plates 15, 16, 17, and 18 in Snortland-Coles' (1979) report. Of these sherds, several have parallels at EaLf-1, including one Grainger-like sherd, which would not be out of place in the Lockport ceramic assemblage. This is also interesting because of the similarities between the sherds with heavy lip modification from EaLf-1 and sherds from the Mero Site, an Oneota site on the Door Peninsula of Michigan (see Mason 1966: 260, fig 1). In this site, the ceramics have a high proportion of lip notching and what could be described as "saw tooth scallops", as well as other classic Oneota traits like trailed and incised variations on chevrons. These, in turn, bear similarities to Riggs Plain ware, Riggs Incised Rim, and Pinched Rim from the Paul Brave Site in North Dakota (Wood and Woolsworth 1964). Moreover, the custom of lip stamping, common on many Duck Bay Complex sherds, is also common on sherds from the Grant Oneota Village Site in Iowa, which dates to 1100 AD [the reader is directed to compare illustrations 34, 35, 32 in McKusick (1973: 124-127) with figure 8.8, bottom sequence of sherds, in Lenius and Olinyk 1990: 91)].

Another Aschkibokahn ceramic trait, incising, which is present on a small number of sherds from that site, is also present on "Red River ware", Oneota, and Middle Missouri vessels. Interestingly, all of these fall within the 1100-1400 AD range.

The small number of smoothed, trailed, and Grainger-like sherds from the Aschkibokahn site are a comfortable fit within "Red River Ware" as defined, and subsequently dropped, by Michlovic (Michlovic and Swenson 1998). At Lockport, "Red River Ware" seems to be associated more with the Rainy River Composite, as opposed to Sandy Lake/Psinomani, as Michlovic argues it is in the upper and middle Red River Valley of Minnesota and North Dakota. A large portion of the Aschkibokahn assemblage characterized as Duck Bay Complex and, although Duck Bay composite sherds do occur in the Lockport assemblage, the high representation of Duck Bay sherds at Aschkibokahn is unlike EaLf-1. While unusual smoothed, trailed sherds are present within the Aschkibokahn assemblage I am not suggesting any particular mechanism by which they might have arrived so far north. There are many different ways such sherds might have become part of this particular collection.

8.5.2 Other possibilities

Other assemblages similar to EaLf-1 exist at the Swan River Site (Gary Wowchuk, pers. comm. 1991), and there are a few Lowton Site ceramics (Reid 1972) which are similar to those found at Lockport. While these are similar to some of the recoveries from the horticultural layer at EaLf-1, these other sites have yet to reveal evidence of horticulture.

Assemblages from sites within the Red River drainage basin, directly

across the river at EaLf-2 (McKinley 2001) and those found in Minnesota and North Dakota contain the best analogues for the Lockport horticultural assemblage as a whole. These sites also have similar subsistence and settlement patterns. Red River Ware is covered in detail in the Culture History section. Some of the ceramics from EaLf-1, especially those with lip notching and trailed line decoration could best be described as "Buchanan Flared Rim Ware" and "Lisbon Flared Rim Ware" as they have recently been proposed by Michlovic and Swenson (1998).

Some of the most unusual sherds, the so-called "Grainger Ware" have their closest analogues very afield. These are the previously mentioned Mero Site, on the Door Peninsula of eastern Lake Michigan (Mason 1966) and the Grant Oneota Village on the Upper Iowa River (McKusick 1973).

Population movements discussed earlier may have involved a group or groups having some contact either with the Oneota themselves or with Oneota-influenced people. The fact that both the ceramics and mode of subsistence all along the upper and lower Red River Valley show synchronous changes which suggests that the entire region was subject to similar shifts in influence around this time.

8.6 THE LOCKPORT CERAMIC ASSEMBLAGE

In sum, these ceramics are new to the area; they are not closely related to stratigraphically earlier components at the site. The rest of the assemblage is also clearly different from everything that went before in terms of the tool kit, food storage technology, ceramics, and mode of subsistence. There is no

evidence at this time for gradual diffusion of horticulture in a step-wise fashion up the Red River valley, or for in situ development from Late Woodland hunter-gatherer to maize horticulturalist. The set of associated features and artifacts moves rapidly northwards, not as an isolated decorative motif, or a few kernels of corn, but as a more or less complete package. From this evidence it is arguable that a migration is the most likely explanation for the presence of maize at EaLf-1 and the ceramics are the most effective class of artifacts by which to ascertain the group or groups responsible for this intrusive occupation.

It is interesting to note then, that some of the EaLf-1 materials have a distinctly Red River "flavour", in Michlovic's original sense of the term. G. Goltz and C. Hohman-Caine (pers. comm. 1991) were in agreement with this assessment and placed these vessels within this category. The assemblage from the B/C-Organic horticultural occupation matches both the written descriptions and photographic records of this pottery. The exception to this is the apparent lack of Sandy Lake ware as a strong base for the "exotic" ceramics within the assemblage. However, this does not present an immediate problem since the operative characteristic of the assemblage is also its variability, especially across space (Michlovic and Schneider 1988). As such, one would expect Red River ware to exhibit an annoying tendency not to fit well within any established category outside of its immediate area, beyond perhaps certain basic decorative styles. Moreover, it is not that Sandy Lake/Psinomani ceramics are not present. They just are not present in large quantities. Possibly a product of the small size of many of the sherds, which might lead to misidentification as a plain, untyped rim.

Some inferences may now be made about the Notched Lip and

Grainger-type ceramics found in these beds. Notched lip rims are found on some Sandy Lake ceramics, and Duck Bay notched lip is a type within the Duck Bay complex (Lenius and Olinyk 1990). Notched lip ceramics are also found in certain wares of the Stutsman Focus and are also prevalent on ceramics from Oneota sites (Mason 1966) and in sites with Oneota related ceramics. Some notched lip ceramics are also found in Plains Village ceramic types (Michlovic and Swenson 1998). This introduces the possibility that the notched lip ceramics originate with Oneota groups and manifest themselves in the pottery assemblages of cultural groups with direct or indirect contact with Oneota cultures. This makes perfect sense, and certainly suggests the Aschkibokahn site ceramics need to be re-analysed. The majority of these sites date seem to date between the 1300's and 1400's AD, although the Aschkibokahn site may date somewhat earlier, within the 1200's AD.

The Grainger-type lip treatment, an anomaly in this region, has correlates in Oneota ceramics from Wisconsin, Michigan, and Iowa in sites dating from the same period. It is therefore reasonable to suggest that these sherds are Woodland Tradition-derived although not necessarily a product of direct contact with Wisconsin-based Oneota groups.

The single most striking characteristic of the Lockport ceramic assemblage from the B/C- Organic horticultural occupation is that it fits into no known ceramic category presently used in Manitoba. Moreover, the assemblage possesses characteristics of both Woodland and Plains ware types and contains ceramics that correlate with nothing seen within the region to date (e.g. Grainger "ware"). This, combined with the fact that maize horticulture was evidently practiced, and with the presence of bison scapula hoes, the lack of evidence for

other domesticates, and the apparent heavy reliance on fishing, hunting, and gathering makes this entire assemblage a prime candidate for inclusion within a new category, which is, by extension, clearly deserving of a new complex designation. Gregg (1990) has suggested the North Eastern Plains Village complex as an all-inclusive category. However, the lack of general Plains Village traits other than deep storage pits and scapula hoes suggests that this term may not be entirely appropriate since the term "Plains Village" has strong associations with the Middle Missouri sub-area. While these assemblages on the Red River and its tributaries are probably all related phenomenon, labeling it a "Plains Village" complex may obscure the difference between this and the Middle Missouri. These complexes could probably all be placed within the Plains Village Tradition (as Gregg defines the term), but the complexes within this tradition should bear a name which is more reflective of their origins and distribution. This will be addressed in a subsequent chapter.

SECTION 3

Regional and Extra-Regional Setting: the Northeastern Plains and Beyond

9. Culture Historical Overview of the Northeastern Plains
10. Cultural Historical Overview of the Middle Missouri and Upper Mississippi

CHAPTER 9
CULTURAL HISTORICAL OVERVIEW OF THE NORTHEASTERN PLAINS: LATE PRECONTACT CERAMIC SEQUENCES OF SOUTHEASTERN SASKATCHEWAN, SOUTHERN MANITOBA, NORTHWESTERN ONTARIO, THE EASTERN DAKOTAS AND MINNESOTA

9.1 INTRODUCTION

This chapter provides a comparative overview of late Precontact Period ceramics on the Northeastern Plains (figure 43); the analysis and interpretation of which form the cultural historical backbone for the entire ceramic period there. The intent is not to provide a review of all the ceramic complexes for the entire sub-area. But, by examining the ceramics from the region surrounding the Lockport site between roughly 1000 AD and 1500 AD (all C14 dates are uncorrected unless stated otherwise) I hope to establish a contextual framework of sites and ceramics that are most closely affiliated with the horticultural occupation at EaLf-1.

This section has been divided along a combination of ecological and cultural lines into: Southwestern Manitoba, Southeastern Saskatchewan, Southeastern Manitoba and, finally the Red River corridor. These sub-divisions reflect cultural historical, and possibly ethnic, differences, which are visible in the archaeological data, as they are presently understood. However, as this study progressed it also became clear that the diagnostic characteristics of the ceramics no longer fit into the discrete cultural and analytical categories that have been established for them. It quickly became apparent that the ceramic complexes of the Northeastern Plains tend to blend into one another. This is especially true for a north-south running corridor that roughly corresponds the boundary between the Plains and Woodlands -- an area, which coincidentally encompasses the Red

River valley and its surrounding environment. This was not entirely unexpected and serves to affirm recent research that suggests regional chronologies and ceramic typologies, and, hence, the people that lived their lives and made the pots, are not always assignable to analytically convenient adaptations and environments, instead they grade into one another. (Having said that, for the reader who is overwhelmed by detail, please refer to figure 43, for nice, neat, analytically convenient categories for archaeological cultures of the Northeastern Plains).

9.2 Regional Chronological System: Historical Background

In 1966, Willey treated the two unnamed sites along the lower Red River as Plains Village outliers although, apart from a few sherds photographed in MacNeish's 1958 report, there was virtually no evidence on which to base this assertion. In some respects, Willey's assumption was prophetic but, in positing such overwhelming dominance of the Plains Village Pattern without any consideration of the importance of adjacent areas such as the Boreal Forest and Eastern Woodlands, he unwittingly helped to mask the richness of cultural interaction within the region. Since then, there has been a tendency to regard the Red River Valley as a mere extension of the Boreal Forest. Unfortunately, this perspective has been equally limiting. In truth, due to the environment and the geographical position of this area, neither the Plains nor the Boreal Forest holds all the clues to unraveling the cultural developments in the Red River Valley.

9.2.1 Concepts

Two decades ago, Syms (1977, 1980) warned of the dangers of viewing cultural interaction too narrowly. When one considers the vast areas over which Aboriginal groups were known to have travelled, it is ethnocentric to presuppose that this pattern emerged the moment Europeans arrived on the scene. In fact, subsequent work by researchers like Gregg (1985), Michlovic (1990), and Michlovic and Schneider (1988) has started to uncover what should have been a predictable blending of Plains and Woodland cultures along the prairie-forest zone of western Minnesota and eastern North Dakota. This pattern may also extend along the same corridor between Minnesota and South Dakota (Anfinson 1997). It is clear from such work that the nature of Plains-Woodland interactions within this zone has left a mixture of traits from these two areas, which is visible in the archaeological record. Unfortunately, archaeology is ill equipped to deal with hybrids because continuities are more difficult to address using rigid ethnic and chronological categories than rigidly bounded spatial and temporal categories. Neat little boxes do not lend themselves to blendings of peoples and styles, especially when the people were highly mobile.

A recent reworking of the Boreal Forest cultural chronology has powerfully demonstrated the inadequacy of linear and progressive chronological models (Lenius and Olinyk 1990). Our expectations of cultural chronologies are inflexible, and, as Syms suggested in 1977, the time for discarding these linear, "stacked" models of cultural development has long since arrived. We must rethink our conception of cultural development, chronology, and relationships in order to allow for a dynamic system -- one that permits shifting populations, adaptations, subsistence systems, environmental

boundaries, and inter-ethnic relationships

9.3 ARCHAEOLOGICAL TAXONOMY

9.3.1 Relation to Culture-History

Any attempt to interpret cultural process must rest on a solid understanding of regional culture history, complex and riddled with taxonomic confusion though it may be. Far from being outdated, or theoretically irrelevant, culture history is the backbone upon which interpretation rests. Without this understanding, models that purport to explain past human behaviour are mere chimeras.

All cultural history relies on a system of nomenclature intended to impart order to visible cultural variation over time and space, but taxonomic nomenclature has not remained static. Archaeological taxonomy has undergone, indeed is still undergoing, many revisions in the terminological schemes which order our understanding of these cultural changes. Several different systems have gained pre-eminence during the past half-century and this has led to a concomitant level of confusion regarding the appropriate term for any given archaeological "culture". Thus, it is necessary to introduce the nomenclature which in use in the region as well as the changes that have occurred over the last few years. Because these terms will be used throughout this document, I begin with an outline of current nomenclature in order to establish the context for the rest of the discussion.

9.3.2 Northeastern Plains archaeological taxonomy and terminology

In any outline of regional chronology, taxonomic nomenclature is a ubiquitous problem. There is a persistent lack of consistency in the terms used to designate cultural, spatial, and temporal units. The problem being that the Midwestern Taxonomic System of components, foci, aspects, traditions (etc.) was superceded by that of Willey and Phillips (1958), yet it is clear that that their revisions have not been entirely satisfactory, perhaps due to the lack of consistency in how they have been applied. Currently some authors use aspects of Willey and Phillips' (1958) taxonomic system, relying variously on "components", "phases", and "horizons" to describe archaeological divisions (Buchner 1986), while others have tenaciously held onto the Midwestern Taxonomic System (Nicholson and Hamilton 1997), or resorted to more ambiguous terms such as "culture" (Nicholson 1987).

Partly in response to this confusion, researchers working on the Northeastern Plains have generated some terms of their own. Gregg (1985, 1990), Syms (1977), and Lenius and Olinyk (1990) all use the word "complex", but in different ways. None of these various taxonomic systems convey the same meaning, nor do they necessarily imply similar levels of classification. In Syms' (1977), Lenius and Olinyk's (1990), and Meyer and Russell's (1987) terminology, a complex is the smallest level of classification after the assemblage and is defined as a group of related assemblages, or:

> ... (T)he total expression of a number of assemblages left by the same group over a sufficiently narrow time period that cultural expressions undergo only minor changes ... It represents the remains of a group with a shared lifestyle, the same overall tool kit, the same technological skills and preferences, and the same

typological attributes.

(Syms 1977: 71)

This is similar to a phase or aspect in other nomenclatures. However, Michael Gregg defines a complex as:

> ... (G)roups of similar and distinctive material remains that have been found at numerous sites in an area or sub-area ... (these) usually include technologically and stylistically diagnostic artifacts such as ceramic wares, point types, and unique mortuary offerings ... A complex in this sense is similar to a composite, as defined by Syms ...
>
> (Gregg 1990: B.9)

The duplication of the term "complex", defined differently within the same research sub-area is confusing and makes it difficult to designate cultural units correctly. Many archaeologists who work in this area have a basic understanding of local archaeological cultures such as Blackduck, and could recite their diagnostic traits from memory. However, Blackduck is a horizon to some (Lenius and Olinyk 1990), while to others it is a phase (Buchner 1986). When one encounters the word "Blackduck" it is unclear whether one is dealing with a culture type, a phase, a horizon, a site, or a ceramic ware. While Blackduck is generally treated as the hierarchical equivalent of Laurel in summaries of local and regional cultural chronologies (Nicholson 1987; Gregg 1985, 1990), the terminology does not reflect this. In one author's eyes, Laurel is a complex (Gregg 1985, 1990), but to others it is a configuration (Lenius and Olinyk 1990).

In this terminological system, the term "assemblage" is probably the most uniformly understood. It represents the physical remains of "a single residential

group over a short period of time at one site" (Syms 1977: 70). In many respects, it is analogous to a component or an occupation in other systems. An assemblage may represent the remains of some specialized aspect of a subsistence system and does not always need to consist of the remains of a single group since assemblages may contain the remains of two or more groups sharing a particular adaptive strategy at a given time (Syms cites the example of shared winter camps of Cree and Assiniboin peoples) (Syms 1977). The complex has been defined above but it is also important to note that the assemblage members of a given complex should be relatively homogenous except where these assemblages reflect different seasonal or geographical activity patterns. No single assemblage will contain all aspects of any given complex (Syms 1977).

A "composite" consists of a group of related complexes that share similar sets of stylistic and technological traits. (Syms 1977), and is roughly comparable to a phase as it is understood in the Willey and Phillips (1958) system, or a "variant" as defined by Lehmer (Syms 1977). Complexes included in a composite should be sufficiently similar to suggest "... a common and recent ancestry but sufficiently different that micro-evolutionary changes have taken place." (Syms 1977: 71). Thus a composite may indicate a common ancestry for the complexes but also allows for small changes to have taken place in an intervening period of time as groups separate and develop different identities. The configuration is the fourth level of classification and groups together composites with enough shared traits to suggest either a distant common ancestry or shared adaptive strategy reflected in certain amount of "cultural convergence" (Syms 1977). This level of classification is roughly similar to a phase in the Midwestern Taxonomic System, a tradition in the Middle Missouri sub-area, or a tradition in Willey and Phillips

system (Syms 1977: 72).

Syms (1977) suggested this revision for two main reasons. First, his attempt to standardize taxonomic nomenclature addressed, for instance, the problem of the use of "phase" at two different levels in two different taxonomic systems; and second, his system was designed to suggest to archaeologists that they take a more cross-regional approach in the hierarchical ordering of their materials which, in his system, could be done in a way that permitted lower order groupings to supercede sharp geographic divisions.

Recently, a number of authors in Saskatchewan (Meyer and Russell 1987), Manitoba (Lenius and Olinyk; 1990 Syms 1977), and Ontario have begun to adopt Syms' (1977) nomenclature system although this is by no means universal. Meyer and Hamilton (1994) address the problem by incorporating no taxonomic terms whatsoever, addressing various cultural units simply by name (e.g.: Blackduck, Laurel, etc.). While I have certain reservations about the use of the term "complex" for the smallest taxonomic collective, I will, nevertheless, incorporate these terms wherever possible.

In this thesis, where any taxonomic agreement is entirely absent, I simply refer to archaeological cultures by name without any accompanying hierarchical designation. However, the reader should also be aware that this problem of taxonomic nomenclature is further complicated by the use of the names of ceramic wares, which are frequently named for their type sites, to designate larger cultural units. This has resulted in a lack of clarity since it is uncertain whether one is referring to a site, a ceramic ware, a horizon, a composite, a complex, a configuration or a phase.

In the interests of simplicity, as the review of Northeastern Plains

proceeds, I will discuss only those archaeologically defined taxonomic units that are directly pertinent to the Late Woodland Period or Tradition, especially as it seen at the Lockport site. At times, it has been necessary to stray, geographically speaking, somewhat further afield in order to provide the context for later discussions. However, it is not appropriate to summarize the entirety of Northeastern Plains prehistory here The reader is directed to more comprehensive summaries if further information is required (e.g. Gregg 1985, 1990, 1994). These cultural developments will be discussed within the context of the appropriate ceramic wares since Woodland cultural chronology in the region rests almost entirely on this class of artifacts.

9.4 SOUTHERN MANITOBA

The eastern and western portions of southern Manitoba are generally treated as separate areas partly because southwestern Manitoba is physiographically, vegetationally, and climatically different from the southeastern portion of the province. This is reflected in the ceramics which also show clear differences between these two parts of the province. Finally, Brandon, the major urban center in the southwestern quadrant of the province, has many years, maintained its own university archaeological curriculum, which rests firmly on a program of local excavations. The combination of these factors has resulted in local culture histories that read quite differently even though there are some clear relationships between the two halves of southern Manitoba.

However, there are also clear differences between them. Not surprisingly, southwestern Manitoba has closer cultural ties with the Pre-contact groups of

southeastern Saskatchewan, the Middle Missouri, and Northwestern Plains sub-areas, which lie directly south and west, as well having ties to the Boreal Forest and Parklands to the east. This eastern influence can be seen in regional ceramic collections that contain typical Late Woodland sherds assignable to Blackduck, Sandy Lake, and Selkirk. However, there are also obvious western and Plains influences apparent in ceramics that are similar and perhaps related to Mortlach and Middle Missouri pottery types to the west and south respectively.

Southeastern Manitoba, on the other hand, is closer to the Eastern Woodlands and Boreal Forest. As a result, this area has frequently been treated as a simple extension of the Boreal Forest even though it is more complex than this, containing Boreal Forest, Mixed Forest, Aspen Parkland, and Tall Grass Prairie (Scott 1995). In the past, boreal forest ceramic/cultural sequences were applied, perhaps somewhat uncritically (see for example Buchner 1986; Flynn 1987), and the Laurel-Blackduck-Selkirk chronological triad remained unquestioned for many years. However, recent work (Michlovic and Schneider 1988, 1993) in the Red River Valley and along its associated tributaries in Manitoba, North Dakota, and Minnesota has shown that cultural relationships are far more complex than this simple chronology permits, as Syms (1977) Co-Influence Sphere model predicted. Once viewed as discrete entities, it has become clear that there is no sharp line demarcating the cultures of the Plains and Woodlands (Michlovic and Schneider 1993; Syms 1977). Nor, and perhaps this is more surprising, is there such a line between horticultural and non-horticultural economies. Instead, groups along the edges of the Plains and Woodlands moved back and forth, exploiting each area as it suited them, adopting and abandoning maize horticulture according to their needs (Michlovic and Schneider 1993), and

forming extensive networks of ties which belie attempts by archaeologists to draw solid cultural, adaptational, and chronological boundaries.

9.4.1 The Vickers Focus of Southwestern Manitoba

9.4.1.1 Definition: The Vickers Focus is defined as a late pre-contact, mixed forager-gardener subsistence economy centered in the Tiger Hills region of south-central Manitoba (Nicholson and Hamilton 1997). This definition relies almost exclusively on ceramic assemblages (Nicholson and Hamilton 1997) which consist of both surface collected and excavated materials amassed over a number of decades from several different locales.

9.4.1.2 Distribution: Vickers Focus sites lie in the extreme southern portion of Manitoba, just north of the Canada-US border, in a region defined by the lower Souris River east of Melita extending eastwards towards the Tiger Hills, Pelican Lake, and Rock Lake north of Cartwright, Manitoba (Nicholson and Hamilton 1997). Sites possessing Vickers Focus components include the Lowton, Lovstrom, Johnas, Jackson, Vera, Randall, and Bradshaw sites. They have been subdivided into an eastern cluster which consists of the Lowton, Lovstrom, and Randall sites and a second, western cluster at the southwestern edge of the Lauder Sand Hills in the Makotchi-Ded-Dontipi locale (Nicholson and Hamilton 1997).

9.4.1.3 Type site: Lowton, the Vickers Focus type site, is situated on rolling land covering approximately 10-15 hectares within a cultivated field. It has been so heavily collected by local amateurs that private artifact collections "contained

thousands of potsherds" (Nicholson and Hamilton 1997:27).

Lovstrom, a multi-component site located on a high bluff overlooking the Souris River, has yielded better information about the Vickers Focus. (Nicholson and Hamilton 1997). It was excavated in 1987-1988 and 1991, and apparently contains the remains of two occupations (Nicholson and Kuijt 1990; Nicholson and Malainey 1991), one of which dates to circa AD 1450. A "probable" scapula hoe (Nicholson and Hamilton 1997) recovered from this occupation comprises the bulk of the evidence for the assertion that Vickers Focus peoples practiced a mixed hunting/gathering and horticultural economy. The only other support for this lies in the similarity between Vickers ceramics and those from other, primarily horticultural, regions such as the Middle Missouri sub-area of the Great Plains.

The separation of the artifact bearing deposit into two occupations at Lovstrom is problematic because soil disturbance has blurred the distinction between them. The suggestion of the existence of two occupations rests heavily on radiocarbon dates, which place the occupations, approximately 400 years apart (Nicholson and Malainey 1991). Excavated ceramics show a mix of boreal forest/parkland types, such as Red River, Blackduck, Duck Bay and Sandy Lake wares, and Plains Village associated wares, such as Scattered Village, Campbell Creek and Anderson Plain (Nicholson and Malainey 1991). At this time, Nicholson (Nicholson and Malainey 1991) noted similarities between these ceramics and those from both the Johnas and Lowton sites. This observation leads Nicholson to place the later of the two Lovstrom occupations into the Vickers Focus. Ultimately, it is the stylistic diversity of Vickers Focus ceramic assemblages that sets them apart from other ceramic assemblages in the same

area. Earlier assemblages are much more uniform in their overall appearance.

9.4.1.4 Associated ceramics: The definition of the Vickers Focus is predicated on a diverse array of ceramics which include sherds identifiable as Sandy Lake, Blackduck, Duck Bay, Fort Yates, and Knife River Fine. It also includes a number of unassigned "vessels" with finger-pinched nodes on the rim, quartered-vessel decorative motifs, and animal effigy tabs (Nicholson and Hamilton 1997). According to Nicholson and Hamilton (1997), all eastern Vickers Focus sites possess similar, if highly diverse collections of ceramics. Lovstrom Site ceramics show affiliations with horticultural groups from Minnesota and North Dakota, although the Ft. Yates-type vessel is likely a trade item (Malainey pers. comm. 1998). The majority of sherds assigned to the Vickers Focus resemble either Late Woodland Sandy Lake or Mississippian Plain wares common to village sites from northern Alabama through to Illinois, Iowa, and Minnesota (Nicholson and Hamilton 1997). Sherds of this type have decorations that are generally confined to a set of oblique tool impressions on the outside or the inside of the lip (Nicholson and Hamilton 1997: fig. 3, p. 28). They argue that these are consistent with the Scattered Village Complex ceramics from North Dakota and also fit Anfinson's (1979a) definition of Sandy Lake. It is unclear from this whether they are suggesting that Middle Missouri Scattered Village, Mississippian Plain, and Sandy Lake are all equivalent terms.

Most of the generalizations about Vickers Focus ceramics derive specifically from the Lowton collection -- a mix of excavated and surface-collected material. Both the Middle Missouri fine wares and the Blackduck sherds are postulated trade items, although some of the Blackduck sherds may also be the

result of an earlier occupation (Nicholson and Hamilton 1997). Many sherds have finger pinched nodes on the rims which they say are unique to Lovstom, Johnas, and Lowton (Nicholson and Hamilton 1997: fig 4, p.27). However, finger pinched nodes are a widely distributed decorative motif seen from Nebraska through to southern Saskatchewan and as far east as the southern Great Lakes.

9.4.1.5 Chronological placement: There is a single bone collagen date from the Lowton site of 510 ± 110 BP (uncorrected) (Nicholson and Hamilton 1997). From this, Hartlen (1997) and Nicholson and Hamilton (1997) suggest two different date ranges of 1000-1500 AD and 1450-1650 AD respectively for the Vickers Focus.

9.4.1.6 Explanatory culture dynamics: According to Nicholson and Hamilton (1997), this focus encompasses a series of brief population incursions originating from the Mississippi and Missouri drainages as part of a northwards expansion of Late Plains-Woodland and Plains Village groups between 1400-1600 AD. Awatixa oral history tells of a group who returned to the Knife River after losing their corn and dwelling in a snowy area with moose (Ahler et al. 1991) which leads Nicholson (1996) to suggest that the Vickers Focus is the result of Hidatsa migrations.

The typological similarity of Vickers Focus ceramics to "foreign" ceramics from Eastern Woodlands and Middle Missouri, in combination with a series of Blackduck dates which terminate around 1100 AD, leads him to posit a gradual, two stage migration of small family groups following the James and Sheyenne River valleys ca 1100-1300 AD, and the Pembina Trench from the Red River

Valley and into the Souris River drainage at 1400-1450 AD. He argues that in response to external threat, migrating groups formed alliances with groups they encountered along the way. Eventually these "poly-ethnic groups" formed their own cultural identities and the visible stylistic diversity of Vickers Focus ceramic assemblages thus becomes reflective of actual ethnic diversity.

These immigrants exploited choice locations and depleted the resource base to the point where Blackduck peoples were no longer able to make seasonal use of these areas, forcing indigenous groups north and west. This coincides with both the disappearance of Blackduck ceramics in southwestern Manitoba and with the final collapse of the large Mississippian chiefdoms to the southeast (Nicholson 1996). Cold summers between 1453-1454 AD, caused by a large volcanic eruption in the South Pacific, spelled the end of corn horticulture in southwestern Manitoba ending the occupation by Plains-Woodland/Plains Village migrants sometime between 1400 and 1550 AD. At this point the area becomes a no-man's land, exploited by many but controlled by none (Nicholson 1996).

Nicholson (1996) subsumes the Vickers Focus within the Scattered Village Complex because the two are co-teminus (Nicholson 1996). As such, Nicholson (1996) revises the Middle Missouri Coalescent to include South Dakota's Randall Phase, the Scattered Village Complex, the Vickers Focus, and the Northeastern Plains Village Complex, all of which share the presence of small, unfortified or fortified villages where the occupants relied primarily on bison with some supplementary maize horticulture (Nicholson 1996). The social and settlement pattern was based on a central village -- part of an incipient chiefdom centered at Lowton, with the Lovstrom and Randall sites as seasonally occupied outliers

whose members returned to Lowton for the winter season (Nicholson and Hamilton 1997).

9.4.1.7 Problems: Obviously, the nature of the ceramic sample from the type site, Lowton, makes it difficult to assess the stylistic diversity that is used to distinguish the Vickers Focus. There is unquestionably an interesting mixture of ceramics showing affiliations with the Boreal Forest, Parklands, and Plains. However, it is hard to accept the cultural processes that are used to explain the presence of these "highly variable" ceramic assemblages in the absence of any clear separation of excavated and surface collected materials. Resting heavily as it does on surface collections which might represent mixed occupations, and on the heavily disturbed occupation layers which characterize the excavated samples, the definition of the Vickers Focus may be predicated on an unknown number of mixed occupations. This renders the explanation for the observed ceramic diversity questionable. When one adds the proviso that the Middle Missouri-affiliated ceramics may be trade vessels (Malainey, pers. comm. 1998), combined with the argument that many Vickers sherds fit well within Sandy Lake/Psinomani (Hartlen 1997), the assemblage begins to look much more typical.

Vickers Focus ceramic assemblages appear to contain a mixture of Blackduck, and Duck Bay ceramics with the addition of some apparently "Middle Missouri" fine and plain sherds which may be attributable to Sandy Lake, and possibly to Mortlach as well. There are also some unassigned sherds that possess effigy tabs, quartered-vessel decorative motifs and finger pinching on the rims. The Blackduck and Duck Bay materials may be the products of an earlier

occupation. Any sherds that are directly attributable to the Middle Missouri are possible trade items. The result of all of this reassignation and reconsideration results in an collection which seems to consist mostly of Sandy Lake, with the addition of some unusual vessels possessing effigy tabs and/or quartered decorative motifs as well as some finger pinched rims. What remains is fundamentally Sandy Lake in character and where the observed variation (the same variation that supposedly defines the Vickers Focus) can be explained by four untested and overlapping scenarios in which the other, more variable or exotic materials are possibly:

1) Trade vessels from unidentified sources to the south;

2) The result of an unknown number of sequential occupations which have become mixed in the post-depositional environment with a Sandy Lake occupation;

3) Indicative of a quite varied, assemblage which, like some of those from the Red River Valley, contains primarily Sandy Lake pottery mixed with a diversity of other ceramics that are are decidedly exotic looking; and

4) Indicative of a multi-ethnic gathering place either as a result of a disrupted period in the regional culture history or perhaps the product of historically known cultural events such as trade fairs or rendezvous.

In the end, we are left with a series of sites both disturbed by cultivation (Lowton, Lovstrom, and Johnas) and extensively surface collected through the years. Other collections lumped within the Vickers Focus consist entirely of surface collected material (Randall and early Lowton). It is entirely possible that, some Vickers Focus assemblages represent a series of closely spaced, mixed occupations by different ethnic groups rather than the poly-ethnic, co-residence

groups suggested by Nicholson (1996). Nicholson (1996) himself states that hard evidence to support the idea that Vickers Focus groups practiced a horticultural economy has been difficult to obtain. A single fragmented bison scapula is not sufficient. Thus, while the model which accounts for the existence of the Vickers Focus is not problematic in and of itself, the data upon which it rests is, and whether these ceramics are all part of a single cultural "Focus" is open to question. The Vickers Focus may indeed express a disrupted cultural dynamic in the late Pre-contact related to the movement of Siouan-speaking peoples, but if this process is to be explained cogently and parsimoniously, the surface and excavated materials need to be clearly identified in the published literature. Published reports frequently include both surface and excavated sherds without distinguishing between the two. In order to assess the validity of both this focus and the model which accounts for its presence, excavated and surface collected artifacts need to be clearly separated and presented in a format which shows their stratigraphic and spatial relationships as do possible trade vessels to ensure that the final statistics are not skewed by the presence of one or two highly fragmented, anomalous pots. The Vickers Focus requires careful re-evaluation before it constitutes a culturally and temporally meaningful taxon.

9.4.2 Other sites in Southwestern Manitoba:

9.4.2.1 The Duthie Site: The Duthie Site is located within the Lauder Sand Hills which are glacial sands, silts, and clays deposited by Glacial Lake Souris (Taylor 1994). This site is near the Souris River and close to the Jackson site, west of Brandon, Manitoba (Voth 1996). Some of the ceramics are unusual for this area. One vessel in particular, (shown in Voth 1996) is reported to have small

"loop handles"; however, it is clear that these are not so much "handles" as perforated tabs. Characteristics of this vessel include the fact that the exterior is burnished, while the paste is coarse, laminated and grit tempered. Other sherds in the Duthie assemblage resemble those from the Middle Missouri, and Saskatchewan Basin. Duck Bay and Blackduck ceramics were completely absent from this site (Pankratz 1996).

The decorative motifs on some of these sherds consist of shallow, trailed lines and sometimes there are incised lines in both straight and curvilinear motifs. The "loop handled" vessel is decorated with zoned, incised rows of horizontals over obliques that circle the vessel in one direction (Voth 1996). Taylor's (1994) assessment of these ceramics suggests that they are analogous to those of the semi-sedentary groups of the Mississippi and Middle Missouri sub-areas. She cites the postulated Oneota affiliation for the Shea Site ceramics and states that they are similar to those found at Duthie. On this basis Taylor (1994) posits a tentative Oneota cultural affiliation for the Duthie Site peoples. She also states that there are certain similarities to the ceramics of the Randall Phase of South Dakota.

Taylor (1994) believes that the Duthie ceramics are similar to both Middle Missouri and Mississippian ceramics without resembling any specific phase although some of the closest related ceramics may be seen in the Cambria, Blue Earth, and Silvernale Phases of southern Minnesota. In her opinion, the anomalous Duthie Site ceramics were locally manufactured. She suggests that the decorative motifs were either inspired by southern vessels or manufactured at the site by immigrants from the south. She argues that the vessel's large size precludes it as a trade or gift item.

Technically, the Duthie Site is not included in the Vickers Focus. It is dated earlier and is regarded as an expression of the Initial Middle Missouri variant of the Plains Village Pattern, which dates from AD 1000 to 1250 (calibrated) (Nicholson and Hamilton 1997).

The Duthie Site is discussed as one that contains mixed Plains Woodland and Plains Village stylistic traits. Radiocarbon dates place the occupation at circa 880± 80 BP and Nicholson (1996) believes that the Duthie material resembles Randall Phase pottery from South Dakota. He states that this site may represent the northernmost extension of the Initial Middle Missouri "...which moved from Mississippian influenced centers in Minnesota and Iowa and along the river valleys into the Dakotas" (Nicholson 1996: 79).

9.4.2.2 Problems: There is no evidence at Duthie for horticulture (Nicholson 1996). This begs the question of what criteria, beyond the presence of unusual and unclassified potsherds are used for placing this site in the Initial Middle Missouri Variant, the definition of which is quite specific. The most reasonable analogs for the Duthie pottery occurs at sites along the Missouri in South Dakota such as the La Roche site (Hoffman 1968)

The absence of any Blackduck or Duck Bay ceramics could be significant since this suggests that there was no preceding Late Woodland occupation in this particular area. This does suggest that whatever process brought the unusual ceramics to the Duthie site, it occurred in the absence of local Late Woodland antecedents.

9.4.2.3 The Killarney Focus

The Randall collection (which is not related to the Randall Phase of South Dakota) consists of surface collected ceramics from five sites in southwestern Manitoba. Collected between 1969 and 1979 in the Killarney District, these artifacts subsequently became part of the Killarney Focus.

George Hartlen (1997) examined the Randall collection in order to assess the utility of surface collections as analytical tools and to place this collection within its cultural and chronological context. While previous analysis placed most of the ceramics in Blackduck, Middle Missouri and Mortlach wares, Hartlen's (1997) reassessment led him to assign these instead to Sandy Lake and Blackduck with the presence of some possible Middle Missouri wares. Obvious simulates between this Killarney Focus collection and Vickers ceramics from the Lowton, Lovstrom, and Jackson sites led Hartlen (1997) to argue that Killarney Focus pottery could be safely subsumed within the Vickers Focus.

Like much of the material in the Vicker's Focus, this material is surface collected and there is no reliable way to separate potentially different cultural occupations. Hartlen (1997) recapitulates Nicholson's conclusion that this area was one in which horticultural groups moved in and displaced existing occupants between 1000-1550 AD. Nicholson (1996) and Hartlen (1997) both believe that these immigrants are somehow linked to both Middle Missouri farmers and to the indigenous non-horticultural Late Woodland and Plains-Woodland cultures of southeastern Manitoba.

9.4.2.4 Problems: Hartlen (1997) states that an in-depth re-examination of Lowton pottery is required in order to devise a definitive Vickers typology:

> ... (I)t is the author's intention to clarify those attributes belonging to Vickers Focus pottery. One of the problems encountered in the preliminary research ... was the ambiguity that existed in the description of the pottery types in question. For example, pottery that was identified as belonging to the Vickers Focus could also be categorized as Sandy Lake depending on how the descriptions/attributes were interpreted.
>
> (Hartlen 1997: 49)

Unfortunately, Hartlen uses the categories Early and Late Blackduck from Anfinson's (1979a) handbook of Minnesota ceramics even though the terms Anfinson uses there have been superceded by Lenius and Olinyk's (1990) taxonomic revision. Furthermore, in the absence of any chronological controls, Hartlen also defines a new category, "Middle Blackduck". Hartlen (1997) rejects Lenius and Olinyk's (1990) revised chronology and returns sherds previously classified as Rainy River to Late Blackduck. This is a step in the wrong direction and one that is based, at least in part, on a misunderstanding of Lenius and Olinyk's work. Their initial typological scheme which, for the materials in question, stands as the best taxonomic update so far, was intended as a platform for future research and hence refinements in their work. It was not intended to stand as a cultural historical monolith to be accepted or rejected in its entirety.

Hartlen also utilizes Snortland-Coles (1979) typology from the Aschkibokahn site report in which the author assigned a great deal of material to Blackduck, much or all of which probably doesn't belong in that taxon. Hartlen does not make use of any of the updated Duck Bay models from either Lenius and Olinyk (1990) or Hanna (1992).

Hartlen (1997) argues that the "*Late* (?) Horticultural Village Ceramic

Period" in Manitoba begins at 1000 AD, when the environment in Manitoba was especially conducive to maize horticulture. This contention carries at least one serious chronological problem. This date of 1000 AD constitutes an extremely early arrival of horticulture for the Northeastern Plains as a whole, especially if we compare this initial date for southwestern Manitoba to other early northern Northeastern Plains horticultural sites such as Mooney and Shea, which show maize horticulture as arriving somewhere in the vicinity of 1300-1400 AD. A date of 1000 AD for maize horticulture in Manitoba may in fact, pre-date the development of northern hardy maize strains on the Northeastern Plains.

9.4.2.5 Bradshaw and Schuddemat Sites

The Bradshaw and Schuddemat sites are located in the Lauder Sand Hills west of the Souris River in what Nicholson and Hamilton (1997) have labeled the "Makotchi-Ded-Dontipi locale" -- the western portion of Vickers Focus site distribution.

Four distinct habitats are present in the immediate area: sand hills, grassland, forest/grassland transition, and aspen forest. They suggest that these varied habitats, together with the presence of the Oak Lake Aquifer, would have created a sheltered, resource rich area of meadows, forest, marshy wetlands, and small lakes attractive to both animals and humans (Nicholson and Hamilton 1997). In the past, this area would have contained bison in addition to the wetland and lacustrine resources provided by the aquifer (Pankratz 1996).

The Bradshaw-Schuddemat ceramic assemblage exhibits a level of diversity similar to others of the Vickers Focus, although Pankratz (1996) states that the former are unlike other Vickers ceramics found in this locale. There are a

few Sandy Lake-type sherds, but there are also vessels that resemble those from Mortlach, Cluny, Shippe Canyon, Sanderson, and some Middle Missouri sites. This variation in shape and form could be attributed either to multiple occupations or to a coalescence of different groups (Pankratz 1996). Moreover, there is no agreement whether this apparently wide distribution of Middle Missouri pottery types is due to movement of people (specifically Hidatsa-Crow) or a product of trade (Pankratz 1996).

Pankratz (1996) argues that the stylistic diversity evident in this assemblage is the result of slow and gradual movements of small groups over a long period of time and that the movement of people into and through this area consisted of numerous seasonal occupations as opposed to one large migration resulting from epidemics or warfare. Therefore this in-migration was a peaceful process -- not sudden, dramatic or violent. Such a pattern fits with known seasonal mobility patterns that resulted from the exploitation of bison. While there is no evidence that the occupants of the Bradshaw and Schuddemat sites cultivated maize, this area would nevertheless have been suitable for horticulture (Pankratz 1996).

Pankratz (1996) concludes that there are certain general similarities between the Bradshaw-Schuddemat ceramics and those from Middle Missouri, Sanderson, Shippe Canyon and Cluny sites. These stylistic similarities are attributed to a common derivation from Siouan linguistic stock rather than having been manufacture by the same cultural group(s). Historic evidence for an 18th century Hidatsa schism suggests that the Crow may have moved northwards. From this evidence, Pankratz (1996) argues that the Bradshaw-Schuddemat assemblage may be a product of earlier movements from the

Missouri heartland, perhaps via the Souris River valley. The evident divergence from established Middle Missouri ceramic forms could have been caused by a combination of time, distance, and isolation as well as the coalescence with other socio-linguistic groups in the region (Pankratz 1996). Unfortunately there are no C14 dates to suggest which, if any, of these ideas is correct.

9.5 Southeastern Saskatchewan

9.5.1 The Mortlach Phase

9.5.1.1 Definition: The definition of Mortlach as a cultural historical entity is not without its problems. Walde et al. (1995) report that it has been the subject of controversy ever since it the ceramics were first recognized by Wettlaufer in 1955. Walde et al. (1995) attribute much of this confusion to evident influences from neighboring groups, such as Selkirk and Middle Missouri. Mortlach ceramics apparently have a tendency to exhibit ceramic elements from adjacent regions. This adds to the existing confusion when trying to formulate an all-encompassing definition.

Previously, there was some disagreement as to whether or not Mortlach could be considered a recognizable archaeological culture. Walde et al. (1995), synthesizing the results of recent research by a number of archaeologists in Saskatchewan argue that there is enough cumulative evidence to elevate Mortlach to the status of a phase. They also suggest that some of the confusion can be further addressed by creating internal subdivisions within this phase, which they call the Lozinsky and Lake Midden sub-phases. This subdivision is based on what appears to be differences in the material cultures between the parkland and grassland manifestations of the Mortlach Phase. The Mortlach

assemblages within the parklands, those of the Lozinsky sub-phase, show more cultural contact with northern neighbors, such as Selkirk; while those south of the parklands, within the grasslands, show more contact with Middle Missouri horticulturalists (Walde et al. 1995). This emphasis is reflected in both the ceramic and lithic assemblages. The subsistence system during the Mortlach Phase was based primarily on bison, with some emphasis on fish and on trade with neighboring groups.

9.5.1.2 Distribution: Walde et al. (1995) state that Mortlach phase ceramics may be found within an area south of the boreal forest, as far east as southwestern Manitoba, and as far south as northeastern North Dakota. Mortlach ceramics extend as far as west central Saskatchewan in the west, where their distribution is truncated by Old Women's and Cluny complex materials. The distribution of Mortlach sites appears to be limited by the neighboring cultural groups such as Selkirk to the north, Blackduck and Psinomani to the east and Middle Missouri to the south (Walde et al. 1995).

9.5.1.3 Type site: The Long Creek and Mortlach sites excavated by Mayer-Oakes and Wettlaufer in the late 1950's can probably be regarded as the type sites for this phase (Walde et al. 1995).

9.5.1.4 Associated ceramics: Assemblages from Mortlach sites are generally quite diverse and show evidence of contacts with both Selkirk and Middle Missouri peoples to the north and south respectively (Walde et al. 1995). However, taking into account these external influences, Mortlach ceramics are

frequently grit tempered, sometimes with low percentages of other types of temper such as sand (Malainey 1995) which is very typical of ceramics in the region. The vessels are comparatively thin and compact with fabric marked, cord roughened, smoothed or check stamped exterior surfaces (Walde et al. 1995). There are four major vessel profiles including vertical, angled, S-, and wedge-rim (Walde et al. 1995). Decorative treatments are varied and may include a number of treatments including cord wrapped object impressions, finger markings, and the use of a variety of tools to create the decorations. Motifs are often quartered around the shoulder and may consist of complex series of horizontal bands with or without the addition of chevrons or triangles. Lip surfaces are often decorated with a variety of treatments, generally consisting of different arrangements of cord wrapped tool impressions (Malainey 1995).

Mortlach sites to the south appear to have higher instances of check stamped and plain exteriors. There is also less variety in the decorative techniques and a higher incidence of dentate impressions on the sherds. In the north cord roughened, fabric impressed and plain exteriors predominate. There is a greater frequency of cord wrapped object impressions and a greater variety of decorative techniques such as incised lines, finger pinching, and punctates (Malainey 1995).

9.5.1.5 Chronological placement: Dating of the Mortlach Phase is not well established at this point. Absolute dates are not abundant but those which have been obtained so far suggest a range of approximately 1500 AD to contact since some Mortlach sites contain European trade items.

9.5.1.6 Explanatory cultural dynamics: Walde et al. (1995) suggests that the Mortlach assemblages represent the ancestors of the Assiniboine groups in this area citing the fact that the Assiniboine were already settled well west of modern day Saskatchewan by the late 1600's. Walde et al. (1995) also argue that there is historic evidence to support the existence of their postulated northern and southern subdivisions. Hudson Bay documents report that there was a schism in the Assiniboine that broke along north-south lines prior to the 1690's. Apparently these records state that these two branches of the Assiniboine were not then on friendly terms. These same records note that the northern division was culturally similar to its Cree neighbors while the southern group more closely resembled the Mandan and Hidatsa (Walde et al. 1995).

9.5.1.7 Problems: In Malainey's (1991, 1995) view, the northern portion of the distribution of Mortlach ceramics shares more in common with Wascana ware whereas true Mortlach ware is confined to the southern portion of the larger range favoured by Walde et al. (1995). Malainey (1995) is critical of the techniques used by Walde to establish and analyze his samples, stating that his methods distorted the proportions of different rim profiles which are one of "... the most useful criteria for classifying late Pre-contact pottery from south central Saskatchewan." (Malainey 1995: 172). It appears that one of the primary means by which to distinguish Wascana from Mortlach assemblages lies in the differing proportions of the various rim profiles -- precisely that aspect of the ceramic assemblage which Walde's methods purportedly distort. However, the nature of the disagreement appears to be largely terminological. In both cases (Malainey 1995; Walde et al. 1995) two clusters are identified a northern one and a southern

one. Malainey (1995) argues that the northern cluster is more appropriately termed Wascana ware rather than Mortlach, while Walde et al. (1995) suggest that the northern cluster is a sub-phase of Mortlach. However, the line which divides these two clusters and exactly which sites get placed in which cluster differs depending on which analytical technique one favours.

9.6 Southeastern Manitoba and the Lake Winnipeg-Rainy River Corridor

9.6.1 The Duck Bay Complex and the Aschkibokahn assemblage

9.6.1.1 Definition: As a ceramic ware, Duck Bay was first recognized at the Aschkibokahn Site in north central Manitoba and defined by Snortland-Coles in 1979. Until 1990, it retained its status as a ceramic ware with a number of internal type and modal divisions based largely on decorative treatment. In a 1990 publication, however, Lenius and Olinyk elevated Duck Bay to the status of a complex within the Rainy River Composite which, they argue, arose out of a coalescence of Laurel and Blackduck cultures around 1000 AD (Lenius and Olinyk 1990; Hanna 1992).

9.6.1.2 Distribution: Duck Bay ware is widely distributed as a minor component of Blackduck or early Selkirk ceramic assemblages, frequently in proportions of 5% or less (Nicholson 1996). Duck Bay sherds are also found in low proportion from the Churchill River region in Central Saskatchewan to the Rainy River region of northwestern Ontario (Hanna 1992). Duck Bay sites are distributed in what appears to be a "corridor" linking Lake Winnipegosis with the Rainy River region of northwestern Ontario and northern Minnesota (Lenius

and Olinyk 1990). However, Aschkibokahn remains the only reported site in which Duck Bay ceramics dominate the ceramic assemblage (Snortland-Coles 1979; Lenius and Olinyk 1990; Hanna 1992; Nicholson 1996). So far, Duck Bay ceramics are comparatively localized in their distribution. Unfortunately, the origin of the complex is unknown and, so far, there is no known relationship to any historic group (Nicholson 1996).

9.6.1.3 Type site: The Aschkibokahn Site is located on an island of Lake Winnipegosis at the confluence of the Duck and Drake rivers in north central Manitoba (Hanna 1992).

9.6.1.4 Associated ceramics: Duck Bay ceramics were originally used by MacNeish to define the Sturgeon Punctate type of Winnipeg Fabric Impressed ware (Hanna 1992). Subsequent to the excavation of the Aschkibokahn Site in the 1970's, Duck Bay was given its own ware designation. Prior to this research, Duck Bay sherds appeared at various sites but never in sufficient quantities to be identified as a separate ware. As such, these sherds were frequently misidentified as "aberrant" Blackduck, Sturgeon Punctate or Winnipeg Fabric Impressed (Snortland-Coles 1979). At many sites, Duck Bay ceramics are associated with Blackduck materials (Nicholson 1996). The Aschkibokahn assemblage also contained a small percentage of sherds with "distinct Plains traits": smoothed surfaces, incipient S-rims, tabs, and quartered-vessel decorative motifs (Lenius and Olinyk 1990; Hanna 1992).

Duck Bay ceramics are much like other Late Woodland wares in their surface finish, which is generally textile impressed or cord-marked, and in shape

and form as well. Primary decorative motifs include the use of stamps, all of which are large -- in excess of 20 millimetres square -- and generally arranged in multiple rows on the rim, neck, shoulder, and lip. Duck Bay Notched Lip has notches occurring on the interior edge of the vessel (Lenius and Olinyk 1990). Rim profiles are often straight with flat or slightly thickened and bevelled lips. This is similar to, but still distinct from, other Rainy River types.

The original definition of the ware outlines Duck Bay ceramics as having straight to slightly S-shaped rims with sharp neck and shoulder angles and with vertically oriented fabric impressions on the vessel surfaces (Snortland-Coles 1979). Lips tend to be thinned instead of thickened or flaring as on Blackduck pottery and shoulders are sharply angled. In other respects, Duck Bay vessels are similar to most Late Woodland ceramics in that they are globular with decoration largely confined to the lip and rim, but sometimes extending down onto the shoulder as well (Snortland-Coles 1979; Hanna 1992).

This ware was originally divided into Duck Bay Punctate and Duck Bay Decorated Lip types, both with a number of internal divisions called modes. Technologically speaking, these sherds appear to be locally manufactured. They are sand or grit tempered, the paste colour and texture is similar to Blackduck vessels recovered at the site, vessel exteriors are fabric impressed, and decoration is usually applied with a cord-wrapped tool (Snortland-Coles 1979). However, in the subsequent redefinition of the complex, Duck Bay becomes somewhat more elaborate that outlined above (Lenius and Olinyk 1990); however, the definition is still based largely on the ceramics and retains the essential character of the original description.

9.6.1.5 Chronological placement: In the original report, Duck Bay ware was thought, like its companion Blackduck ware, to be part of the Late Woodland. Dates from the site indicate an occupation centering at around 1255±75 AD. There were earlier dates obtained from the site but these were dismissed as problematic and likely in error (Snortland-Coles 1979). Based on stylistic comparisons of the lithic and Blackduck ceramic assemblages, Snortland-Coles (1979) suggested a date range of 800-1600 AD. Lenius and Olinyk (1990) have modified this estimate somewhat, proposing a period between 1100-1300 AD. They argue that the Duck Bay Complex disappears with the contraction of Rainy River Composite people towards their core area around the Rainy River. At this time, towards the terminus of the Rainy River Composite, Sandy Lake ceramics predominate in areas where Rainy River ceramics were previously abundant.

9.6.1.6 Explanatory cultural dynamics: Snortland-Coles (1979) has suggested three alternatives to account for the presence of Duck Bay with Blackduck ware.

1) The two are contemporary but functionally different wares made by the same group;

2) The presence of the two ware types indicates change through time within the same group; and

3) These two wares are the products of different groups at different times.

Snortland-Coles (1979) supports the notion that the differences between the two may be partly temporal since Blackduck sherds were generally

recovered in the lower levels of the site; however, there were problems interpreting the stratigraphy which prevented her from being entirely confident in this assessment. Nevertheless, recoveries from the Smith Site support this notion. There, the use of larger decorative stamps, a diagnostic element of Duck Bay ceramics, increases through time. As a result, she (Snortland-Coles 1979) suggests that Duck Bay may in fact be a localized outgrowth of Blackduck.

Quoting a conference paper by Margaret Hanna, Snortland-Coles (1979) postulates that Duck Bay ceramics were the product of a small, Lake Winnipegosis centered social unit that made brief foraging expeditions outside the area. Employing the co-influence sphere model (Syms 1977), Snortland-Coles designates this as the "core" area of the Duck Bay pottery manufacturers (Snortland-Coles 1979).

Hanna's (1992) explanation of cultural dynamics to account for the Duck Bay Complex is somewhat more complicated than this, but she basically adheres to her initial assessment that the site reflects seasonal use by a local endogamous residential group which controlled access to the rich marsh resources and to the surrounding area as well. Duck Bay Complex sherds, which are recovered outside this locality, are the product of limited exogamy and the movement of the Duck Bay women themselves as they participated in trade and ceremonial occasions outside the Manitoba Lowlands. Lenius and Olinyk (1990) are of the opinion that the presence of Duck Bay vessels within the major Rainy River mound groups (McKinistry, Smith site, Oak Point, and Hungry Hall) means that this area constituted a secondary occupation area for Duck Bay people. Meyer and Hamilton (1994) on the other hand, suggest that there was a relationship between Duck Bay Complex peoples and those of the Selkirk Composite since

Duck Bay and Selkirk ceramics share certain basic stylistic traits (such as sharp shoulder angles) with ceramics of the Selkirk Composite, especially the Pehonan Complex.

9.6.1.7 Problems: Although this site is widely viewed as a minor component of the Late Woodland tradition (e.g. Nicholson 1987), this is mainly because the Aschkibokahn site is the only site which so far exhibits a predominance of Duck Bay Complex ceramics (Lenius and Olinyk 1990). However, there is some indication that the site may be worthy of more careful consideration. While it is true that the distribution of Duck Bay ware as the dominant component of ceramic assemblages is limited to its core area around Lake Winnipegosis, it is actually much more widely distributed as a secondary part of other ceramic assemblages such as Blackduck and Sandy Lake. The highly localized core distribution is potentially an artifact of the lack of archaeological survey in that region. It may be more widely distributed than reports would lead us to believe because Duck Bay pottery, like Sandy Lake, is frequently misidentified. Potentially then, there may be more going on with Duck Bay ceramics than initially meets the eye.

First, there are some general similarities with ceramics from the Lockport horticultural assemblage which dates somewhat later than Lenius and Olinyk's (1990) estimated range of 1100-1300 AD, if the Aschkibokahn dates are accurate. There is also the tantalizing presence of one misidentified Red River ware sherd, trailed and stamped in a way which is highly suggestive of the "Tail of a Thunderbird" motif most frequently seen on ceramics recovered in horticultural sites to the south. There is reportedly a scapula hoe with an incised human figure

on it (Hanna 1992). Combined with the fact that a significant proportion of the assemblage is unlike the majority of local Late Woodland ceramics, the fact that the assemblage contains a small proportion of smoothed sherds with wide, trailed chevron motifs becomes much more notable. This suggests the possibility for some interaction with Oneota-related peoples (Ogechie perhaps?) or other groups sharing their subsistence system -- perhaps groups who are related to those who introduced maize horticulture to the lower Red River Valley.

9.6.2 Blackduck/Clam River/Kathio Horizon/Tradition?

9.6.2.1 Definition: Blackduck ceramics are closely related to the Kathio-Clam River series from Minnesota (Lugenbeal 1979). Therefore, Blackduck, Kathio, and Clam River, the three of which are sometimes almost indistinguishable, may be considered spatial divisions or perhaps regional variants of a single cultural or ethnic group (Anfinson 1979a; Syms 1985; Gibbon 1994). Kathio is concentrated in the Mille Lacs area, the core area of their distribution. Clam River is found in the mixed coniferous-deciduous forests of northwestern Wisconsin and eastern Minnesota, whereas Blackduck occurs further north, in the Mississippi headwaters region with its distribution extending from the west central portion of Minnesota to the Red River and across the entire northern forest region of Minnesota (Gibbon 1994), southern Manitoba and northwestern Ontario. Blackduck is also regarded as having a plains manifestation, defined mainly on the basis of recoveries at the Stott site in southwestern Manitoba, which Walde et al. (1995) term "Plains Blackduck".

Gibbon (1994) sees these three, Blackduck, Kathio and Clam River, as fundamentally similar with differences occurring mainly in decorative motifs on

the ceramics. He calls Blackduck, Kathio, and Clam River a "continuum" and suggests that these groups had an intensive bison hunting and wild rice harvesting economy with mortuary complexes based on the construction of groups of conical mounds (Gibbon 1994). Apart from the ceramics, other aspects of these assemblages as well as the subsistence system are quite similar to the previous Laurel assemblages (Gibbon 1994; Meyer and Hamilton 1994). Blackduck/Clam River/Kathio is a ceramic culture just like all the other Woodland archaeological cultures. This discussion will pertain mainly to Blackduck since that this the most widely distributed and well known of the three.

9.6.2.2 Distribution: Sites containing classic (or early) Blackduck ceramics are scattered widely throughout northwestern Michigan, northern Minnesota, the southern half of Manitoba, east central Saskatchewan, and northwestern Ontario. Nicholson (1987) sees Blackduck as emerging west and north of Lake Superior, primarily as a boreal forest adaptation where Blackduck peoples ranged onto the plains in search of bison and to trade with plains groups; Meyer and Hamilton (1994), on the other hand, believe that Blackduck originated in the boundary waters area, from which it eventually spread eastward along north shore of Lake Superior as far as northern Michigan, southwards into central Minnesota and westward to the southwestern Manitoba -- all of which takes it well beyond the traditional distribution of Laurel (Meyer and Hamilton 1994).

9.6.2.3 Type site: The Blackduck type sites are located in the headwaters area of Minnesota and were excavated in the 1930's by Lloyd Wilford (Lugenbeal

1979).

9.6.2.4 Associated ceramics: Blackduck ceramics are characterized by many traits which are shared throughout the upper Great Lakes region including globular shape, grit temper, decorations consisting of cord wrapped object impressions, and the use of a cord wrapped paddle and anvil to manufacture the vessels which gives a cord-marked exterior (Gibbon 1994; Meyer and Hamilton 1994). Blackduck vessels are thin walled, and rarely show coil breaks. Classic vessels have flaring rims, with the rims and necks thickened relative to the bodies. Lips are often flattened and appear wedge shaped. The traditional interpretation of manufacturing technique suggests that Blackduck vessels were constructed by means of a paddle and anvil; however, there is now evidence that at least some of the pots were manufactured in fabric bags (Goltz, pers. comm. 1991; Goltz and Syms 1997; Lenius and Olinyk 1990).

Decoration on Blackduck vessels is confined to the upper rim, lip, and interior rim. In classic or 'early' Blackduck ware, vessels consist almost entirely of combinations of external or internal punctates and bosses, brushing over the exterior neck surfaces, and cord wrapped object impressions oriented obliquely and horizontally (Lugenbeal 1979). Vessels from the Kathio-Clam River series are very similar but do not generally exhibit exterior brushing. Lenius and Olinyk (1990) observe that classic Blackduck vessels (as opposed to later Blackduck/Rainy River) are globular with thickened lips and moderately flared rims. These vessels were probably manufactured with a paddle and anvil or in a fabric bag mold. While vertical brushing is distinctive of Blackduck, it never occurs alone. The authors (Lenius and Olinyk 1990) suggest that if later

'Blackduck' materials are eliminated from the sample, Blackduck becomes even more closely related to Kathio-Clam River ceramics in Minnesota.

9.6.2.5 Chronological placement: The traditional chronological range for Blackduck is between 800 AD and 1400 AD (Lugenbeal 1979; Lenius and Olinyk 1990). However, in their revised chronology Lenius and Olinyk (1990) suggest that Blackduck may have originated as early as 700 AD, with the terminal date falling not much after 1000 AD. This earlier terminal date reflects the fact that vessels post-dating 1000 AD, previously classed as Late Blackduck, are now subsumed within the Rainy River Composite (Lenius and Olinyk 1990). Meyer and Hamilton (1994), however, in an apparent rejection of this revised chronology, subsume Rainy River within Late Blackduck and therefore maintain that, in Manitoba, terminal Blackduck dates fall in the mid 1400's and somewhat later in northwestern Ontario.

9.6.2.6 Explanatory cultural dynamics: Between 750 and 1000 AD there is evidence for increasing regionalization in Laurel ceramics; Blackduck begins to take form in the southern portion of the boreal forest, perhaps as part of this regionalization process (Meyer and Hamilton 1994). The earliest Blackduck phases are found in boundary waters region and extend southwards into central Minnesota around 1000 AD (Meyer and Hamilton 1994). However, the distribution of Laurel never extended this far south. It is this difference that initially led Lugenbeal to conclude that regional affinities of Blackduck were southern and not northern or eastern (Meyer and Hamilton 1994). Between 1000-1200 AD Blackduck contracts northwards, out of central Minnesota, so that

Blackduck appears to have been entirely superceded in the boundary waters region by the early 1200's AD (Meyer and Hamilton 1994).

Apparently the northwards expansion of Blackduck was limited since these ceramics are rare in the Hudson Bay Lowlands. Further north in Manitoba and Saskatchewan, archaeological occurrences of Blackduck are both scattered and rare (Meyer and Hamilton 1994). In northern Ontario, northern Manitoba, and northern Saskatchewan, Laurel pottery persists later where these groups continue to occupy much of northern boreal forest until as late as 900-1200 AD (Meyer and Hamilton 1994).

The Stott site is given as a locality that contains evidence for interaction between Plains and Late Woodland peoples (Meyer and Hamilton 1994). Here, conventional Late Woodland motifs are incised rather than impressed (as they are on traditional Woodland wares) on some sherds. This change in technique is also combined with bison hunting and numerous recoveries of Knife River Flint which suggests considerable Plains influence on the southwestern fringe of the Blackduck range (Meyer and Hamilton 1994).

These developments, along with many other social, demographic, and economic changes, occur in a period of considerably milder climate. One side effect of this was a more productive subsistence system that may have precipitated population increases accompanied by territorial expansion (Meyer and Hamilton 1994). Gibbon (1994) suggests that Late Woodland population densities, at least in northern Minnesota, were extremely high, perhaps even more so than in the horticultural village areas to the south. He also suggests that some of the Blackduck sites are large enough to have functioned as multi-group "exchange centers" (Gibbon 1994). Johnson (cited in Gibbon 1994) was a major

proponent of the association between the emergence of Blackduck and the intensification of wild rice exploitation, but Meyer and Hamilton (1994) believe that the appearance of Blackduck is probably more closely related to the onset of this milder climatic episode.

The continuity between Laurel and Blackduck has led many to suggest that Blackduck is a possible outgrowth of Laurel. For example, Lugenbeal (1979) says there is evidence for a continuous Laurel to Blackduck development in northern Minnesota. The fact that there is enormous similarity in most other aspects of Blackduck and Laurel assemblages lends some support to this argument, but there is no universal agreement with this interpretation (Meyer and Hamilton 1994).

Lenius and Olinyk's (1990) revision places the start of Blackduck somewhat earlier than the more conservative 800 AD. Indeed, they suggest that Blackduck may start as early as 500 AD and terminate as a recognizable archaeological entity when it merges with the Laurel Configuration to create the Rainy River Coalescent. This conception of Blackduck chronology is parsimonious with what is known about cultural developments further south. There, by 1100 AD, both the Oneota and Plains Village Traditions (both likely of Siouan linguistic stock) begin a rapid expansion and there is archaeological evidence for fully developed wild rice parching and storage technology. These technological and subsistence innovations relate to the emergence of Sandy Lake (Gibbon 1994) which is also generally agreed to be Siouan in derivation (Gibbon 1994; Meyer and Hamilton 1994; Michlovic and Schneider 1988).

In Lenius and Olinyk's (1990) chronological revision, all of this occurs as Blackduck and Laurel come together to form the Rainy River Coalescent which

then could be viewed, at least in part, as an adaptive response to external cultural pressures as more powerful, likely Siouan, groups expanded their influence. In this conception, Blackduck is contemporary with Late Laurel, Late Avonlea, and the Initial Variant of the Middle Missouri Tradition. Blackduck then contracts northwards probably in response to the expansion and growth of horticultural peoples and those with well-developed wild rice exploitation techniques. At this time the Blackduck "cultural unit" expands northwards into Ontario and southeastern Manitoba either at the expense of Laurel "peoples" or accompanied by a rapid and radical shift in ceramic style and technology among Laurel "people" (Meyer and Hamilton 1994). Meyer and Hamilton (1994) reject the idea of a Laurel-Blackduck coalescence, instead favouring the idea that the Laurel occupation ended and was replaced by Blackduck. They use the cultural chronology evident at the Lockport site to support this position. However, it must be mentioned here that during the University of Manitoba's 1998 Field School at EaLf-1, there were a number of instances in which Laurel and Blackduck ceramics were recovered in the same stratum with no obvious evidence of disturbance. The number of units in which this occurred is too small to permit wider generalizations; however, this discovery is both unexpected and provocative.

Kathio is worthy of special notice here for the fact that the Kathio components at Mille Lacs may have some relationship to the Initial Middle Missouri. Here, there is evidence of semi-subterranean rectangular houses, one of the hallmarks of the Middle Missouri Plains Village Tradition (Gibbon 1993). Interaction between Plains Village and Late Woodland peoples may have occurred when Kathio folk travelled westward to the Red River Valley to hunt

bison on a seasonal basis. Such contacts may have resulted in the adoption of new house forms or this may reflect an indigenous movement towards increasing sedentism among Minnesota Late Woodland populations at this time. Apparently, this house form is seen in Initial Mississippian components in the Red Wing area as well. New Late Woodland house forms could have arisen as a product of eastern rather than western contacts (Gibbon 1993).

9.6.2.7 Problems: Although there is an overall similarity in the choice of motifs and the method of their execution, there remains considerable, albeit subtle, internal variability within Blackduck ceramics that has yet to be sorted out. There are some persistent terminological difficulties with the Blackduck taxonomic entity as well. Gibbon (1994) calls Blackduck/Kathio/Clam River a "continuum" and in their reorganisation of Late Woodland cultural chronology, Lenius and Olinyk (1990) have designated Blackduck a "Horizon". This is problematic since they leave "horizon" undefined and this term is not part of the Syms (1977) hierarchical taxonomic system. However, Syms himself did something similar in an initial reorganisation of the Selkirk Composite (Meyer and Russell 1987), which leads one to ask if this is a provisional category until the time when Blackduck reaches "Composite" status either on its own or merged with other complexes such as Kathio and Clam River. Lenius and Olinyk (1990) provide no rationale for designating Blackduck as a horizon rather than a composite. Perhaps a Blackduck Composite *per se* is problematic since it excludes similar ceramic ware types from Minnesota such as Kathio and Clam River, making it seem more prudent to await a widely agreed upon designation for Blackduck. Presently, Blackduck remains larger than a complex but smaller than

a configuration. However, merging it with Kathio and Clam River might be sufficient to give it the breadth required to elevate it to a configuration

9.6.3 Rainy River Composite

9.6.3.1 Definition: This is a comparatively new taxonomic entity defined by Lenius and Olinyk (1990). It is not strictly a Northeastern Plains cultural division since it arises out of research on Boreal forest materials; however, materials which clearly belong to this complex are recovered well out of the Boreal Forest as far away as southwestern Manitoba. This composite replaces what was formerly known as Late Blackduck or 'Blackduck-like' ceramics and addresses some of the ongoing difficulty in the classification of later Blackduck ceramics.

The Rainy River Composite contains a number of complexes all of which are defined on the basis of differences in their ceramic assemblages. Rainy River Composite complexes include Duck Bay, Bird Lake, and Winnipeg River. The composite is thought to represent an agglomeration of groups with similar social, political and religious traits. Obviously, this also extends to expressions of material culture, in this case ceramics.

9.6.3.2 Distribution: The distribution of sites attributed to the various complexes of the Rainy River Composite occur along a broad corridor running northeast to southwest -- from northwestern Saskatchewan, south towards Lakes Winnipeg and Winnipegosis, through the Manitoba Lowlands towards the Winnipeg River and then southwards to the Rainy River and Headwaters

regions of Minnesota. There are outlying sites as far east as Lake Superior and to the west in southwestern Manitoba as well.

9.6.3.3.Type Site: None, *per se.* The definition of the Rainy River Composite was a result of a reclassification of Blackduck materials predicated on the analysis of a large number of sherds from a variety of sites in Manitoba, Minnesota, Ontario, Saskatchewan, and North Dakota.

9.6.3.4 Associated ceramics: The term 'Rainy River Coalescent' is a larger more inclusive taxon that "...represents a blending of traits from the ceramics of the ancestral Blackduck and Laurel people together with traits which characterize the later Rainy River complexes." (Lenius and Olinyk 1990). This period marks the beginning of Rainy River Composite complexes such as Duck Bay and Bird Lake. Of great interest is the fact that the Duck Bay Complex ceramics contain certain "plains-like" design elements such as lip tabs and shallow S-rims, which may be suggestive of contact with plains groups to the south. However, it is not clear how this influence is spread. Bird Lake and Duck Bay characteristically use the stamp as a primary design element. These stamps occur in a variety of shapes (e.g. triangular, crescentic). The size of the stamp is considered diagnostic, with Duck Bay materials having much larger stamps than Bird Lake vessels. According to Lenius and Olinyk (1990) vertical brushing, punctates, and external bossing are all prevalent on Blackduck ceramics but they are never found on Rainy River vessels. Small stamp design elements combined with horizontal cord wrapped object impression design elements are a common motif.

9.6.3.5 Chronological placement: Lenius and Olinyk (1990) label the period between 1000-1100 AD the 'Rainy River Coalescent'. The "cultural peak" of the composite probably occurred around 1350 AD. By 1350-1400 AD, the Rainy River Composite appears to have collapsed and is limited to the area around the Rainy and Winnipeg Rivers. By 1475 AD, there are no more radiocarbon dates associated with Rainy River Composite sites although it may have persisted as late as 1650 AD (Lenius and Olinyk 1990).

9.6.3.6 Explanatory cultural dynamics: Lenius and Olinyk (1990) believe that the Rainy River Composite originated from a coalescence of Laurel and Blackduck cultures which both disappear from the archaeological record at approximately 1000 AD. Moreover, Rainy River vessels possess characteristics of both Laurel and Blackduck ceramics. Laurel attributes on Rainy River vessels include plain or smooth finishes combined with decoration on the shoulder or body, while Blackduck attributes consist of globular vessels with cord wrapped object impressions oriented obliquely and horizontally on the neck and rim (Lenius and Olinyk 1990). It is this mingling of ceramic elements which suggests to the authors (Lenius and Olinyk 1990) that two previously separate ceramic "cultures" merged to become one. As a result, Lenius and Olinyk (1990) argue that plains-related groups replace the Duck Bay complex in the north, while in Minnesota Sandy Lake or the Psinomani "Culture" replaces Rainy River Composite groups.

9.6.3.7 Problems: The Winnipeg River Complex is more problematic, and has been included in the later Selkirk Composite by some authors (Meyer and

Russell 1987). Unfortunately it does not fit well there. It has also been suggested that the Winnipeg River Complex is more closely related to Rainy River, most likely as a later manifestation of that composite. The placement of this particular cultural taxon remains unclear. (see discussion of Selkirk Composite which follows).

The ceramics of the Selkirk and Rainy River composites are similar in that they both consist of globular, simple necked jars, finished by fabric impressing, with moderate to extreme outflared rims that are typically non-thickened. One has the sense that both are somehow outgrowths of Blackduck and Laurel (Lenius and Olinyk 1990). However, Selkirk Composite vessels exhibit exterior punctates but no oblique or horizontal cord wrapped object impressions, whereas Rainy River Composite ceramics display external cord wrapped object impressions but no punctates. Instead, Rainy River materials display external stamps; these vessels are never brushed.

In addition, the definition of the Rainy River Composite as something separate and distinct from "Blackduck" is still comparatively recent (Lenius and Olinyk 1990) and has not yet become common parlance among archaeologists on the Northeastern Plains. However, there is some general recognition that "Blackduck" as a taxonomic category is too broad to be effective. The definition of the Rainy River Composite remains both the most recent and the most effective attempt at creating some internal order within a taxon that was widely viewed as problematic.

9.6.4 Selkirk Composite

9.6.4.1 Definition: Meyer and Russell first defined The Selkirk Composite

in 1987; however, its origins go back a further three decades. MacNeish first defined the Selkirk Focus in the early 1950's based on a series of excavations in southeastern Manitoba. The "focus" was later redefined according to the Willey and Phillips taxonomic system as the Selkirk Phase, but its basic definition remained more or less unchanged into the early 1980's (Meyer and Russell 1987).

As a result of numerous excavations in the 1970's, there was growing recognition of internal variation within the Selkirk "Phase" and, by the early 1980's, as more Selkirk components were uncovered, a number of complexes were recognized and named, including: Clearwater Lake, Kame Hills, Pehonan, Kisis, Grass River, and the problematic Winnipeg River. In 1987, Meyer and Russell suggested that the Selkirk Phase be renamed the Selkirk Composite.

The non-ceramic components of Selkirk assemblages are very similar to those of the Blackduck horizon (Meyer and Hamilton 1994). The definition of the Selkirk Composite rests on distinctive ceramics found throughout the southern boreal forest zone of Ontario, Manitoba and Saskatchewan and is believed to have originated in northern Manitoba (Meyer and Epp 1990). The Selkirk Composite has frequently been interpreted as the archaeological manifestation of Cree-speaking peoples (Walde et al 1995).

Much of the associated assemblage apart from the ceramics is similar to that of preceding archaeological cultures in this zone. Fish, large game such as moose and caribou and an assortment of other wild foods are presumed to have formed the basis of the hunting and gathering economy of Selkirk Composite peoples. The crossover of ceramic form and design elements between Mortlach and Selkirk are visible in elements of the pottery assemblages in both areas. These shared traits have been used to argue for social interaction and exchange

between these two archaeological populations (Meyer and Epp 1990; Walde et al. 1995).

9.6.4 2 Distribution: The Selkirk Composite is a boreal forest adaptation concentrated in north central Saskatchewan, Manitoba, and northwestern Ontario. However, the timing of the spread of the Selkirk composite is variable across this region. By 1250 AD, Selkirk pottery is fairly widespread from the Churchill River in northern Manitoba to northwestern Ontario. Selkirk does not seem to be present in central Manitoba, around Lake Winnipegosis. This area was occupied at that time by the makers of Duck Bay pottery who appear to have excluded Selkirk peoples from this region (Meyer and Russell 1987; Meyer and Hamilton 1994).

In Minnesota, Selkirk sites seem to be associated with wild rice stands (Meyer and Hamilton 1994). Arthurs (cited in Meyer and Hamilton 1994) believes that may be due to a limited penetration of northern Minnesota by Selkirk groups on wild rice harvesting expeditions.

9.6.4.3 Type Site: There is no single "type site" since the original definition of the Selkirk Focus grew out of MacNeish's work at five sites in southeastern Manitoba during the early 1950's. Two of these sites were on the banks of the Red River, north of Winnipeg (one of which was the Lockport site). The remainder was located along the Winnipeg River (Meyer and Russell 1987)

9.6.4.4.Associated ceramics: In its initial stages, the Selkirk "Focus" encompassed a number of different ceramic wares including Winnipeg Fabric

Impressed, Clearwater Lake Punctate, Cemetery Point Corded, Alexander Fabric Impressed, Sturgeon Falls Fabric Impressed, and Sturgeon Punctate (Meyer and Russell 1987). However, few of these terms remain in general use today. Typical Selkirk ceramics are globular with rounded or angular shoulders and smoothed textile impressions on the exterior body surfaces. These fabric impressions may take different forms, possibly as a result of the manufacturing technique. They may be created either by malleation with a fabric wrapped paddle (Meyer and Russell 1987) or manufacture in woven bags of different patterns (MacLean 1995). The paste is grit tempered and laminated, and archaeologically recovered sherds frequently exfoliate (Paquin 1997).

Selkirk assemblages from northern Manitoba, especially around Southern Indian Lake, are distinguished by the presence of ceramic "plates" or "lamps" -- a ceramic vessel type that is unique to this area. The Saskatchewan portion of the Selkirk Composite shows influences from both the parklands and grasslands, including angular rims and shoulders as well as the occasional S-rim which may be derived from interaction with plains peoples to the south and west (Meyer and Hamilton 1994). The feeling of Meyer and Hamilton (1994) is that there is a great deal of borrowing of decorative features at this time, especially between Mortlach and Selkirk groups. There are variations in the ceramics from complex to complex but the most common decorative element is the use of a single row of punctates on the exterior rim. While the vessel shape and technique of manufacture both changed during this transition, the persistent use of punctates as a primary decorative element is seen as highly diagnostic (Meyer and Russell 1987).

9.6.4.5 Chronological placement: It has been argued that Selkirk is a direct development out of northern Laurel groups around 1100 (Meyer and Hamilton 1994). The earliest appearance of Selkirk so far seems to be in north central Manitoba, where there are associated dates of 1100 AD although there is some additional evidence that this composite might begin here as early as 850 AD (Meyer and Hamilton 1994). This scenario was first proposed by Rajnovitch in her 1983 Master of Arts thesis, but rejected by Meyer and Russell (1987) in their re-evaluation of the complex. The earliest Selkirk dates from Saskatchewan occur in the Nipawin area and center around the 1300's and there are similar dates for southeastern Manitoba and Ontario (Meyer and Hamilton 1994). Between 1250 AD and 1500 AD Selkirk expands west, east and southeast out of northern Manitoba and, by 1500 AD, Selkirk is well established on the Churchill River system in Saskatchewan (Meyer and Hamilton 1994). Selkirk appears in southeastern Manitoba well before 1500 AD and in Ontario and northern Minnesota around this time as well (Meyer and Hamilton 1994). This has been labeled "southern tier Selkirk" and the ceramics are often undecorated or have simplified versions of Blackduck motifs (Meyer and Hamilton 1994). Selkirk may persist in some areas as late as the contact period.

9.6.4.6 Explanatory cultural dynamics: By 1250 AD, the milder climatic period comes to an end and it is at this time that well dated Selkirk composite assemblages appear in archaeological record. The origins of the Selkirk composite are not well understood, but Meyer and Russell (1987) see the composite as arising out of northern Laurel as a product of interaction between Laurel, Blackduck and Avonlea peoples between 1000 AD and 1100 AD. Between

1250 AD and 1500 AD, Selkirk expands west, east, and southeast out of northern Manitoba at a time during which the climate is comparatively cool (Meyer and Hamilton 1994). Viewed in this context, this southward expansion makes perfect sense. If the Selkirk Composite is the product of a cold climate, boreal forest adaptation, such groups would have been able to move south out of the north as the climate cooled. At this time, groups accustomed to a warmer climate may have simultaneously contracted southwards into more comfortable areas, leaving their former range open for occupation by boreal forest adapted Selkirk peoples.

Between 1250 AD and 1500 AD, late Blackduck or Rainy River Composite 'peoples' continue to occupy northwestern Ontario and it appears that there are extensive contacts with the makers of Selkirk ceramics (Meyer and Hamilton 1994). Lenius and Olinyk (1990) argue that the Rainy River and Selkirk Composites are basically contemporaneous, with Selkirk being centered in the north-central boreal forest and Rainy River concentrated more to the south around the Rainy River region of Minnesota and northwestern Ontario. Meyer and Russell (1987) view the lack of Selkirk Complex ceramics in the Duck Bay region of central Manitoba as a product of the presence of Duck Bay Composite 'people' who dominated the region prior to the beginning of the Selkirk Composite. In a later publication, Meyer and Hamilton (1994) argue that there may in fact be some connection between the two since Duck Bay and Selkirk Composite ceramics (of the Pehonan Complex in particular) share a number of stylistic traits, including both the angular shoulders of Duck Bay ceramics and the emphasis on the use of punctates on the neck and rim which are especially reminiscent of northern Selkirk ceramics.

The Selkirk Composite is composed of a number of different complexes which will not be treated in any detail here. It should be noted, however, that there does seem to be general agreement that the Selkirk Composite represents the archaeological manifestation of the ethnographically known Cree (Meyer and Hamilton 1994).

Lenius and Olinyk's (1990) reading of the ceramic and culture history of Blackduck is actually quite parsimonious with regards to Meyer and Russell's (1987) work. In Lenius and Olinyk's interpretation, the coalescence of Blackduck horizon and Laurel configuration populations initiates two composites, Selkirk in the north and Rainy River in the south, with their accompanying complexes. Together these form the Western Woodland Algonkian Configuration (Lenius and Olinyk 1990). This is very different from the previous chronological interpretation that posited an uncomplicated, unilineal progression from Laurel through Early and Late Blackduck to Selkirk. This latter version is certainly the way the chronology was interpreted at EaLf-1, and the way it was employed over much of the Boreal Forest and Aspen Parkland for many years.

9.6.4.7 Problems: The origins of the Selkirk Composite are still not well understood. However, most recent interpretations, notably that of Meyer and Hamilton (1994) draw heavily on Rajnovitch's work from the early 1980's (cited in Meyer and Russell 1987; Meyer and Hamilton 1994).

The distribution of so-called Selkirk Composite ceramics may also have to be altered as a better understanding of the lesser-known Sandy Lake ceramics develops. In the past, there has been a tendency to classify all plain, undecorated ceramics that occur stratigraphically later than Blackduck as Selkirk even when

some of these may in fact be Sandy Lake. Meyer and Hamilton (1994) predict an expansion of the distribution of Sandy Lake as older collections are re-examined and pottery that was once regarded as Selkirk is re-classified as Sandy Lake.

Finally, since the use of punctates as a decorative element is considered highly diagnostic (Meyer and Russell 1987) of Selkirk Composite ceramics. It is interesting to note that the Winnipeg River Complex lacks this trait. It is on this basis that Lenius and Olinyk (1990) suggest that Winnipeg River should be part of the Rainy River Composite rather then the Selkirk Composite. The problem of the Winnipeg River Complex is worth considering because, like so many problem areas, the Winnipeg River is intermediate between the core areas of two important and well-defined cultural historical units. The fact that the Winnipeg River Complex is not an especially comfortable fit in either is worthy of further study. (Please refer to the discussion of the Winnipeg River Composite above).

9.7 The Hybrid Assemblages of the Northeastern Plains in Minnesota and the Dakotas

9.7.1 The Psinomani "Culture"

9.7.1.1 Definition: Birk first defined The Wanikan Culture in 1977 (Meyer and Hamilton 1994). However, Gibbon has recently coined the term "Psinomani" for the Sandy Lake archaeological complex. "Psinomani" is a Dakota word for "wild rice gatherer" (Gibbon 1994). Given that Sandy Lake sites are often associated with wild rice areas (Michlovic et al. 1995) and are widely

regarded as the archaeological representatives of the historic Dakota, the term "Psinomani" seems appropriate.

Sandy Lake ceramics provide the basis for the definition of the Psinomani "culture" which flourished between 1000 AD and 1700 AD. Archaeological evidence suggests that the Psinomani economy consisted of wild rice harvesting in the north and maize horticulture in the south. This difference in subsistence, however, is probably more a product of environmental factors than of significant cultural or ethnic differences (Gregg 1994). That is, Psinomani peoples probably grew maize where it was possible to do so, and relied on wild rice where they had exceeded the northern climatic tolerance of maize.

There is no evidence at Sandy Lake sites for reliance on large stored surpluses of either grain, instead it is more likely that bison and wild foods provided the primary food sources, with foods such as maize and sunflowers serving as a dietary supplements (Gregg 1994). Gregg (1994) does not mention if he views Sandy Lake peoples as having a similar relationship with wild rice.

9.7.1.2. Distribution: Cooper and Johnson (1964) state that Sandy Lake ceramics are distributed from the tributaries of the St. Croix River in Wisconsin in the east, across north central Minnesota and the Mississippi Headwaters to the prairie edge of northwestern Minnesota in the west, and onwards into southeastern Manitoba in the north. The core area of the distribution of Sandy Lake probably lies around the Mississippi Headwaters region (Cooper and Johnson 1964). In a later publication, Gregg (1994) states that Sandy Lake ceramics are found mostly in and around central and western Minnesota, southern Manitoba and eastern North Dakota (Gregg 1994).

In general, the consensus is that central, northern, and western Minnesota have the greatest concentration of sites containing Sandy Lake ceramics. However, these sites are also spread over an area that includes southern Manitoba, eastern North Dakota and northwestern Ontario. Michlovic et al. (1995) state that these ceramics have very little presence south of the Minnesota River. However, because there has been a tendency to misidentify Sandy Lake ceramics, several authors have suggested that as our ability to distinguish these ceramics improves, more Sandy Lake assemblages will be identified and the distribution of the Psinomani culture will increase (Meyer and Hamilton 1994; Walde et al. 1995).

9.7.1.3 Type site: Birk (1979) gives three "type" sites for Sandy Lake -- the Scott and Osufsen Sites in Minnesota, and the Fickle Site in northwestern Wisconsin. The name "Sandy Lake" itself was apparently derived from the recovery of similar ceramics from around Big Sandy Lake in north central Minnesota.

9.7.1.4 Associated ceramics: Sandy Lake vessels are characteristically globular and quite wide relative to their height, with very slight neck constrictions, and straight to incurved or incipient s-rims (Walde et al. 1995). Lips have either a flat or slightly rounded profile. Rim body junctures do not form a sharp angle. The neck and shoulder regions of these vessels are usually poorly defined and the juncture of the two is also noticeably thickened in the vessel profile (Arthurs 1978).

Surface treatment is generally either plain cordmarked or smoothed

cordmarked with some fabric impressing in the northern portions of its distribution (Walde et al. 1995). Sandy Lake vessels are commonly undecorated, but where present, decoration is minimal. Generally it is confined to lip notching or lip "crimping", sometimes combined with large interior rim punctates (Gibbon 1994, Walde et al. 1995). Michlovic (et al. 1995) also reports that Sandy Lake vessels from the Mooney site also have decorations consisting of punctates, incisions or CWO impressions on the lip, rim or rim interior. Arthurs (1978) states that decorative elements consist mainly of notches on the interior lip applied with a blunt tool. He also suggests that these are often the only decoration, where any is present at all. Bossing on the exterior rim or crenellations on the lip surface may also be present.

Paste texture is laminated and temper consists of either shell, a shell and grit mix, and finally grit alone which becomes the temper of choice as one moves northwards (Gibbon 1994; Meyer and Hamilton 1994). Temper has often been considered a culturally diagnostic ceramic attribute. In the past, shell temper has been treated as indicative of either Mississippian or Oneota influence. However, Cooper and Johnson (1964) suggest that temper may not be a primary diagnostic trait after all and some authors have found evidence to support this contention. Braun (1983) suggests temper is a functional rather than a cultural phenomenon, while Michlovic and Schneider (1988) have recovered sherds from reconstructed vessels which contain sherds that are shell, grit, or both shell and grit mixed. Therefore, in Sandy Lake ceramics at least, temper may not be particularly diagnostic. However, Cooper and Johnson (1964) also say that they are able to distinguish between Sandy Lake shell tempered wares and those from Oneota assemblages because the shell tempering in Sandy Lake sherds is

much finer -- 1mm or less -- while the size of the Oneota shell tempering is much larger, averaging 2-5mm.

It is interesting that in the southern portion of the Red River valley, nearly all Sandy Lake ceramic assemblages contain small amounts of "northern Oneota" pottery or Red River ware (Gibbon 1994). Typologically, Sandy Lake ceramics appear to be related to both Blackduck and Oneota ceramics (Michlovic et al. 1995). Blackduck typological associations appear in the use of cordwrapped object impressions and in the possible developmental sequence from Kathio to Sandy Lake (Michlovic et al. 1995). They (Michlovic et al. 1995) argue that Sandy Lake is clearly contemporary with Oneota and that Oneota cultural influences may be responsible for the shift to shell temper. Such contacts may also be responsible for the occasional occurrence of handles and lugs and the use of trailed decoration on some Sandy Lake pottery (Michlovic et al. 1995). An Oneota connection is also visible in the association between Sandy Lake and the northern manifestation of Oneota called Ogechie (Michlovic et al. 1995).

9.7.1.5 Chronological placement: The dating of Sandy Lake is problematic in Minnesota because few Sandy Lake sites have absolute dates associated with them (Michlovic et al. 1995). However, the duration for Sandy Lake is generally given as ranging between approximately 1100 AD and 1700 or 1750 AD (Birk 1979). The James River site has Sandy Lake material and dates to 1000 AD. The Ballynacree site in northwestern Ontario dates to AD 1650 and also has Sandy Lake ceramics (Michlovic et al. 1995). Bradbury phase sites around Mille Lacs in Minnesota have European trade goods associated with Sandy Lake, Ogechie and Orr phase ceramics. The terminal dates for these sites lies somewhere between

1680-1750 AD (Michlovic et al. 1995).

Meyer and Hamilton (1994) provide a summary of the spread of Sandy Lake pottery. They state that by 1250 AD the makers of Sandy Lake pottery were as far north as the boundary waters region and by 1500 AD they had extended their range into northwestern Ontario and southeastern Manitoba. Meyer and Hamilton (1994) also believe that these people were probably in direct contact with Selkirk Composite peoples since the ceramics share some of the same stylistic attributes. This stylistic similarity has meant that some pottery which was once defined as Selkirk is now considered Sandy Lake which may ultimately alter or expand the distribution of the Psinomani culture (Meyer and Hamilton 1994).

9.7.1.6 Explanatory cultural dynamics: Psinomani culture may have emerged around 1000 AD, coincident with the appearance of more intensive wild rice harvesting and storage technology. Unfortunately, it is not known how rapidly Sandy Lake spread (Gibbon 1994) although "... it is generally assumed that the Psinomani culture abruptly replaced the Clam River-Kathio-Blackduck continuum across central Minnesota and in the Wisconsin tributaries of the St. Croix River." (Gibbon 1994: 146).

Gibbon (1994) argues that the northern forests of Minnesota were unsuitable for maize horticulture. Therefore, there was a parallel intensification in the exploitation of wild plant resources which is visible in concentrated wild rice harvesting, parching, and storage technology which emerged in northern Minnesota between 1000 and 1100 AD -- coincident with the emergence of the Psinomani Culture. Interestingly, this date coincides precisely with that given by

Lenius and Olinyk (1990) for the emergence of the Rainy River Composite and with the earliest dates established for the emergence of Selkirk Composite ceramics in northern Manitoba.

Psinomani sites are generally similar to Kathio and early Blackduck sites in all respects other than the ceramics (Gibbon 1994). However, whether Sandy Lake is a continuation of Blackduck-Kathio-Clam River has not been established (Gibbon 1994). Anfinson and Wright (1990) argue that Sandy Lake ceramics, which first appear around AD 900, are sufficiently different from other Late Woodland ceramic wares such as Kathio and Blackduck to suggest that outside cultural influences may be involved in spite of the apparent continuity in both subsistence and settlement patterns. Meyer and Hamilton (1994) also believe that Sandy Lake replaced Blackduck at around AD 1100. Gibbon (1994) too, argues that this is a major cultural shift since settlement patterns also change dramatically at this time. The majority of Psinomani settlements appear to be clustered into a small number of widely separated locales with intervening areas virtually abandoned, whereas the preceding Blackduck-Kathio-Clam River settlement pattern was much more diffuse and extensive. Gibbon (1994) says that the Psinomani pattern was one which involved increased population growth, the development of large semi-permanent, palisaded villages. Together, these can be regarded as more evidence of warfare and the evolution of formalized socio-political alliances.

Ethnically, Sandy Lake is generally considered to be Siouan, possibly Dakota, while northern Sandy Lake is considered by some as being Assininboine. Both of these are Siouan and are generally regarded as being ethnically and linguistically related (Michlovic et al. 1995). However, in the 1690's,

it is known that the Assiniboine occupied a much broader range than that which is known for Sandy Lake ware -- although there may still be a broader distribution for Sandy Lake to be found in misidentified Selkirk pottery (Meyer and Hamilton 1994). Gibbon (1994) believes that Sandy Lake groups emerge in the historic period as "rather amorphous" groups of Dakota speakers -- Santee or eastern Dakota. Anfinson and Wright (1990) also accept the Sandy Lake-Dakota connection. If this postulated association with the historically known Dakota is accurate, this shows that the Dakota were out on Northeastern Plains hundreds of years before this move was suppose to have occurred in response to fur trade pressures from the east. The model favoured by Michlovic places them in semi-sedentary villages with horticultural economies not unlike the Middle Missouri Plains Villagers (Michlovic et al. 1995). However, traditional Plains Village economies focussed heavily on corn and bison, while Sandy Lake economies focussed more on wild rice and bison (Michlovic et al. 1995).

9.7.1.7 Problems: The placement of the Mooney and Shea sites in the Northeastern Plains Village Complex (see discussion below) presents us with a problem. Can these sites be regarded as part of the Psinomani Culture since these sites contain significant quantities of Sandy Lake ceramics? If so, how can they simultaneously be considered part of the Northeastern Plains Village Complex? Overall, the evidence from these sites shows an economy that resembles that of the Oneota -- moderate reliance on cultivated foods such as maize, with a heavy reliance on a wide variety of wild foods such as fish and bison. It also seems that the interpretation of these two sites depends very much on the side of the cultural spectrum from which they are viewed. For those with

a greater familiarity with the Middle Missouri Plains Villagers, these assemblages can easily be viewed as part of the Plains Village Tradition, whereas from an eastern perspective they appear more closely related to the Oneota, perhaps as outliers. However, both these perspectives attempt to tie these unusual, possibly hybrid assemblages to a more dominant regional culture when, in fact, they may be neither. Instead, these sites probably belong in their own category, one which shows cultural and economic ties extending east and west to both of these larger and better known cultural entities.

The position of Sandy Lake in recent cultural chronological developments remains an enigma. The basic similarities of Sandy Lake to "Selkirk" ceramics have been noted in the literature (Birk 1979; Meyer and Hamilton 1994). Whether this is a complex of Rainy River Composite, the Selkirk Composite, part of the NEPV Complex, an Oneota outlier, or something separate but yet to be identified such as a Psinomani Composite, has not yet been addressed.

The relationship between Sandy Lake and Blackduck is also interesting if unresolved. Cooper and Johnson (1964) state that Sandy Lake pottery is often found in association with Blackduck habitation sites and that the Sandy Lake components usually occur (in a stratigraphic sense) after Blackduck. However, Michlovic et al. (1995) state that while in some sites Blackduck is stratigraphically older than Sandy Lake in other sites these two may be contemporary.

9.7.2 Stutsman Focus

9.7.2.1 Definition: In the original 1963 publication which defines the Stutsman Focus Wheeler states that:

> The term Stutsman Focus identifies a newly recognized culture complex represented at 10 sites that occurred along the west side of the James River, from about 2 1/2 miles to about 6 1/2 miles in an airline north and northwest of the Jamestown dam, which lies just above the city of Jamestown, in Stutsman County, east-central North Dakota...Prominent traits of the Stutsman Focus include:
>
> 1) Unfortified, semi-permanent town sites and transitory campsites on flood free alluvial terraces along the upper James River; and eagle trap sites on the crest of valley ridges in this area.
>
> 2) Small, circular, earth covered (?) lodges, randomly placed and rather closely set, with four central supporting posts and two rings of peripheral posts, a long covered entryway or vestibule opening on the east or southeast, one more fireplaces, and small sub-floor cache pits.
>
> 3) Various minor structures including a small circular sweat lodge; a bower; a drying rack; open unprepared and prepared hearths; and eagle trap pits.
>
> 4) Secondary burials in eagle trap pits.
>
> 5) Knife blades of trade iron and brass.
>
> 6) Culinary pottery of 16 newly defined and 6 previously defined (rim) types.
>
> 7) Utilized pottery sherds (gaming pieces?).
>
> 8) Triangular and bilaterally side-notched arrow points, small end scrapers...
>
> (Wheeler 1963: 171)

His definition of the Stutsman Focus goes on to include drills, full grooved hammers, steatite, catlinite, an array of bone tools, busycon shell pendants and an economy which included bison, wild plants, mussels etc. At that time, there was no surviving evidence of maize, beans, sunflower, cucurbits, or tobacco at Stutsman Focus sites.

9.7.2.2 Distribution: The Stutsman focus, as it was originally defined, is

found in east-central North Dakota distributed along the west side of the James River, from about 2 1/2 miles to about 6 1/2 miles north and northwest of the Jamestown dam which lies just north of the city of Jamestown, in Stutsman County. (Wheeler 1963: 171).

9.7.2.3 Type site: The Hintz Site is a single component site bearing a number of semi-subterranean circular house features which was situated on a terrace above the wooded floodplain of the James River below the upper bluffs. The site now lies within the Jamestown reservoir, which was inundated in 1954 (Wheeler 1963).

9.7.2.4 Associated ceramics: The Stutsman Focus incorporated a number of previously named ceramic wares including Parkhurst Incurved Rim, Buchanan Flared Rim Pingree Wedge Rim, Edmunds Collared Rim, and Melville S-Rim. In addition, a number of ceramic wares considered diagnostic of the Stutsman Focus were named and described in the appendix (Wood 1963). These include Lisbon Tool Impressed and Lisbon Undecorated, Ransom Cord Impressed and Cord Wrapped Stick, Stanley Cord Impressed, Stanley Plain and Stanley Wavy Rim and Talking Crow Indented. The descriptions of these wares are quite lengthy and so will not be repeated here. The reader is referred to Wheeler (1963) for further detail.

9.7.2.5 Chronological placement: Wheeler (1963) views the Stutsman Focus as a late Pre-contact or early Post-contact phenomenon dating to between approximately 1750 and 1800 AD. This assessment is based on the presence of

metal trade goods and the nature of the ceramic assemblage.

9.7.2.6 Explanatory cultural dynamics: The Painted Woods Focus was initially described by Wheeler in 1963 and then subsequently assigned to the Hidatsa, based on Hidatsa traditional knowledge obtained by Bowers from an elderly informant in the 1930's. Wheeler (1963) believed that there were sufficient similarities between the (then) newly defined Stutsman Focus and the existing Painted Woods Focus to say that the Stutsman Focus was an early historic period manifestation of the Hidatsa on the James and Sheyenne Rivers in North Dakota. He also believed that there were close cultural ties between it and the Great Oasis Aspect because of affinities in the ceramic assemblages. Archaeologically speaking, he compared the Stutsman material with the Slant Village and Biesterfeldt sites (Wheeler 1963). Culturally speaking, the groups that inhabited these sites were probably semi-nomadic with an economy based on horticulture, hunting foraging, and eagle trapping.

9.7.2.7 Problems: Little work has been done with the Stutsman Focus since it was originally defined. Recently, however, Michlovic and Schneider (1993) have suggested dropping the term Red River ware and subsuming these ceramics within previously defined ware categories of the Stutsman Focus because of the apparent relationships between them (more on this in the section on Red River ware). They further suggest that the Stutsman Focus should be placed within Gregg's (1994) Northeastern Plains Village Complex. However, as we can see from the definition of the Stutsman Focus, these Red River drainage sites do not adhere to many of the diagnostic criteria outlined for this focus. Nor

are the ceramics themselves a particularly good fit based on the photos provided in the pertinent reports. There are certain affinities between Red River ware and the Lisbon and Owego tool impressed varieties although certain of the Lisbon Tool Impressed bear a striking resemblance to Sandy Lake ceramics. In fact, in Michlovic and Swenson's (1998) recent reworking of these categories they do suggest placing Lisbon Tool Impressed within Sandy Lake. Beyond these, it is obvious that Stutsman Focus ceramics are clearly a subset of the Middle Missouri ceramics, especially the Pingree and Edmunds varieties, which Michlovic and Swenson (1998) readily acknowledge. What is interesting however, is the striking admixture of Middle Missouri, Oneota (seen in the Parkhurst and Buchanan types), and Late Woodland ceramics (some sherds of Owego and Lisbon Tool Impressed) within the same assemblage at the Hintz Site. Before we discard the term Red River Ware altogether, perhaps we should give careful consideration to the implications of embracing such terms as Owego and Lisbon which may be in need of some revision themselves.

9.7.3 Big Stone Phase

9.7.3.1 Definition: Although the Big Stone Phase does not, in the strictest sense, occur within the Red River Valley, it's presence in the Lake Traverse region of Minnesota and South Dakota places it immediately south of the Red River Headwaters. Moreover, there are aspects of this phase that are sufficiently similar to other Northeastern Plains manifestations at this time to warrant its inclusion here.

These sites usually consist of small, fortified villages in the Big Stone Lake and Lake Traverse area (Anfinson 1997) of South Dakota and Minnesota. In

general, sites tend to be situated on high bluffs of terraces overlooking lakes or rivers. They appear to be "guarding" what were probably major transportation routes (Anfinson 1997). Anfinson (1997) further suggests that the smallest sites may not be villages, but may instead represent refuge-type forts or ceremonial sites.

Artifact densities are typically low. Knife River Flint dominates the lithic assemblages and ceramics appear to be somewhat similar to some of those from the Cambria Phase, specifically the Linden and Mankato types (Anfinson 1997). The Big Stone Phase has been defined partly in response to the tendency in this area to classify all non-Great Oasis sites as Cambria (Anfinson 1997). These sites appear to exhibit more of a mixture of Plains Village and Woodland ways of life than Cambria sites (Anfinson 1997) and, as such, require a separate taxonomic category to address this problem.

Non-fortified sites have also been included in this phase but little can be said about them since only one of them, the Zacharias site in South Dakota, has actually been excavated (Anfinson 1997). However, non-fortified villages are located on lower terraces overlooking Big Stone and Traverse Lakes with smaller unfortified habitations also being found along some of the smaller lakes in the area (Anfinson 1997).

There are three mound sites which yield Plains Village ceramics associated with this phase. There were also a number of flat topped mounds along the Minnesota River which occurred in a distributional pattern that suggests that they may be associated in some way with the Cambria, Big Stone, and Great Oasis cultural complexes (Anfinson 1997).

9.7.3.2 Distribution: Sites of the Big Stone Phase have an extremely limited distribution. The majority of these are scattered along the border between Minnesota and South Dakota in the extreme northeastern corner of South Dakota where it adjoins Minnesota.

9.7.3.3 Type site: The Hartford Beach site on Big Stone Lake is the type site for the Big Stone Phase. It is located on a high terrace near the western shore of the lake and is surrounded by a small fortification ditch. Originally excavated in 1922, it was tested again in 1981 by James Haug (Anfinson 1997). A single bison scapula hoe was recovered from this site. Subsistence for this phase has been hard to define due to a lack of faunal remains in the excavated assemblages, but it appears to consist of a mixture of bison, fish, shellfish, and maize (Anfinson 1997).

9.7.3.4 Associated ceramics: Ceramics from this phase tend to be a mixture of Late Woodland and Plains Village types. Late Woodland ceramics are of the Lake Benton Vertical Cordmarked type. The Plains Village ceramics resemble Anderson High Rim, which is considered part of the Initial Middle Missouri Variant (Anfinson 1997). A small percentage of sherds at some of these sites are shell tempered. Vessels are probably globular and grit tempered for the most part and many have cordmarked surfaces applied in such a way as to suggest cord-wrapped paddle impressions (Anfinson 1997). At the Hartford Beach site, many of the body sherds show broad trailed curvilinear and linear designs (Anfinson 1997). Decoration is most commonly applied to the shoulders rather than the rims and consists of trailing and twisted cord impressions (Anfinson

1997).

There are also sherds from one site which, at least in the written description, sound like Sandy Lake: "Six rims from three vessels are cordmarked. Tool-impressed lips are the only decoration...The cordmarking is vertically oriented but less distinct than most Woodland cordmarking in southwestern Minnesota" (Anfinson 1997: 108). Citing Wheeler's 1963 report on the Stutsman Focus Anfinson (1997:108) states: "The closest description of these sherds in the existing literature is 'Lisbon Tool Impressed' associated with the poorly defined Stutsman Focus of southeastern North Dakota". Some sherds also resemble a more crudely produced version of Great Oasis High Rim ware (Anfinson 1997). It must be noted here that Lisbon Tool Impressed is one of the ware types which Michlovic and Schneider (1993) initially suggested as a replacement for the ceramic taxon Red River ware. However, in the most recent revision of Northeastern Plains ceramic taxonomy, Michlovic and Swenson (1998) suggest that this term be discarded altogether in favour of subsuming the category within Sandy Lake. This certainly suggests that there is something closely resembling Sandy Lake ceramics in this area.

Anfinson's (1997) overall impression is that Big Stone Phase ceramics exhibit closer ties with Late Woodland ceramics than those of the Cambria Phase. Check-stamping, rolled rims, S-rims and collared rims are all notable by their absence (Anfinson 1997). Unfortunately, one of the characteristics of ceramic assemblages from this phase is an inter-site stylistic variability which defies neat classification.

9.7.3.5 Chronological placement: Haug (cited in Anfinson 1997) originally

suggested that the Big Stone Phase dated to around 1100.AD Anfinson's (1997) suggested date range for the Big Stone Phase is 1100-1300 AD; it is considered a contemporary of Cambria and Great Oasis cultural complexes.

9.7.3.6 Explanatory cultural dynamics. Cultural relationships appear to be with the Plains Village sites to the west. Little else is suggested at this point for either the existence of Big Stone Phase peoples or their interactions with their neighbors.

9.7.3.7 Problems: This material is distributed around the lakes and waterways immediately on the other side (to the south) of the watershed that drains the Red River Valley. Some of the material has been tentatively suggested by Anfinson (1997) to either have affinities with or to resemble closely that of the Stutsman Focus of North Dakota -- the precise taxonomic entity to which Michlovic and Schneider (1993) wish to assign their material from the upper Red River drainage. It is possible, even probable that these materials are closely related. The sites from these two areas share many common elements: the ceramic assemblages both contain an unusual mix of Plains and Late Woodland sherds, sites are small and may be either fortified or unfortified, artifacts are often small and crumbly, and subsistence appears to rely on a mixture of bison, fish, shellfish and limited maize horticulture. Big Stone Lake phase sites also appear to contain some Sandy Lake ceramics although this is difficult to confirm given the fact that I have had to rely on written descriptions of the ceramics.

9.7.4 The Randall Phase

9.7.4.1 Definition: The Randall Phase (no connection to the Randall collection from southwestern Manitoba) is a term recently proposed by Thomas Haberman (1993) to address a series of unusual ceramic assemblages from several sites in southeastern South Dakota. Ceramics termed 'Randall ware' were first excavated in the 1950's and later placed within the Randall Component, an isolated archaeological occurrence at the Scalp Creek site. Because there were no similar ceramics from any other sites at that time, no larger cultural unit was ever defined to accommodate the ceramics from the Randall Component (Haberman 1993: 103). As a result, Haberman (1993: 106) has taken the ceramics from the middle component of the Dirt Lodge Village site, lumped them together with similar components from Scalp Creek, Wolf Creek Mounds, and Rose Hill Village, and used them to define the Randall Phase.

This phase is defined more by what it is not than by what it is. The Randall Phase is distinguished from existing cultural historical expressions in this area because it appears to contain elements of both the Woodland and Plains Village Traditions of the Northeastern Plains. Haberman (1993) suggests that it may be either influenced by, or transitional to, the Plains Village Tradition. But he also argues that it cannot be considered part of this tradition due to the lack of evidence for substantial earth lodge houses. In addition, these sites contain no substantial midden accumulations, nor do they appear to be intensively occupied by large groups, nor is there any evidence of scapula hoes. So far, there are no fortified Randall Phase sites either. However, the Dirt Lodge Village site does possess large cache pits and bell-shaped storage pits. In other words, many important hallmarks of the Plains Village Tradition are lacking at Randall Phase

sites. Other local archaeological cultures such as Cambria, Great Oasis, and the Lower James Phase are also not appropriate categories for these occupations because of substantial differences in the ceramic assemblages (Haberman 1993). Subsistence was probably based on a mixture of broad-spectrum hunting and gathering, and limited horticulture (Haberman 1993). The occupations associated with this phase then superficially resemble both Initial Middle Missouri Mill Creek and Great Oasis occupations from nearby sites but, according to Haberman (1993), Randall Phase sites are not a good fit within either.

The Randall Phase is perhaps closely related to Late Woodland cultural manifestations as shown in the presence of burial mounds at the Dirt Lodge Village and Wolf Creek Mounds sites. Although only one mound is present at Dirt Lodge Village, the site has been under cultivation for some time and there may have been more mounds prior to this disturbance (Haberman 1993). Unfortunately it is not known whether the mounds are associated with the Plains Woodland occupation or the Randall Phase occupation (Haberman 1993).

9.7.4.2 Distribution: The few known Randall Phase sites are distributed through the Southern Riverine sub-area of the Northeastern Plains. This area encompasses the southern or lower half of the James River, the Vermillion River, the lower Big Sioux River, the adjacent portions of the Missouri River, and the tributaries of these streams (Haberman 1993).

9.7.4.3 Type site: Dirt Lodge Village is the type site for the Randall phase; it is located on the left bank of the James River in South Dakota approximately two kilometers north of its confluence with Turtle Creek. The site is situated on a

high terrace overlooking the river valley. Excavated in the early 1980's, the site is comparatively small with no visible surface features, although six storage/trash pits were excavated there. The defining occupation for the Randall phase is sandwiched between a Plains-Woodland Component and a historic Dakota Sioux occupation.

9.7.4.4 Associated ceramics: As usual, the diagnostic artifact class for this taxon is the ceramics. Most sherds are grit tempered and manufactured using the paddle and anvil technique. Surface treatments include cord roughening, smoothed over cord roughened, and smooth. Vessels are globular, generally well made, and may have straight or flared rims. They may be either plain or decorated. Decorations consist of incised or trailed lines arranged in horizontal and triangular patterns on the exterior rim, and exterior rims may be decorated with tool impressions as well (Haberman 1993). There are no S-rims, handles, or curvilinear decorative motifs. These vessels do not appear as finely made as Great Oasis pottery.

An admittedly small sample of 21 rim sherds comes from nine vessels that encompass a variety of types including Randall Plain and Randall Incised which appear more Late Woodland in character, and some that resemble the IMM variants Mill Creek, Chamberlain, and Great Oasis (Haberman 1993). Haberman (1993) sees the closest ceramic analogs in Great Oasis. However, the decorations on Randall sherds are neither as carefully applied nor as well executed, nor are the vessels as thin as Great Oasis pottery (Haberman 1993). While Haberman (1993) states that some Randall Phase pottery could pass for Great Oasis, the Randall ceramics tend to combine traits of both major Great Oasis wares -- High

Rim and Wedge Lip -- on the same vessel. There is also some resemblance between Mill Creek Pottery types and Randall ceramics.

9.7.4.5 Chronological placement: The Randall Phase is poorly dated; however, limited C14 dates suggest a range of 1050 to 1250 AD (Haberman 1993).

9.7.4.6 Explanatory cultural dynamics: Randall Phase dates are too late to permit this phase to be considered as ancestral to local manifestations of the Initial Middle Missouri Variant. These sites are part of the Lower James Phase and appear to be more closely related to Mill Creek of northern Iowa and other IMM manifestations in the surrounding area. It has been argued that the Randall Phase might represent Great Oasis populations on the James River, an idea that Haberman dismisses. Although the Randall phase ceramics appear to be a Mill Creek-Great Oasis hybrid, he argues that this is unlikely given the evidence for separate but contemporary Mill Creek and Great Oasis occupations in Iowa with no evidence for any blending of ceramic attributes. To him, this suggests that the two populations were distinct; it is therefore unlikely that the traits of two separate wares would be seen on Great Oasis vessels. Citing Schneider, Haberman (1993) argues that the Lower James and Randall Phase cultural expressions are roughly equivalent to those from the unusual Sandy Lake occupations on the James River in North Dakota. Haberman (1993) believes that the visible differences in the ceramics (Sandy Lake "hybrids" versus Great Oasis "hybrids") are indicative of important cultural differences between the southern and northern portions of the James River drainage.

Hendrickson III, Beisterfeldt, and Hintz are also dismissed as possible

analogs; while Hintz and Beisterfeldt, he states, show closer relationships to Post-Contact Coalescent sites on the Missouri River. Although he sees some similarities between Hendrickson III and Randall Phase sites he also believes that the ceramics from Hendrickson III are too complex to assign to existing archaeological taxa. Therefore they show no clear relationship to Randall Phase ceramics. Red River sites are dismissed out of hand, being too far north to have any bearing on the Randall occupations whatsoever (Haberman 1993).

9.7.4.7 Problems: This phase has been defined on the basis of small ceramic samples from comparatively few components, restricted to a fairly narrow geographic area. There has been little effort made to tie this entity to contemporaneous cultural processes on the Northeastern Plains. The author (Haberman 1993) acknowledges that the period from 1000-1300 AD was probably a dynamic one on the Northeastern Plains, then pays little attention to the numerous unusual ceramic assemblages found up and down the transitional zone between western Minnesota and the eastern Dakotas. This transitional zone also extends along the lower Red River Valley into the southern portion of Manitoba. Clearly this area tended to create, for whatever reason, ceramics that appear to be enigmatic blends of neighboring ceramics to the east and west. Unfortunately, there have been few, if any, concerted attempts to examine the cultural dynamics that underlie the ceramics from this area.

9.7.5 Red River Phase/Complex/Ware

9.7.5.1 Definition: The term Red River ware was originally suggested by Michlovic and Schneider (1988) as a designation for unusual ceramics recovered

from sites along the central Red River Valley and its major tributaries in Minnesota and North Dakota. Taking this concept one step further, Flynn (1993) suggested that a Red River Complex be defined for the region (although this is not necessarily contingent on Red River ware as a separate category). Unfortunately, just as the term was gaining wider acceptance, its originator, Michael Michlovic, suggested that "Red River ware" be eliminated in favour of older terms with taxonomic priority. In a later publication, Michlovic and Schneider (1993) took the material that might have been included within a Red River Complex and subsumed it within the Stutsman Focus of North Dakota which they regarded as part of the Northeastern Plains Village Complex. In a more recent publication Michlovic and Swenson (1998) split up the materials in the Stutsman Focus, placed some of it within extant Middle Missouri ceramic wares, placed others within Sandy Lake/Psinomani, and placed the rest within the Northeastern Plains Village Ware Group. Red River ware is discarded and its constituent ceramics placed into Lisbon Flared Rim Undecorated and Buchanan Flared Rim Incised/Trailed wares. Nevertheless, "Red River ware" does exist in the literature and as such it needs to be discussed here.

Archaeological evidence for subsistence at Red River ware sites suggests that a broad-spectrum hunting-gathering-fishing-horticultural system with emphasis on bison hunting and some use of maize. Evidence for maize horticulture occurs in the form of deep storage pit features and maize kernels (Michlovic and Schneider 1988). So far there is no evidence for other cultigens such as squash, beans or sunflowers (Michlovic and Schneider 1988). Settlements are frequently unfortified, although some fortified sites (e.g.: Shea) do occur on the James and Sheyenne Rivers (Michlovic and Schneider 1988). This all suggests

that these were village-dwellers still largely dependent on wild foods.

Common features of these villages include their small size, their situation on high ground overlooking a river or a lake, and the presence of a variety of ceramics, some of which are Late Woodland in character. For example, The Hartford Beach site has Lake Benton ceramics, while Hendrickson III has Blackduck and Sandy Lake pottery. There also appears to be an east-west gradient in the degree of relatedness to the Middle Missouri sub-area. For example, the Shea and Hendrickson III sites both have Red River ware while Hintz and Beisterfeldt have more Middle Missouri-like ceramics (Michlovic and Schneider 1988). The eastern sites also contain pipestone, a rare recovery in the Middle Missouri (Michlovic and Schneider 1988).

9.7.5.2 Distribution: Red River ware is found at sites along the Red River Valley and its tributaries. It is also found village sites known from the southern Sheyenne and James River drainages, west of the Red River (Michlovic 1985a). Related ceramics occur in a village sites near Lake Traverse and on Big Stone Lake (Anfinson 1997; Michlovic and Schneider 1993) just on the other side of the Red River drainage basin. These sites have been placed in the Big Stone Phase by Haug (cited in Anfinson 1997), although from the description provided these materials appear to be nearly identical to those from the upper Red River drainage. These villages are neither Middle Missouri nor Oneota but share aspects of both (Michlovic and Schneider 1993).

9.7.5.3 Type site The Mooney site is considered the type site for Red River ware (Michlovic and Swenson 1998). It is located on the east bank of the Red

River within the floodplain (Michlovic et al. 1995). Faunal recoveries at this site indicate that bison and deer were the most important mammalian resources with secondary reliance on fish and smaller mammals (Michlovic et al. 1995). The ceramic recoveries also indicate the existence of two Late Woodland components. Other sites related to the Mooney site include: Shea, Hartford Beach, Big Stone Lake, Shady Dell, and Bunker Hill (Michlovic et al. 1995). Anfinson (1997) has placed Hartford Beach and Big Stone Lake within the Big Stone Phase (see above).

With specific reference to the Mooney, Shea, and other northern manifestations of this complex, Michlovic and Schneider (1993) argue that such sites belong within the Northeastern Plains Village Complex. Archaeological material from these sites indicates that there are cultural ties with both the Eastern Woodlands and the Plains. While some of these sites contain evidence for domestic plants, these cultigens were not a big part of the economy. The dominant plant food was probably wild rice combined with other resources such as fish, waterfowl, deer, and bison -- a mix of prairie and woodland resources. Two major ceramic wares are present: Ogechie and Sandy Lake (Michlovic and Schneider 1993). Some sites have evidence for the presence of clay-lined rice threshing pits and rectangular house features, but no evidence for bell-shaped storage pits (Michlovic and Schneider 1993). The authors suggest that such sites would have supported populations, possibly numbering in the hundreds, living in semi-permanent, hamlet-sized settlements (Michlovic and Schneider 1993, 1995).

9.7.5.4 Associated ceramics: Red River vessels are wide shouldered, grit

tempered, thin walled, and globular (Michlovic 1990). Surfaces are smoothed and a few vessels are burnished (Michlovic and Schneider 1993). Decoration consists of incising, zoned tool impressions, and shallow trailing arranged in various motifs such as chevrons and "tail of thunderbird" on the body and shoulder. Other decorative traits include fingernail impressions, small lip castellations, and "saw tooth scallops" (Michlovic and Schneider 1988). Lips may be decorated with tabs or channels and some lip tabs also have trailed lines. Cord wrapped object impressions are relatively rare (Michlovic and Schneider 1993). When compared to the ceramics of the Middle-Missouri and earlier, indigenous Late Woodland pottery, these ceramics are thinner and distinctively decorated (Michlovic 1990). While they have certain stylistic and formal similarities to Late Woodland pottery, their decorative motifs are decidedly Oneota-related (Michlovic and Schneider 1993).

Sites with Red River ware may also contain Late Woodland ceramics such as Ogechie, and Blackduck/Kathio although Sandy Lake sherds tend to form a substantial portion of the ceramics from these sites (Michlovic and Schneider 1993). The presence of Ogechie ceramics is interesting because it is classed as a northern variant of Oneota that shares aspects of both its style and distribution with Sandy Lake. Oneota is much better known from Iowa and southern Minnesota and is not generally seen as far north as the Red River Valley (Michlovic 1983). Some ceramics also appear to be a Northeastern Plains variant of the Plains Village Tradition (Michlovic 1985b). Among Sandy Lake ceramics from the Red River drainage, Michlovic has identified unusual sherds that may be Oneota-related. At sites on the Red River some trailed line decoration also occurs on vessels that are otherwise Sandy Lake. These are neither true Sandy

Lake and true Oneota and are dubbed "Sandyota" in Minnesota (Michlovic 1983). To Michlovic, this suggests contact between different ethnic groups in the upper Red River drainage: "On the basis of shared ceramic traits, use of a common environment, chronological overlap, and likely relationship to historically known Siouan speakers, a close link between Sandy Lake and at least one variant of Oneota may be postulated." (Michlovic 1983: 25). However, it is also possible that some of this variability arises out of mixed stratigraphic contexts.

Grit temper tends to dominate the ceramics collections from these sites but both shell temper and mixed grit-shell temper may be present (Michlovic and Schneider 1988). At the Shea site this variation in temper seriates by depth, shifting from shell in the deepest layers, through a grit-shell mix, and finally to grit in the upper levels (Michlovic and Schneider 1988). Shell tempering is generally associated with Middle Mississippian, Oneota and Sandy Lake ceramics. The Late Woodland ceramics at this site are mostly grit tempered as are the NEPV/Red River vessels (Michlovic and Schneider 1993).

Several authors (Michlovic and Schneider 1993; Swenson and Gregg 1988) have observed stylistic similarities between Red River ceramics and Devil's Lake-Sourisford mortuary vessels. Swenson and Gregg (1988) suggest that Red River ware is the utilitarian pottery of participants in the DLS mortuary complex. While this association is by no means certain, the motifs observed on both the Red River ware vessels and those of the DLS mortuary complex are part of an iconographic system generally identified with the Oneota (Michlovic and Schneider 1993). However, Syms (pers. comm. 2001) disagrees, arguing that DLS vessels do not have the same sort of detailed and chevron shaped zoned decorations. What these vessels share instead, is some of the icons found on

Oneota ceramics. Since Red River ware ceramics are not Oneota as such, this suggests that there was perhaps some borrowing or sharing of iconography among Northeastern Plains hunter-gatherer-horticulturalists (Michlovic and Schneider 1993). It does not mean that the makers of either DLS vessels or Red River ware ceramics were Oneota.

The changes in ware and type distributions are evident less as bounded units in space and time than as a gradient running in an east-west direction. This has caused persistent difficulty in enumerating diagnostic traits for Red River ceramics (Michlovic 1985b). For example, the Red River ware: Sandy Lake ratio at the Mooney site is approximately 1:5, whereas at the Shea site, this ratio is approximately 1:3. By the James River valley, Late Woodland cord marked pottery is almost entirely absent (Michlovic and Schneider 1988). Along the Red River, Sandy Lake and cord marked wares with grit or grit-shell tempering are dominant. The Shea and Hendrickson III sites both have Red River ware and also contain pottery best described as Plains Village but which is not similar to Missouri Trench Plains Village pottery (Michlovic and Schneider 1988). These ceramics also do not resemble Initial or Extended Middle Missouri Variants such as Cambria or Mill Creek (Michlovic and Schneider 1988). By way of contrast, the Beisterfeldt and Hintz sites contain pottery that is more closely related to that of the Middle Missouri (Michlovic and Schneider 1993). Basically, as one moves west, the ceramics become more Middle Missouri-like. Further to the east, the ceramic assemblages become more Woodland and more Oneota-like. However, it needs to be noted that these ceramic assemblages are still quite distinct from those of their closest neighbors.

9.7.5.5 Chronological placement: The Mooney site dates suggest an occupation ranging between 1300 and 1500 AD, making this site contemporary with Sandy Lake sites to the east and Oneota sites to the south (Michlovic et al 1995).

9.7.5.6 Explanatory cultural dynamics Michlovic et al. (1995: 85) suggest that the Mooney, Shea, and related sites represent numerous "sporadic, short term occupations by small groups taking place over long periods during the late pre-contact period", probably over the last 500 years or more. There are several unique qualities of the sites in this area. First, it is unusual to see fortified villages with high representation of Late Woodland ceramics (Michlovic and Schneider 1988). They also contain ceramics that, while best described as Plains Village, do not resemble the well known Missouri Trench Plains Village wares. These sites also contain Sandy Lake pottery that is often associated with wild rice exploitation in the lake-forest regions to the north. This combination of traits leads Michlovic and Schneider (1988) to suggest that the occupants were part of the Sandy Lake ceramic tradition leading a "Plains Village" lifestyle. They regard the Shea site as an independent development of a village way of life different from the better established, better known village cultures in adjacent areas. These villagers may have developed a system in which meat and hides were traded for other agricultural produce and where they defense was accomplished with the combination of a large population and fortifications rather than mobility (Michlovic and Schneider 1988).

Previous interpretations regarded the Red River Valley as a mere extension of the eastern Woodlands, primarily as an area in which Late

Woodland peoples practiced the mortuary ceremonialism of the Arvilla Complex. However, research over the last two decades has uncovered sizable valley bottom habitation sites showing a mixture of Plains and Woodland cultural influences as indicated by the unusual mixes of Sandy Lake, Ogechie, Blackduck/Kathio, as well as some trailed line, fabric impressed ceramics with no known analogues (Michlovic 1983). This is precisely what one might expect given the intermediate cultural and geographical position of this area. Both Sandy Lake and Oneota are thought to be ancestral populations of Siouan speakers although there is little agreement concerning which branch of the Siouan linguistic family they represent. However, many agree that Sandy Lake populations were probably Dakota. Written records contain evidence that the Red River Valley was utilized or occupied by a wide variety of ethno-linguistic groups including the Yanktonai, Chippewa, Cheyenne, Assiniboine and Cree. The presence of so many different groups in a single area has generally been attributed to European pressure -- groups moving out of the Woodlands and onto Plains in response to the cultural and economic influence of the fur trade (Michlovic 1983). Michlovic (1983) argues that this archaeological data shows that the Dakota at least, were further out on the Plains than is often supposed during the Pre-contact period. The evidence for defensive architecture fits with the argument that the period following 1200 AD was one of increasing inter-group hostility (Michlovic and Schneider 1993). During this time, Oneota populations were expanding and forcing other populations to abandon their traditional territories (Michlovic and Schneider 1993) a process that probably engendered some conflict.

Archaeological evidence suggesting the presence of several different contemporary traditions on the Northeastern Plains argues for the use of Syms'

co-influence sphere model. This conception of Pre-contact interaction better explains complex cultural dynamics such as multi-environment use by single groups of people, as well as the presence of different cultural groups in a single environment (Michlovic 1983). Michlovic (1983) argues for extensive networks of connections between pre-contact Plains Villagers and Woodland peoples, the multi-ethnic use of single environmental zones, and the existence of widespread trading connections (Michlovic 1983). He believes that rivers like the James and Sheyenne acted as corridors to the grasslands for Woodland peoples (Michlovic 1983).

> Apparently, on the northeast Plains it seems to matter little where we direct our attention; there seems to be a generally consistent pattern of combined Plains and Woodland influences, not unlike the cultural configurations recognized by anthropologists such as Lowie for the Historic Period.
>
> (Michlovic 1983: 28).

The Northeastern Plains was a distinct area with its own cultural adaptation and a far-flung procurement network extending east and west (Michlovic 1983). Thus, the Red River valley becomes a nexus with an important intermediate position between the western Great Lakes and the Plains, not some peripheral western outpost for eastern Woodland peoples. The Northeastern Plains was a distinct area with its own cultural adaptation and a far-flung procurement network that extended both east and west (Michlovic 1983)

9.7.5.7 Problems: Research into the nature of Red River ware and its possible cultural associations is still scant since the only major researcher in this

area is originator of the term, Michael Michlovic. While the designation of a new ware type makes sense, the idea has not gained wide acceptance within the Northeastern Plains archaeological community. Moreover, due to the enigmatic character of the term itself and the internal diversity of the complex, it is easily subject to misuse. For instance, Nicholson (1990) suggested that the ceramics recovered from the Lovstrom and Jonas sites are Red River ware and, at the same time, are part of the Scattered Village Complex of the Middle Missouri sub-area. This exhibits a misunderstanding of both terms since Red River ware is not a Scattered Village ceramic type. It was also clearly Lovick and Ahler's (1982) intent that the Scattered Village Complex be considered a provisional taxonomic category subject to revision once the materials were more thoroughly understood. Moreover, none of these southwestern Manitoba ceramics bear much resemblance to those from the Red River Valley.

Ultimately, one is left with the sense that the term "Red River ware" is descriptive of an assemblage type containing a few distinctive ceramic vessels, rather than of a well defined ware category. The most diagnostic trait is the presence of incised and trailed line Oneota-like vessels, some with more Woodland-like traits such as exterior cordmarking and grit temper, while other vessels incorporate Plains-like traits such as smooth surface treatment and high angled shoulders (Michlovic 1985b). Based on a combination of subsistence strategy, settlement pattern, and ceramics, there is every indication of a population influenced by Oneota expansion, interacting simultaneously with both Plains Village horticulturalists and non-agrarian Late Woodland populations. Michlovic has also suggested that the merging of Plains and Woodland traits on single vessels is indicative of a population composed of both

Plains and Woodland peoples (Michlovic 1990). The persistent problem of a gradient rather than a sharp distinction between such well defined areas such as the Middle Missouri and the Eastern Woodlands means that one may be hard pressed to assign the ceramics and perhaps the populations as well, to any single category. Finally, since the hypothetical origins of the Plains ceramic cultures lie south and east of the Middle Missouri sub-area, within the Woodlands themselves, it is inevitable that the ceramics of the two areas should share some basic characteristics.

Unfortunately, Michlovic (Michlovic and Schneider 1993; Michlovic and Swenson 1998) has advised discontinuing the use of the term Red River ware in favour of previously defined wares such as Buchanan Flared, Owego Flared and Lisbon Flared Rim from the Stutsman focus (originally defined in Wheeler 1963). However, the Stutsman Focus bears only a slight resemblance to the Red River material. Stutsman, as defined by Wheeler (1963), is clearly affiliated with the Middle Missouri Plains Village assemblages. The Red River ceramics are eastern rather than western, not least because of the strong presence of Late Woodland Sandy Lake pottery. Recent work suggests that Oneota displaced IMM Variant, and that Sandy Lake ceramics possess remnant IMM traits in the form of S-rims and check stamping on some vessels. Perhaps makers of Sandy Lake pottery are displaced IMM groups who escaped the Oneota by moving to more marginal areas?

The photographs from the pertinent reports show little to recommend the elimination of the term Red River ware. Moreover, the definition of the Stutsman Focus is quite specific in many of its elements (see discussion in Stutsman section above) and it is clearly related to the other Plains Village

manifestations on the Middle Missouri. The position of the Red River materials is far more ambiguous. These pottery assemblages are quite variable and contain many Late Woodland ceramic traits without showing elements of a Late Woodland way of life as it is currently defined. Any evidence for a Plains Village affiliation comes in the form of (semi?) sedentary, horticultural villages, sometimes with fortifications. But this transition may have been going on in many places simultaneously for reasons that have no direct ties to cultural or ethnic affiliation.

Subsuming Red River materials within a complex whose cultural affiliates are decidedly western may do more to confuse the necessary process of redefinition. It is clear, by Michlovic's own admission (Michlovic and Schneider 1988), that the cultural affiliations of these ambiguous settlements in the Red River drainage system lie to the east. The presence of Late Woodland Sandy Lake ceramics, Oneota motifs, and the settlement pattern all suggest some relationship to Oneota. It may be arguable that the Red River villagers are a northern variant, possibly related to Minnesota Ogechie. The ceramic relationships may ultimately be traceable to the Blue Earth River Valley and pottery such as Allamakee Trailed. Michlovic (1983) also states his belief that these developments occur within an area that was culturally distinct, but not isolated from the eastern Woodlands and the Middle Missouri. As such, it would behoove us to define the archaeological complexes within the Red River Drainage in a way that clearly demarcates them as independent and unique and not as a poor cousin of the Middle Missouri. These new revisions help take Northeastern Plains and Boreal Forest archaeology a step closer to recognizing the complexity of Pre-contact human interaction. In this regard, Syms' (1977) Co-

Influence Sphere Model, although it has been around for some time, is finally being applied.

9.7.6 Northeastern Plains Village Complex

9.7.6.1 Definition: Northeastern Plains Village (NEPV) sites are characterized by semi-sedentary villages, horticulture, mound mortuary features, the Devil's Lake-Sourisford mortuary complex, a primarily hunter-gatherer subsistence system, extensive use of Knife River Flint, the use of catlinite, and the requisite diagnostic ceramics (Gregg 1990; Michlovic and Schneider 1993). Little is known about residential pattern, especially in the northern portions of the Northeastern Plains, since they are unlike the large, fortified Middle Missouri Plains Village settlements (Gregg 1994). NEPV Complex habitation sites are located in the larger river valleys of the Northeastern Plains and are frequently small, unfortified villages lacking obvious house depressions, and (Gregg 1990, 1994). (Note: Gregg's use of the word "complex" in this section is similar to a "composite" as it has been used by other authors such as Lenius and Olinyk (1990) and Meyer and Russell (1987).

Maize horticulture was not as intensively practiced as in Middle Missouri villages. Although maize, beans, squash, and sunflowers were grown at some sites (Michlovic et al. 1995), the horticultural villages of the NEPV Complex usually lack evidence for any cultigen other than maize and, while no actual garden plots have been identified, Gregg (1994) speculates they were located near the villages.

NEPV Complex sites often possess pottery that is not normally expected in the region, as well as unclassifiable ceramics which indicate interactions with

neighbors to the east, south, and west (Gregg 1990). Later sites show increasing influence from Middle Missouri and Coalescent Tradition groups to the west and southwest.

9.7.6.2 Distribution: Sites occur frequently in the James, Sheyenne, and Red River drainages in southeastern North Dakota (Gregg 1990) and northwestern Minnesota. Their distribution does not extend past the Rainy River (Michlovic and Schneider 1993).

9.7.6.3 Type site: Dating to around 1470 AD, the Shea site is generally regarded as the type site for this complex (Walde et al. 1995). This fortified site is located on a bluff overlooking the Maple River, a tributary of the Sheyenne. (Michlovic and Schneider 1988). Two curvilinear ditches similar to those found on the Missouri River probably contained a wooden palisade although the inner ditch has been filled in, suggesting that there are two occupations (Michlovic and Schneider 1993). There are no earth lodge depressions, no visible house outlines, and post-moulds form no obvious pattern.

Bison bone is the most common faunal recovery here although there are also small quantities of charred maize kernels, scapula hoes, and bell-shaped storage/trash pits. Maize was probably grown in gardens located near the village. This paints a picture of the Shea site as a warm season occupation where corn was grown and used as a supplementary source of food, but bison were the primary resource (Michlovic and Schneider 1988, 1993; Michlovic et al. 1995). Hunting and gathering of other wild food resources was probably also important (Michlovic and Schneider 1993).

9.7.6.4 Associated ceramics: The Northeastern Plains Village ware group consists of related ceramics from western Minnesota, eastern North Dakota and southern Manitoba (Michlovic et al. 1995). Vessels are grit tempered, smooth surfaced, and usually globular with occasional handles. Decoration consists of trailed line chevrons and curvilinear designs similar to those found on Oneota vessels (Michlovic et al. 1995). Similar ceramics can also be found in DLS mortuary contexts and have been identified with the Stutsman Focus of the James River in North Dakota as well (Michlovic et al. 1995) (see discussion of Red River ware above).

The southern portion of the study area shows evidence for Middle Mississippian ceramic influences from Cahokia -- Mill Creek sites with Middle Mississippian-style bean pots and effigy bowls, for example. Similar stylistic influences can be seen in some IMM Variant phases such as Cambria and Great Oasis, as well as in Buchanan Flared and Linden Everted Rim wares of northern Iowa, southern Minnesota, and eastern North Dakota (Gregg 1994).

At the more northerly end of their distribution ceramic assemblages at site such as the Mooney Site, are dominated by Sandy Lake, with the rest of the associated ceramics characterized as Red River ware or Northeastern Plains Village ware. These have been linked to Buchanan Flared, Lisbon Flared and Owego Flared Rim wares of the Stutsman Focus by Michlovic and Schneider (1993) and Michlovic and Swenson (1998). Sometimes Sandy Lake and NEPV traits can be found on the same vessel (Michlovic et al. 1995).

> It is obvious, however, that the cultural system that produced these ceramics was one in which sharing between ceramic traditions was taking place. Whether these represent different ethnic groups,

> slightly different but overlapping time periods, or trade, is a matter of great interest ...
>
> (Michlovic et al. 1995: 95-96)

9.7.6.5 Chronological placement: The Plains Village period on the northern Plains dates from 1200-1650 AD, although in northern Iowa and southern Minnesota it begins 200 years earlier, around 1000 AD (Michlovic et al. 1995). Dates from the Shea Site itself bracket the period between 1400 and 1642 AD. This is contemporary with Sandy Lake sites to the east and Oneota sites to the south. This also coincides with the Heart River Phase of the Middle Missouri Tradition (Michlovic and Schneider 1988). Archaeological complexes in this area associated with the Plains Village period include Cambria, Great Oasis, Mill Creek and Stutsman (all considered IMM variants), Oneota, and the Post-Contact Coalescent seen at the Beisterfeldt site (Michlovic et al. 1995). Although Oneota is normally regarded as an Upper Mississippian manifestation, Michlovic (et al. 1995) believes their way of life was sufficiently similar to that of other Plains Villagers that they can be regarded as part of the broader Plains Village Tradition. This notion is by no means universally accepted at this point.

9.7.6.6 Explanatory cultural dynamics: The interval between 800-900 AD sees a general increase in population density on the Northeastern Plains (Gregg 1994). In particular, Gregg (1994) reports numerous Late Woodland sites along the Red River dating to around 1000 AD. These have been divided into a number of different regional complexes or phases, such as St. Croix of the prairie-lakes region and aspen parkland of southwestern Minnesota, and Blackduck of the aspen parklands and woodlands of west central and northeastern Minnesota

(Gregg 1994). Within the ceramics there is a trend towards thinner, better made, larger pottery vessels, accompanied by an apparent increase in the overall number of vessels being made as well. By 700 AD, western and northwestern Iowa see population aggregation and settlement into more permanent villages -- possibly to protect agricultural produce. At this point, however, subsistence is still based largely on hunting and gathering, especially in the area between prairie-lakes region of southwestern Minnesota and north to southeastern Saskatchewan (Gregg 1994).

The period between 1100 AD and 1200 AD appears to have been a prosperous time for hunter-gatherer and horticulturalist alike. At this time, archaeological evidence shows the development of a mixed hunting and horticultural economy in many areas of the Northeastern Plains. A milder climatic regime may have facilitated the northwards spread of maize horticulture and of the Plains Village Pattern among the woodland peoples of southwestern Minnesota, western Iowa in the lower and central James River valley and in the Middle Missouri sub-area as well (Gregg 1994).

Between 1400 AD and 1500 AD there is evidence for a changing climate documented low water levels and in high salinity of prairie lakes from 1350 to 1650 AD. These indicate the existence of drought conditions in the southern portion of the Northeastern Plains. Evidence for aridification in the northern portion of the study area is seen at Devil's Lake, which dried up a more than once between 1300 and 1555 AD (Gregg 1994).

Beginning around AD 1250 or 1300,prolonged drought forced people to live near permanent sources of water (Gregg 1994). Dramatic changes in human adaptation are evident in the Plains Village settlements in northwestern Iowa

and southeastern South Dakota at this time, when many sites are abandoned and most remaining villages are fortified. Increasing levels of disease and warfare can be interpreted as evidence for food shortages and population pressure resulting from limitations in the amount of arable land (Gregg 1994). At the same time, Late Woodland cultures adopt a number of Plains Village traits, as seen at the Shea site where a fortified village contains predominantly Late Woodland Sandy Lake ceramics (Gregg 1994). This occupation dates to around AD 1450 and resembles contemporary Plains Village settlements to the west (Gregg 1994).

Late Woodland sites, common on the middle and upper Red river and its tributaries, often contain shell tempered and cord marked Sandy Lake pottery at this time. Further north, the ceramics are more exclusively Blackduck, which is interesting since Sandy Lake is regarded as Dakota, and Blackduck is associated with Algonkian groups such as the Ojibwa (Michlovic et al. 1995). Historical records indicate that Ojibwa guides were reluctant to pass Grand Forks since the territory there supposedly belonged to the Dakota (as reported by Alexander Henry in 1801). Therefore, Michlovic (et al. 1995) suggests that this territorial division may have existed during the late Pre-contact period as well.

However, since Sandy Lake and NEPV wares are both present in the same ceramic assemblages this may represent a number of possibilities:

1) The use of one site by two groups;
2) The historical development of one group into another; or
3) A single community was responsible for a varied ceramic assemblage.

(Michlovic et al. 1995).

Gregg (1994) entertains a fourth option -- that Late Woodland peoples, in response to pressures presented by prolonged drought and hostile neighbors started to depend on gardening. Historic records contain evidence of ethnically diverse winter villages in the aspen parkland ecotone. Thus, it is also possible that such villages were present in the Pre-contact Period. This would account for some of the stylistic mixing apparent in the ceramic assemblages (Gregg 1994).

It is also probable that this entire area was more culturally diverse than previous archaeological models have allowed. Historic records, archaeological research, and oral history all indicate the presence of the Dakota, Ojibwa, Cheyenne, Plains Cree, Assiniboine, Iowa, Mandan, Hidatsa, Atsina, Arapahoe, Oto, and Missouri on the Northeastern Plains (Gregg 1994). The ancestors of all of these groups may have utilized different portions of the Northeastern Plains prior to European contact and their territories probably overlapped (Gregg 1994). Gregg (1994) states that the Middle Missouri system linked the entire continent during the early Post-contact period and that an annual Dakota rendezvous on the James River in South Dakota was probably already fully developed during the Pre-contact Period. Circumstantial archaeological evidence comes in the form of exotic trade goods as well as the presence of Southeastern Ceremonial Cult designs and objects, and trade ceramics from the Southern Plains.

Sandy Lake pottery is closely linked to Siouan groups with strong woodland ties, perhaps middle or western Dakota or Assininboine. Such groups are then also good candidates for the Pre-contact Period occupation of the Northeastern Plains. The Beisterfeldt site on the Sheyenne River in South Dakota is thought to be a residence of the Cheyenne who were also living in earthlodge

villages like the Middle Missouri Plains Villagers in 1750 and perhaps as early as 1600. There were also Algonkian groups on the central Northeastern Plains who apparently lived a Plains Village lifestyle around 1500. Hidatsa oral history has the Awaxawi subgroups on the Sheyenne River and at the headwaters of the Red River where they may have shared the territory with the Cheyenne and perhaps the Teton. The Hintz site on the James River of North Dakota has been interpreted as a proto-Hidatsa village and the Schultz, Sharbono, and Irvin Nelson sites are all thought to be Hidatsa as well (Gregg 1994). Gregg (1994) postulates that the Mortlach Complex may also have links to the Hidatsa. However, unlike the northern Northeastern Plains, by 1500 AD the Oneota dominate the southern third of the study area. During the late pre-contact, this area was occupied by the Ioway, Oto, and Omaha (Gregg 1994).

9.7.6.7 Problems: Previous archaeological models have been unable to model or explain the evident stylistic diversity in the ceramics. Moreover, archaeologists have generally favoured models with single cultural groups using a single subsistence pattern occupying a single environmental zone (Michlovic and Schneider 1993). Unfortunately the evidence from the Northeastern Plains runs counter to each and every one of these assumptions. There is evidence that populations switched from horticulture to hunting and gathering and back again. It is also possible that Late Woodland hunter-gatherer groups moved towards a semi-sedentary, but only partially horticultural way of life, and it is also clear that different cultural groups shared access to this environmental zone and perhaps even dwelled, for short periods of time, within the same villages. Conventional archaeological thought is not equipped to deal with this behavior and, as a result,

we have been slow to accept the evidence. This information has also presented problems for existing models that have attempted to slot anomalies into pre-existing categories even where they are a less than comfortable fit. The NEPV Complex, while it is an attempt to rework the evidence by placing it in a new category, requires some work before it can successfully accommodate all of its diversity. The NEPV Complex is still too tightly tied to pre-existing categories, which engender sharp divisions between Plains and Woodland, agriculturalists and hunter-gatherers, and nomads and villagers. By using the term 'Northeastern Plains Village', this dynamic and diverse area, instead of becoming something separate and distinct, becomes an offshoot of the better known, and more established Middle Missouri Plains Village Tradition. There is an immediate mental association with a sedentary, maize cultivating economy -- a model that is only partially appropriate to the flexible and diverse economic adaptations that characterized the Northeastern Plains.

9.8 CONCLUSIONS

This overview of the culture-history of the Northeastern Plains offers some insight into the origin of the Lockport horticulturalists. Information presented here strongly suggests that the cultural affiliations of the horticultural occupation lie within the Red River Corridor. The late pre-contact materials from Saskatchewan do not have a direct bearing on the question at hand, nor do materials assigned to Mortlach, Blackduck, Rainy River, Winnipeg River, or Selkirk. Contemporaneous sites from the Middle Missouri trench to the south and west, previously suggested as a possible source for the exotic ceramics found

at Lockport (Buchner 1986), are not closely related either. And, although purported to be horticultural and to contain Red River ware (Nicholson 1990), neither the Vickers Focus, nor related sites from southwestern Manitoba are closely related to the horticultural occupation at EaLf-1. To date, these sites contain no storage pits, no scapula hoes, and no direct evidence of maize. Moreover, it's ties probably lie to the south and west, whereas Lockport's clearly lie directly south and possibly to the east as well -- well east of those of the Vickers Focus. -- within a narrow corridor defined in a large part by the physiography of the Red River drainage basin and immediately adjacent rivers. This area encompasses a series of sites and archaeologically defined cultures that have tended to defy all attempts to slot them into existing archaeological classificatory schemes. Aside from Lockport West (McKinley 2001), the Shea site which is a fortified village located on the Maple River, dating to the mid-fifteenth century AD (calibrated) (Michlovic and Schneider 1993) is probably one of the better analogues for EaLf-1 to date. The Mooney site (Michlovic et al. 1995) is located on the east bank of the Red River further south in Minnesota. This site dates to between 1300 and 1500 AD and contains ceramics attributable to Sandy Lake/Psinomani and Northeastern Plains Village wares -- grit tempered, smoothed vessels with trailed line decorations arranged in chevron and curvilinear motifs Unfortunately no dietary inferences were possible due to the fragmentary nature of the faunal remains and the complete lack of any plant remains (Michlovic et al. 1995).

Broader affinities are clear within the larger Red River drainage basin, and on the James River to the west in North and South Dakota. The Stutsman Focus (the suggested new home for Red River ware, the Big Stone and Randall Phases

around Lake Traverse and Big Stone Lake in South Dakota may also be part of the same dynamic that is operative within the Red River Valley. Looking at the ceramics, it is also clear that the Oneota also have a role to play although in exactly what capacity is still not entirely clear. Red River ceramics from EaLf-1, Mooney, Shea, and Lockport West are not Oneota. However, they do show decorative motifs strongly suggestive of Oneota ceramics.

The Lockport ceramics from the horticultural occupation are neither east, nor west. They appear to exist in a transitional zone between the two, and as such may also be caught in a zone of some tension between the two areas. Michlovic and Schneider (1993) have reported that sites along this corridor are sparse so far, and seem to exist in discrete clusters. In fact, it might be arguable that the Red River valley and adjacent drainages represent the migratory route for a series of population movements northwards, possibly away from the Oneota.

9.9 THE RED RIVER COMPLEX

At this time, it is appropriate to suggest an alternative to the Northeastern Plains Village Complex that seems unable to account for the nature, distribution, and cultural affiliations of these late horticultural sites on the Red River and its adjacent drainages. The Lockport site and other sites like it on the Northeastern Plains should be grouped into a complex as per Syms (1977) definition of the term. Given that this particular constellation of artifacts and features (the corn, hoes, storage pits, and ceramics) has been identified on the Red River in Manitoba and given that there are similar sites on the Red River and its

tributaries in North Dakota and Minnesota I suggest that it be called the Red River Complex. This is in keeping with its known geographical distribution and with the recent propensity towards naming things after local bodies of water.

Such sites are unfortified or only lightly fortified villages with bell-shaped storage pits, scapula hoes, and some reliance on maize horticulture. The maize horticulture, however, is probably not the primary element in the subsistence economy since it is combined with a reliance on bison, other larger game, and fishing. The ceramics from these sites appear to be locally manufactured but possess Oneota-influenced motifs such as trailed or incised chevrons and falcon tails. This is all nested in a ceramic assemblage that contains a small percentage of Late Woodland pottery as well. Other aspects of the assemblage show little discontinuity with earlier indigenous occupations and there is little or no evidence for domesticates such as beans, squash, sunflower, or tobacco. There may be evidence for the intensive exploitation of other seedy plant such as *chenopodium*. All of this can be regarded as characteristic of Red River Complex sites. These sites should not be viewed as derivative of Middle Missouri Plains Village sites and the words "Plains Village" should probably be avoided altogether because of their strong associations with the Middle Missouri. The term 'Plains Village' might be used later to group such complexes into a cultural composite or complex that expresses a more widespread relationship to the overall Plains Village Pattern which existed over a broad area at this time. With careful survey more such sites will be discovered on the Red, on its tributaries in Manitoba, North Dakota, Minnesota, and possibly further north and west as well.

Cultural Responses to the Medieval Warm Period on the Northeastern Plains: the example from the Lockport Site (EaLf-1)

BY

CATHERINE M. FLYNN

A Thesis
Submitted to the Faculty of Graduate Studies
in Partial Fulfillment of the Requirements
for the Degree of

MASTER OF ARTS

Department of Anthropology
University of Manitoba
Winnipeg, Manitoba

THE UNIVERSITY OF MANITOBA

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CHAPTER 10
EXTRA-REGIONAL CONTEXT: MIDDLE MISSOURI AND UPPER MISSISSIPPI CULTURAL HISTORICAL BACKGROUND

10.1 INTRODUCTION TO THE CULTURE HISTORY OF THE PLAINS VILLAGE AND ONEOTA TRADITIONS

During the Late Precontact Period on the more southerly potions of the Northeastern Plains and its surrounding areas, there are three major cultural traditions each of which is identified by a reliance on intensive maize horticulture, settlement in permanent or semi-permanent villages, and finely made, globular ceramic vessels. These are the Middle Mississippian, the Oneota (generally regarded as Upper Mississippian), and the Plains Village traditions (Anfinson and Wright 1990).

Middle Mississippian Tradition components are found in southeastern Minnesota from about 1200 to 1300 AD, although these are found earlier farther to the south and east. The Plains Village Tradition manifests itself in an eastern division of the Initial Middle Missouri Variant seen in the form of the Great Oasis, Cambria, and Mill Creek phases between approximately 900 and 1300 AD (Anfinson and Wright 1990). These three, Cambria, Great Oasis and Mill Creek, either individually, or in a variety of combinations, have all been regarded as ancestral to the Middle Missouri Tradition. Great Oasis has affinities with both Late Woodland and Plains Village Traditions, while Cambria appears to be related to Plains Village, Oneota, and Middle Mississippian Traditions (Anfinson 1982). Both the Middle Mississippian and Plains Village Traditions are very short lived in Minnesota. Neither lasts beyond 1300 AD, nor do they span more than a

couple of hundred years (Anfinson and Wright 1990) although the Plains Village Tradition persists in the Middle Missouri sub-area to the west until contact. The Oneota, though only peripherally present on the Northeastern Plains, are a pervasive presence in adjacent areas. The Oneota appear to displace the eastern manifestations of the Initial Middle Missouri Variant and flourish from that time until at least 1500 AD in many places, and as late as the 1700's in some where European trade goods are found in association.

All of these various traditions possess a maize-based subsistence system and all begin as replacements to the indigenous Late Woodland Tradition. They continue to co-exist with Late Woodland groups in the southeastern portions of the Northeastern Plains until around 1300 AD. In more northern areas, the Late Woodland continues more or less uninterrupted until the Protocontact Period. To the south, this tradition appears to be replaced by the Mississippian Tradition. However, it is unclear whether these Late Woodland groups are absorbed by, displaced by, coexist with, or are transformed into the many local manifestations of Plains Village and Oneota (Anfinson 1982). The level of complexity within this region as a whole means that the origins, development, interrelationships, and ultimate demise of all these various traditions are not well understood (Anfinson 1982).

Of these various phases and traditions, only a few will be treated in detail in this section. I will provide a more general overview of the Middle Missouri Plains Village and Oneota Traditions without examining all their myriad internal subdivisions. From there, I will treat the eastern phases of the Initial Middle Missouri Variant more comprehensively for a number of reasons:

1) While these are perhaps less well understood they also provide the earliest evidence of the Plains horticultural way of life, which is ultimately manifested in its most well developed form in the Middle Missouri trench;

2) The eastern expressions of the Initial Middle Missouri may also bridge the gap between Late Woodland hunting and gathering adaptations and later, horticultural groups; and

3) These Initial Middle Missouri Variant groups are also part of a larger cultural and technological revolution which occurs along the prairie-forest border between about 1100-1300 AD. The arrival of maize horticulture at Lockport is also part of this larger process.

Therefore it is appropriate to examine these early manifestations of the Middle Missouri Tradition in greater detail than the later, mature Middle Missouri phases which do not have much bearing on the problem at hand. I will also examine some of the more northerly Oneota phases such as Blue Earth and Ogechie in greater detail because geographically, these are the nearest expressions of Oneota to the study area and may have some relationship to Oneota-like ceramics which can be found further to the north.

10.2 THE PLAINS VILLAGE TRADITION OF THE MIDDLE MISSOURI SUB-AREA

This section will be approached somewhat differently than the previous chapter with its many cultural subdivisions. If the Middle Missouri sub-area were treated as the hierarchical equivalent of the Northeastern Plains, I would address each phase and variant of Middle Missouri sub-area separately, a monumental task better accomplished by specialists in the field. Moreover, the cultural chronology of the Middle Missouri has undergone several revisions in the last 20 years. Since this not a thesis on the Middle Missouri Tradition, it is more effective

to present the bulk of this material in a single section with some of the suggested chronological revisions. However, certain phases of the Initial Middle Missouri Variant, such as Cambria and Great Oasis, for instance, may have a bearing on later cultural developments on the Northeastern Plains. Therefore, I will address some of these earlier cultural historical divisions individually.

However, the Middle Missouri sub-area still deserves special attention because of its close proximity to the study area. In addition, various authors (Buchner 1986; Nicholson 1990; Syms 1980; Pettipas 1996) have postulated that Middle Missouri groups probably both interacted with, and influenced populations to the north in what is now southern Manitoba. Evidence for this interaction comes in the form of Middle Missouri ceramics in southwestern Manitoba, and the presence of various elements of a horticultural subsistence system such as bell shaped storage pits at sites like the Snyder site. Much is made of Hidatsa oral traditions that tell of a time when they went north to a land of snow and moose during which time they lost their corn (Ahler et al. 1991). However, whether these archaeological clues indicate the movement of people, ideas, goods or some combination of these is unknown.

Archaeologically, the entire Middle Missouri sub-area is well surveyed and researched as a result of the archaeological salvage program instituted in the years following World War II (Logan 1977). Much of the subsequent survey work has been directly related to mitigations of the frequent inundations of major rivers along the Missouri Trench. Interestingly enough, for all the work done in the area, the origins and development of the Middle Missouri Tradition are still not as well understood as one might expect (Lovick and Ahler 1982).

10.2.1 Definition and taxonomic problems:

Lehmer, in 1954, was the first to formally define the Middle Missouri Tradition (Tiffany 1983). The taxonomic system he developed to impart chronological order to the area is terminologically dense and remained with few alterations for many years. However, the system has not been without its problems. Lehmer's work has been criticized for both its inflexibility (Lovick and Ahler 1982) and for its inability to adequately account for the origins of Middle Missouri Plains Villagers (Lovick and Ahler 1982; Tiffany 1983). In more recent taxonomic systems (Gregg 1990), "Plains Village", like Plains Woodland or Plains Archaic would be seen as a "tradition" rather than as a "pattern" as Lehmer suggested, while the Middle Missouri Coalescent would be classified as a "complex" -- a sub-unit of a tradition rather than as a "variant". Unfortunately, these suggested terminological revisions have been adopted unevenly. For example, while the term "tradition" has been adopted by many authors, terms like "variant" still remain in common parlance.

In Gregg's conception of archaeological taxonomy, cultural traditions are:

> ... lifeways or general adaptive strategies defined in terms of variation in reliance upon hunting, gathering, and gardening for food production, the subsistence resources exploited, and the use of ceramic containers for cooking and food processing.
>
> (Gregg 1990: B.7).

Traditions are roughly equivalent to stages of cultural development in an anthropological sense; however, these traditions are not temporally exclusive, since groups living according to different adaptive strategies could have been, and indeed frequently were, each other's contemporaries (Gregg 1990).

A cultural complex is somewhat more problematic as it has been used by different authors to express different concepts; however, in North Dakota, culture complexes are seen as "groups of similar remains that have been found at numerous sites in an area or sub-area" (Gregg 1990: B.9). The diagnostic artifact types of a given complex are generally stylistically similar and such artifacts may include ceramics, point types, mortuary behavior, and settlement patterns (Gregg 1990). This is similar, but not identical to Syms (1977) definition of a cultural complex.

Again, confusion surrounding the terminology does not serve to clarify this matter. Lehmer (1971) suggests the Middle Missouri Tradition was part of the Plains Village Pattern, while in the other schemes the Middle Missouri Tradition is part of the Plains Village Tradition. This duplication of the term 'Tradition' is not terribly helpful and serves to obscure the critical fact that the Middle Missouri horticultural mode of production is a sub-unit of a larger and much more widespread cultural unit known by the term Plains Village "Tradition" or "Pattern". This way of life extended well beyond the bounds of the Middle Missouri sub-area.

The Plains Village Tradition, as it is understood in Gregg's terminology, is spread over a wide area including Oklahoma, north central Texas (Bell 1983), Kansas, Nebraska, Iowa, Missouri, South Dakota, and North Dakota (Benn 1983). However, it is concentrated within the major river valleys, especially the Missouri and its primary tributaries. The Middle Missouri then, should be understood as one of three sub-areas within the Northern Plains which includes the Northwestern Plains, the Northeastern Plains, and the Middle Missouri (Gregg 1990). Unfortunately, the fact that the term "Middle Missouri" designates

both a sub-area and a horticultural way of life within that sub-area complicates things. But, for purposes here the two geographic sub-divisions of major importance are the Middle Missouri sub-area and the Northeastern Plains sub-area.

The Plains Village way of life is distinguished by a reliance on intensive horticulture, primarily corn, with a lesser reliance on beans, squash, and sunflowers. The production of a dependable, storable food surplus is also characteristic, in this case primarily of corn (Gregg 1990; Lovick and Ahler 1982). High population densities and large, fortified semi-permanent villages also characterize this way of life with semi-sub earth lodges clustered along major rivers (Michlovic and Schneider 1993). Often these villages are situated on terraces overlooking major rivers in close proximity to the garden plots (Michlovic and Schneider 1993). These villages are large, being populated by hundreds and perhaps as many as 1000 residents at a time (Michlovic and Schneider 1993).

Other characteristics include floodplain garden plots, dependency on bison, some gathering and hunting of smaller game, and rectangular or circular semi-subterranean earth lodges for eight to ten occupants or more. Winter settlements tended to be located on floodplains where gallery forests provided some shelter from the elements (Michlovic and Schneider 1993). The artifact assemblages are characterized by bison scapula hoes, a varied bone tool kit, large bell-shaped storage pits, and a distinctive ceramic series the general characteristics of which include globular vessels with S-shaped or straight rims. Most of the internal ceramic divisions here are based on rim form, lip form, exterior surface treatment, and rim and shoulder decoration. Bison scapula hoes

are present, and settlements generally include large and prominent middens as well as deep and often bell-shaped storage features, presumably for corn (Lovick and Ahler 1982; Tiffany 1983).

10.2.2 Distribution: The Middle Missouri is a well defined sub-area of the Northern Plains which includes the Missouri River from its junction with the White River in South Dakota to its confluence with the Yellowstone River in North Dakota. It also includes the Little Missouri River, a northern tributary of the Missouri River, which flows north through South and North Dakota.

10.2.3 Type site: There is no "type site" per se for either the Middle Missouri or the Plains Village Tradition. The definition of the sub-area and the way of life arose largely out of the work mandated by the U.S. Bureau of Reclamation as portions of the Missouri River and its many tributaries were dammed up and large areas were inundated for flood control and reservoirs from the 1930's through the 1960's. Archaeologists were permitted to survey these areas prior to inundation. The end result of this was the many publications of the Smithsonian Institution River Basin Surveys Papers series. This, and other publications which arose from it, form the foundation for what is known about this area but it was Donald Lehmer (1971) who provided the first major synthesis of this work.

10.2.4 Associated ceramics: The ceramic wares of the Middle Missouri sub-area are exceedingly well studied and, as a result, are correspondingly complex. Because of this, it is necessary to treat the ceramics in a very general fashion.

However, the ceramics are integral to Middle Missouri archaeology, so much so that one cannot do any archaeology in the area without some understanding of this artifact class (Gregg 1985, 1990). The following is a general overview of the basics of Middle Missouri ceramic typology.

Within the Middle Missouri sub-area vessel, rim, and lip form, surface treatment and decoration are all highly diagnostic (Gregg 1985). Comparative analysis is accomplished by means of wares, and wares are then subdivided into types (Gregg 1985). Wares share such basic characteristics as fabric, surface finish, vessel, and rim form. Types possess many of the features of wares but are commonly distinguished by variations in surface treatment, decoration, and rim form (Gregg 1985).

Vessels tend to be locally made and are usually round bottomed. Surface treatment may be plain, smoothed, simple stamped, or check stamped. Both simple and check stamping are accomplished by means of malleation with a carved, grooved, or thong wrapped paddle over the vessel exterior. Cord marking is, on the other hand, considered generally diagnostic of woodland ceramics (Gregg 1985). Plains rims may be S-shaped or straight, with variations in the form thereof. Diagnostic decorative techniques include single strand cord impressing, cord wrapped tool impressing, incising, trailing, tool impressions, fingernail impressing, and stab and drag techniques (Gregg 1985).

While written descriptions may make Late Woodland and Plains Village ceramics sound superficially similar, visual inspection of photos and of the ceramics themselves reveals that the two are immediately and strikingly different. In comparison with Late Woodland ceramics, Plains ceramics appear finer and better made. The fabric is more compact and the paste better worked

and more compact. The temper is smaller and more uniform. Impressions are made with more tightly wrapped cord and are executed with great care and precision. Plains Village vessels are large and have a final appearance of being higher fired than the standard Late Woodland pottery.

10.2.5 Chronological placement: Much effort has been expended over the last forty or more years at internal chronological ordering based on various combinations and permutations of archaeological data, ceramic analysis and Mandan/Hidatsa oral tradition and ethnography. The most often cited of these various chronologies is that of Donald Lehmer (1971), the pre-eminent Middle Missouri archaeologist. Therefore, it is important to have at least a general understanding of the terms employed when discussing Precontact cultures in the Middle Missouri sub-area.

The culture divisions and subdivisions within the Middle Missouri way of life (as opposed to sub-area) are based largely on ceramics, which have been exhaustively studied and used to sort out cultural and chronological problems throughout the sub-area. The ceramics, like the chronology itself, do not suffer from lack of detail but rather than belabour ware types and subtypes, I will present a brief summary of Lehmer's (1971) chronology based on the interpretations, as well as some of the suggested revisions, presented in Lovick and Ahler (1982), Tiffany (1983) and Gregg (1990). The criticisms presented here are also to be found in the above sources.

Up until the florescence of the Plains Village lifeway, the area under consideration undergoes a more or less normal progression from Paleo-Indian through to Late Woodland. With the introduction of maize, the Woodland

Tradition ends and the Middle Missouri Plains village way of life begins. The following sections provide a basic, pared down outline of Lehmer's chronology.

10.2.5.1 Middle Missouri Tradition: This spans the period from approximately 1000 AD to 1400 AD and is the earliest period in Lehmer's chronology. It describes that time period during which there was an initial influx and expansion of Plains Villagers into the area. In cultural terms, it is generally agreed that this tradition accounts for the movement of proto-Mandan and Hidatsa into the area, possibly from the woodlands to the east.

The Middle Missouri Tradition consists of three *variants*: Initial, Extended and Terminal. During the Initial Middle Missouri Variant, the ancestral Mandan and Hidatsa are thought to have arrived in the sub-area. During the Extended Variant, these groups extended their dominance throughout the sub-area. Finally, they are thought to have retreated to the north during the Terminal Variant, as a result of conflict with the groups of the Coalescent Tradition (Proto-Arikara).

10.2.5.2 Coalescent Tradition: The Coalescent Tradition begins some 300 years later than the Middle Missouri Tradition and is composed of four variants: Initial, Extended, Post-Contact, and Disorganized. During the Initial Variant there is an intrusion from the south into the Middle Missouri sub-area. These immigrants are probably Proto-Arikara and the initial intrusion is followed by an expansion upriver at the expense of the ancestral Mandan and Hidatsa groups during the Extended Variant. The

Extended Variant groups shared ideas with and partially absorbed their northern neighbours during the early historic Post-Contact Variant, but finally collapsed under sustained Euro-american settlement during the Disorganized Coalescent Variant.

As previously noted, the Middle Missouri tradition is generally and quite solidly associated with the ancestors of the Mandan and Hidatsa (Tiffany 1983; Gregg 1990).

10.2.6 Explanatory cultural dynamics: With regards to the problem of cultural genesis there are two major schools of thought concerning the origins of the Plains Village Middle Missouri Tradition groups:

(1) They are an indigenous development which grew out of the local Late Woodland populations on the plains (Benn 1983; Winham and Lueck 1994); and

(2) They are an outgrowth of developments further south and east along the Mississippi River Valley (Anfinson 1997; Fawcett 1988; Gregg 1990; Johnson 1991; Lovick and Ahler 1982; Tiffany 1983).

The Woodland period for this area spans the period between approximately 500-900 AD (Winham and Lueck 1994). Those who view the Middle Missouri as an indigenous development discuss the fact that there does seem to be some evidence of components which are transitional to full blown Middle Missouri (Winham and Lueck 1994). Woodland phases include Valley, Besant, Sonota, Truman Mound Builders, Loseke Creek and Cross Ranch

(Winham and Lueck 1994). The Valley phase precedes Loseke Creek, which precedes Great Oasis, and the three have almost identical spatial distributions in this region (Winham and Lueck 1994). Such evidence of apparent in situ cultural evolution is used to argue the position. Winham and Lueck (1994) also discuss the Flaming Arrow site in the Knife-Heart region. This site dates to between 920-1230 AD and may have a very early Awatixa-Hidatsa component. This component is similar to Initial Variant of the Middle Missouri Plains Village Tradition, but could also be classified as Late Plains Woodland. This leads the authors to conclude that this occupation is transitional between the two (Winham and Lueck 1994).

> It is likely that the transition from one lifeway (Woodland) to another (Plains Village) is reflected in varying degrees in all Woodland groups present in the Middle Missouri region -- that is, they were all adapting to changing circumstances. It has been suggested...for Great Oasis that some post of those peoples developed a more complete Plains Village lifeway, while others...retained their Woodland lifeway.
>
> (Winham and Lueck 1994:155)

There have also been numerous attempts to find cultural progenitors in the woodlands to the east of the Middle Missouri. There will be much more discussion of this position in the sections on Mill Creek, Great Oasis, and Cambria.

Michlovic and Schneider (1993) offer some middle ground between these divergent opinions. They state that by the 14th century AD, the Plains Village adaptation was well established throughout woodlands west of the Great Lakes. This leads them to suggest that some of the more obvious similarities might be

"functional convergence", while other similarities are a result of contact and cross-cultural influence (Michlovic and Schneider 1993).

Regardless of the divergent opinions about their origins, it is generally agreed that the Middle Missouri Plains Villagers represent the ancestors of the ethnographic Mandan, Hidatsa, and Arikara (Michlovic and Schneider 1993).

10.2.7 Problems: The existing Middle Missouri chronology has been criticized because:

(a) it does not account for developments in the tradition in the northern reaches of the sub-area around the Knife-Heart region (Lovick and Ahler 1982);

(b) it failed to utilize the rich oral tradition of the ethnographically well known Mandan and Hidatsa (Lovick and Ahler 1982);

(c) it is inflexible and cannot accommodate subsequent archaeological developments (Lovick and Ahler 1982); and

(d) it is disproportionately reliant on unidirectional migrations and diffusion of people and cultural elements from south to north (Lovick and Ahler 1982).

Subsequent researchers have also found Lehmer's terminology confusing and unnecessarily complex. While Winham and Lueck (1994) state that Lehmer's 1971 compilation is the most comprehensive overview of the topic, they also believe that his work is now badly out of date. Winham and Lueck (1994) raise further objections to the existing chronology. They suggest that the currently recognized archaeological variants or phases may not even relate, at least not on a one to one basis, with past human groups since some Mandan and Hidatsa groups are virtually indistinguishable in the archaeological record. Without the

benefit of historic data these two groups might be classified as one.

Rather than using the traditions, horizons, and variants of Lehmer's chronological system, the trend in North Dakota at least, has been towards the use of traditions, complexes, and phases (Gregg 1985, 1990) or even just phases (Lovick and Ahler 1982) without the accompanying baggage of variants, etc. In such a reordering, the Plains Village "Pattern" becomes the Plains Village "Tradition" and the Middle Missouri and Coalescent "Traditions" become "Complexes" (Gregg 1990) with smaller internal phase divisions (Lovick and Ahler 1982). Gregg (1990) suggests a third complex be added to the Middle Missouri and Coalescent to accommodate recent archaeological developments in the Northeastern Plains sub-area. He calls this complex the Northeastern Plains Village Complex. However, there is some question as to the suitability of this choice of terms, as subsequent sections will point out.

10.3 THE INITIAL MIDDLE MISSOURI VARIANT: CAMBRIA, GREAT OASIS, MILL CREEK AND OVER

10.3.1 Cambria Phase

10.3.1.1 Definition: Cambria can and has been seen as an eastern manifestation of the Initial Middle Missouri variant (Anfinson 1982). Of those cultural units that are used to designate the eastern portion of the Initial Variant, the Cambria Phase is one of the most enigmatic. It is often cited as a possible source of Middle Missouri Plains Village groups. However, this position is by no means universal because it is a complicated phase, with one of the more diverse and confusing ceramic assemblages.

Cambria ceramics have similarities to Late Woodland, Middle Mississippian, Oneota, and Middle Missouri ceramics (Anfinson 1982). It may be complex interrelationships such as these which lead Anfinson (1979a) to the belief that Minnesota is central to any understanding of the entire mid-continental cultural sequence. This area is, after all, the intersection two major biomes, the Plains and the Eastern Woodlands and, therefore, also of diverse adaptations and cultural traditions (Anfinson 1979a). Within this particular area we see Late Woodland, Early Plains Village, Oneota and Middle Mississippian Traditions, sometimes simultaneously.

Cambria is the least known phase of the Initial Middle Missouri Variant. The Cambria type site was first reported in the early part of this century and excavated by Nickerson in 1913 and 1916 (Anfinson 1997). It was excavated again mid-century by Jenks and Wilford and again by Gibbon and Shane in the 1970's. The combination of repeated excavations, cultivation, and pot hunting has left the original site almost completely destroyed (Anfinson 1997).

Cambria sites, insofar as they can be effectively defined as such, are generally small campsites with Woodland components containing samples of thin, smooth, grit tempered pottery. Other site types include large villages on river terraces, smaller villages on the smaller tributaries, and mortuary sites (Anfinson 1997). Bone horticultural tools, including bison scapula hoes, and the charred remains of maize were all common at the type site. Cucurbits and sunflowers have also been recovered as well as a wide variety of wild food resources, both floral and faunal (Anfinson 1997). Like so many of these ceramic cultures, there is little other than the ceramics combined with changes in subsistence and food storage technology to distinguish these sites from previous

Late Woodland occupations (Anfinson 1997).

Johnson (1991) mentions the association between Cambria sites and flat topped pyramidal mounds, something he takes as evidence for the interaction between Cambria peoples and those of the Middle Mississippi region. However, in Anfinson's (1997) discussion of Cambria, he states that all but two of these mound sites are located in the Big Stone Lake locality and therefore become, in his terminology, part of the Big Stone Phase.

10.3.1.2 Distribution: Obviously in the absence of a reliable definition, assigning a distribution is somewhat problematic; however, Ready (1979a) reports that Cambria sites are distributed through southwestern Minnesota and west central Minnesota. Anfinson (1997) is somewhat more cautious; he states that sites which have non-Great Oasis ceramics and have, by virtue of this, acquired the label "Cambria", are concentrated in southwestern Minnesota although similar sites have also been reported from southeastern and west-central Minnesota (Ready 1979a). Anfinson (1997) however, states that well-defined Cambria ceramics have only been reported from the type site, the Price site, the Lewis Mound site, and from the Silvernale and Bryan sites.

10.3.1.3 Type site: The type site for Cambria ware is the Cambria Village or Low Village Site in south central Minnesota, 25 km northwest of Mankato, Minnesota. It is located on a naturally defensible, intermediate terrace above the Minnesota River (Anfinson 1997). This site is the largest and most complex of all the identified Cambria sites in Minnesota

10.3.1.4 Associated ceramics: Cambria ceramics are primarily confined to the southwest corner of Minnesota and it has been suggested that this phase is affiliated with Lehmer's (1971) Initial Variant of the Middle Missouri Tradition, possibly as a phase of this variant (Ready 1979a). There have been several attempts to make some sense of Cambria ware but, because Cambria is so complex, none of these have been overly successful. For this reason, only the most general characteristics will be dealt with here.

Cambria ceramics have been divided into five types: Powell Plain and Ramey Broad Trailed, both of which are rolled rim types; Linden Everted and Mankato Incised, both of which are outflared rim types; and Judson Composite which is an S-rim type (Gibbon 1993).

Cambria vessels are generally globular, with constricted necks, pronounced shoulders, and flaring rims (Ready 1979a; Anfinson 1997). Both rolled and S-rim types are present within Cambria ware (Anfinson 1997). Although surfaces are generally smooth, a small percentage of sherds may also be cordmarked (Anfinson 1997). The Cambria site itself also yielded a small percentage of sherds that were burnished and some that were painted black (Anfinson 1997). Rim and Lip form are variable and vessels may have strap handles. Temper is primarily grit, although there are shell tempered varieties included within the ware such as Linden Everted or Ramey Incised (Anfinson 1997). Decoration tends to be confined to lip, rim, neck, and shoulder regions, and designs are either incised or trailed. Predominant motifs or design elements include punctates, horizontal lines, chevrons, filled triangles, spirals, meanders, and angular combinations of the above (Ready 1979a). Cambria ware is broken down into a number of types based largely on rim shape, lip morphology, and

decoration.

It should be noted that the rolled rim type, a Ramey Incised-like ware, has only been recovered at the type site itself although these ceramics are clearly locally manufactured and are grit rather than shell tempered (Johnson 1991). This is interesting in light of the fact that the type site is the most eastern of the Cambria phase sites and thus closest to the Middle Mississippian sites. These may have influenced those who manufactured these rolled rim varieties (Johnson 1991).

10.3.1.5 Chronological placement: Cambria is relatively short lived and dates between 1000 AD and 1300 AD (Ready 1979a). Gibbon (1993) suggests that Cambria probably lasts from 900-1300 AD, while Anfinson (1997) gives a somewhat more conservative range of 1000-1200 AD.

10.3.1.6 Explanatory cultural dynamics: Johnson (1991) argues that all of the available evidence points to the development of Cambria out of an indigenous Late Woodland base. He believes that the source and motivation for this transition came from contact with the culture of the Middle Mississippi region possibly through Mill Creek and Great Oasis. Johnson (1991) also argues that the developments visible in Cambria Phase sites arise out of agricultural intensification, the need for river terrace land that could be cleared for gardens, and population growth attributable to horticulture. Some believe that Cambria represents the remains of the ethnographically known Mandan, but this has not been confirmed (Gibbon 1993)

The type-site contains a complex mix of Woodland, Middle Mississippian,

and Plains Village traits in the ceramic assemblage. Johnson (1991) explained this by placing the Cambria site as a dominant centre in the northern extension of a Cahokia-centered trade network which exchanged bison meat and hides, horticultural tools and products, specialized clothing for the elite, and exotic goods. Cambria, Silvernale, and Mill Creek phase sites, he believes, created three northwestern "nodes" of a Cahokia-based system in which the northern zone collected and extracted the resources for trade that were then funneled to Silvernale sites which interacted more directly with the Cahokian trade network (Johnson 1991). He also argued that relations with the Late Woodland populations to the north, the ancestors of the historic Dakota and manufacturers of Onamia and Kathio ceramics, were hostile since these Woodland peoples would have been outside the range in which maize could be effectively cultivated. This phase is seen as a possible origin of the Middle Missouri Plains Village Tradition (Schneider 1982). No Initial Variant components are present in Minnesota by 1250 or 1300 AD:

> ...(W)hen Blue Earth Oneota peoples seem to have gained control of this section of the northeastern prairies. Traits after this date that may derive from the Middle Missouri tradition are a few 'weak' S-shaped rims on Woodland pottery jars from sites in the northern mixed forest zone of the state, simple and check stamping on Sandy Lake pottery vessels in the same general zone...and an S-shaped rim or two in Blue Earth River Oneota sites.
>
> (Gibbon 1993:181).

However he also acknowledges that such traits may be too widespread to be truly diagnostic.

10.31.7 Problems: There is actually very little published data on this phase

(Anfinson 1997). This problem is further complicated by the fact that Cambria, as a taxonomic entity, is very poorly defined and has therefore tended to function as something of a garbage category in the archaeology of southern Minnesota. Non-Great Oasis sites frequently acquire the label "Cambria" which has made the distinction between the two ineffective (Anfinson 1997). There is also the frequent assumption that plain grit tempered sherds in these sites represent Cambria components when, in fact, such pottery might be a product of a Mill Creek, Over, NEPV, or even a Big Stone Phase occupation (Gibbon 1993). Moreover, Cambria sites generally contain assemblages of small sherds that also exhibit great variety. This further complicates any attempt to construct a firm definition of the complex. Overall, Cambria lacks a well-defined ceramic typology with diagnostic types that would allow for the effective definition of archaeological components (Anfinson 1997).

10.3.2. Great Oasis

10.3.2.1 Definition: Great Oasis has been variously labeled an "Aspect" (Winham and Lueck 1994), a "Phase" (Anfinson 1979b) and a "Complex" (Anfinson 1997). Regardless of the taxonomic confusion, Great Oasis has long been regarded as important in ascertaining the origins of the Middle Missouri Plains Villagers (Winham and Lueck 1994). This phase may in fact bridge the gap between the Late Woodland and Plains Village traditions or, alternatively, it may be an eastern manifestation of the Initial Variant of the Middle Missouri (Anfinson and Wright 1990; Henning and Henning 1978; Winham and Lueck 1994). Henning and Henning (1978) see Great Oasis as having a strong relationship with the Late Woodland Tradition, possibly as a development out of

a Late Woodland base. They believe that Great Oasis, along with other phases such as Mill Creek which are clearly related to the Initial Middle Missouri Variant, were not included in this taxon by Lehmer simply because they lay outside the Middle Missouri sub-area (Henning and Henning 1978).

Floral and faunal remains from Great Oasis sites indicate that these folk were exploiting their environment to its maximum potential. There is also evidence for the use of use of horticultural products, but it is not clear how heavily they actually relied on horticulture (Henning and Henning 1978) because Great Oasis peoples apparently had different subsistence strategies in different regions. For the most part, they were hunter-gatherers, but there is also evidence that they practiced some maize horticulture (Anfinson 1997; Winham and Lueck 1994). Within Minnesota, the subsistence pattern appears, for the most part, to be a continuation of the broadly based, non-agrarian pattern of Late Woodland groups (Anfinson 1979b). Here, Great Oasis has a much more "Woodland appearance" and the ceramics are less varied (Anfinson 1979b).

Subsistence during the Great Oasis Phase outside Minnesota appears to be based on mixed agriculture and on hunting and gathering (Anfinson 1979b). However, Winham and Lueck (1994) speculate that Great Oasis may have split into two sub-groups in response to differing environmental circumstances in different portions of their range. They became horticultural where conditions were optimal for maize growing, and remained bison hunters where herds were larger and horticulture less practical. The remains of scapula hoes are rare, but not unknown at Great Oasis sites and, although maize kernels are reported from most of these sites, cobs are uncommon (Anfinson 1979b, 1997). Squash and sunflowers are also present at some sites, along with a wide variety of wild food

remains (Anfinson 1997). Henning (1991) argues that the absence of corncobs and digging implements at Great Oasis sites means that Great Oasis peoples traded for their corn. While the presence of both of these at adjacent Mill Creek sites means that this is where the Great Oasis groups traded for their corn.

Great Oasis sites tend to be located on the smaller tributary streams. When these sites occur on major rivers, they tend to be located at junctions with the smaller tributaries (Henning and Henning 1978). Habitation sites are typically found on the lower terraces of floodplains. Unfortunately there are few large Great Oasis sites most of which contain little evidence of house structures. This paucity of large village sites suggests that the smaller, more temporary camps with small garden plots adjacent to them may have been the most common Great Oasis settlement type (Anfinson 1997). In southwestern Minnesota, settlements are found on islands, peninsulas, and isthmuses of the lakes. Again, these sites lack of evidence for large house structures. Where houses do occur, they are semi-subterranean and rectangular, with eastward facing entrances, a central fire pit, and many trash/storage pits (Henning and Henning 1978).

10.3.2.2 Distribution: Anfinson (1979b, 1997) says that Great Oasis is one of the earliest and most widespread of the Plains Village phases. It is found from east and central South Dakota, through northern Iowa and southwestern Minnesota and into northeastern Nebraska and western Illinois although the core area of their distribution is in northwestern Iowa (Anfinson 1979b, 1997; Henning and Henning 1978). Unfortunately, Anfinson (1997) cites Nicholson (1989) who states that there are Great Oasis ceramics in Manitoba (Anfinson 1997), something which is, at best, unproven at this time.

10.3.2.3 Type site: There is some confusion over the name Great Oasis itself, since this term was initially used to describe an area of Minnesota rather than a site. Furthermore, the Great Oasis type site has been referred to by a number of different names (Anfinson 1997). However, the term Great Oasis for the type site is acceptable (Anfinson 1997). The type site remains the only major Great Oasis village in Minnesota and is actually one of a very few Great Oasis sites in that state (Anfinson 1979b, 1997). First excavated in the 1940's and 1950's by Wilford, the type site remains largely unpublished. Anfinson (1997) has provided a brief summary of the unpublished data collected by Wilford. During the early excavation of the type site, Wilford apparently uncovered a mixture of Great Oasis, Woodland, Cambria, and Oneota ceramics. He believed that both the Late Woodland and Cambria materials were contemporary with the Great Oasis materials and that the Oneota material was later (Anfinson 1997). The site contained many storage/trash pits, but no scapula hoes (Anfinson 1997).

10.3.2.4 Associated ceramics: Great Oasis vessels are globular with round bottoms and shoulders, constricted necks, and flaring rims. Vessels are primarily grit tempered, but can be shell tempered. Surface treatment is either smoothed or cordmarked, although rims are usually smooth. Vessels are probably made using a paddle and anvil. The pottery is partly distinguished by the fact that it is extremely fine and well made (Anfinson 1997; Henning 1991). Design elements include cross hatching or tool impressions. Motifs are overwhelmingly linear, consisting of various arrangements of closely spaced parallel lines, either horizontal or angled to form triangles, obliques, trapezoids, diamonds, or chevrons. Rims may be either high with unthickened, flattened lips, or short and

thickened with flattened lips. These two basic rim forms provide the primary distinction between the two Great Oasis ware types: Great Oasis High Rim and Great Oasis Wedge Lip.

High Rim ware has straight, outflaring rims, flat lips, and sharp shoulders. Decoration consists of trailed lines on the rim exterior which are organized into bands of oblique and horizontal parallel lines in a variety of patterns and motifs (Anfinson 1997). The use of cordmarking on the exterior surfaces suggests that there is some relationship with the Woodland Tradition, potentially as an antecedent of Great Oasis (Anfinson 1997). High Rim ware resembles Chamberlain ware from Mill Creek sites and Anderson High Rim of the Over Phase/Focus in South Dakota. This suggests that Great Oasis may be ancestral to other Initial Middle Missouri Variant High Rim wares (Anfinson 1997).

Great Oasis Wedge Lip has an outcurving rim with a broad, flat outwardly beveled lip. The rim-neck junction is thickened and the rims are thickened to form a wedge shape in profile, which gives the ware type its name (Anfinson 1997). Decoration is found on the lip, rim, and shoulder and consists of fine trailed lines, crosshatching or tool impressions. Shoulder decorations usually consist of fine, trailed closely spaced parallel horizontal lines (Anfinson 1997). Great Oasis Wedge Lip ware looks like Mill Creek Sanford ware and some of the Anderson wares which have been assigned to the Over Focus.

There seems to be some regional variation in the proportions of Wedge Lip to High Rim. It is important to note that there are no S-rims in Great Oasis which, in combination with the lack of fortifications at Great Oasis sites, is why Tiffany argues that Great Oasis is not part of the Middle Missouri Plains Village tradition (Anfinson 1997).

10.3.2.5 Chronological placement: The date range given for the Great Oasis Phase is 900 to 1200 AD (Anfinson 1979b, 1997; Henning 1991). However, Great Oasis may begin as early as 800 AD and end at 1250 AD (Anfinson 1997).

10.3.2.6 Explanatory cultural dynamics: Many authors place Great Oasis as ancestral to and partially contemporary with the Mill Creek and Over Phases of the Initial Middle Missouri Variant (Anfinson 1979b, 1997; Henning and Henning 1978; Winham and Lueck 1994). Henning and Henning (1978) state that the two Mill Creek phases: the Big Sioux and Little Sioux phases, together with the Over Phase:

> "...are phases of several hundred years duration, having Great Oasis antecedents combined with elements derived from elsewhere. The bulk of these 'outside' elements are probably derived from consistent contact with Mississippian peoples on the Mississippi and Illinois River valleys and possibly those of the Central Plains and Caddoan areas as well."
>
> (Henning and Henning 1978: 14)

The posited relationship with Mill Creek is based on similarities in tool types, pottery vessel paste, color and finish as well as the overall way of life. As such they argue that the obvious similarities between Great Oasis, Cambria, Mill Creek and Over phases suggest that these should all be considered as phases of the Initial Middle Missouri (Henning and Henning 1978).

There is evidence to suggest that Great Oasis grew out of Late Woodland antecedents (Anfinson 1979b). And, because Great Oasis simultaneously predates and is contemporary with the Initial Middle Missouri Variant (especially the Mill Creek Phase), it is often held out as a direct ancestor (Anfinson 1979b, 1997;

Winham and Lueck 1994). There is also some evidence of transitional Late Woodland to Great Oasis ceramics in the form Angelo Punctated from western Wisconsin. Late Woodland pottery with a distinct incised, pendant triangle motif is often seen as a diagnostic Great Oasis trait (Boszhardt 1994). Unfortunately, the evidence is too slim to permit anything but the suggestion of Great Oasis influence and the suggestion that these incised pendant triangles may be an important horizon marker (Boszhardt 1994).

Cambria, Great Oasis, Mill Creek, and the Over Focus/Phase are all regarded as related and as variants of the Initial Middle Missouri tradition (Anfinson 1979b). In Iowa, Great Oasis villages are usually found near Mill Creek villages (Henning 1991). The close proximity of these two obviously separate but related phases of the IMM has led Henning (1991) to suggest that they had an important symbiotic relationship. Henning (1991) believes that Great Oasis peoples initiated trade with Emergent Mississippian peoples to the south and east and that this relationship was then "expanded and enhanced" by Mill Creek peoples. Anculosa shell formed an important part of this trade relationship. The lack of evidence for Mississippian influences in Great Oasis sites combined with the obvious Mill-Creek-Mississippian influences, seen most clearly in the presence of seed jars, bottles, effigy handles, and the occasional use of red slip in Mill Creek ceramics, leads to the suggestion that the Mill Creek culture received a broader range of trade goods and hence cultural influence from Mississippian peoples than the Great Oasis culture. In fact, this Mississippian influence was sufficiently strong to lead some earlier researchers to argue that Mill Creek was a direct outgrowth of Emergent Mississippian cultures (Henning 1991).

10.3.2.7 Problems: There is no universal agreement on whether this phase, complex, or aspect is part of the Middle Missouri Tradition mainly because this material looks more Late Woodland than any of the other Initial Middle Missouri variant phases (Anfinson 1997). The fact that there is no evidence of fortifications is important because these are regarded as an important component of the definition of IMM variant. However, there does seem to be some general agreement that Great Oasis is probably ancestral to the IMM (Anfinson 1997). The fact that Great Oasis both pre-dates and is contemporary with the IMM seems to be the source of much of this confusion

10.3.3 Mill Creek Culture/Complex

10.3.3.1 Definition: Mill Creek is considered an Iowa manifestation of the Initial Middle Missouri Variant which contains two major phases: Big Sioux and Little Sioux (Lensink 1993). Recently, however, on the basis of work in the Perry Creek Valley, Henning (1996) has suggested a third phase: the Perry Creek Phase. This is a late phase distinguished by the unusual recovery of both Mill Creek and Great Oasis ceramics within a single cultural component at the Larson site.

In general, there has been a lack of consistency concerning the exact taxonomic position of Mill Creek, which has occupied a number of different positions in the Midwestern Taxonomic System (Anderson 1981). The term is frequently employed with no taxonomic identifier whatsoever, although the trend now seems to be to label it a "complex" (Anderson 1981).

Mill Creek sites are characterized by earth lodge villages, a reliance on corn horticulture combined with wild game such as deer, elk, and bison as well

as a variety of wild plant resources (Lensink 1993). Mill Creek artifact assemblages contain evidence of Middle Mississippian influence which can be seen in both the form and decoration of ceramic items (Lensink 1993; Henning 1996) and in the presence of actual trade items, which can sometimes be recovered in very large quantities. These trade items come in many forms and suggest a far-flung and active trade network (Henning 1996).

Many Mill Creek sites are characterized by midden deposits, some as thick as three meters. Initially these were mistaken for mounds by early archaeologists, but later excavations revealed that these were earth covered trash accumulations that probably collected around the exteriors of house structures (Fishel 1996).

During the 1940's, archaeologists working in this area noticed that Iowa Mill Creek components and the newly defined Over Focus materials from South Dakota were very similar. Mill Creek was then relabeled an "aspect" and subsumed within the Over Focus. By the 1950's, the South Dakota material had been removed once again and was placed within the Chamberlain aspect along with the Anderson and Monroe Foci (Anderson 1987). By the 1980's, Anderson states that, in general, the most closely related materials to Mill Creek tended to occur within the "poorly known" Over Focus, and he suggested that these all be made part of the Initial Middle Missouri Variant.

It is not clear at this time exactly what has been done with the Over Focus. The term seems to have fallen out of common usage although one still finds it in the literature (e.g.: Anfinson 1997; Lass 1981). In his discussion of the Perry Creek Valley sites, Henning (1996) lumps Mill Creek and Over sites into the same category with the term "Mill Creek-Over", which suggests that Over Focus sites

have been dumped into Mill Creek, at least by some authors.

10.3.32 Distribution: Mill Creek sites tend to occur within the Big Sioux and Little Sioux River drainages. The majority of sites occur in the northwestern corner of Iowa in the Mill Creek area (hence the name). Related materials are also recovered in southeastern South Dakota, where they were formerly known as the "Over Focus".

10.3.3.3 Type site: The Broken Kettle West site in Iowa was first excavated in the early part of the 20th century and was subsequently subjected to frequent archaeological excavations (Anderson 1987). The term "Mill Creek" was applied later because this was the area that possessed the greatest concentration of Broken Kettle West-type sites (Anderson 1987). Some other major sites include Chan-ya-ta, Brewster, Braunschweig, and Kimball Siding (Anderson 1987).

10.3.3.4 Associated ceramics: Mill Creek ceramics have been broken down into ware categories distinguished on the basis of variations in rim profiles (high, wedge, and S-shaped). These vessel profiles, as well as the variations in general vessel form and surface finish, are considered important diagnostic traits, (Anderson 1981; Henning 1996).

Mill Creek ceramic wares include Sanford, Chamberlain, Mill Creek and Foreman. Basic characteristics common to all include the fact that these vessels are mostly grit, grit and sand, or (occasionally) limestone tempered. Paste is comparatively coarse for this area, but sherds are both hard and difficult to break. Vessels are generally "sub-globular" and may be either decorated or

plain.

Decorative motifs generally include various arrangements of incised or trailed parallel lines that encircle the rim. Triangular motifs and diagonal lines may occur within this field or on their own. The lip-rim juncture may be decorated with a variety of tool impressions. Handles and lip nodes may also be present. Some sherds also display wide, trailed curvilinear motifs reminiscent of Middle Mississippian Ramey Incised pottery although these Mississippian-style Mill Creek vessels are locally manufactured, and not imported (Anderson 1981).

Unusual Mill Creek ceramic attributes include the application of red slip, the presence of effigy figures, and a number of unusual forms such as seed jars and bowls (Anderson 1981; Henning 1996). Many of these latter traits are considered a result of either direct or indirect Middle Mississippian influence. Characteristic Mississippian ceramics, such as Powell Plain and Ramey Incised jars, are also found on Mill Creek sites and are probably imports from Middle Mississippian sites to the south. Evidence for older, anachronistic Middle Mississippian pottery is thought to represent broken curated or heirloom pottery (Henning 1996). No Mississippian pottery or Mississippian derived forms are found on Great Oasis sites (Henning 1996).

10.3.3.5 Chronological placement: Mill Creek radiocarbon dates range between 810 AD and 1510 AD, but over ninety percent of these fall between 900-1400 AD (Fishel 1996). Recent chronological revisions narrow this range, suggesting that Mill Creek culture falls between 950-1275 AD (Fishel 1996). Henning (1996) argues that, while Mill Creek did undergo significant decline by 1300 AD, a few Mill Creek Villages may have persisted as late as 1350 AD.

10.3.3.6 Explanatory cultural dynamics: There are a number of models that have been developed to account for the origins and development of Mill Creek. Griffin's (1946: cited in Anderson 1987) original model suggested a migration across Minnesota of Mississippian peoples who initially inhabited the Cambria site before moving on into northwestern Iowa. By the 1950's, others had suggested that Mill Creek derived from the movement of Old Village Phase people out of Cahokia who later adopted a plains way of life. Over time, the movement has been away from migration models to an emphasis on in situ developmental sequences (Anderson 1981).

In 1967, Henning argued that neither the radiocarbon dates nor the inclusion of local ceramic forms within the earliest dated Mill Creek assemblages supported the Mississippian migration models. He also suggested that Mill Creek origins might instead be found in a hybridization of Great Oasis and early Middle Missouri with some cross-fertilization from Middle Mississippian culture (Anderson 1987). As a result, this Middle Mississippian emphasis was rejected, and some postulated (Anderson 1987) that Mill Creek origins could be found within indigenous Late Woodland populations who adopted Middle Mississippian traits through trade, diffusion and intermarriage. Anderson (1987) suggests that a concatenation of various climatological and cultural factors between 800-900 AD created a physical, biological, and cultural environment which encouraged the emergence of Mill Creek out of a local Late Woodland base. Subsequent cultural "budding off" resulted in migrations creating Mill Creek occupations outside the Big Sioux/Little Sioux drainage system (Anderson 1987).

Currently, the trend seems to be to place the origins for Mill Creek out of

a local base with a great deal of cultural and biological influence from Great Oasis, with the addition of Mississippian-derived cultural traits (Henning 1996; Lensink 1993). Henning (1996), one of the major proponents of this model, points out that evidence for this scenario has been somewhat scanty -- no Great Oasis component has ever been recovered at the base of a Mill Creek site. Nor is there evidence for a Great Oasis-type ceramic tradition at the bottom of a Mill Creek midden. In fact, these two traditions appear to be extremely conservative through both space and time -- sufficiently so that some authors have used this evidence to argue for matrilineal/matrilocal marriage and residence patterns within Mill Creek and Great Oasis groups (Anderson 1981; Henning 1996 {based on Deetz 1965}). The fact that both Great Oasis and Mill Creek ceramic assemblages show a high degree of overall conservatism coupled with subtle local and regional variations offers some support for this notion.

Late Woodland and Mill Creek groups apparently existed simultaneously in Iowa (Anderson 1987). The same holds true for Mill Creek and Great Oasis and for Mill Creek and Oneota. Henning (1996) suggests that the onset of drier conditions which occurred around 1200 AD may have driven bison herds further east, to the plains-prairie edge, luring Woodland peoples west onto the Prairie Peninsula. The movement of different groups into the same area, exploiting the same resource at the same time may have resulted in increased conflict between groups. The establishment of early Oneota villages in this area between about 1100 to 1300 AD suggests that they were in direct conflict with both Great Oasis and Mill Creek peoples at this time (Henning 1996). This inter-group conflict probably drove Mill Creek groups into the smaller, secondary drainages and initiated the end of Great Oasis peoples, possibly through their integration with

Mill Creek populations (Henning 1996).

There is support for this hypothesis in the archaeological evidence. First, there is virtually no evidence for any crossover of ceramic traits between Mill Creek and Oneota, suggesting that these two groups, while contemporary, were on less than friendly terms (Anderson 1981). Second, Mill Creek sites show that around 1200 AD the villages become larger and there is evidence for fortifications through the addition of palisades and ditches. Third, by 1400 AD, most of the Mill Creek villages in Iowa are abandoned, possibly as Mill Creek populations moved westwards, out of harms' way, and merged with the historically known groups of the Missouri River (Anderson 1981; Lensink 1993). Terminal Mill Creek sites show evidence of consolidation and abandonment indicative of cultural stress which may relate to both climatic and cultural factors such as the aridification accompanying the Pacific Climatic episode and the expansion of the Oneota, both of which began around 1200 or 1250 AD (Anderson 1987; Henning 1996). The final nail in the Mill Creek coffin was probably the collapse of the Middle Mississippian system.

> If Mississippian trade and contacts were in any way vital to the traditional Mill Creek way of life, the termination of Mississippian influence upon its 'nodal points' by no later than 1300 could have had some effect upon the Mill Creek occupations in northwest Iowa. Certainly the increase in bison populations ... the arrival of Oneota peoples ... the shift away from the Neo-Atlantic to Pacific I climatic regimes ... and the decline of Ramey State influence ... combined to affect the resident Mill Creek populations.
>
> (Henning 1996: 95)

It has often been noted that Mill Creek and Great Oasis sites tend to occur in close proximity to one another, which has led to speculation that the two must

have had a close relationship, possibly centering on trade with Middle Mississippian groups (Henning 1996); prior to this discovery, however, the general view was that the two had led a "contemporaneous but separate" existence (Henning 1996). The recovery of these two different ceramic categories within a single component site has forced a re-evaluation of this relationship. Although many of the potsherds remain identifiable as either Mill Creek or Great Oasis, a minority of the sherds shows a mingling of the two traditions. Henning (1996) has suggested that this evidence may signal the end of Great Oasis as a distinct cultural entity.

The consensus seems to be that there is an enormous amount of similarity between the Over Focus material from southeastern South Dakota and Mill Creek from Iowa. There is also general agreement that, collectively, this material shows a great deal of influence from Middle Mississippian groups. However, the exact nature of these relationships remains unclear.

The question of trade relationships with Middle Mississippian groups remains one of the central problems. There is abundant evidence that Mill Creek groups participated, probably directly, in the Middle Mississippian trade network (Henning 1996). However, Henning (1996) also argues that these people were not part of the socio-religious life of the Mississippians since neither Mill Creek nor Great Oasis villages were never "called upon" to construct flat topped temple mounds. There are, however, sufficient quantities of exotic trade goods to support the notion that Mill Creek villages functioned as outlying "nodal points" in a Middle Mississippian trade network (Gibbon 1974; Henning 1996).

10.3.3.7 Problems: Ceramic and, therefore, cultural relationships in

northwestern Iowa and southeastern South Dakota are complex. Even though there has been a great deal of systematic ceramic analysis, it has only succeeded in creating a profusion of ceramic and cultural historical categories. There are broad similarities that can be seen in the ceramics over a relatively large area, but these are obscured by subtle inter-assemblage variability in ceramic attributes. This has resulted in controversy over the correct placement of the various foci, phases, and complexes, the subtleties of which elude all but the most seasoned systematist. As a result, the origins, subsequent movements, and later demise of Mill Creek populations are not well established at this time.

10.3.4 Over Focus/Phase

10.3.4.1 Definition: The Over Focus or Phase is a subdivision of the Initial Middle Missouri Variant of the Plains Village Tradition. However, Lass (1981) reports that the term is not in common usage at the present time. Over Focus/Phase sites were originally regarded as a separate but related South Dakota manifestation of Iowa Mill Creek. These sites are viewed as constituting the earliest village cultures in South Dakota, transitional between Late Woodland and "mature" Middle Missouri village sites (Lass 1981).

Over Focus/Phase sites generally share a number of characteristics. They are generally located close to rivers, situated on promontories with three steep, defensible sides. A ditch, a palisade or both (Lass 1981) generally defend the fourth side. These villages consist of groups of semi-subterranean rectangular earthlodges. These were made of larger wooden posts interwoven with smaller sticks and mud, all roofed with sod and timber. The houses frequently had enclosed entryways with central fire pits and interior cache pits of various sizes

(Lass 1981). Subsistence was probably a mixture of horticulture -- corn, beans, squash and sunflower -- combined with extensive wild resource harvesting which included large and small game, fish, birds, shellfish, wild plants, and a variety of aquatic resources. Many sites contain evidence of scapula hoes and other gardening implements. There is limited evidence of bison ceremonialism (Lass 1981).

10.3.4.2 Distribution: Over Focus/Phase sites are generally found in the extreme southeastern corner of South Dakota along the James and Big Sioux rivers.

10.3.4.3 Type site: There are a number of sites that were included in the original Over Focus. These include: Twelve Mile Creek, Ethan, Brandon, Bloom, Mitchell and Swanson (Lass 1981).

10.3.4.4 Associated Ceramics: Typical ceramics are similar to those of Mill Creek sites (see discussion of Mill Creek pottery above). Vessels are globular, grit tempered and may be either smoothed or cord marked. Paste texture is relatively coarse. There is evidence that vessels were made using the paddles and anvil technique (Lass 1981). Handles, effigies, and pinched nodes may occur on the vessels. Decorations may be incised, trailed, or tool impressed. Rim forms include collared, high rimmed, and S-shaped varieties (Lass 1981).

10.3.4.5 Chronological placement: This manifestation of the initial Middle Missouri Variant probably ranges between about AD 1000 and 1250 AD.

10.3.4.6 Explanatory cultural dynamics: Lass (1981) suggests that the sites in southeastern South Dakota and northwestern Iowa present an east-west cultural gradient from Mill Creek through Over to full blown Middle Missouri. The Over Focus/Phase can be regarded as transitional between the eastern origins of Middle Missouri and the settled village horticulturalists of the Middle Missouri itself. In this regard, Great Oasis is viewed as something of a throwback, retaining its Late Woodland roots both culturally and technologically, while contemporary groups such as Mill Creek, moved on.

Lass (1981) specifically mentions the Randall component of the Scalp Creek site as one occupation which presents good evidence of a transitional Late Woodland to Middle Missouri cultural group. However, later research (Habermann 1993) has suggested that this component actually belongs in a separate phase -- the Randall Phase -- precisely because of its intermediate position and because it is not closely related to pre-existing cultural historical categories such as Mill Creek, Great Oasis, and the Lower James Phase

10.3.4.7 Problems: Beyond the original site reports, discussions of the Over Focus/Phase are hard to come by, especially synthetic treatments that place it in a larger cultural context. There seems to be some movement to subsume it within Mill Creek. For example, Dale Henning (1996) uses the term Mill Creek-Over, although I am not yet aware of any formal discussion in this regard. The position of the Over Focus/Phase appears to have presented a problem almost since it was first defined. It has moved back and forth vis-a-vis Mill Creek for the last fifty years and its position is by no means clear even now. Lass (1981) reports

that it is not a term which is any longer in common usage but then continues her discussion as though the Over is still, and should remain a separate cultural historical taxon.

10.4 THE ONEOTA

10.4.1 Definition: McKusick (1973) states that the word "Oneota" itself is an Iroquoian word and recounts and incident in which the Oneida were apparently asked the name for the upper Iowa River and they replied "Oneota" meaning "People who sprang from a rock".

Under the nomenclature of the Midwestern Taxonomic System, all Oneota materials were formerly lumped into the Oneota "Aspect". Later this became the Oneota Tradition (Dobbs 1982). "Tradition" is being used here in a sense roughly equivalent to that of the Middle Missouri Tradition. In this sense, the Oneota Tradition is a separate and distinct taxonomic entity, not to be lumped into the Plains Village Tradition as Michlovic and Schneider (1993) and Gregg (1994) have suggested. While it is true that this development is part of a widespread shift to settled village horticulturalism around 1000 AD, it is also arguable that this is either an independent or convergent development, possibly with common ancestry. However, it is not generally considered part of the Plains Village Tradition as it is understood in North and South Dakota.

Gallagher and Stevenson (1982) outline the economic pattern for the Oneota of the La Crosse area of Wisconsin. Here the general pattern is a "diffuse" economic adaptation that incorporated horticulture as one aspect of a broadly based subsistence system. Village sites tend to be located on well

drained terraces near good agricultural soil, but proximity to other resource zones, especially marshy areas, is also important. This general pattern is observed for Oneota settlements elsewhere in the upper Midwest such as those in eastern Wisconsin and in southeastern Minnesota (Gallagher and Stevenson 1982). It is interesting to note that at the State Road Coulee site, in the La Crosse area of Wisconsin, wild rice is integral part of the Oneota subsistence system (Anderson 1995).

In general, the Oneota augmented an intensive use of wild resources with maize horticulture and other cultigens, the precise expression of which seems to vary but may include the addition of beans (Anderson 1995). Other aspects of Oneota subsistence include intensive aquatic resource utilization, native seed cultivation, wild seed harvesting, and big game hunting (Benn 1983; Brown 1982). The development of maize horticulture never reached "full intensity" because "light duty" tools such as bison scapula hoes were of no use on tough prairie sods and intractable riverine clays (Brown 1982). The overall impression of Oneota subsistence is that no matter where the Oneota are found, they make complete use of local floral and faunal resources. The situation of Oneota of sites is selective in the extreme, and appears designed to permit them to exploit their environment to its fullest. It has been noted that Oneota sites tend to cluster into small areas, rather than being spread out widely across the landscape as was the case with earlier Late Woodland settlements in the same areas (Sasso 1993).

Most sites are relatively large village sites. These sites contain many pit features, both bowl and bell-shaped. The artifact assemblage, apart from the ceramics, does not serve to distinguish the Oneota clearly from other contemporaneous Upper Mississippian cultural manifestations (Harvey 1979).

Bison scapula hoes are part of the tool inventory, but the bone tool industry is neither as abundant nor as varied as that of adjacent plains cultures (Harvey 1979). European trade items are sometimes recovered at later Oneota sites.

10.4.2 Distribution: There are various regional expressions of Oneota distributed across an area which includes Wisconsin, Minnesota, South Dakota, Iowa, Missouri, Illinois, Nebraska, and Kansas -- roughly coincident with an area known as the "Prairie Peninsula" (Harvey 1979). The northernmost expression of Oneota culture is found in southern Minnesota, northwestern Iowa, and eastern South Dakota (Michlovic and Schneider 1993).

10.4.3 Type site: One cannot really talk of a type site as such given the scope and diversity of the Oneota.

10.4.4 Associated ceramics: The standard Oneota vessel is squat and globular to elliptical with shell temper (Harvey 1979). It has "flamboyant" decorations trailed into soft paste, mostly at the shoulder but sometimes on interior rims and lips as well. The decorative motifs are highly recognizable and almost always include trailed chevrons or variations thereof (Benn 1989; Harvey 1979). Motifs generally span either halves or quarters of the vessel circumference as symmetry and balance were both important design considerations (Benn 1989). Decorative lip treatments made of various types of tool impressions are also common and many vessels also have handles.

One of the most helpful clues in the interpretation of Oneota "culture" is Oneota symbolism, which is confined largely to the ceramics. Their iconographic

system appears to be closely tied to Mississippian symbolism. Predominant Oneota symbols include the chevron and many variations on the chevron theme. Based on more comprehensive studies of Mississippian symbolism, Benn (1989) believes that these chevrons and their many variations are stylized representations of peregrine falcons, especially their wings and tails. This principle is most clearly illustrated by the very well known Bryan site vessel from the Red Wing area of Minnesota, which shows a rare complete representation of a stylized bird, possibly a peregrine falcon. This complete representation shows the clear relationship between the isolated partial representations of the bird and its whole. This peregrine falcon theme is repeated at various levels of abstraction on ceramics from all Oneota sites (Benn 1989).

Recognizable portions of this bird motif are seen on sherds from many sites, not only within the expected range for the Oneota Tradition, but also at sites as far afield as the Red River Valley (Mooney and Lockport for example), at the Shea site along the Maple River in North Dakota, and at a variety of sites across the James and Sheyenne drainages. There is also one body sherd bearing evidence of such a motif from the Aschkibokahn site in central Manitoba as well.

Oneota designs then, are widely distributed; yet, they actually incorporate variations on less than six major themes (Benn 1989). This peregrine falcon abstraction is not only an important part of Mississippian iconography, but is also prevalent in the iconography of the "Southern Cult" (Benn 1989). It is important to note that Southern Cult motifs such as the "forked" or "weeping" eye are suggestive of a hawk man or anthropomorphized peregrine falcon and that this motif is prevalent in Devils Lake-Sourisford mortuary complex symbolism (Syms 1979).

10.4.5 Chronological placement: Oneota sites span the period from 1000 AD to at least the beginning of the 17th century AD. So far though, Oneota sites with European trade goods are rare. One possible exception to this is the Utz Site (Petersen 1979). However, sites that would allow archaeologists to directly link the Oneota with historically known cultural-linguistic groups such as the Winnebago have been difficult to come by.

10.4.6 Explanatory cultural dynamics: The Oneota Tradition is not a single monolithic taxon. Instead, it is composed of a series of later Pre-contact cultures, the remains of which are found throughout the Midwest, and are defined primarily on the basis of their associated ceramics since there is nothing terribly distinctive about the remainder of the assemblages (Gallagher and Stevenson 1982). The variations in the ceramics have led to the definition of the many regional phases of Oneota (Gallagher and Stevenson 1982) such as Brice Prairie, Pammel Creek, Lake Winnebago, Moingona, Grand River, Lake Koshkonong, and Chariton River, to name just a few.

The Oneota Tradition has been more intensively studied and is, by extension, better understood than many of the archaeological cultures of the same time period. The origins of this tradition appear to lie in Iowa, Minnesota and Wisconsin "largely north of and outside of the zone of penetration of complex Mississippian cultures" (Brown 1982:107). The Oneota, therefore, are not a simple offshoot of Mississippian culture. But, like so many other Pre-contact groups, their ancestry, origins and general cultural processes are not well understood (Benn 1989; Brown 1982). The shift from Late Woodland to Oneota is abrupt and involved dramatic changes in both settlement and subsistence

patterns. This naturally leads to the suggestion that there was an accompanying shift in the ethnic composition of the groups inhabiting these sites as well (Dobbs and Shane 1982). Other archaeologically visible changes include evidence for the development of increased social complexity and for a wide trading sphere. This group, or groups, however, lacked the same degree of social complexity that is so strikingly visible in Middle Mississippian culture (Benn 1989).

Benn (1989) believes that maize cannot be seen as the cause for the emergence of the Oneota way of life since all of the evidence for intensive maize horticulture so far post-dates 1200 AD. Some time afterwards, we see evidence for the emergence of the Oneota as an archaeologically distinct culture.

Interestingly, the decline of Cahokia as a major regional power center begins during the 14th century AD. This process is comparatively rapid and it is during this same time period that Oneota influence increases (Porter 1984). In the American Bottom, where Middle Mississippian cultural influence was so pervasive, the Oneota tradition is regarded as a northern-based culture which moved south at about this time, apparently with little conflict with or resistance from established local groups (Porter 1984). There is, though, no explanation or insight into the precise nature of the relationship between the Oneota and Mississippian groups (Brown 1982). Oneota sites in the American Bottom also demonstrate a significant degree of contact with the northern Midwest (of the United States) and with the plains as well (Kelly et al. 1984b). This all occurs as part of a period of dramatic cultural change from ca. 1300-1400 AD which is very poorly understood (Kelly et al. 1984b). This period is also poorly understood in many other areas of the continent and seems to correspond with cultural changes in the boreal forest, on the plains and in the woodlands.

Benn (1989) sees the meaning embedded within Oneota ceramic decorative motif as fundamentally aggressive. This is not purely speculation on his part but based on a comprehensive knowledge of Mississippian iconography. Benn (1989) regards this uniformity in the symbols and motifs as part of a system that was designed to intimidate competitors and sublimate ethnic identity in those competitors. The "hawk man" was one means of expressing power and of reifying leadership roles by associating leaders with the "cosmic archetype of predatory bird men" (Benn 1989). The purpose of such symbols was to assist in exacting resources or tribute from member groups and to turn this into "social surplus" (Benn 1989). Benn (1989) points out that the transition from Late Woodland into Oneota was, in fact, exceedingly rapid, spanning less than one or two generations. This process presumably subsumed many Late Woodland groups within the Oneota system, such that by ca. 1200 AD, Late Woodland culture was virtually wiped out in many areas. The Oneota then, are viewed as a multi-ethnic, expansionist group, and Benn (1989) believes that this may explain some of the obvious incongruities visible at Late Woodland sites. These "incongruities" may be viewed as submissive groups adopting the "trappings" of a more powerful and aggressive group as part of the process of participating in a far-flung exchange network designed primarily for the benefit of the Oneota. This is consistent with the Minnesota evidence which suggests that the there are numerous regional phases of the Oneota that point to the simultaneous transition of late Woodland groups into Oneota (Anfinson 1979a). Benn (1989) sees the Oneota as neither Late Woodland nor Mississippian, but does not address where their origins may then lie. He does suggest, though, that the Oneota probably arise out of a complex and varied set of circumstances that

include such things as population density, environmental setting, economic base, and historical necessity.

By 1400 AD, Oneota village culture is well established in many areas and is generally associated with Siouan groups who were maize growers, bison hunters, and gatherers of wild foods. Those practicing this type of subsistence pattern can be characterized as hunter-farmers (Michlovic and Schneider 1993). Citing McKusick (1973), Michlovic and Schneider (1993) state that some Oneota were living in rectilinear lodges or elliptical houses with subterranean storage pit features. The bell-shaped storage/trash pits show up in western Oneota manifestations where they are more similar to the well known storage/trash pits from Plains Village sites than the usual bowl shaped Oneota pits (Michlovic and Schneider 1993). Bison scapula hoes are also more common at western Oneota sites (Michlovic and Schneider 1993). These east-west cultural gradients, which are visible in the archaeological evidence of the prairie region of northwestern Minnesota and eastern North Dakota, usually occur in an area where bison hunters were in contact with more "organizationally sophisticated" peoples to the southeast and to the west (Michlovic and Schneider 1993).

104.7 Problems: One of the first major problems is one that plagues all archaeological cultures -- one of definition. Were the Oneota an ethnographic reality, or is this label merely archaeologically convenient (Gibbon 1982)? The Oneota are commonly regarded as a biological, ethnic, and linguistic group that emerged in historic period as Chiwere speaking Siouans. The main problem, however, is that Oneota is primarily defined as a ceramic culture and therefore non-Siouan groups could have adopted or developed an Oneota material culture

(Gibbon 1982). Gibbon believes that there is still no satisfactory historical link between ethno-historically known Chiwere Siouans and the Oneota however, this is not universally held. While there can sometimes be simple correlations between material culture and linguistic, ethnic, sociopolitical, and biological groups, this is not always the case (Gibbon 1982). Gibbon (1982) asks whether the archaeologically visible Oneota pattern is more likely the result of differential adoption of diffusing ideas or of the actual movement of people. Given the complexity of this group and the evidence for numerous regional manifestations one may well ask why it has to be one or the other? Why not both? It is possible that Siouan groups, ethnically Oneota if you will, provided the seeds of this visible archaeological culture. Local groups succumbing to the expansionist tendencies of a more aggressive group might explain the numerous regional transformations of groups to something archaeologically identifiable as Oneota. Such a transformation could be cultural, ethnic, linguistic, or some combination of all three. In some areas, perhaps more peripheral to the core of Oneota distribution, what we interpret as archaeologically "Oneota" may be merely the visible stylistic manifestations we see in the ceramics.

Another major problem that plagues those who study these groups is the question of Oneota origins. Gallagher and Stevenson (1982) state that the question of Oneota origins remains unresolved and can probably only be understood with careful examination of economic strategies used to adapt to the different physical environments of the Midwest. There are two major competing schools of thought regarding Oneota origins: migration and in situ development (Gibbon 1982). The earliest and most successful model, put forward by Griffin (1946), postulated that the Oneota were a product of the northward movement

of Middle Mississippian peoples from Cahokia to the upper Midwest during the Old Village Phase. This initial intrusion could be seen at places such as Aztalan (Gibbon 1982). Oneota culture, as we know it, developed from this base as an adaptation to the colder northern climate and/or climatic deterioration ca. 1300 AD (Gibbon 1982).

McKusick's (1973) data from the upper Iowa River seems to suggest that Oneota groups replaced indigenous Late Woodland groups very quickly without any accompanying evidence for a pre-Oneota Mississippian population. He (McKusick 1973) suggests that the "transition" to Oneota may have been both rapid and spatially limited. Once it occurred, it was very successful and therefore spread rapidly. McKusick seems to support the idea that the Oneota separated from Middle Mississippian forebears and he suggests that the originating cultural group lies to the east or south of Iowa. The upper Iowa River valley has some of the most abundant Oneota remains "Yet, Oneota is intrusive here, appearing early and without antecedents." (McKusick 1973: 3)

So far, however, the radiocarbon dates do not support this model. Old Village cultural florescence takes place around 1150 AD which is far too recent to account for the early Oneota sites which have dates ranging from 950 AD to 1060 AD (Gibbon 1982). Such sites include Carcajou, Lasley's Point and Valley View in Wisconsin, Bartron in Minnesota, and the Grant Village in Iowa (Gibbon 1982).

In situ development models, the alternative approach to Oneota origins, suggest that the Oneota arose out of resident Late Woodland populations who modified their lifestyle as a response to contact with Middle Mississippian groups (Gibbon 1982). However, some have suggested an unspecified common ancestor for both, although no candidates have been located so far, because Middle

Mississippian and Oneota seem to develop more or less simultaneously (Gibbon 1982)

Gibbon (1982, citing Gibbon 1972) suggests that a portion of the Early Late Woodland Effigy Mound culture in Wisconsin may have been ancestral to the Wisconsin branch of the Oneota. The transition from Late Woodland to Upper Mississippian Oneota way of life came as a result of the adoption of horticulture and some Middle Mississippian cultural traits (Gibbon 1982).

There are two important but separate processes which occur simultaneously: the transformation to a new settlement/subsistence pattern which was widely occurring throughout the northeastern portion of the continent and the adoption/invention of a distinct complex of widely "diffusing Mississippian traits" (Gibbon 1982). So far, there is no widespread agreement concerning which Late Woodland group might constitute the "donor population" for this process (Gibbon 1982).

Gibbon (1982) favours the in situ developmental models since Oneota assemblages are generally quite diverse and since the C14 dates do not show a "wave of advance" pattern in the spread of Oneota cultural patterns (Gibbon 1982). However, one obstacle to this model lies in the fact that there are no obvious developmental Oneota assemblages and in the fact that similar transformations were occurring all over the continent at about the same time. Therefore, the persistent problem is the lack of transitional links between the Late Woodland and Oneota Traditions (Gibbon 1982)

There is evidence for early Middle Mississippian interaction with Late Woodland peoples visible in the Lohman and Stirling phases in the extreme southeastern Wisconsin (Hendrickson 1996). Here, Late Woodland ceramics are

primarily Madison Cord Impressed and Madison Fabric Impressed. These are identified with Effigy Mound tradition as part of the Horicon Phase dating 650-1200 AD, which is thought to appear early in the Late Woodland (Hendrickson 1996). Another Late Woodland ceramic type that shows evidence of interaction with Middle Mississippians is Aztalan Collared, defined from vessels recovered at the Aztalan site (Hendrickson 1996).

10.5 Blue Earth/Correctionville

10.5.1 Definition: Blue Earth is a phase subdivision of the Oneota Tradition in Minnesota (Peterson 1979) and part of Henning's Northwestern Iowa "group continuity" (Anfinson 1997). For some authors, Blue Earth and Correctionville are synonymous terms; however, Anfinson (1997) points out that there is no universal agreement on the relationship between the two since there are subtle stylistic differences in the ceramics and some evidence for differences in settlement and subsistence patterns as well. There has been some suggestion that Blue Earth be divided into four sub-phases: Correctionville, Red Wing, Center Creek, and Ft. Ridgely, the four of which are distinguished mainly on the basis of stylistic differences in the ceramics.

Blue Earth archaeological sites represent semi-sedentary villages on river floodplains and minor campsites in lacustrine environments. There have been attempts to subdivide Blue Earth settlement patterns based on intensive research with surface collections (Anfinson 1997). However, the largest and most obvious of the villages are located on the floodplains of small tributaries and there are also many Blue Earth components at other sites (Peterson 1979). Along the Blue

Earth River, sites are almost always located on the floodplain at the confluence of smaller creeks, especially at Willow and Center Creeks where there are major site concentrations (Anfinson 1997). Here, the sites are found on elevated patches of outwash (Anfinson 1997). Smaller, special purpose sites can be found in outlying areas within the same region.

The subsistence base was broad and probably included maize, beans and sunflowers, as well as a variety of wild foods such as deer, elk and smaller game. Intensive exploitation of aquatic resources such as fish and shellfish was also important. (Petersen 1979; Anfinson 1997; Anfinson and Wright 1990).

10.5.2 Distribution: The distribution of Blue Earth Oneota sites is confined primarily to southern Minnesota, northwestern Iowa, southeastern Nebraska, north central Missouri, and southwest Wisconsin (Peterson 1979). Major site concentrations occur along the Big Sioux River of Northwestern Iowa and along the Blue Earth River in south central Minnesota (Anfinson 1997). Anfinson (1997) states that Blue Earth components are not common east of the Blue Earth River valley.

10.5.3 Type site: The Humphrey site in Minnesota and the Correctionville site in Iowa are regarded as the type sites for the Blue Earth Phase (Petersen 1979).

10.5.4 Associated ceramics: As mentioned above, Blue Earth ceramics are similar to Correctionville Trailed as defined by Harvey (1979) and Anfinson (1997). Blue Earth pots are primarily globular with constricted necks and possess

vertical to outflaring rims, although rim height can be quite variable (Anfinson 1997). Vessel shoulders tend to be broad and curved. Most vessels are shell tempered, but some vessels also have grit temper (Peterson 1979). There is, however, some dispute over whether or not these anomalous, grit tempered pots really represent Blue Earth vessels or whether they might be Late Woodland sherds instead (Anfinson 1997). Vessel surfaces are generally smooth, although there is the occasional sherd which shows smoothed over cord marking (Anfinson 1997). Jars may have loop or strap handles, or none at all.

Decoration usually consists of rectilinear trailed line decoration applied to a wet paste at the shoulder. Motifs include curvilinear, chevron, angular or vertical lines, embellished with small tool impressions, as well as shorter trailed lines or punctates, crosses, concentric circles, or spirals (Anfinson 1997: Peterson 1979). It is common to see alternating patterns of chevrons bordered by bands of vertical lines (Anfinson 1997). Lips may be notched or tool impressed and strap handles may be decorated when they are present (Peterson 1979). Motifs are generally arranged to span either halves or quarters of the vessels. Balance and symmetry were likely important considerations in the Oneota aesthetic (Benn 1989). Vessel lips are simple and thinned, whereas rims are thick relative to the rest of the vessel.

There is some suggestion of temporal trends within the ceramics. During the terminal stages of Blue Earth, the ceramics become cruder and less well made and there are other stylistic trends within the assemblages that have led some to suggest a developmental sequence for Blue Earth (Anfinson 1997). However, this temporal sequence has not yet been widely adopted. Thus, while the ceramics are well studied, the cultural ramifications of these data are less certain.

10.5.5 Chronological placement: The chronological position of Blue Earth extends from 1000 AD to at least 1500 AD in most places (Anfinson and Wright 1990) and may last as late as 1650 AD (Anfinson 1997). Although it has been argued that Blue Earth may extend into the Post-contact period in some areas (Anfinson and Wright 1990), to date there have been no Blue Earth sites excavated which contain European trade items (Anfinson 1997).

10.5.6 Explanatory cultural dynamics: Around 1000 AD, there are major changes in settlement and subsistence patterns throughout this area (Dobbs & Shane 1982). Archaic and Woodland sites are generally scattered, thin, small and located along river bluffs, in bottomlands, and along the shores of prairie lakes, whereas Oneota sites become tightly grouped in two major clusters, both of which are located at creek confluences with the Blue Earth River on the Elm, Center and South Creeks areas (Dobbs & Shane 1982). There are no sites located along lakes after this time despite intensive archaeological survey in these areas (Dobbs & Shane 1982). The subsistence pattern also changes from a transhumant, hunting and gathering way of life with low population densities, to a system of much larger, semi-permanent horticultural villages with a reliance on maize (Dobbs & Shane 1982). Together, this all suggests that the ethnic composition of the groups inhabiting this area probably changed at this time as well (Dobbs & Shane 1982).

Oneota settlement patterns are well studied and it is now known that they used a very specific set of criteria to select suitable habitation sites. In general, Oneota villages were located where a number of resource zones converged

including river valley, closed deciduous forest, marsh or wetland, semi-open oak savanna and prairie. For Blue Earth sites in the Willow and Center Creek areas, habitations are also adjacent to good alluvial bottomlands where the river valley becomes significantly wider. These are also localities that are sheltered, protected from fires, severe storms, and flooding (Dobbs & Shane 1982). Soil type appears to be of only secondary importance after primary access to the varied resource mosaic, a sheltered site location and close proximity to good farmland. Dobbs and Shane (1982) also argue that socio-cultural factors, such as proximity to neighboring villages, may have been a consideration in Oneota site selection process.

10.5.7 Problems: There seems to be very little mention of the extended use during the Oneota period of the indigenous Late Woodland horticultural complex. This existing complex is apparently completely replaced by the Oneota system (Anderson 1995). This suggests that the Oneota did not develop from a local Late Woodland cultural base since it begs the question why would a local group suddenly cease the use of developed horticultural way of life in favour of what appears to be an entirely different subsistence strategy? There is some variability in the horticultural complexes though, which also suggests that there were various locally adapted branches of the Oneota. (Anderson 1995)

So far, there have been no sites located that link the earlier Woodland tradition with the Oneota. There is also very little to link the Oneota with historically known groups, although the Ioway, Oto and Omaha are known to have inhabited southern Minnesota in the 17th century (Dobbs & Shane 1982).

10.6 OGECHIE

10.6.1 Definition: The Ogechie series is related to Oneota and Upper Mississippian groups and appears to be associated with a Mississippian-Woodland blend culture (Ready 1979b). This ceramic series represents the furthest known northern extent of the Oneota Tradition. Ogechie also appears to be closely associated with Sandy Lake ceramics and may extend into the southern Red River Valley (Ready 1979b).

10.6.2 Distribution: This ware is distributed primarily in central Minnesota (Ready 1979b) although Ogechie ceramics may extend as far north as the southern Red River valley of west central Minnesota (Ready 1979b). This represents the furthest known northern extent of the Oneota Tradition.

10.6.3 Type site: The type site for the Ogechie Phase is Petaga Point (Ready 1979b).

10.6.4 Associated ceramics: There are two main ceramic types: Alamakee Trailed, which is a widespread Oneota ware, and Ogechie Plain, which lacks any decoration except lip notching. Vessels are generally globular and possess constricted necks, straight rims, flat lips, and round shoulders and bottoms. Some vessels may have loop handles applied in pairs; lip notching is also common. Decorative techniques include the application of broad trailed lines on the shoulder. These may be arranged vertically, obliquely, or as chevrons, often in association with linear punctates (Ready 1979b). Some vessels are completely plain except for the aforementioned lip notching.

10.6.5 Chronological placement: Ogechie sites date to the period between 1400 and 1750 AD (Ready 1979b).

10.6.6. Explanatory cultural dynamics: The closest ceramic relationships are to Orr phase materials in southeastern Minnesota and northwestern Iowa; Ready (1979b) also states that there are close associations between Ogechie and the more Woodland of the Sandy Lake ceramics. Ogechie is often regarded as a northern variant of Oneota (Michlovic and Schneider 1993; Ready 1979b).

10.6.7 Problems: Ogechie Plain ware seems to be another one of those east-west hybrid assemblages which consists of a better known regional ceramic type, possibly Alamakee trailed, with Sandy Lake ware in the ceramic collection as well.

10.7 Conclusions: Overview of Oneota, Cambria, Great Oasis and Mill Creek-Over

Great Oasis is the earliest Mississippian intrusion into the area, closely followed by Cambria and Blue Earth. Great Oasis is generally seen as having affinities to both Late Woodland and generalized Plains Village cultures (Anfinson 1982). However, there is a certain degree of confusion surrounding the place of such archaeological cultures in the development of post-Late Woodland chronology. For example, Anfinson (1982: 69) refers to Great Oasis and Cambria as the earliest Mississippian aspects in the Prairie Lakes region yet, not ten pages later, he also refers to them as the two earliest Plains Village

phases in the same region. There does seem to be a certain level of ambiguity regarding the place of these early Mississippian-related or Plains Village phases and unfortunately, the exact position of these cultural units is by no means clear in the literature.

Great Oasis and Cambria sites tend to cluster around 1000-1200 AD but are limited to the extreme western edge of Minnesota by 1300 AD. Middle Mississippian-related complexes cluster in the one hundred years between 1200 AD and 1300 AD and are gone from the region by 1300 AD. The Oneota, on the other hand appear to flourish throughout this period and beyond, virtually to the contact period in some areas (Anfinson and Wright 1990).

The Oneota are regarded as peripheral to both this area and to the Northeastern Plains, although there is some evidence that goods were funneled through Cahokia to sites along the Minnesota River such as the Cambria Site (Shay 1990). This addresses, to a certain extent, the visible eastern influences on the James, Sheyenne, and Red rivers (Shay 1990). Cahokia is seen to be at its peak ca. 1100 AD. There is evidence for the presence of the Oneota that is of equal antiquity in Iowa, Minnesota, and Wisconsin. It is possible that this region is the centre of Oneota growth and development, a process that cannot then be regarded as merely an outgrowth of similar developments in the Mississippi River basin (Brown 1982). One of the major problems with regard to these developments, and one that is of central importance to this thesis, is the fate of the generalized Late Woodland peoples in the face of this horticultural expansion. Were these hunter-gatherers destroyed, displaced, absorbed, transformed, or did they co-exist with these horticulturalists and agriculturalists (Anfinson 1982)?

Oneota influence quickly expands through the period around 1200 AD. At this time, non-Oneota village complexes begin to add fortifications to main villages while the outlying villages are abandoned (Anfinson and Wright 1990). At the Sheffield site, dated ca. 1300 AD, the Oneota component there is both preceded and succeeded by a Late Woodland, non-horticultural Kathio/Blackduck component (Gibbon 1973). This suggests at least a certain degree of reluctant displacement of non-horticultural Late Woodland groups by expansionist maize growers such as the Oneota. The position of the Plains Villagers in all of this is unclear. Their suggested eastern origins point towards some population movement, a possible relationship to the Oneota, to Mississippian developments, and perhaps some displacement and absorption of indigenous non-horticulturalists.

Cambria and Mill Creek were once assumed to be ancestral to the Middle Missouri tradition but are now more widely regarded as an outgrowth of the Great Oasis phase that ultimately derives from a Late Woodland base (Gibbon 1993). Gibbon (1993) argues that this was part of a more widespread "structural transformation" on the Plains and in the northeastern Woodlands which occurred between 900 AD and 1000 AD. This transformation included major changes in settlement patterns, subsistence, and in material culture. In this area these changes are seen as the movement to semi-permanent fortified villages, the cultivation of maize, and the appearance of new ceramic wares and changes in existing ceramic technology (Gibbon 1993).

It is not known what got this process rolling; it seems to have been social and interregional in nature rather than the result of local response to environmental change. Both the Great Oasis and Cambria phases are expressions

of this emergence and should be studied within this enlarged sociopolitical context (Gibbon 1993: 182). Great Oasis has been viewed alternately as either terminal Late Woodland or as incipient Plains Village (Gregg 1994). It is present in southwestern Minnesota and northern Iowa, and in eastern South Dakota from around 1000 AD (Gregg 1994). It manifests a variety of adaptations that range from hunting and gathering in the prairie-lakes region to possible horticulture in northeastern Iowa and southeastern South Dakota (Gregg 1994). Where this complex is horticultural, it resembles Initial Middle Missouri groups (Gregg 1994).

The disappearance of Cambria and Great Oasis in Minnesota by 1200-1300 AD is a difficult problem since this appears to be part of further reorganization of the entire upper Midwest and of the large trade networks which were evident at this time. The appearance of the Oneota seems to be an important part of this phenomenon. In fact, Gibbon says that the Oneota "swept" across southern Minnesota and northern Iowa and that this process may have pushed Plains Villagers in a westwards direction (Gibbon 1993).

Again, this process seems to be part of a more extensive regional cultural reorganization and not just a local phenomenon. Gibbon states that the Middle Missouri tradition presence in Minnesota may have ended when IMM Variant ends around 1200 or 1300 AD and entertains the possibility that large numbers of these people may have moved from what is now Minnesota to the Missouri trench at about this time. Both the emergence and disappearance of Middle Missouri tradition cultures seems to be a part of a larger phenomenon which involved significant, widespread cultural changes that affected everything from subsistence and material culture to politics and ideology. It "... is arguably the

most radical culture change in tempo and magnitude to have occurred in the upper Midwest..." (Gibbon 1993:183).

10.8 THE LATER PRE-CONTACT PERIOD ON THE NORTHEASTERN PLAINS: SYNOPSIS AND SPECULATION

For the Northeastern Plains as a whole there is, as mentioned above, an apparent north-south running corridor, which extends from the lower/northern Red River Valley of Manitoba, along the border between Minnesota and North Dakota and into southeastern South Dakota. This corridor contains distinctive archaeological components and sites dating between approximately 1100 and 1500 AD that share a number of things in common. First, when compared to contemporaneous assemblages from the same area, the ceramics present a perplexing blend of eastern Late Woodland and western Plains Village attributes. The precise nature of the traits appearing on these sherds depends on how far north or south one is within the corridor. To the south, we see a merging of Woodland, Great Oasis and Initial Middle Missouri elements (some would place Great Oasis in the IMM Variant). Further to the north, ceramics from the Big Stone phase display a commingling of Late Woodland Lake Benton and Plains Village traits. While in the Red River Valley and adjacent drainages, the ceramics frequently show an admixture of Late Woodland Sandy Lake, Oneota, and Plains Village traits.

These sites tend to be larger than Late Woodland encampments in the same area. On the other hand, these villages are smaller and less intensively occupied than classic Plains village sites and they rarely show evidence of the

major earth lodge architecture that is so characteristic of full-blown Plains Village occupations. Fortifications are rare but present at some sites. Corn and scapula hoes are in evidence, but are not particularly abundant. Evidence of other cultigens common to Plains Village Tradition sites is rare to non-existent. Wild plant and animal foods such as bison, fish, and wild rice, remain an important part the overall subsistence pattern. Finally, many of these sites also show some influence, albeit indirect, from agricultural groups to the east such as the Oneota.

Basing his definition on the work of Michlovic and Schneider (1993), Gregg (1994) used these traits to define the Northeastern Plains Village Complex (see above). I have already stated my reservations about the use of the term "Plains Village"; moreover, I don't think the distribution of this complex extends far enough south or west to warrant the use of this term. There are substantial differences in the ceramics as one ranges from north to south along this corridor and these differences have been used to reject the notion of any relationship between these areas. However, I also believe these hybrid assemblages to be part of a cultural dynamic resulting from the behaviour of Siouan groups along the Prairie-Woodland edge. During the latter portion of the Pre-contact period, the pottery found in sites along this corridor is strikingly different from the globular, grit tempered, corded wares that we generally associate with Algonkian groups in the woodlands and boreal forests at this time. If Sandy Lake pottery can be related to the historically known Dakota, as Michlovic has suggested (Michlovic 1984, Michlovic and Schneider 1988, 1993) and, if the Oneota represent a branch of the Siouan linguistic family, then it is possible that these apparently "hybrid" pottery types represent the work of Siouan groups with links to both the east and west. These groups are not Oneota but perhaps

have political, economic, and cultural ties to them. I would suggest that these groups were not on altogether friendly terms with the Oneota. This may explain why they show up in what was probably marginal maize growing territory just as the Oneota are becoming a dominant force to the south and east. Michlovic and Schneider (1988) suggest that these villages represent an independent development of the village way of life. This suggests to me that they need to be regarded as both separate and distinct from the Plains Village pattern and to subsume them under this moniker does them an injustice.

Based on a combination of historical evidence and Mandan/Hidatsa traditional knowledge, many authors have suggested that the origins of at least part of the Middle Missouri Plains Village Tradition lie to the east (Winham and Lueck 1994). It may be possible that some of these hybrid assemblages along the Prairie/Woodland transitional zone represent a general westward movement of some of these peoples out of the woodlands and onto the plains. As with many long distance migrations, not everyone wants to keep moving. Some are happy to stay at home, some quit part way, and others want to keep going. The strange ceramic assemblages which defy tidy explanation everywhere in this zone may be just that. As some groups moved out of the Woodlands, they retained aspects of their economy and ceramic style -- both of which would doubtlessly alter as they moved westward and made contact with different groups of Plains-oriented people. In more southerly, maize friendly areas, horticulture was adopted. Further north, where maize horticulture was a more marginal pursuit, gardening came and went as resource availability varied, and as climatic constraints dictated. In the most northerly extremes, where intensive maize farming was not feasible, wild rice became the preferred food and may have

reached the stage of incipient cultigen.

Bison seems to have remained important throughout this zone ultimately perhaps providing one of the attractions of the move. For those groups that continued on the path westwards, some may have settled on the Missouri River, finally moving to a fully developed Plains Village Tradition way of life. There is no reason to suppose that these groups ceased all contact with one another. The regular forms of cultural interaction that accompany widely dispersed cultural groups -- trade, raiding, warfare, intermarriage, ritual gift giving etc. may have helped create ceramic assemblages that are not a comfortable typological fit in any single taxon. It is logical to expect that less sedentary groups were the ones to develop more variable pottery.

This entire period of time between about 900 and 1300 AD appears to be one in which there were large and wide ranging movements of Siouan speakers out of the east, perhaps in response to growing inter-group hostility as shown by the development of fortified villages quite early on. Later, some of these may have developed into the many regional variants of Oneota, Great Oasis, Initial Middle Missouri, Sandy Lake, Big Stone, and Randall phase. Those who continued moving westward perhaps became the historically known Mandan and Hidatsa. There are some compelling arguments for lumping all these assemblages, from southern South Dakota to southern Manitoba into a single composite. Red River, Psinomani, Stutsman, Big Stone, Randall, and others as yet unidentified might all be considered complexes of this composite. The fact that they all appear to be east-west hybrids, that they all exist along the corridor that essentially defines the boundary between the Plains and the Woodlands, that they all exhibit a roughly similar subsistence-settlement strategy (with some

internal variation), and the fact that none of them fit neatly with any other identified cultural complexes immediately to the east or west suggests that they are more closely related to each other than they are to contemporary and better understood cultural entities in immediately adjacent areas. The visible north-south differences in this hypothetical composite could be accommodated by the creation of different complexes within the composite.

The Northeastern Plains Village Complex has already been defined; however, I would like to propose elevating it to a differently named composite due to the taxonomic consistency of the "Complex"- "Composite"- "Configuration" system. Furthermore, there are good reasons for creating a larger Configuration which encompasses the Oneota (but which does not subsume them under the rubric "Plains Village"). Such a designation should include both the regional variants and attenuated versions of Oneota further to the north and west, such as Ogechie and perhaps Red River/Northeastern Plains Village Ware. There is also considerable overlap between this potential cultural-historical entity and that of the Initial Middle Missouri Variant which should perhaps be examined as a common ancestor of both.

The later Pre-contact period on the Northeastern Plains and adjacent areas is dynamic and complex. In many areas the Late Woodland settlement-subsistence system comes to an end and this ushers in a semi-sedentary, horticultural way of life. All of which is accompanied by the development of larger, fortified villages probably as a result of is increased inter-group conflict. Some areas, like the Red River corridor, seem to fluctuate back and forth between a nomadic hunter-gatherer and semi-sedentary horticultural way of life. The Middle Missouri and Oneota/Upper Mississippian areas emerge as separate

and distinct, while the area in between the two shows influences from both areas. The northern portions of the Northeastern Plains, in southern Manitoba, northern Minnesota and North Dakota, and southern Saskatchewan, possess sites that contain evidence, largely in the form of ceramics, for major movements of people presumably from areas to the south. It is probably not a coincidence that in other areas of North America this same period of time is also one in which there is a great deal of cultural upheaval. Where exactly the Oneota fit within this equation is still something of a mystery. They might be a motivator -- the group which provided some of the impetus for large scale movement out of the woodlands -- or they may be part of the process, being pushed themselves by Middle Mississippians perhaps, who were extending their empire as far north as Aztalan in Wisconsin at about this time as well.

It is interesting that this period of time, one that is so culturally complex, also corresponds with the climatic intervals known as the Medieval Warm Period and the beginning of the Little Ice Age. The influence of these climatic changes on the inhabitants of the Northeastern Plains has been debated (Anfinson and Wright 1990, Bamforth 1990) but without any firm resolution. Gregg (1994) maintains that the MWP was hard on the Plains and portions of the Northeastern Plains and there is certainly evidence from other areas of North America, such as the Southwest (Jones et al 1999), that suggests this period was a difficult one both culturally and economically. Yet, the relationship between cultural change and the MWP on the Northeastern Plains has not yet been explored.

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SECTION 4

Discussion and Conclusions:

11. Culture Change on the Northeastern Plains
12. Synthesis: Macro-regional Push/Pull Factors Environmental Change and Migration

CHAPTER 11
ENVIRONMENT, CULTURE CHANGE, AND POPULATION DYNAMICS IN THE MIDDLE MISSOURI AND UPPER MISSISSIPPI SUB-AREAS AND THE NORTHEASTERN PLAINS CA. 1000-1400 AD

11.1 CULTURAL CHANGE CA. AD 1000

All over the central continent, the Late Woodland Period is ushered in by a general shift in social organization accompanied by an intensification of existing subsistence and settlement patterns that seems designed, at least in part, to support larger numbers of people. Evidence for this intensification includes the widespread adoption of the bow and arrow, increased use of large food storage facilities, increased sedentism, and the refinement of ceramics in order to enhance their efficacy as cooking vessels (Benn 1983; Braun 1983; Shay 1990). However, by the end of the Late Woodland, many areas appear to have reached the end of their ability to absorb and support these increases in population. Apparently this system has reached its functional limit as an effective settlement and subsistence strategy (Benn 1983) over much of the central continent and adjacent areas to the north. This apparent demographic saturation sets the stage for a sweeping series of changes in subsistence and settlement patterns, many of which are linked to the development and spread of maize.

11.2 THE LATE WOODLAND

The Late Woodland Period in the central portion of the continent saw a number of important changes in both demographic and subsistence patterns. These include trends toward increasing sedentism, a broadening of the

subsistence economies, and an increase in the importance of items of status and personal adornment (Steponaitis 1986). Smaller villages begin to amalgamate into larger ones and there is evidence for the development of expanded social networks (Ford 1974). All of this suggests some degree of demographic pressure accompanied by shifting social and political relations. In many areas, the Late Woodland Period sees the culmination in the efficiency of the forest-based hunter-gatherer subsistence pattern (Ford 1974) as well as changes in technological adaptations, demographics and subsitence-settlemment systems. On the shield, and in the Minnesota prairie-lakes areas, wild rice exploitation increases, sites are occupied for longer periods of time, and there is a trend towards increasing sedentism as well. Most of these changes occur between 400 and 800 AD (Benn 1983; Ford 1974; Fowler 1969; Steponaitis 1986; Shay 1990). It is this pre-existing reliance on incipient, low-level horticulture, combined with the fact that many non-agricultural subsistence systems appear to have reached their maximum carrying capacity, that partially accounts for the rapidity of the spread of maize (Shay 1990).

However, the introduction of maize, in and of itself, probably did not directly precipitate the shift from hunting and gathering to horticulture. Rather, maize was merely a convenient overlay on a well established complex of indigenous domesticates which developed independently in many places during the Middle and Late Woodland periods (Arzigan 1987; Benn 1983; Gallagher 1989; Steponaitis 1986; Watson 1989). There has even been some suggestion that groups were 'flirting' with the idea of (non-maize-based) horticulture as early as the Archaic (Brown 1987) such that many indigenous cultigens were already domesticated in the Eastern Woodlands by 1000 BC. Horticultural complexes are

visible in the archaeological records at many sites by 500 BC (Watson 1989). By 200 BC, the cultivation of a complex of native plants was well established in many areas of the central Mississippi Valley (Struever and Vickery 1973), the northeast (Watson 1989), and in the north central United States or Western Prairie Peninsula (Benn 1983). The set of indigenous domesticates consists of starchy, oily, and protein rich seed plants including pigweed (*Amaranthus*), lamb's quarter or goosefoot (*Chenopodium*), knotweed or smartweed (*Polygonum*), marshelder (*Iva*), ragweed (*Ambrosia trifida L.*), sunflower (*Helianthis annua*) and others (Benn 1983; Struever and Vickery 1973; Watson 1989).

Because this complex of indigenous domesticates developed long before the introduction of maize horticulture, the span of 'early horticulture' is technically quite long -- 1000 to 3000 years (Watson 1989). This period sees a slow trend towards increasing population density and increased settlement size as part of a complex of irreversible and sweeping changes which occur over much of the continent east of the high plains by the end of the Late Woodland Period whether or not maize has been introduced.

11.3 The Development and Spread of Maize Cultivation in North America

The spread of maize cultivation in North America is a complex process. It is well known that the most probable origin of its domestication lies in Mesoamerica, as well as that of the origin of other 'tropical' domesticates such as beans, squash/pumpkin, and bottle gourd (Streuver and Vickery 1973). The major concern here is with corn (*Zea mays*).

Maize was probably introduced to North America fairly early -- possibly as much as 1000 years prior to its gaining any significance as a cultigen (Fowler 1969). It has been recovered in association with early dates ranging from ca. 200 AD in the American Southwest (Shay 1990), to ca. 300 AD from the southeast (Steponaitis 1986; Watson 1989). From these areas, the cultivation of maize spread rapidly over the continent. In fact, its spread throughout North America is much more rapid than the spread of agriculture during the European Neolithic (Shay 1990). By 1000 AD, the spread of maize as an important, although not necessarily primary, component of the diet is all but complete, and maize is well established throughout the southeast, southwest, Midwest, and northeast of North America (Arzigan 1987; Benn 1983; Ford 1974; Fowler 1969; Gallagher 1989; Shay 1990).

Clearly, the first varieties of introduced maize would not have been well adapted to a temperate climate. As a southern plant, its low tolerance for frost and short northern nights means that initial yields would have been low (Gallagher 1989). However, maize is also renowned for its ready adaptability to new climates and its amenability to genetic manipulation. In the move from Meso-America the plant went from being a tall, sub-tropical, small eared, long season plant to a short, hardy, large eared, short season plant (Moody and Kaye 1969; Struever and Vickery 1973). It was, in fact, this final innovation, the development the hardiest variety of Native corn, Northern Flint -- also known as Harinoso de Ocho or Eastern 8 row -- which facilitated the final rapid spread of maize to the northern reaches of its limit. This variety was readily adopted because it is insect resistant, high yielding, and frost tolerant (Gallagher 1989). In light of these improvements, it is interesting to note that in many places maize

was not adopted gradually, but suddenly and wholesale (Steponaitis 1986).

For example, maize is believed to have been introduced into the upper Midwest by approximately 600 AD (Gallagher 1989). But by 900-1000 AD, a mere 300 years later, maize cultivation has become an important component of the diet over much of the eastern half of the continent. Maize cultivation is also an important consideration in a series of social, political, and demographic changes that occur all over the central eastern and north central continent. Whether or not maize was merely an overlay on a pre-existing pattern, its introduction seems to have been accompanied by considerable cultural change (Gallagher 1989). During this period, just prior to, and slightly after 900 AD, there is a widespread shift from hunting and gathering supplemented by horticulture to intensive horticulture supplemented by wild foods (Gallagher 1989; Watson 1989). The introduction of horticulture or agriculture is accompanied by a number of dramatic trends. The introduction of maize is synchronous with dramatic increases in population density, increased sedentism, movement to larger localized population distributions, new forms of political organization, evidence for agricultural intensification in the form of garden plot selection and preparation, and increases in the size, number, and distribution of food storage facilities (Arzigan 1987; Benn 1983; Brown 1982, 1987; Ford 1974; Fowler 1969; Gallagher 1989; Shay 1990).

These changes, in turn, seem to have had an impact on many aspects of social organization. The shift to larger social aggregates seems to engender a concomitant shift in social relations and political organization (Brown 1987) which is entirely consistent with the suggestion that major economic shifts also entail corresponding shifts in the social realm (O'Shea 1987). Frequently, further

rapid population growth follows, accompanied by increases in cultural complexity (Gallagher 1989). After maize is introduced, populations also begin to concentrate along the major river valleys. In the north, these include the Missouri, James, and Red River systems (Shay 1990). This pattern appears to have spread at the expense of contemporary Late Woodland populations.

11.4 Social and Cultural Changes Accompanying the Spread of Maize Horticulture in the Middle Missouri and Upper Mississippi

Although maize does not become widespread until after ca. 1000 AD, it appears almost simultaneously in many different areas, frequently as an overlay on a pre-existing complex of native cultigens (Shay 1990; Steponaitis 1986). The introduction of maize is accompanied by the introduction of beans, the development of ridged fields, greater effort in site selection, cultivation, and ground preparation, and increased land clearance (Gallagher 1989; Steponaitis 1986) which, together, suggest some degree of accompanying horticultural intensification.

It is generally agreed that the shift to maize was precipitated by widespread "demographic stress". This stress seems to continue since the adoption of maize triggers further population increases as it becomes incorporated into the diet (Kelly et al. 1984a). Demographic stress is shown by a general decrease in occupied land area with an accompanying increase in the number of structures per unit area. Together these may reflect an adaptation to population pressure in which suitable plots of arable land were at a premium (Kelly et al. 1984a).

The exact sequence of these changes remains unclear. Whether these changes result from the introduction of hardier strains of maize, whether they were precipitated by more intensive horticulture, or whether widespread demographic stress was directly responsible for intensification and accompanying social and political changes has been a matter of some debate (Arzigan 1987; Steponaitis 1986). As Gallagher (1989: 572) notes: "It is clear that no single factor was responsible for a shift to intensive agriculture in the Late Precontact Midwest. In fact, many of the basic ingredients were present in earlier periods". In truth, it would appear that the combination of small scale horticulture, the introduction of hardy, high yield, nutritious cultigens, demographic changes, and social and political developments acted in concert to promote sweeping changes which brought the hunting and gathering economy of the Late Woodland period to a dramatic close in many areas of the continent.

This trend culminates in the development of the classic Mississippian cultures -- large, complex, centralized sociopolitical formations -- by ca. 850 AD (Steponaitis 1986). While these show some basic continuity with earlier Late Woodland cultures there are also some distinct changes in both the ceramics and house form (Steponaitis 1986). This fact, combined with evidence for increased confrontation and hostility between Late Woodland and emergent and expanding Mississippian peoples has led some to suggest that Mississippian groups grew partially at the expense of Late Woodland cultures (Ford 1974). The newly developed Mississippian political formations expand rapidly to encompass broad areas of eastern and central North America (Steponaitis 1986). Shay (1990) infers the existence of a dense population by the development of complex ceremonial societies and by the visible increase in the importance of status

differentiation. Also, there is a growth in the importance of long-distance trade at this time -- a development that may be attributable to the same causes since population growth increases the demand for trade goods by creating more consumers (Shay 1990). This expansion in trade resulted in a wide distribution of Mississippian traits without any evidence of altered social organisation in recipient cultures (Ford 1974). The growth of permanent and semi-permanent villages provided convenient central places at which goods could be exchanged. In this light, the growth of Cahokia can be seen partly as the establishment of an important central core from which to conduct trade (Shay 1990).

At this time, we also see the emergence of densely populated, maize cultivating settlements in the Middle Missouri and along the upper reaches of the Mississippi. Whatever the cause, by 1000 AD larger, maize dependent subsistence-settlement systems such as the Plains Village Pattern are well established along the Missouri River and are also becoming established in southwestern Minnesota, western Iowa, and the lower James River (Kordecki and Gregg 1986).

11.5 The Spread of Maize and Cultural Developments on the Northeastern Plains

Terminal Late Woodland cultural developments outside the Middle Missouri sub-area are not well understood at all. In fact it is only in the last decade or so that we have been able to suggest that there were pre-contact, post-Woodland cultural developments at all. These trends are interesting both for their similarity to and difference from Middle Missouri cultural developments in

roughly the same time period.

Aspects of the Plains Village pattern appear somewhat later further to the north and east, although to the east the distinctions between Plains Village and Mississippian Patterns becomes increasingly blurred. Further north on the James and Red rivers, maize makes its appearance between 1200 and 1300 AD (Gregg et al. 1986; Michlovic and Schneider 1993). However, unlike the better known manifestations of the Plains Village Pattern, these areas generally lack any evidence for cultigens other than maize.

Gregg (1990) described his Northeastern Plains Village (NEPV) complex as arising approximately 900-1000 AD. The complex includes: diagnostic ceramics, abundant Knife River Flint, catlinite, semi-sedentary villages, mound mortuary features, Devil's Lake-Sourisford mortuary complex, and a primarily hunter-gatherer mode of subsistence with some corn horticulture which, while important, was not as intensive as that practiced in the Middle Missouri villages. These NEPV complex settlements frequently remain unfortified. Sites fitting this description occur most frequently in the James, Sheyenne, and Red River drainages in southeastern North Dakota and northwestern Minnesota (Gregg 1990; Michlovic 1984).

One of the characteristics of these sites is that they often possess both different ceramics from those expected in the region, as well as unclassifiable pottery types which indicate interactions with their neighbours to the east, south, and west (Gregg 1990). Apparently, sites dating later show increasing influence from the Middle Missouri and Coalescent Tradition groups to the west and southwest.

On the Northeastern Plains, there is a visible increase in Mississippian

influence throughout this period. While the core of these cultural developments remains the central and lower Mississippi Valley, their sphere of influence encompassed a broad area including many parts of the north central, eastern, and southeastern United States (Anfinson 1979b). This Mississippian intrusion into Minnesota brought the Late Woodland period there to an end in the southern portion of the state, and appears to initiate the development of a number of new, but related horticultural complexes there, including Great Oasis, Cambria, and Blue Earth Oneota (Anfinson 1982, 1997).

Maize continued to spread throughout the late Precontact and Protocontact Periods. Although the Precontact limit of Native horticulture was believed to be in North Dakota (Moodie and Kaye 1969; Nicholson 1990), there was also some suggestion by Syms (1980) that if horticulture was not present in southwestern Manitoba, according to a combination of ethnohistoric data, climatic data, and his Co-influence Sphere model, maize horticulture should be found there. In 1974, Syms located a deep, bell shaped pit feature at DgMg-15 in the southwestern corner of the province. This site dated ca. 1610 AD (uncorrected) and provided tantalizing evidence that horticulture might have existed in southwestern Manitoba during the Precontact period. However, the lack of any direct evidence for maize, and of gardening implements such as scapula hoes, prevented him from suggesting that the pit was linked with Precontact horticulture (Syms 1974).

There is well documented evidence for post-contact maize horticulture in Manitoba. Moodie and Kaye (1969) examined some of the early accounts of corn growing in Manitoba. Apparently, Henry Schoolcraft makes the first mention of Native corn horticulture north of the Middle Missouri sub-area in 1805, when he

observed that the Netley Creek Indians were growing corn and potatoes. Later, in 1821, these same people were reputed to have provided the Selkirk settlers with seed. After this time, Native horticulture became much more widespread in the north. Moodie and Kaye (1969) also report that the Netley Creek Ottawas were well aware of maize farming practices but did not do so themselves until they were given the seed in 1805. At this time, garden plots were placed in strategic provisioning locations and, by the 1850's, they had added beans and even melons to their inventory. The practice of gardening quickly diffused to other Woodland groups and was spurred by the demand for provisions by traders who had significantly depleted the wild resource base by then. They also state that, of all of the known varieties of maize, the Mandan Flints were the hardiest (Moodie and Kaye 1969) and therefore the best suited to this northern environment.

Moodie and Kaye (1969) state that the Hidatsa brought corn to its furthest known northward extension during the Precontact Period in the Knife-Heart region of North Dakota. This variety could_have moved further north and not have over-extended its biological limitations: "Mandan corn, however, was capable of penetrating still higher latitudes, though it would produce a crop only under the most favorable local conditions" (Moody and Kaye 1969: 526). This seems to indicate that during the Protocontact Period corn had, in fact, reached the effective limit of cultivation as a consistent and reliable dietary staple except under exceptional circumstances.

Moodie and Kaye (1969) note that the choice of Netley Creek for Native garden plots was an exceptionally good one. Not only was the soil loose and sandy, the very soil type noted for producing the earliest harvests, it was also

well drained. In addition, there was ample moisture and a longer than average frost-free period due to the close proximity of Lake Winnipeg. "Elsewhere in the lower Red River Valley, corn was an uncertain crop. The Selkirk settlers, for example, were successful with Mandan varieties only on natural levees along main rivers" (Moodie and Kaye 1969: 528). This supports the idea that Natives were acutely aware of the potential advantages and pitfalls of any given garden site and kept these well in mind when locating their plots.

11.6 Cultural Disruption and Dislocation ca. 1250-1400 AD

Cahokia declines quite suddenly as a regional centre in the fourteenth century AD. At this time, the scale of occupation there has been considerably reduced and there is movement of northerly cultures, specifically the Oneota, into the American Bottom. The lack of evidence for conflict there suggests that there was no sizable indigenous population to oppose this movement (Porter 1984). However, to the north, the increasing use of fortifications around villages, as well as incontrovertible evidence for unprecedented levels of inter-group violence, such as that found at Crow Creek (Zimmerman and Bradley 1993), points towards increased hostility (and fear) on the Northeastern Plains, Prairie Peninsula, and Middle Missouri sub-areas. There has been some suggestion that at least some of this hostility is driven by expansionist activities on the part of the Oneota (Anfinson 1997; Benn 1989); however, this may be only one aspect of a larger pattern of escalating fear and tension at this time.

As Cahokia declines, evidence of northern and midwestern plains influences in that area increase which, in turn, seems to be part of a pattern of

general cultural upheaval spanning the period from 1300 AD to 1600 AD. This period seems to be one of considerable cultural dislocation in the Woodlands, on the Northeastern Plains, in the Boreal Forest, in the American Bottom, and in the Middle Missouri. However, most archaeological explanations are limited by the authors' highly local approaches which do not address the broader scope of cultural changes occurring throughout the Woodlands and Plains between 1300-1400 AD.

By 1300 AD, the postulated Plains Village outliers, Cambria and Great Oasis, have retracted to the western edge of Minnesota probably due to hostile relations with the Oneota as they expand into territory formerly occupied by the Plains Village groups (Anfinson and Wright 1990). However, in northern Minnesota, where Oneota expansionism is less of an issue, Blackduck and Kathio ceramics are replaced by Sandy Lake ceramics at about the same time (Anfinson and Wright 1990; Johnson 1979). While in southwestern Minnesota, the Oneota themselves begin to abandon areas which apparently remain unoccupied until the Postcontact Period (Anfinson and Wright 1990).

Lugenbeal (1976) sees evidence for widespread cultural decline over the entire upper Great Lakes region starting at around 1400 AD. He suggests that whole areas were abandoned some of which, as in southwestern Minnesota, were left unoccupied until Contact. Syms (1980) states that there was a generalized population recession around 1450 AD, but says there is insufficient data to allow him to offer any sort of explanation. In many portions of the boreal forest of northwestern Ontario, the Rainy River Composite comes to a halt ca. 1350 AD. At this time the manifestations of this composite collapse back into their heartland around the Rainy River between Ontario and Minnesota (Lenius

and Olinyk 1990). There are no dates associated with any Rainy River mound sites after 1475 AD. While the authors suggest that the composite may have persisted for as long as 200 years following this date, their data does suggest that an important aspect of the composite, mound ceremonialism, was no longer functional (Lenius and Olinyk 1990).

Kordecki and Gregg (1986) see the period between 1200-1400 AD as critical in terms of climate and human adaptation on both the Northeastern Plains and in the Middle Missouri sub-areas. Around 1300 AD, the people of the lower James River were abandoning their villages and some degree of population pressure is suggested by the obvious increases in warfare. The most dramatic example of this trend is the dramatic proto-Arikara, Crow Creek Massacre in South Dakota (Zimmerman and Bradley 1993). There is also an increase in metabolic disturbances reflected in skeletal pathology. Villages in the region also show increasing evidence of fortification. This pattern seems to manifest itself outside the Northeastern Plains and into the Woodlands. There also appears to be some archaeological support for this trend on the northern plains where Zimmerman and Bradley (1993) have postulated the existence of a Late Prehistoric population collapse among Arikara, Mandan, and Hidatsa groups of North and South Dakota at about this time.

Another example of this increased stress can be seen just to the south and east of the Northeastern Plains. The Norris Farms #36 Oneota grave site in west central Illinois shows a remarkable percentage of individuals with traumatic injuries and mutilation. The cemetery was completely excavated and yielded a sample in which 43 of 264 individuals showed evidence of violent death (Milner, Anderson and Smith 1991). Not coincidentally, this cemetery dates to the period

and warfare at settlements within these valleys suggests that these river bottom populations outstripped carrying capacity there as well. In general, this period appears to have been a stressful one for Plains Village horticulturalists; population pressure appears to be responsible for the movements of people and the increases in both inter- and intra-group hostilities visible during the Initial Coalescent (Gregg 1985).

Evidence further afield, from the northern and central Plains indicates that the Precontact cultures there were also in some difficulty. From the Arkansas River region, there is evidence of population retraction and consolidation ca. 1300 AD following an initial period of expansion. By the subsequent Spiro Phase, ca. 1400 AD, mound building and long distance trade have collapsed. The following period also shows evidence of population loss and redistribution (Bell 1983). In the Great Basin, the Freemont culture disappears ca. 1350 AD.

Finally, at Lockport, we know that there is also a major shift in the cultural developments at this time. Indigenous Late Woodland hunter-gatherers are replaced by a group of maize growers who appear to have strong relationships south and east of the study area, among "Northeastern Plains Villagers" and perhaps northern Oneota from Minnesota. In any case, it is clear that there is a 100-150 year period around 1300 AD which is exceedingly difficult for pre-contact Native North Americans both culturally and economically. It should be abundantly clear now that the arrival of horticulture at EaLf-1 between approximately 1300-1400 AD, is part of this general pattern of change, abandonment, and dislocation.

11.7 The Ceramic and Cultural Historical Evidence Reconsidered

Looking at the nature and variety of ceramic complexes from Minnesota, North and South Dakota, southeastern Manitoba, northwestern Ontario and from Michigan, Wisconsin and Iowa as well, certain trends begin to manifest themselves. Based on a combination of ethnohistoric data, archaeological recoveries, and oral history, there is widespread agreement that the origins of the Middle Missouri Hidatsa and Mandan groups lie somewhere to the east of the sub-area. Moreover, the position of the Cambria, Great Oasis, and Mill Creek ceramic cultures within the cultural chronology of Minnesota, and North and South Dakota is consistently problematic. Various authors have looked to each of these ceramic cultures to as the origin of Middle Missouri Plains Village groups and yet, there are also persistent attempts to slot all of these into early variants of the Middle Missouri Tradition. These cannot be both originator and part of the Middle Missouri Tradition at once. The ceramics from many of these sites are also problematic since they possess certain aspects of Middle Missouri ceramics but also bear distinct resemblances to Oneota and Mississippian ceramics.

Perhaps, like the Winnipeg River complex or "Red River ware", these are intermediate ceramics that simply do not slot neatly into a predetermined cultural historical category. Furthermore, because Middle Missouri cultural chronology and ceramics are so well studied, there is something of a tendency to work backwards from west to east in assigning ceramic affiliation. Working the other way, from east to west, seems more logical given the hypothesized eastern origins of Middle Missouri Plains Village groups. To the researchers from North Dakota, anything with corn and scapula hoes is likely to be placed into the Plains Village pattern, even though Oneota, a Mississippian-related archaeological

culture, also possesses both corn and scapula hoes. As one moves east, it seems sensible, therefore, to carefully examine the relationships of these corn-growing, hoe-wielding, pit-digging, ceramically-inconvenient archaeological cultures.

The Plains orientation does not stop at the 49th parallel. Snortland-Coles (1979), Nicholson (1987, 1990), Buchner (1986), and Lenius and Olinyk (1990) have all been eager to subsume unusual ceramics into a Middle Missouri-Plains Village mold. Yet, close examination of these materials reveals a definite relationship between the unusual aspects of the Duck Bay ceramic assemblage, "Red River ware", some Stutsman Focus, Devil's Lake-Sourisford, and Oneota ceramics. This may sound radical but is not so odd considering that Duck Bay ceramics are distributed well into the Rainy River region of Northwestern Ontario and Minnesota, and into the Red River corridor as well. There are also Duck Bay ceramics at one site in the headwaters region of Minnesota (Lenius and Olinyk 1990). These relationships appear to extend in a narrow corridor running southwards to northern South Dakota where we see Randall and Big Stone Phase materials that are not entirely dissimilar either in appearance or in the fact that they are difficult to slot taxonomically speaking.

11.8 Population Dynamics and Cultural Interrelationships on the Precontact Northeastern Plains:

Syms "Co-influence Sphere" model of cultural interrelationships has gained widespread acceptance within the Plains archaeological community since it was first published in 1977. His conception of population movements and distributions was a radical rethinking of Precontact population dynamics and has

been widely praised as such (Anfinson 1982; Lenius and Olinyk 1990; Michlovic 1985b). The Co-influence Sphere model provided a fresh conceptual framework in which to rethink preconceptions of regional interaction and inter-assemblage variability (Michlovic 1985b). Despite this, it is only recently that authors have embraced the requisite re-conceptualization of Precontact Period population dynamics. Of primary importance is the discarding of so called "stacked chronologies", defined as linear, exclusive cultural historical frameworks which permit an area to be occupied by only one group at any given time in the past. It is this type of chronology that has dominated the ordering of regional culture histories in North America. The best local example of this is the Middle to Late Woodland Laurel-Blackduck-Selkirk progression, a holy triumvirate in which the culturally relationships and historical developments are far more complicated than this simple chronology suggests.

Syms' model also compels one to discard spatial preconceptions perpetuated by culture area maps which show Native groups occupying single, well-delineated, mutually exclusive areas on the continent. Syms (1980) suggests that most areas of the Northeastern Plains would have been occupied simultaneously by a number of ethnic and/or cultural groups thus rethinking both the spatial and temporal distributions of Precontact populations. In Syms' own words (1980: 112): "The co-influence sphere includes those cultural areas of an ethnic group that are affected, or perceived to be affected, by contact with one or more other ethnic groups". Such influences are suggested to include subsistence strategy, technology, artistic styles, language, myth and religion, oral tradition, biological structure (Syms 1980) and, I might add to the list, political and social relations. It is impossible to understand the events at EaLf-1 without

making use of this framework.

Archaeological evidence from the Northeastern Plains points to a system of interaction that extended both east into the woodlands and west onto the plains (Michlovic 1985b). However, Syms (1980) states that a proper regional perspective on the Northeastern Plains must also incorporate a consideration of the Northern and Central Great Plains, the Boreal Forest, the Aspen Parkland, the Upper Mississippi River, and midwestern riverine systems. All in all, when Precontact cultural relationships are examined in any detail, one quickly sees that the Plains was a culturally dynamic region which saw long distance movements of people, goods, and ideas, frequent fission and fusion of groups, and complex cross-cultural relationships. Where this Co-influence Sphere model is concerned, the degree of influence from other cultures depends on the nature, intensity, and duration of cultural interaction. It is assumed that: "... both natural resources and cultural patterns undergo changes because societies are dynamic, adaptive units responding to environmental and cultural pressures" (Syms 1980: 114). While this may superficially sound like a truism, all too frequently archaeological cultures have been treated as responsive only to the environmental dimension of external pressure and the inter-societal nature of such external pressures has been ignored or given only the most cursory consideration. Unfortunately, these two pressures often function in concert and to ignore one is to do an injustice to the other.

Evidence of the nature of pre-contact cultural relationships is gleaned mostly from the historic and ethnohistoric records and these relationships are projected back into the Precontact Period. While there is ample criticism for the direct historic approach, it is reasonable to assume that Precontact cultures

behaved in at least as complex a fashion as their descendants. There is ample evidence in the material record of the same far-reaching and intricate relationships as those that existed in the Postcontact Period. There is even some suggestion that the relationships and interactions between Precontact societies were more sophisticated than those that were visible to the first European explorers (Dobyns 1983).

Historically, Native groups are known to have covered unexpectedly vast distances over the plains and to have routinely crossed different cultural and environmental zones, a fact that seems to have been the rule rather than the exception (Syms 1980). The home territories of these groups often overlapped to some extent and, in addition to their core area, they also frequented secondary and tertiary areas (Syms 1980). Other historic evidence consists of "poly-ethnic" Native groups that were maintained through a variety of mechanisms such as alliances, group fusion, and inter-marriage (Michlovic 1990; Nicholson and Hamilton 1997). Moreover, historically encountered Natives were frequently multi-lingual, suggesting frequent interactions with other linguistic groups (Michlovic 1990). Population movements and migrations were common and helped to widely distribute people, goods, and ideas (Syms 1980).

Of all of the ways in which these Precontact cultural groups are presumed to have interacted, trade is one of the easiest to prove using the archaeological record. There is a great deal of material evidence to support the existence of extensive trade networks from the Paleo Period onward. Yet trade is consistently misrepresented as being relatively unimportant until the arrival of the Europeans (Vehik 1990). Syms (1980) believes that Precontact groups traded in a way that was both systematic and which spanned most of the North American

continent. This was accomplished partly through exchanges and trade fairs at central places. There is much evidence to suggest an intricate and extensive network of relationships linking the Plains and the Woodlands in Precontact period (Michlovic 1990). Such evidence includes copper from Lake Superior out on the Plains and Knife River Flint from the Plains well into the Woodlands. Both of these exist in steadily declining quantities the further one gets in the opposite direction from their respective sources (Michlovic 1990). Historically, nomadic groups traded such items as meat, hides, fat, robes, catlinite, decorated clothing, and salt for produce and crafts from sedentary horticulturalists (Gregg 1985). It is well documented in the historic record that corn occupied an important place in the hearts (and stomachs) of the nomadic groups who had a special craving for concentrated sources of carbohydrates (Will and Hyde 1964 {1917}). Natives came to the Middle Missouri region from "as far away as" Lake Winnipeg and these groups carried their knowledge of the Hidatsa and Mandan from the Upper Great Lakes to Hudson Bay (Will and Hyde 1964 {1917}). Shay (1990) suggests that this was the operative system during the Precontact Period on the Northeastern Plains as well. Ceramics provide most of the proof of such relationships but interpretations of their distributions may vary with the focus of the researcher (Shay 1990). It is likely that the visible complexity in ceramic distributions are attributable to these many different processes -- trade, intermarriage, migration, seasonal mobility to name just a few, as well imitation by subordinate groups, and sociopolitical influences exercised by more aggressive groups within their sphere.

Gregg (1985) suggests that long term relationships between different groups were probably not common. Rather, these were temporary in order to

maintain flexibility of both territory and the relationships themselves. He also emphasizes the complexity and richness of inter-group contacts in stressing the existence of coexistence, interaction, territorial overlap, use of multiple biomes, trade, conflict, resource sharing, alliances, exchange of marriage partners, technology, and other resources. These are all well documented historically and it seems only reasonable to assume that Precontact cultures did the same. Vehik (1990) believes that such complexity and variability, especially as it pertains to the relationships between Plains Village and non-Plains Village groups, was an important factor in the development of the Plains and the Native cultures found there.

It is certain that the large Missouri River horticultural groups, woodland groups to the north east, plains nomads to the west, and the large complex groups to the south enjoyed widespread, significant, and varied relationships with their respective neighbours. However, very little is known about the relationships between the Middle Missouri, the Mississippi, and the riverine systems directly to the east, particularly the Red River region (Michlovic 1983).

Geographically, the Red River is midway between the western edge of Lake Superior and the Missouri River (Michlovic 1985a). Environmentally, the Red River is at the eastern edge of the Great Plains (Michlovic 1985a) and at the western edge of the Eastern Woodlands. However, the classic conception of the Precontact cultures in this area place the Red River on the periphery of the Eastern Woodlands and the cultural influences firmly within this sphere (Michlovic 1985a).

As discussed earlier, the ceramics recovered from archaeological sites on the Northeastern Plains show a complicated mix of plains and woodland traits.

This would suggest that the area was not a simple extension of either region, but an area unto itself with relationships extending in both directions (Michlovic 1985a, 1990). Michlovic (1990) suggests that this obvious mixing of traits from separate cultural and environmental zones is indicative of exchanges of people as well as goods, technology, and ideas. He sees this interpretation as the only effective means by which to explain the perplexing level of eclecticism visible in the artifact assemblages from this area. One explanation for this perceived eclecticism sees the Precontact culture(s) in this region as an independent development of the Plains Village adaptive pattern with more eastern cultural affiliations (Michlovic and Schneider 1988). Earlier, Michlovic (1983) also suggested that the area was used simultaneously by both classic Plains Villagers and Late Woodland groups. Making use of Syms, (1977) Co-influence Sphere model, Michlovic (1983) saw this pattern as a widespread on the Northeastern Plains and drew an analogy between this sub-area and the steppes of Asia where there were frequent and far flung movements of nomadic groups and where invasions of major centres were fairly common. At that time, Michlovic viewed the grasslands of North America not as a barrier to the movement of people, but as a facilitator of widespread contact and migration. He saw these postulated population movements as creating an "interdigitation" of plains and woodland groups which tended to produce "multi-ethnic" zones where a variety of cultures and linguistic groups made use of the environments, made contact with each other, and initiated exchanges (Michlovic 1983).

These two interpretations -- that of the use of the Northeastern Plains by both plains and woodland groups and that of the area as containing groups which were independent of, but related to, both the plains and woodland groups

-- are not mutually exclusive. The geographic and environmental location of the Northeastern Plains, and especially of the Red River Valley suggests that both processes were likely in operation. It is in no way unreasonable to postulate cultures that grew and developed a horticultural way of life independently of both the Middle Missouri Plains Villagers and the agricultural groups of the woodlands. However, once established this area would have enjoyed extensive contacts in both directions, especially as populations grew and trade became increasingly important and wide ranging. The postulated eastern origins of the Middle Missouri Plains Villagers also suggests that corn horticulture saw its inception to the east and rapidly spread westward, at least partly as a product of the movement of people. However, the diversity of Precontact cultural relationships between the plains and the woodlands immediately suggests that the growth and development of corn horticulture, and the subsequent evidence for growing hostility and abandonment in the Northeastern Plains and Middle Missouri sub-areas was a far more complex process than that. Clearly, any consideration of culture processes on the Northeastern Plains must take into account contemporaneous processes in adjacent areas and must also consider the possible nature and complexity of the Precontact cultural and environmental dynamics that operated between these areas.

11.9 Plains or Woodland?: Population Dynamics and Cultural Change in the Sheyenne, Red and James River Valleys

11.9.1 The Sheyenne River valley:

Haury and Schneider (1988) see the Plains Village Complex beginning on

the Sheyenne River ca. 1000 AD at sites with identifiable Plains Village components. However, they also state that it is difficult to consistently differentiate Woodland and Plains Village ceramics in this area. The Hendrickson III site dates to 1400 AD (Good et al. 1977). The ceramics here suggest that this and other "Plains Village" sites in eastern North Dakota represent indigenous groups who developed from a Late Woodland base but were also in contact with both Middle Missouri Plains Villagers and village groups in western Minnesota and northwestern Iowa. In both areas, pottery from Late Woodland sites are unexpectedly diverse and show strong affinities with sites in western Minnesota, and the Red River Valley.

Unfortunately, it appears that North Dakota archaeologists, with their heavy focus on the Middle Missouri, regard anything with corn and scapula hoes as Plains Village. Thus, these anomalous, post-1000 AD archaeological complexes on the James and Sheyenne drainages automatically become variants of that tradition. At the same time, many authors (Gregg 1990; Gregg et al. 1986; Haury and Schneider 1986) draw attention to obvious eastern influences in the ceramics. Rather than attempting to tear a region and its archaeological manifestations in half, it may make more sense to treat these sites and components as something separate from, but still influenced by, the Plains Village Tradition, especially as it is manifested in the Middle Missouri sub-area. The Red River, which divides North Dakota from Minnesota, is especially poorly understood. This is not only due to reasons mentioned in the introduction but also to the fact that established chronologies are simply not well developed enough to explain the visible variability.

11.9.2 The Red River valley

Early archaeological work there led to the conclusion that predominant cultural influences, as far back as the Archaic, were Woodland (Michlovic 1990). However, new data has forced a re-evaluation of cultural relationships in the region (Michlovic 1990). While Late Woodland populations did make extensive use of the area, there were other cultural influences operating during the Precontact Period. Some ceramics resemble Oneota, while others are more closely related to Plains Village pottery from the Missouri Trench (Michlovic 1985a). The ceramics consistently point to a complex combination of influences apparently embedded within some variation of the Late Woodland Tradition, frequently the Sandy Lake/Psinomani complex. Work at Mooney and other sites provide data that point to an integrated east-west interaction network of Northeastern Plains populations.

11.9.3 The James River valley

The Shea site also provides clues concerning these relationships. This is a fortified village site, but without any evidence of Missouri Valley ceramics (Michlovic and Schneider 1988). Again, the ceramics are largely Sandy Lake/Psinomani, but maize kernels, maize plant phytoliths, carbonized maize plant remains, storage pits, and bison scapula hoes all indicate that that corn was grown locally -- not something generally regarded as a Psinomani practice. This remains a late introduction for maize and the site's occupants probably relied more heavily on bison than on horticultural produce (Michlovic and Schneider 1988). The authors suggest that this too, represents a variant of the Plains Village Tradition, but point out the anomalously heavy representation of Late

Woodland ceramics and pipestone, both of which are rare in Middle Missouri sites. These Plains-type ceramics are not similar to either Initial or Extended Variants of Middle Missouri, including Cambria or Mill Creek (Michlovic and Schneider 1988). As Michlovic and Schneider (1988: 39) observe:

> Indeed, the Shea Site deposit does not appear to represent the same kind of village living as the more substantial and more agricultural villages of the Missouri Trench. Reasoning strictly on the basis of the data the Shea Site 'looks like' a community of bison hunters, who hunted or trapped a few other animals and who grew a modest amount of corn. Furthermore, if these people were gardeners on any scale it is surprising that only corn was recovered. There were no squash, beans or sunflowers.

Clearly there were village horticulturalists on the Northeastern Plains who were largely dependent on hunting and who did not grow the "normal" complex of garden crops: maize, beans, squash and sometimes sunflower and tobacco. In light of this, Michlovic and Schneider (1988: 41) suggest that:

> ... the assemblage from the Shea Site represents an independent development of a village adaptation which may have differed from better known prehistoric village cultures. *Cultural relationships are eastern rather than western* " (emphasis mine).

Are 'anomalous' sites with their 'anomalous' ceramic assemblages really Plains Village, or do they belong in a category of their own? Prior to 1990, various authors suggested that these were in fact Plains Village variants (Michlovic 1983; Michlovic and Schneider 1988). Some (e.g. Gregg 1990) continue to assert that these are a Northeastern variant of Plains Village, calling them the Northeastern Plains Village Complex. However, it is increasingly clear that the villages on the Red, James, and Sheyenne Rivers are something unto themselves,

and Michlovic, at least, seems to have retreated somewhat from the assertion that these groups were primarily Plains Village.

11.10 THE ONEOTA ON THE RED RIVER?

Although direct archaeological evidence of the Oneota Tradition has not been found in northern Minnesota, archaeological research in the Red River Valley has revealed that ceramics there are superficially similar to Oneota pottery. It must be made clear however, that these ceramics are not Oneota as such. Ogechie, a central Minnesota variant of Oneota, is sometimes found with Sandy Lake ceramics albeit not so far north. Better known "classic" Oneota materials in Minnesota are restricted to the southern portion of the state around the Blue Earth River Valley and in Northern Iowa (Michlovic 1983). Swenson and Gregg (1988) point out that the utilitarian pottery from the James River Valley of North Dakota is not unlike Devil's Lake-Sourisford mortuary vessels which, in turn, resemble Oneota ceramics at least in their decorative motifs. Swenson and Gregg (1988) also suggest that the Devil's Lake-Sourisford mortuary complex was introduced onto the Plains when Mississippian cultural developments were at their peak ca. 900-1300 AD. They point to existing similarities between these ceramics and those of the Cambria Phase in Minnesota; a phase they believe is influenced by both Great Oasis and Oneota. They suggest that similar ceramics extend in a southerly direction as far as Cahokia, the center of Mississippian culture. They go on to suggest that the "Plains Village" groups of the upper James River were of Siouan linguistic stock, possibly related to the Hidatsa, and participating in Devil's Lake-Sourisford mortuary ritual.

None of this speculation clarifies the relationships between classic Mississippian, Oneota, Middle Missouri Plains Village, and Northeastern Plains groups. Although it does seem clear that the Middle Missouri Plains Village groups originate east of the Middle Missouri sub-area, possibly within archaeologically visible cultures such as Great Oasis, Cambria, and Mill Creek whose present status vis-a-vis the Plains Village Tradition is still being debated. While Oneota may somehow be related to both Middle Missouri and Middle Mississippian maize growers, this "culture" is still regarded as "foreign" in both areas.

It seems evident that these groups are all connected between 900 and 1100 AD. But by ca. 1200 AD, several distinct archaeological cultures become well established and are cultivating maize in the Middle Missouri, Northeastern Plains, and Middle Mississippian sub-areas. It is at this time, or shortly thereafter, that Oneota presence makes itself felt over much of the area. By ca. 1300 AD, their aggressive and expansionist tendencies appear to be in full swing.

This all occurs as part of a generalized period of dramatic cultural change visible throughout much of central North America including the Woodlands, Northeastern Plains, Middle Missouri, Southwest, and Southeastern areas at this same time. Unfortunately, references to this process are frequently vague. There is a general awareness that something important and widespread is occurring at this time, although it is seldom discussed explicitly. There is even some suggestion of occupational gaps in the record in a variety of locations including portions of the Middle Missouri (Gregg 1985), the Aspen Parklands, and at The Forks of the Red and Assiniboine rivers in Manitoba (Ebell 1987). Unfortunately some of this work, notably that for the northern Red River corridor, depends on

a lack of large, stratified habitation sites, as supporting evidence for this hypothesis, a situation which could conceivably change with the survey and excavation of more sites.

11.11 CONCLUSIONS

This complicated dynamic obviously has significant ramifications for the problem at hand. It has been established that migration has a key role to play in the presence of horticulture at Lockport. The ceramic data, combined with the regional culture history point to a possible source area or homeland for the migrants along the Red River valley to the south. In this light, the Red River corridor can be seen as a direct corridor for the north-south/south-north movement of people potentially, at least, lowering transport costs for migratory groups. Substantial movements of people, cultural disruption, dislocation, and significant increases in inter-group hostility all occur within the context of the MWP whose environmental effects resulted in a significantly denuded environment in the uplands of the Dakotas, and the more arid portions of the Northeastern Plains. Clearly many groups at this time were experiencing different types and degrees of stress. However, not all groups made the decision to leave their homes. So, what are the final inducements for a migration northwards to Lockport; what, exactly, were the operative push/pull factors in this specific case?

CHAPTER 12
TYING IT ALL TOGETHER: THE LOCKPORT SITE, PUSH PULL FACTORS, MIGRATION, THE MEDIEVAL WARM PERIOD, AND THE ONEOTA

12.1 INTRODUCTION

This project opened with the question: what are the effects of widespread environmental change on human populations? I also asked how bad things have to get before a population will migrate? I have attempted to answer these questions by presenting the data from the Lockport site as a case study. Was the appearance of a seemingly anomalous horticultural component there driven by "... a complex series of cultural responses to environmental stress precipitated by the MWP?" (chapter 1: p. 3 above)

12.2 EALF-1 SUMMARY

The 1987 and 1988 excavations at Lockport (EaLf-1) resulted in a reinterpreted stratigraphy that suggested a sharp break between the Bed CDE occupations and the overlying B/C- Organic Layer horticultural occupation. The C14 dates indicate that this horticultural occupation occurred during the late 1300's or early 1400's AD following a Late Woodland occupation in Bed CDE which contains no evidence of horticulture whatsoever. The ceramics from Bed CDE are entirely consistent with indigenous, Late Woodland, hunter-gatherer occupation, although it is possible that two Late Woodland occupations (late Blackduck and transitional Rainy River Composite) are mixed in Bed D, the primary artifact bearing bed in the CDE deposit.

The overlying material from the B/C-Organic Layer contains material

consistent with a maize-growing horticultural occupation, including scapula hoes, unusual ceramics, and bell shaped storage pits, as well as kernels and corn plant parts of the domesticate *Zea Mays*. All of the features associated with the horticultural occupation excavated in 1987 and 1988 originate from this bed, which appears to be the flood redeposited remains of a midden. Ceramic analysis supports the contention that this occupation represents a sharp cultural disjunction with the earlier Late Woodland hunter-gatherer occupation. Not only is the material in CDE non-horticultural, but the ceramics are predominantly Blackduck and Rainy River. This is in sharp contrast to the material from Bed B/C-Organic, where the ceramics appear to be locally made but display significant shifts in both manufacturing techniques and decorative motifs. The processes that prompted people to bring maize horticulture with them to EaLf-1 are complex and multi-causal.

12.3 Climate, Environmental Change, and Resource Stress: Visible Archaeological Correlates During the Medieval Warm Period

There is ample evidence of cultural disruption and dislocation all over the central portion of North America between about 1250 and 1400 AD. The combined results of the ceramic analysis and regional cultural history discussed earlier shows that at least one group left the southern Red River valley and moved directly north to establish a horticultural settlement at the northern margins of viable maize horticulture. However, having established that the Lockport horticultural occupation is the product of a migration, it is now necessary to distinguish the various factors that contributed to a decision to

move.

Looking to the work by Dirks (1980), Colson (1979), Rowley-Conwy and Zvelebil (1989), and others, there is evidence for endemic, low-level food stress throughout the Northeastern Plains and beyond from about 1000 AD onwards. The initial shift to maize cultivation is a major alteration in risk-buffering strategy, taking these groups from what was a predominantly diversity-mobility system to one relying more heavily on storage and exchange.

Such shifts in basic economic patterns and risk buffering strategies are in evidence all over the Northeastern Plains. The transition from a Late Woodland hunter-gatherer subsistence-settlement system to a simple New World horticultural economy as outlined by O'Shea (1989), is well underway by 1000AD. Groups of comparatively independent maize growers flourish, and most retain a significant reliance on wild resources, a characteristic of New World horticultural economies in marginal environments (O'Shea 1989). However, by the middle of the MWP, significant environmental changes are disrupting this adaptation.

O'Shea (1989) states that simple New World horticultural systems are dependent on two critical factors: good neighborly relations and a significant land base to allow for the seasonal, supplementary exploitation of wild resources. As the MWP develops into a full-blown drought in some areas, we see these prerequisites dissolve in increasingly hostile relations between groups, combined with a decrease in the productive land base as intensifying aridity simultaneously impacts wild resources and the yields from garden plots. At this point the system must either become a complex system, one in which groups begin to rely more heavily on domesticated products and trade with successful

hunter-gatherers for wild foods, or suffer collapse (O'Shea 1989). However, the responses to this developing crisis are not pre-determined. The archaeological evidence from the larger region indicates that the transition from simple to complex horticultural system was, in fact, underway along the Middle Missouri during this interval. Groups were beginning to become more specialized there, while many other archaeological cultures seem to meet their demise, coming to an end between 1300 and 1400 AD. This certainly suggests that at least some of them were unable to successfully cope with this transition. Other groups shift position in order to get themselves out the way out of various sources of disruption and maintain their existing social and economic systems.

Elements of Dirks recursive famine responses are also visible during this interval. We see the increased importance of status goods and long distance networks of exchange. These also fit within the parameters of effective risk buffering strategies outlined by Rowley-Conwy and Zvelebil (1989). Increases in random acts of violence and raiding of known food stores indicate serious resource stress in the region. There also appears to be an increased attraction to authoritarian power structures potentially as crisis managers and food redistribution systems. One might also point to the Mississippian system as evidence of increased ritual observance, a characteristic of Dirks (1980) alarm phase famine response. Colson (1979) also points to the movement of food storage indoors as another characteristic of endemic food stress. This is visible in the interior food storage pits found in these late Precontact Period horticultural villages.

12.4 THE SOCIO-POLITICS OF BULLYING: THE ROLE OF THE ONEOTA

The ability of the Oneota to flourish during an apparent environmental crisis has been used to suggest that there was no crisis. However, in examining and attempting to explain culture process in the Virgin River Branch of the Southwest, Larson and Michaelson (1990) have also addressed some aspects of culture change and process to the north, where a similar sequence of environmental change and cultural adaptation appears to be operative.

All of the means they postulate as archaeologically visible ways to cope with unusually severe episodes of drought in large, economically specialised populations are also visible in this region. We see increased and improved food storage in the introduction of large bell-shaped storage pits as well as improvements in existing technological systems. Ceramic technology develops to better extract nutrients from a carbohydrate rich diet and scapula hoes are introduced as the gardening implement of choice. The intensification of horticultural practices is seen in the introduction of ridged fields, increased land clearance, and expansion into previously uncultivated areas. Political reorganisation is apparent in Oneota expansion and generalized population agglomeration, nucleation into larger fortified villages, and finally the growth of warfare, trade, and alliances shows that there was also an extension of the network of reciprocal relationships.

The collapse of Cahokia created a power vacuum that allowed the Oneota to expand rapidly and develop a political system designed to assimilate as many groups as possible. This can be viewed as a means of expanding social and political contacts in order to secure and consolidate their subsistence base in a period of climatic flux. Here it is possible to regard Cahokia as one of Rosen's

(1995) "higher order regulators" in which a group with a more specialized economy stresses conformity in situation where innovation would be more appropriate. They find themselves unwilling or unable to either re-tool or innovate, and collapse in a situation where other, more flexible groups might have survived. This result would have been a disruption in the flow of information (Stone 1999) which creates social and political repercussions far beyond the immediate boundaries of Cahokia and its surrounding area. As a "lower order regulator", the Oneota are more flexible, and have the benefit of a diversified economy, as such they are able to move, and to maximize the exploitation of available resources. This is supported by Oneota settlement data which show that their sites were located in very specific areas to maximize the available diversity in the resource base by using lake, river, forest, and prairie resources.

Oneota expansion probably occurred as a result of a combination of many factors. General population growth, the intensification of maize horticulture throughout the woodlands and on the Northeastern Plains, combined with coincident decline of Cahokia, which left room for the Oneota to expand. As a result, Oneota influence moves across the western fringes of the woodlands and spills out onto eastern fringes of the plains during the 1300's and 1400's AD. As the Oneota sphere of influence expands, we see the localized transformation of many indigenous Late Woodland groups into Oneota-like cultural formations. This is suggested by the many regional phases of Oneota visible in Minnesota (Anfinson 1997). Moreover, many Late Woodland Period sites in the Blue Earth area in Minnesota possess Oneota components near the surface suggesting a relatively late expansion into the area, and one which likely both transformed

and displaced Late Woodland hunter-gatherers (Anfinson 1982). It is unclear whether all of these groups were ethnically Oneota. Most likely, they were a hybrid of indigenous Late Woodland hunter-gatherers and Oneota or Oneota-influenced horticulturalists. These groups probably also enjoyed extensive contacts with Plains Village groups from the Middle Missouri sub-area and with Late Woodland hunter-gatherers to the east as well. This period of expansion is followed by general Oneota retraction that may be part and parcel of a more widespread cultural retraction on the continent during the Little Ice Age.

All of these factors together indicate social and political accommodation of an unusually severe climatic episode that is visible on the Northeastern Plains, in the adjacent woodlands, and all over the central continent as well. In fact, it is reasonable to postulate that cultural developments here as well as those which others (Jones et al. 1999; Larson and Michaelson 1990) attempt to address elsewhere, are part of the same period of climatic and cultural disruption of which the Lockport horticultural occupation is a part.

The spread of maize occurred during an extended period of climatic moderation, the warmer, humid early MWP that sees populations grow and spread, adopting maize as an indispensable dietary staple. Meanwhile, this mild period is followed by an equally extended hot, dry period far less conducive to dry land subsistence farming that disrupted existing subsistence strategies. Possibly due to this extended favourable climatic episode, people were unprepared for such alterations in their environment and found it necessary to shift to larger, semi-permanent settlements in river valleys with major permanent water courses such as the Missouri, Mississippi, and Red rivers. Populations aggregate along these major permanent rivers, leading to

overcrowding; the result was increasing population pressure within these valleys. Localized increases in population pressure led to an increase in inter and intra-group hostilities, and the development of aggressive, expansionist groups such as the Oneota who cope by promoting their own survival possibly at others' expense. The flip side of this is the extension of co-operative, friendly relations, such as trade and inter-group alliances, as a means of mitigating increased resource stress.

12.5 Macroregional Push-Pull Factors and Migration: Cultural Responses to Environmental Change and Resource Stress

A striking set of push/pull factors is clearly evident in the regional archaeological data. The broader contextualization of the data within a detailed culture history reveals that the source area and its adjacent regions to the east and west may have been experiencing some difficulty. Benn (1989) has argued that the Oneota exercised a considerable degree of political hegemony over an expanded territory, likely through coercion. Evidence within this sphere for increased inter-group conflict certainly supports his contention. If we pause to examine the Oneota-like decorations on the ceramics from Lockport, it is possible to suggest that groups along the southern portion of the Red River may have been party to some of the less admirable qualities of the Oneota. (The wide trailed chevrons and 'tail of a thunderbird' motifs on Lockport pottery in figures 44 & 45 can be compared to common Oneota ceramic decorative motifs in figures 46 to 49). The desire to escape political coercion in whatever form it took, and seek safe havens elsewhere would have provided the primary push-pull for

the migrant horticulturalists. Assuming the uplands of the Dakotas experienced significantly reduced subsistence potential, as Gregg (1990) suggests they did, resource stress provided additional economic incentive to leave. Populations were forced to settle into the larger river valleys as environmental conditions worsened. This seems to have engendered a certain amount of inter-group tension there, as the evidence for the growth of larger, fortified settlements attests. The location of villages at strategic, defensible locations provides additional support for this idea.

Pull factors include the potential for increased group security. This is shown by the absence of fortifications at EaLf-1, while an absence of obstacles along the way is suggested by the low density of sites along the Red River dating to this period. Lower relative population densities to the north as compared to the south or east may have made it comparatively easy to traverse this region. The presence of a good site with access to a comforting diversity of resources including riverine, lacustrine, wetland, forest, and grassland resources, as well as arable land on sandy soil immediately adjacent to a major water course would have presented the migrants with an attractive destination. It must be assumed that the group had some pre-existing knowledge of the area. In Anthony's (1997) conception of a developing migration we have an excellent set of push-pull factors, a direct transportation route, a lack of intervening obstacles, and an prime area in which to settle that provided clear adaptive advantages over the home territory. It is also unlikely that the move would have precipitated another set of cascading crises since the group was able to continue to use existing technological systems with some success. Site data from the Red River corridor also seems to possess many of the characteristics of a chain migration. The

similar settlement across the river at Lockport West (McKinley 2001) suggests a migration by a closely related group, as well as what might be regarded as a linear site distribution along a narrow pathway with significant gaps in between. This is indicative of "leap-frogging", in which an initial migration becomes the proximate cause of subsequent, kin-based migrations to the same area as information about the new settlement flows back to the home territory (Anthony 1990, 1997).

This cultural dynamic was part of a system of adaptation to adverse climatic conditions, conditions which indirectly facilitated the spread of maize to otherwise marginal areas by rendering northerly areas more amenable to horticulture. The settlement at Lockport was not accidental. It was a conscious and well-considered choice by a knowledgeable group. Most of the soils along the Red River are heavy clays (Moodie and Kaye 1969), the infamous Red River 'gumbo. However, at this time a severe episode of flooding on the Red River left extensive sandy deposits up to one meter deep along the shore immediately prior to the initiation of the episode of corn growing. This created conditions conducive to the establishment of maize gardens by horticultural groups using only scapula hoes to break ground. It is important to note that the earliest maize harvests were on sandy soil (Moodie and Kaye 1969). Garden site selection was a careful, non-random process. It is no accident then, that a horticultural site can be found at EaLf-1, on a strip of sandy soil, in an area which probably enjoyed a frost free period slightly longer than the regional average, as well as higher mean annual temperatures. Any hypothesized lack of precipitation during the MWP would not have inhibited horticulture owing to the close proximity of an abundant and permanent water supply. It is likely that these immigrant groups

already knew of the area. Having resided further south within the Red River valley system they would have been aware of its northern end through trade, kinship, and hunting-gathering-fishing expeditions. However, it may not have been until the MWP that corn growing at this northerly latitude became a viable option.

Oneota influence at Lockport is a result of expansionism; the migration of transformed indigenous Late Woodland groups, intermarriage, the desire to imitate successful and dominant political groups, and coercive political formations. The rapid shift in both subsistence and technology at Lockport, together with the fact that this occupation is both preceded and succeeded by Late Woodland occupations argues for population movement combined with some form of interaction. While there is no evidence for fortifications, it is unknown whether these interactions were friendly or hostile. Perhaps they were both. Such interaction may have included intermarriage as originally suggested by Buchner (1986), since this is part of the traditional means of cementing alliances and extending kinship ties. However, it must be included with the many other modes of interaction that occurred between populations in the region.

The dates at which horticulture occurs at Lockport allow some inferences to be made. Dates in uncorrected radiocarbon years range from 1245 to 1430 AD. Range within one standard deviation is 1170-1530 AD, but the central trend supports a range for the occupation of approximately 100 to 150 years between the late 1300's to mid 1400's AD. This range fits with the introduction of horticulture in other marginal areas on the Northeast Plains but means that EaLf-1 was not occupied during the height of the MWP. The climate, however, had to have been amenable to the growing of early varieties of maize.

12.6 WHY NOT STICK WITH ONE OR THE OTHER?: MIXED ECONOMIES AND ECONOMIC SHIFTS AMONG NORTHEASTERN PLAINS HORTICULTURALISTS

Having placed these Northeastern Plains horticultural groups in their broader regional and historical context, the shift back and forth from horticulture to hunting and gathering on the northern Northeastern Plains can be addressed. Schnirelman (1992) documents circumstances under which subsistence regimes may switch from predominantly hunter-gatherer to farmer and back again. First, in areas marginal to the sustained practice of agriculture, groups will be aware of farming long before they bring it into practice, or they will practice it themselves at a very low level, as a resource buffer not critical to basic subsistence. Visible shifts to a greater reliance on farming will generally come at a time when ecological crisis renders the hunting and gathering economy inefficient, yet simultaneously makes the practice of farming more profitable (Schnirelman 1992). Farmers may return to hunting and gathering when resettlement has been necessary or when the environment suddenly becomes less hospitable to agriculture. Repeated farming to hunter-gatherer shifts are more likely where agriculture is a marginal practice to begin with. He cites the example of Kalahari !Kung San, who farm more when precipitation is better and shift to hunting and gathering when the environment is less reliable

A subsistence crisis may precipitate the shift from hunting and gathering to farming but there are two necessary pre-conditions:

1) Hunter-gatherers require a pre-existing familiarity with a food-producing economy
2) The crisis must develop slowly enough to allow them to adapt

> culturally, economically, socially and psychologically to a new subsistence system

"These conditions being absent, a society could decline and disintegrate, or aggressiveness could sharply increase and armed conflicts become more frequent." (Schnirelman 1992: 37)

The heretofore-perplexing tendency of the northern village horticulturalists to shift back and forth from hunting and gathering to maize growing becomes less puzzling. Maize gardening was a well-established practice, but not altogether viable at the northern fringes of the Northeastern Plains. Presumably when conditions were good -- when friendly neighborly relations and adequate access to wild resources prevailed, and when the populations of key wild resources such as bison were healthy -- these northerly groups could continue to rely on hunting and gathering. Some maize may have been grown at an extremely low, perhaps archaeologically invisible, level as a minor resource buffer. Under deteriorating conditions in the wild resources, or if mobility had to be curtailed, then it might have been necessary to supplement the diet more heavily with maize. However, at this northerly latitude, yields would have been unreliable, forcing continued reliance on wild resources. These groups would have settled into a modified version of a horticultural economy, perhaps until local conditions improved. Under conditions where this strategy begins to fail due to hostile relations with neighboring groups the choice is either to continue down the path to an increasingly specialized economy, make the necessary economic, social, and political adjustments or pack your bags and leave, hoping that there is a place where your existing system can continue to exist undisturbed. Clearly there is evidence for both choices on the Northeastern

Plains and its adjacent regions between 1000 and 1400 AD.

12.7 FULL CIRCLE: BACK TO LOCKPORT AGAIN

To return to the questions asked in the introduction. The MWP clearly has serious effects on the environment in various places throughout the central portion of the continent starting around 1250 AD or so. The effects of this interval are spatially and temporally variable but widespread environmental deterioration can be seen in more arid areas. This sets in motion a far-reaching series of responses that are as spatially and temporally varied as the effects of the MWP itself. This does not mean it didn't happen, or that its impacts were not severe and widely felt. It does mean however, that the human element plays a critical role in whether the end result is survival or collapse and abandonment.

Lockport is at the northern fringes of these developments -- a marginal player in some respects -- a single ripple in very large pond. But its position at the northern fringes of viable maize gardening helps us answer the question: what do people do when faced with difficult circumstances in their social and physical environments? These circumstances had a profound effect on the stability and well being of resident groups. Some chose to do nothing. It is likely these are some of the groups that disappear at this time. Others opted to make structural alterations in their subsistence-settlement and social systems. Some of whom likely survived in various forms up until contact with Europeans. Some attempted to keep their way of life unharmed and unchanged -- perhaps being forced to move in order to do so. One such group came to Lockport, assisted by a fortunate concatenation of events. The MWP warming trend created a climate

amenable to northern maize growing. This, combined with a flood of unusual proportions that left soft, sandy deposits in its wake, and a complex series of push-pull factors that prompted the decision to move northwards all acted in concert to bring maize to its northernmost extension in the Precontact period.

The Oneota were trying to make the best of a bad situation. The presence of an aggressive, expansionist culture, as suggested by Benn (1989) makes the presence of Oneota-related symbols and motifs on far flung ceramics (like those from Lockport and Duck Bay) easier to explain. This is not to suggest that there were Oneota groups traipsing up and down the rivers and streams of the Northeastern Plains and Boreal forest in what are now Manitoba and Ontario. However, for a brief period in the fourteenth and fifteenth centuries AD, Oneota influence extended well out of its core area in northwestern Iowa and southeastern Minnesota, into the Boreal forest, onto the plains, possibly as far as central Manitoba. The visible influences along the Red River can be regarded as Oneota- influenced groups responding to external threat during which they also had dealings with many different groups from the Middle Missouri Plains Villagers to the hunter-gatherers of the Rainy River.

The short duration of these horticultural occupations, often both under- and overlain by indigenous Late Woodland occupations, combined with the fact that differences in the ceramics are so marked, points to movements of people. Together with the many other aspects of population dynamics mentioned above, population movements help create the unusual horticultural components up and down the Red River corridor, and in adjacent regions such as the Sheyenne and James River Valleys. Intermarriage and the creation of poly-ethnic residence groups may have played a role in the creation of these assemblages, but were

neither prime mover nor a determining factor. These were merely one part of the complexity and richness of cultural interaction, population dynamics, and socio-political relations between Mississippian, Oneota, Plains Village, and Late Woodland hunter-gatherer populations.

The arrival of horticulture at Lockport post-dates the most difficult portion of the MWP, therefore the Medieval Warm Period was not a determinant, but a catalyst in an already volatile mix of circumstances set in motion just prior to end of the Late Woodland. Environmental change, driven by the MWP, had an important role to play, but the variety of cultural responses visible on the Northeastern Plains underscores the fact that environmental crisis engenders no single predetermined consequence. Crisis does not always equal collapse. What this study should point out, however, is that given an environmental catastrophe accompanied by serious food stress there are certain avenues that are more likely than others.

The arrival of horticulture at Lockport was a part of a larger continental pattern of disruption and dislocation. The latter portion of the Medieval Warm Period was a difficult time in many areas of the continent, including the Northeastern Plains. What the Europeans probably encountered in their initial visits with Native groups of interior North America were people recovering from two hundred years of drought, food stress, disease, warfare, and a sweeping series of social, political, and cultural adjustments as varied as the groups themselves.

Appendix I

Maps and Illustrations

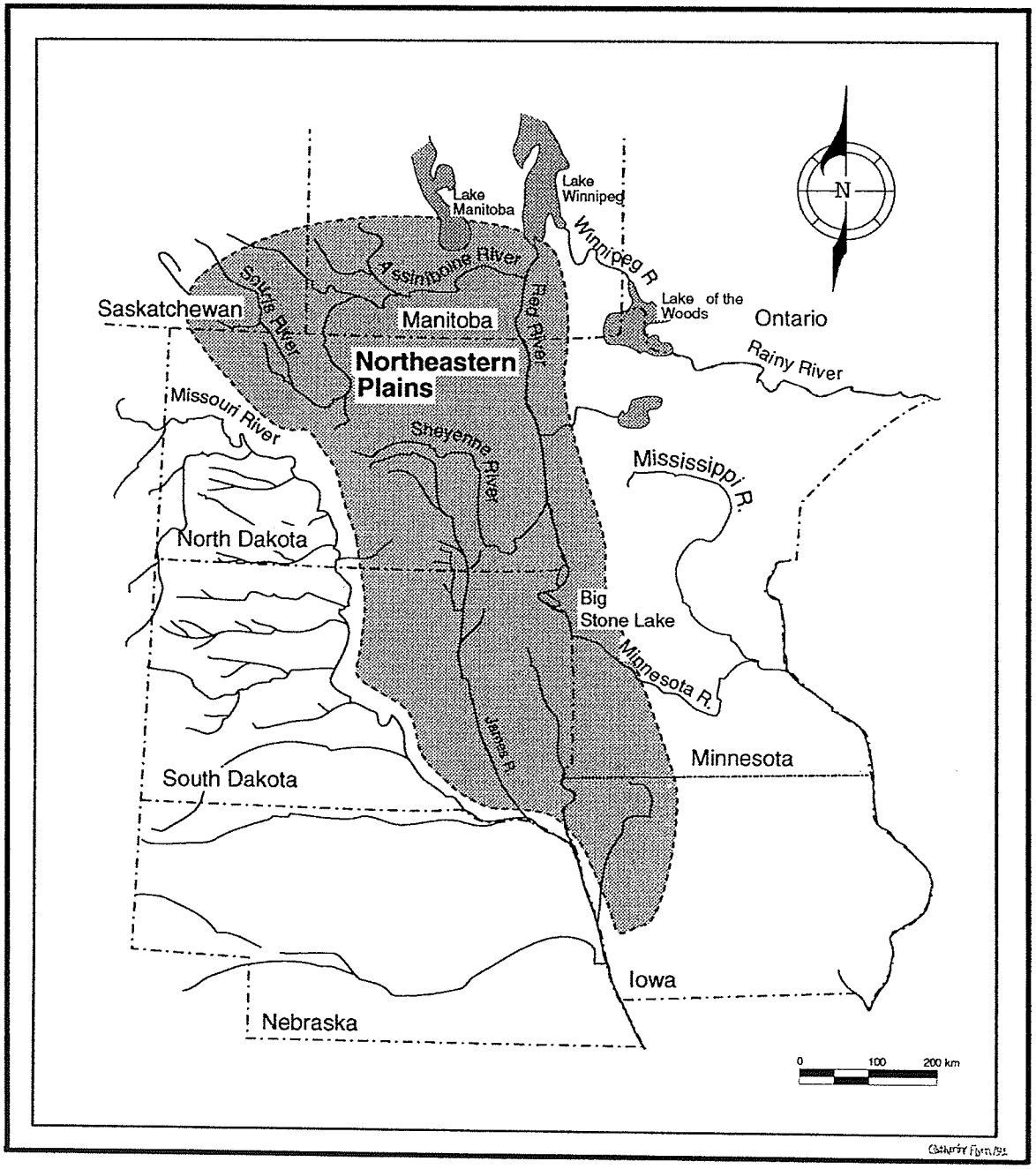


Figure 1: Areal extent of Northeastern Plains and major rivers

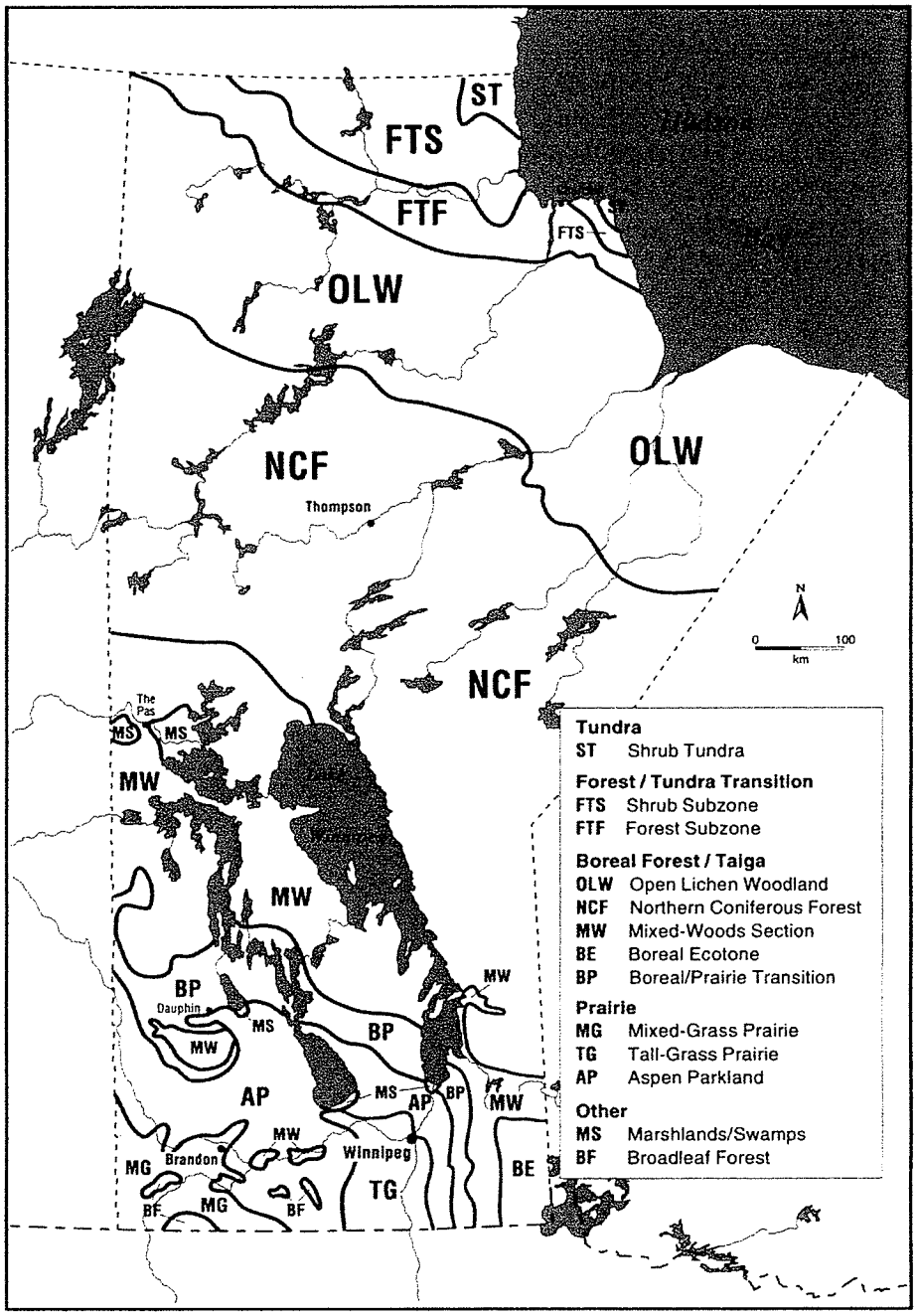


Figure 2: Potential natural vegetation zones of Manitoba (from Scott 1997:45)

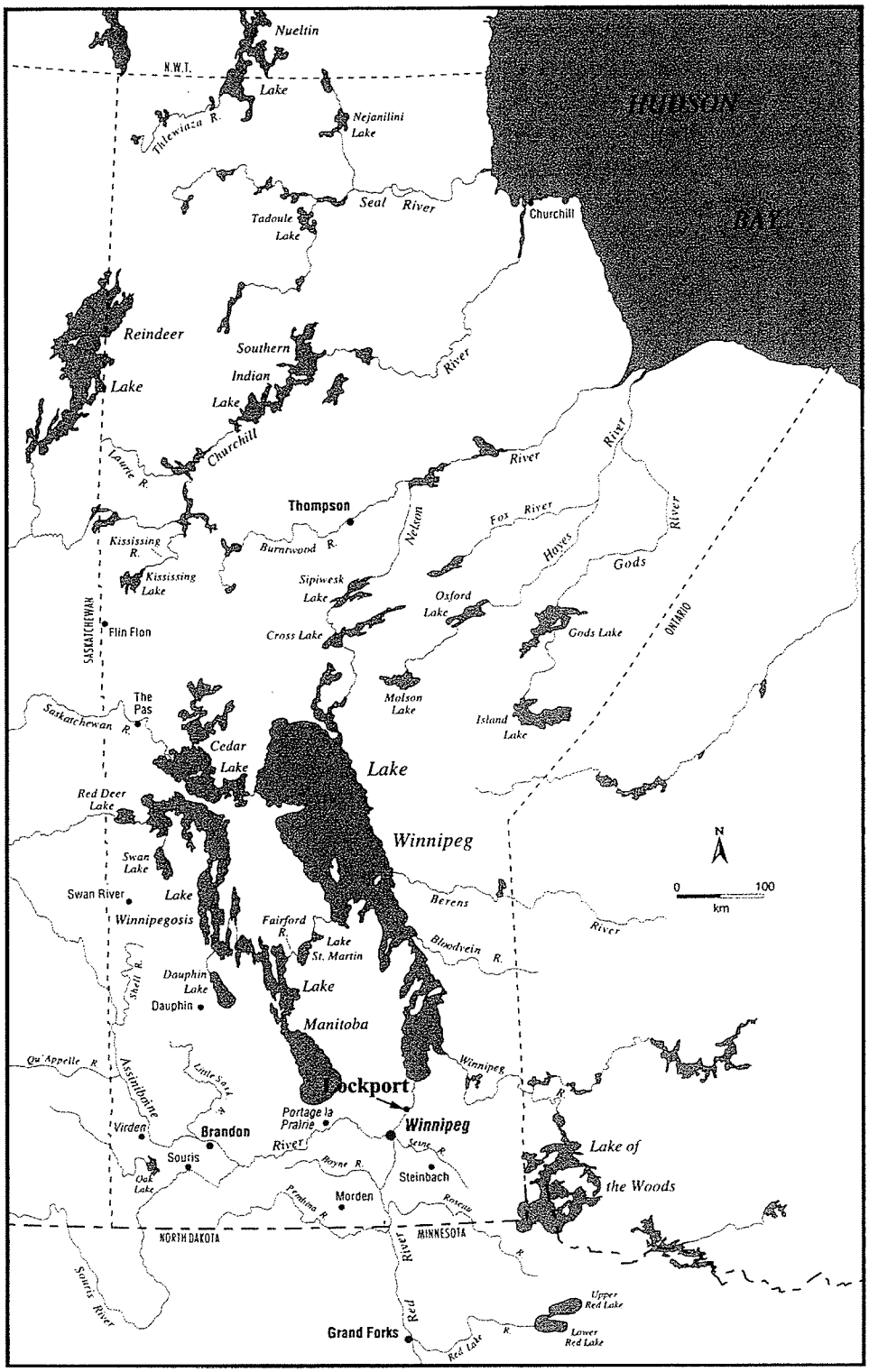


Figure 3: Location of Lockport, Manitoba (modified from Welsted et al.:frontispiece)

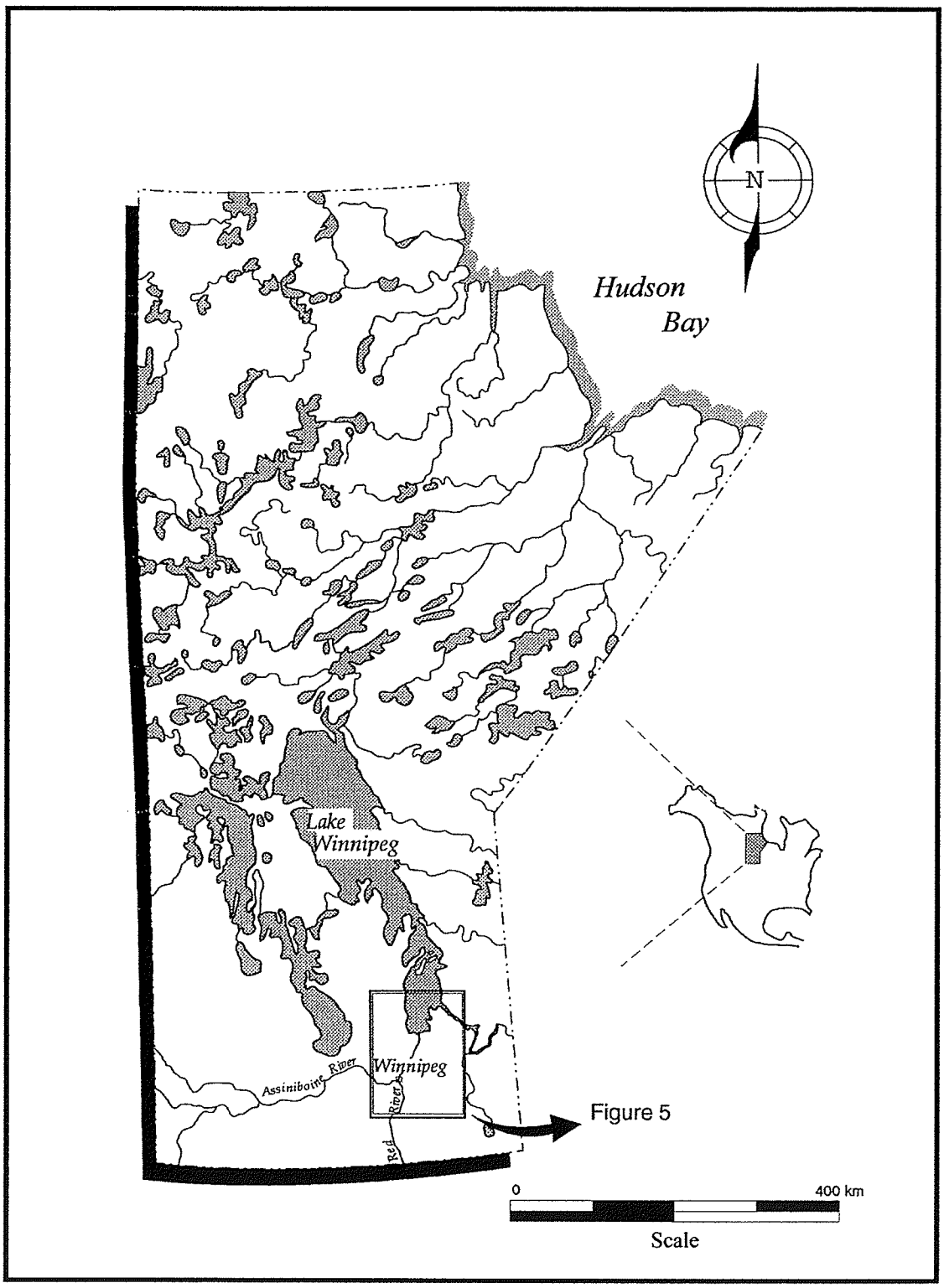


Figure 4: Province of Manitoba showing location of detail (Figure 5)

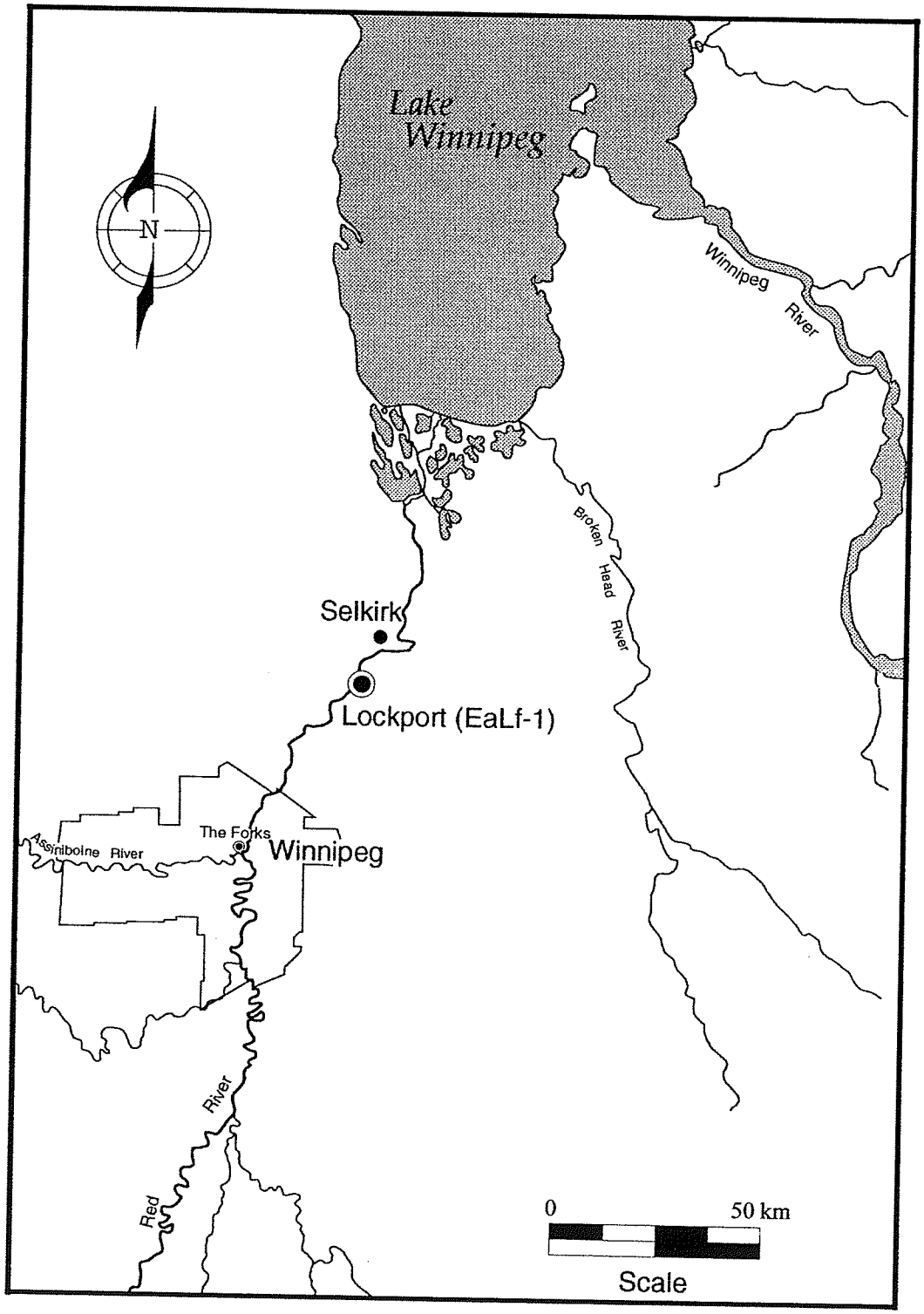


Figure 5: Location of EaLf-1, Lockport, Manitoba

EaLf-1 Lockport, Manitoba

Changes in Riverbank due to erosion 1984 to 1988

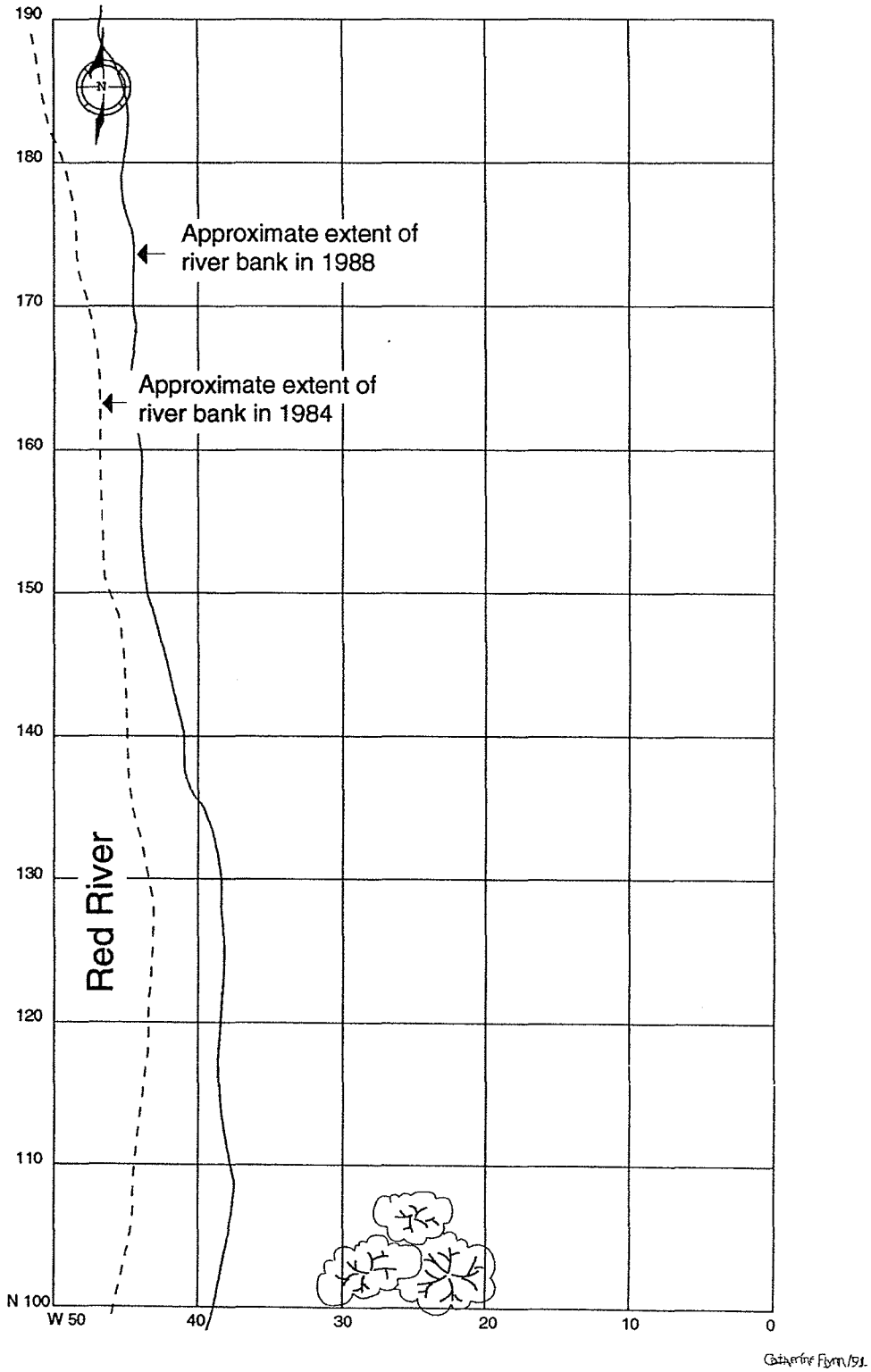


Figure 6: Map showing extent of bank erosion between 1984-1988

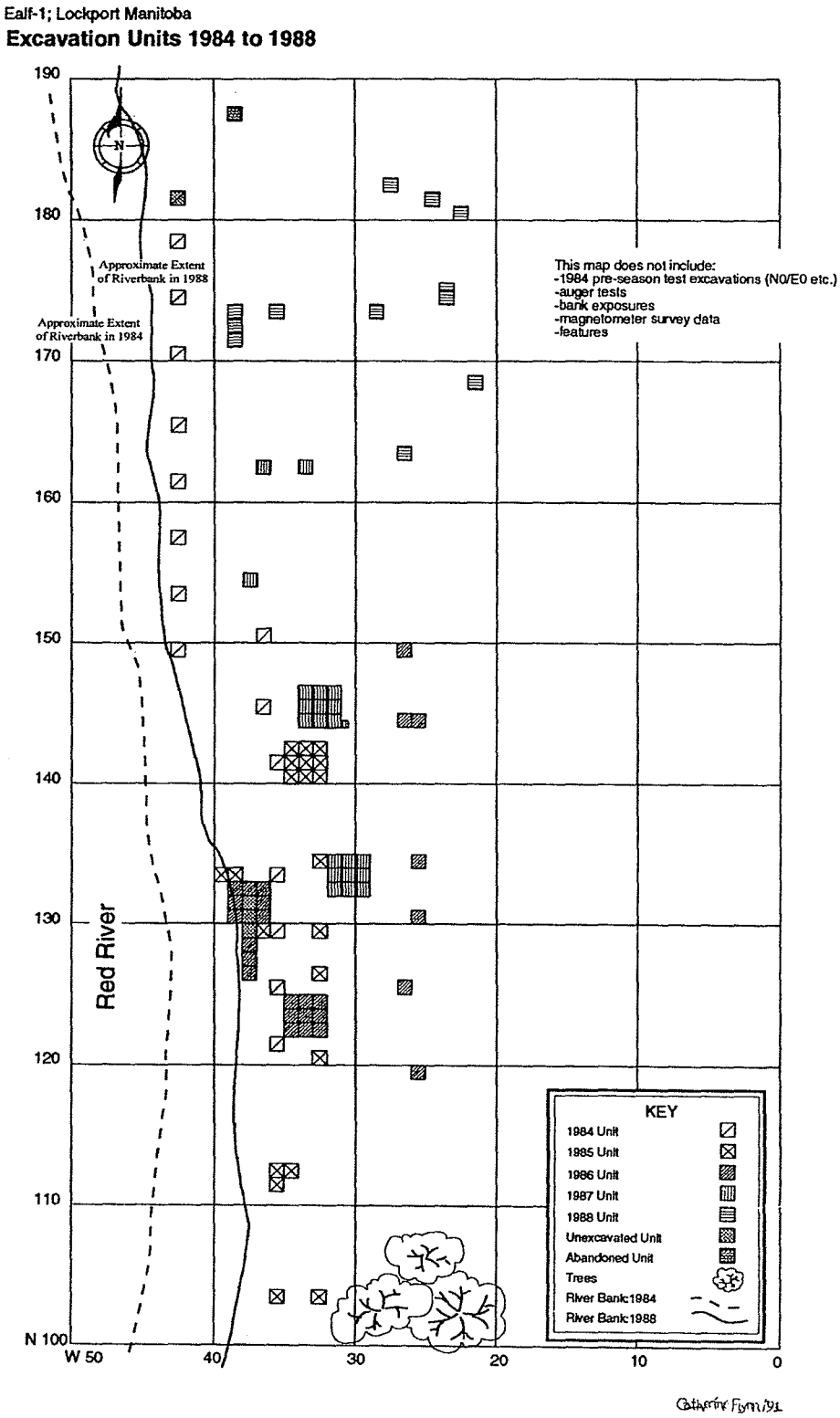


Figure 7: Excavation units at EaLf-1 (1984-1988)

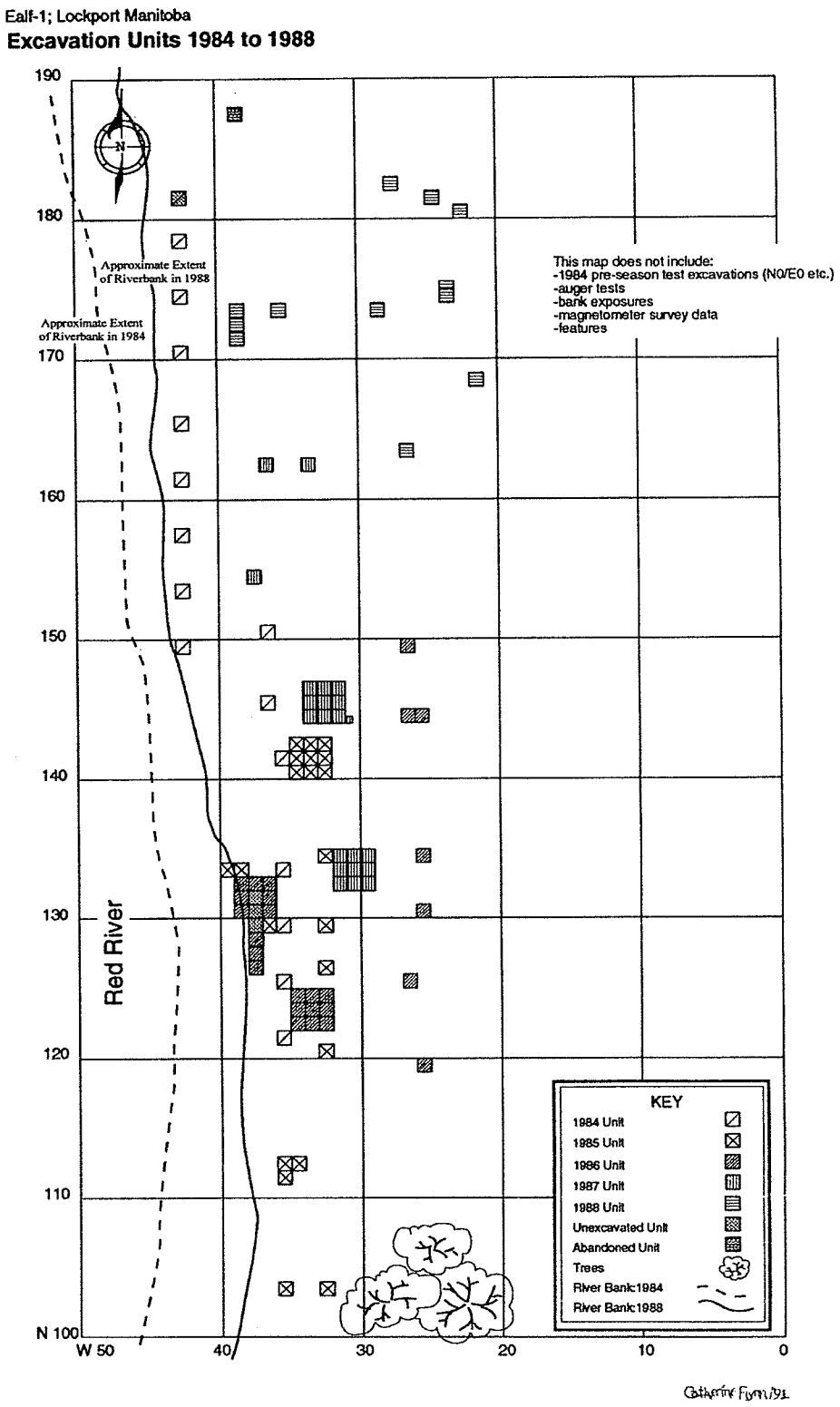


Figure 7: Excavation units at EaLf-1 (1984-1988)

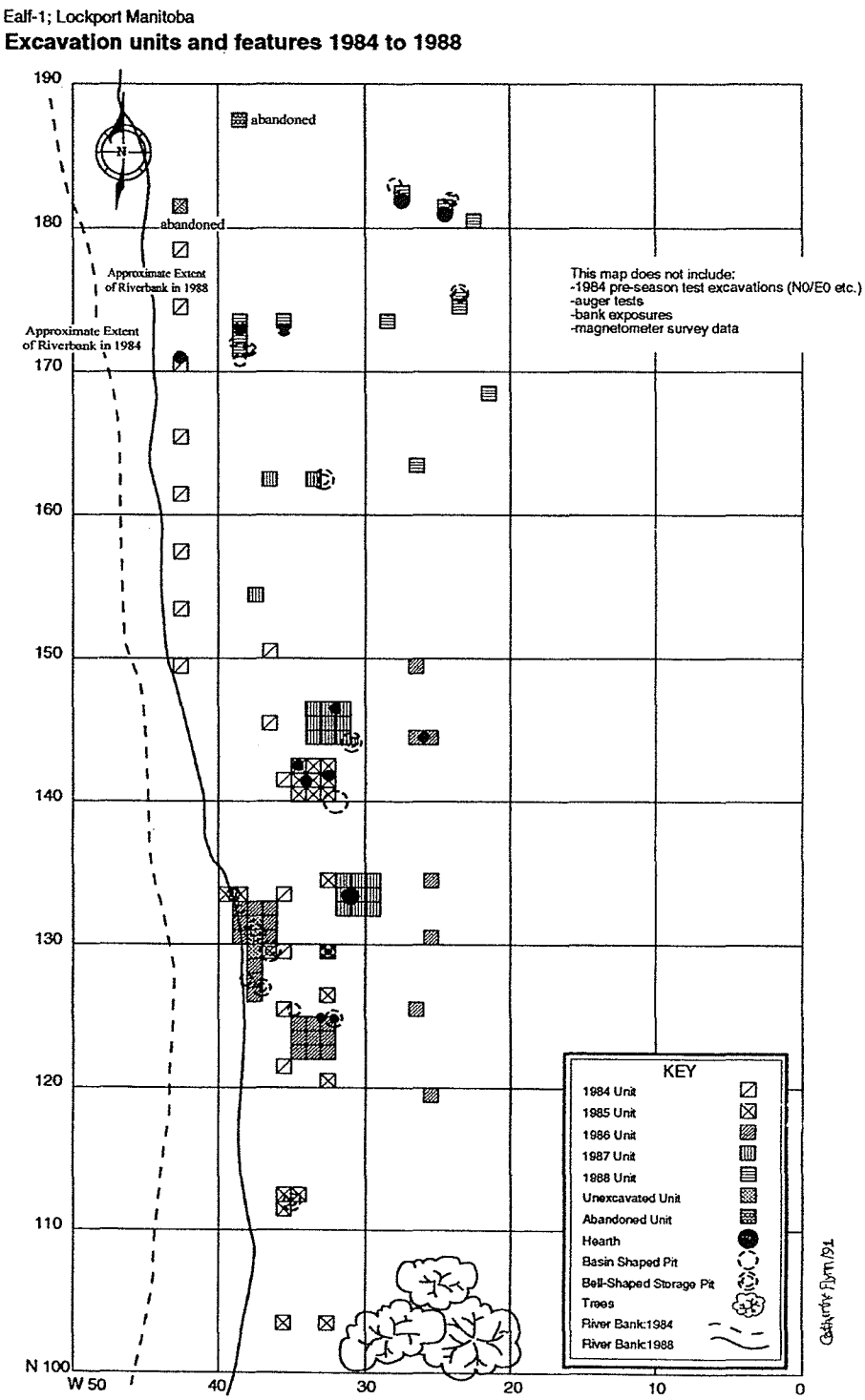


Figure 8: Site map showing all excavation units and features from 1984 to 1988

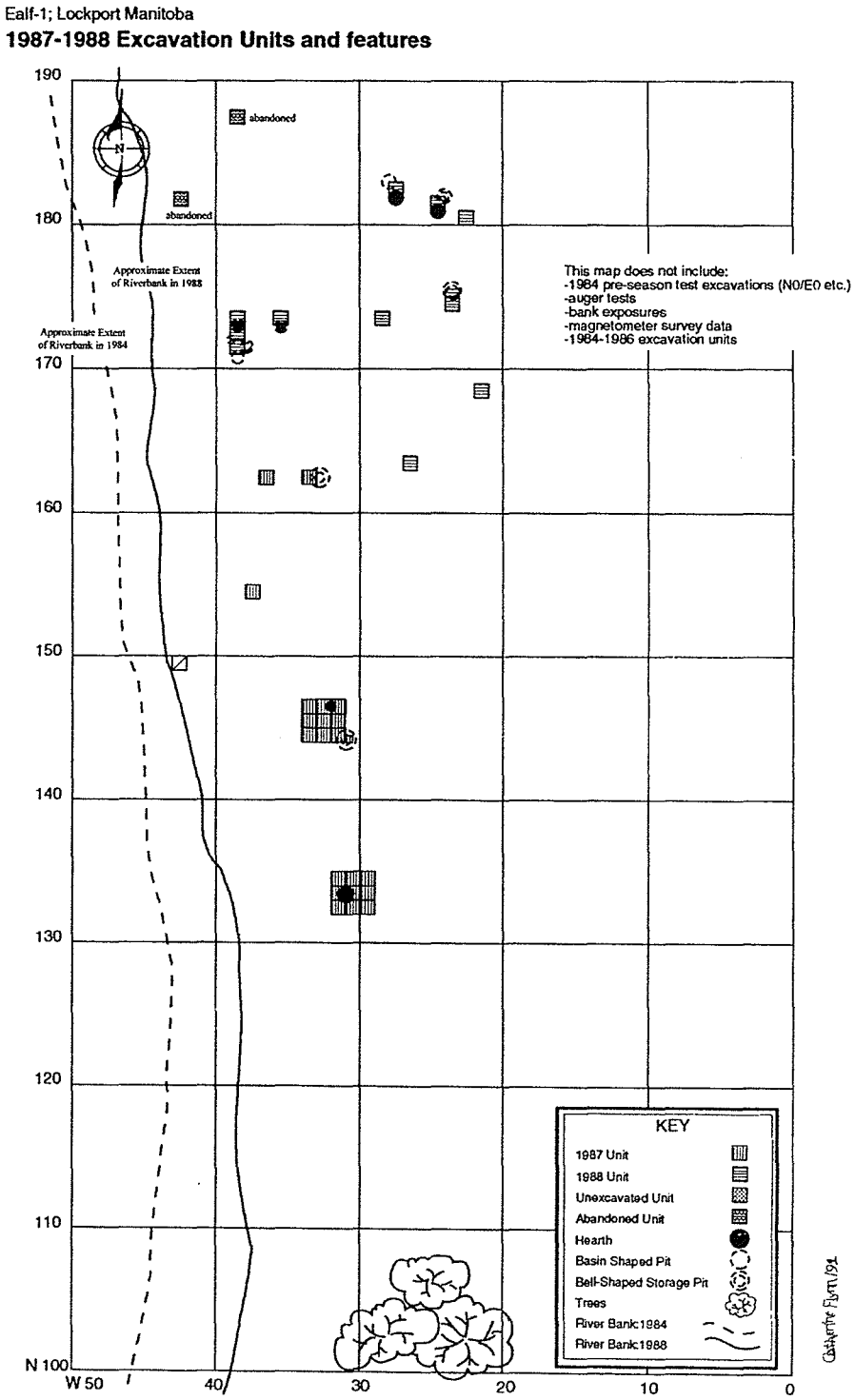


Figure 9: Site map showing all excavation units and features 1987-1988

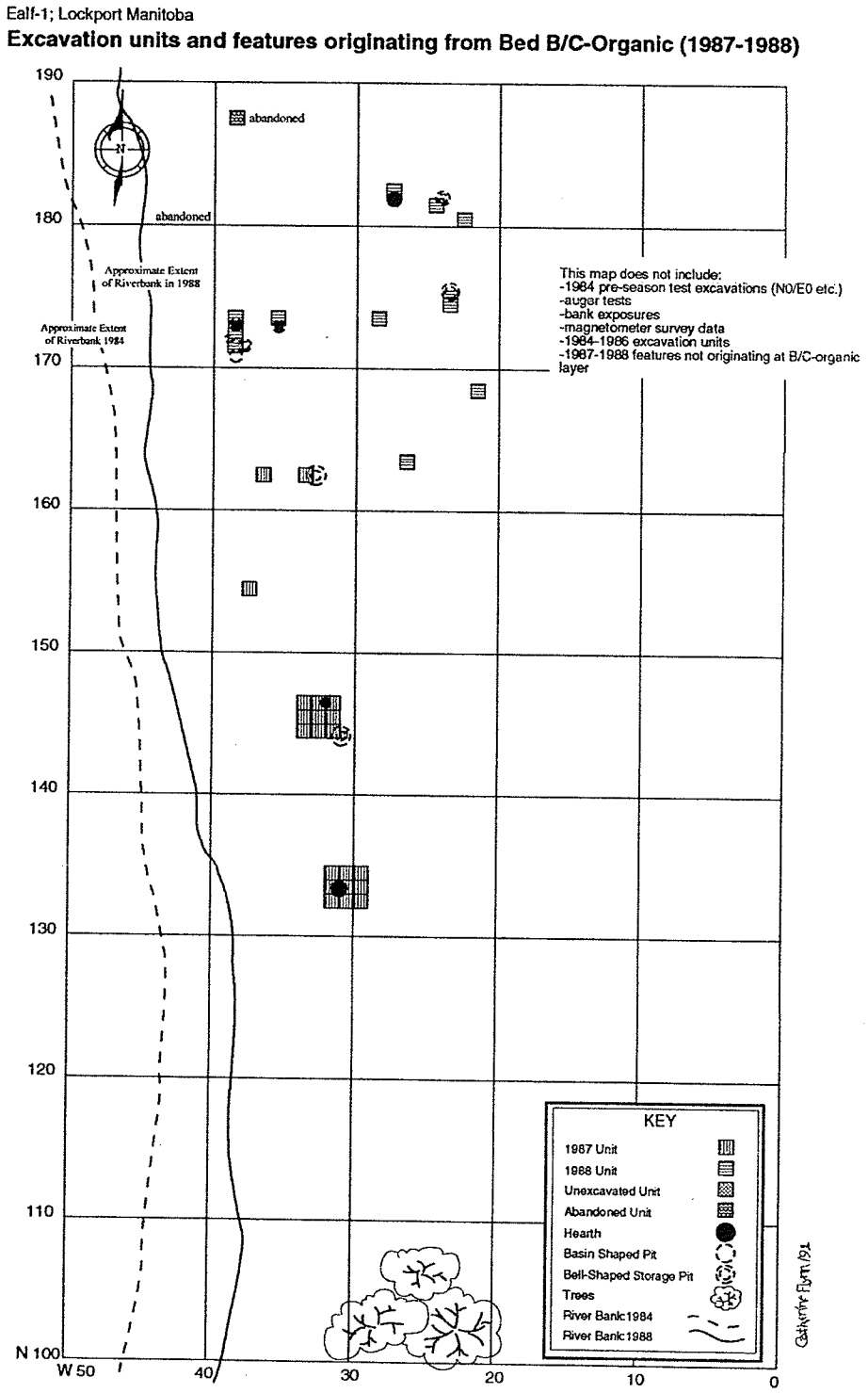


Figure 10: 1987 and 1988 features originating at Bed B/C - Organic Layer

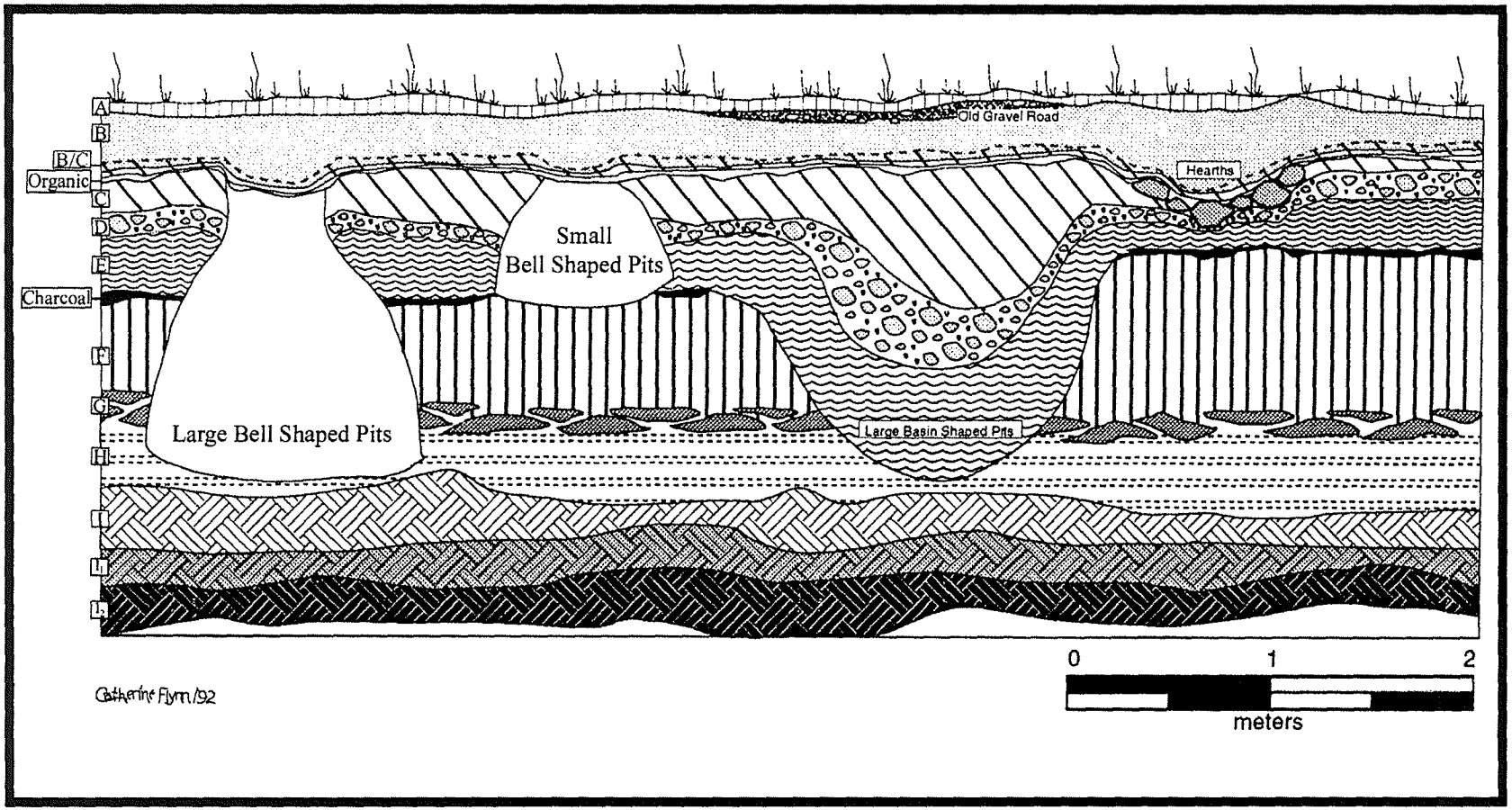


Figure 11: Idealized Lockport (EaLf-1) stratigraphic profile (according to 1987 - 1988 re-interpretation)

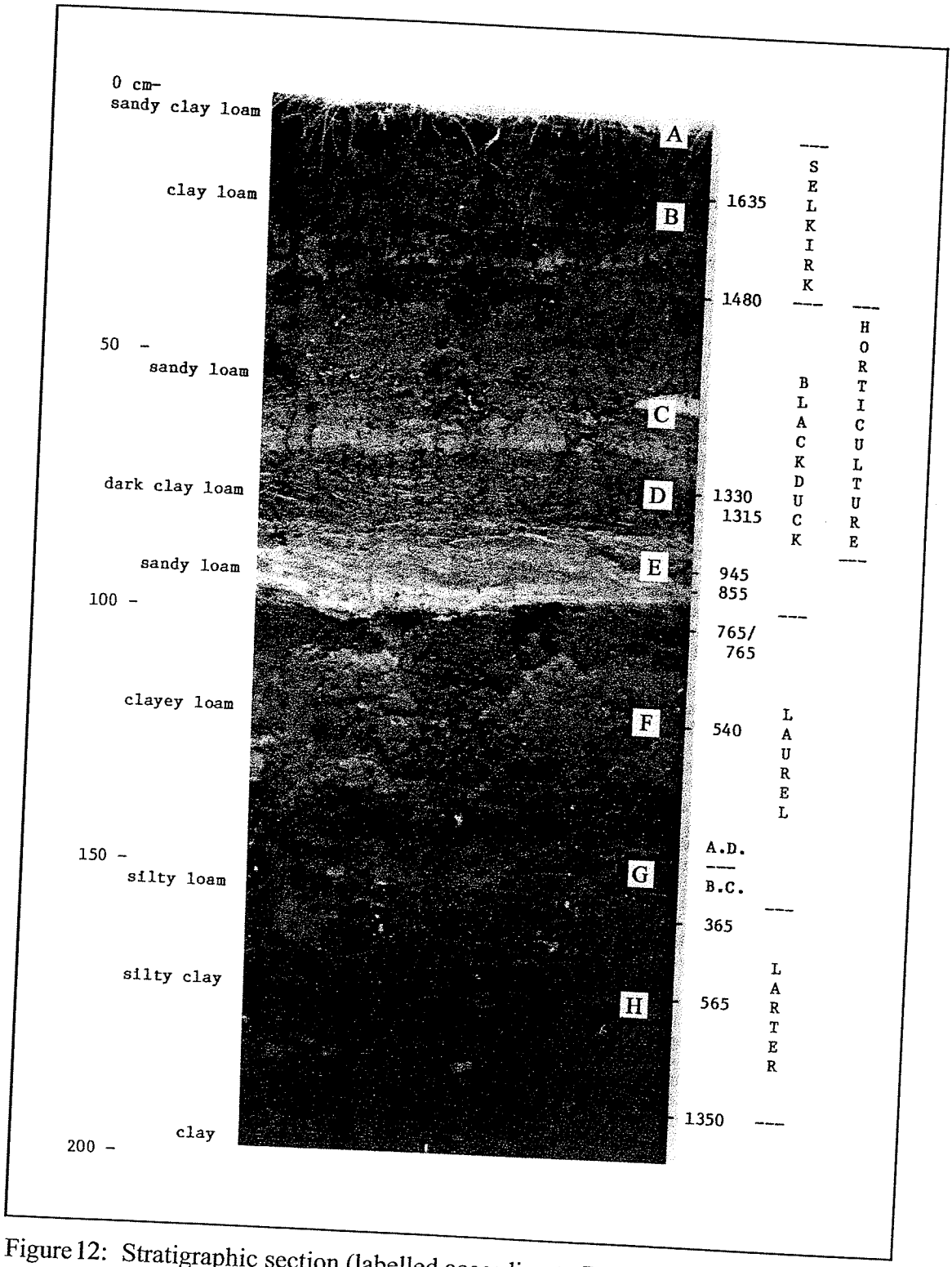


Figure 12: Stratigraphic section (labelled according to Buchner's stratigraphic interpretation) (modified from Buchner 1988).

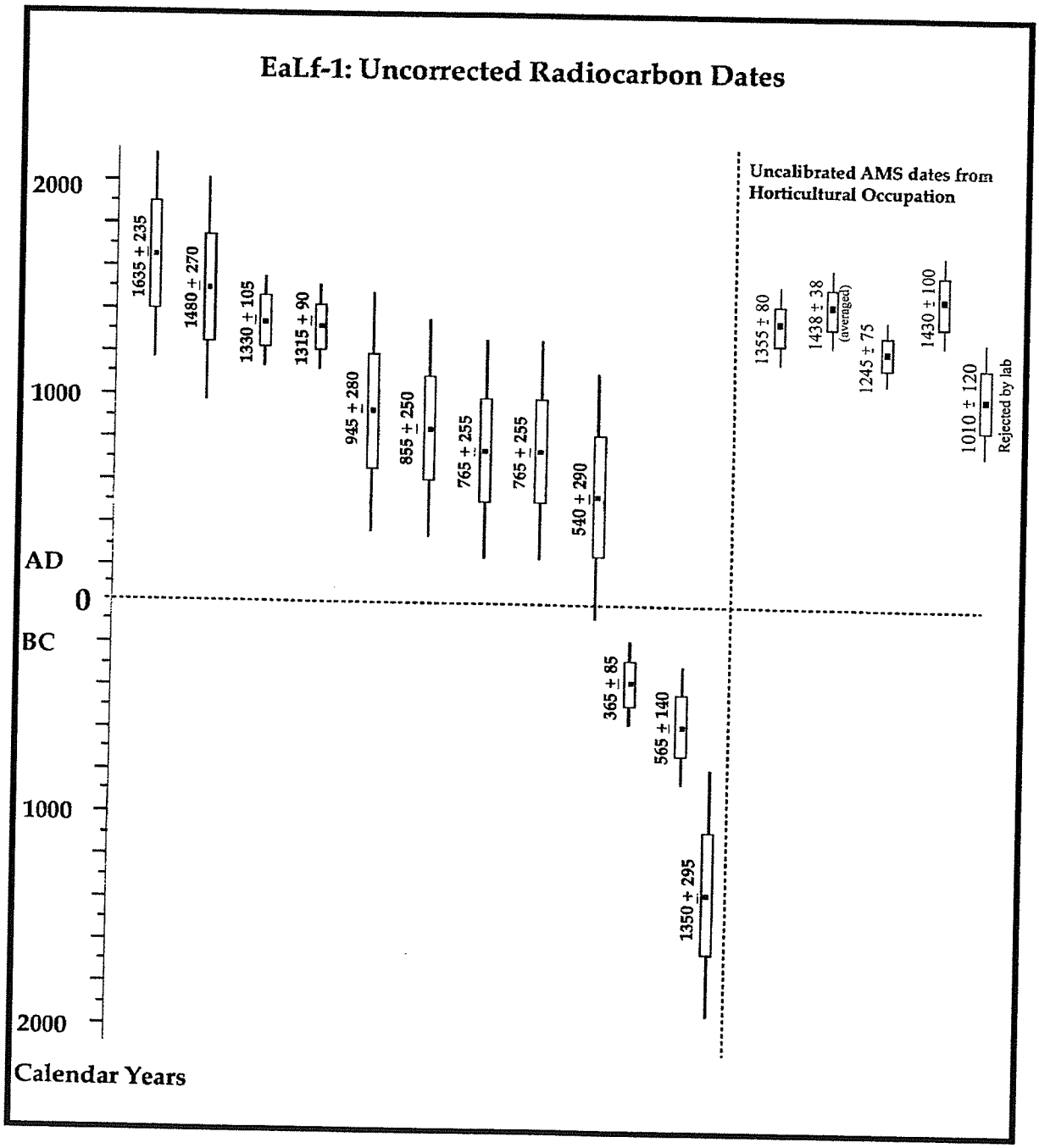


Figure 13: Lockport Site C14 and AMS Dates

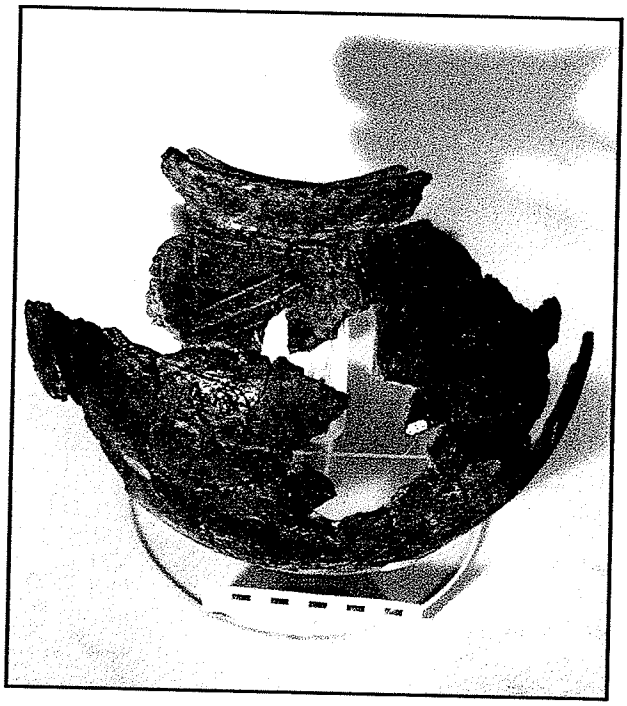


Figure 14: Portion of reconstructed pot showing incised chevron decoration (photographs courtesy of Dr. E.L. Syms, Manitoba Museum)

Figure 15: Portion of a reconstructed pot showing "Tail of a Thunderbird" decoration (photography courtesy of Dr. E.L. Syms, Manitoba Museum)

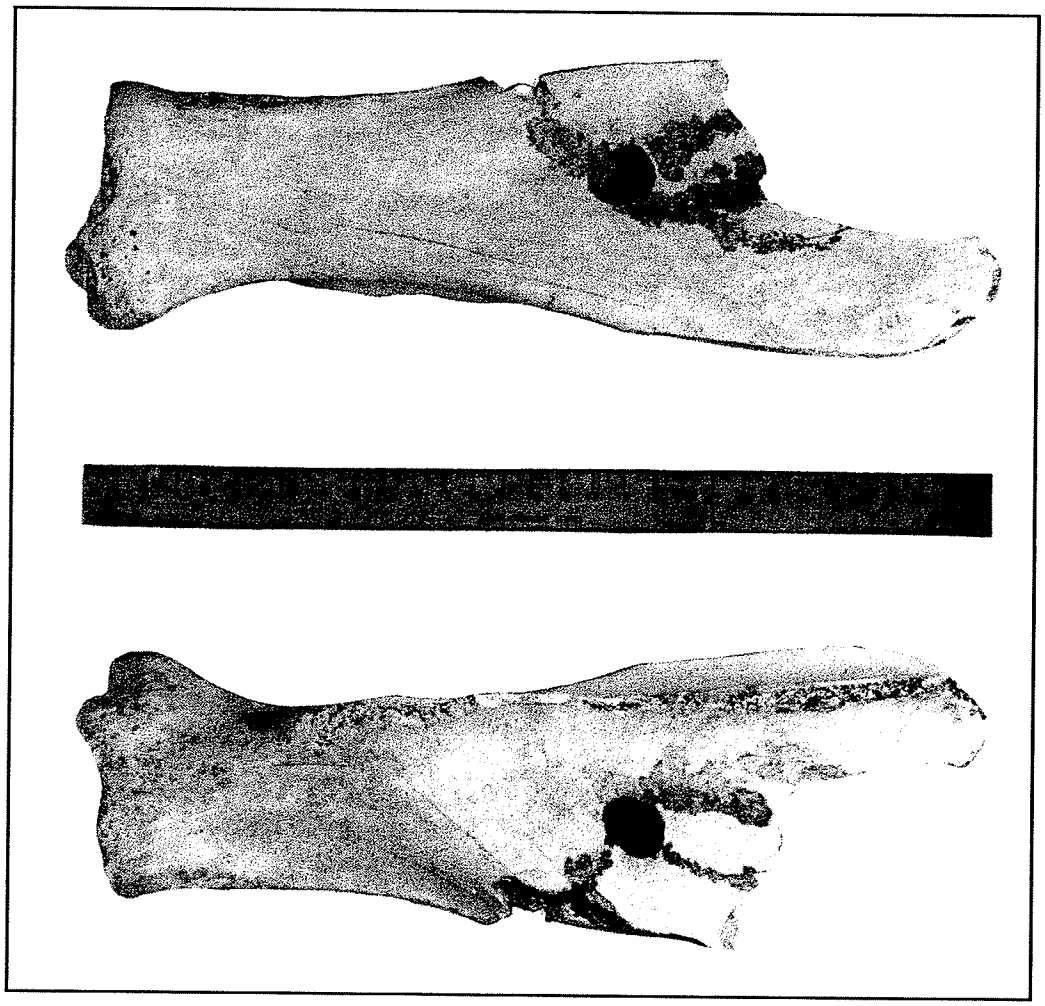


Figure 16: One of the bison scapula hoes from EaLf-1 (Specimen 37832, N162 W43, Level 13, from Roberts 1991:5)

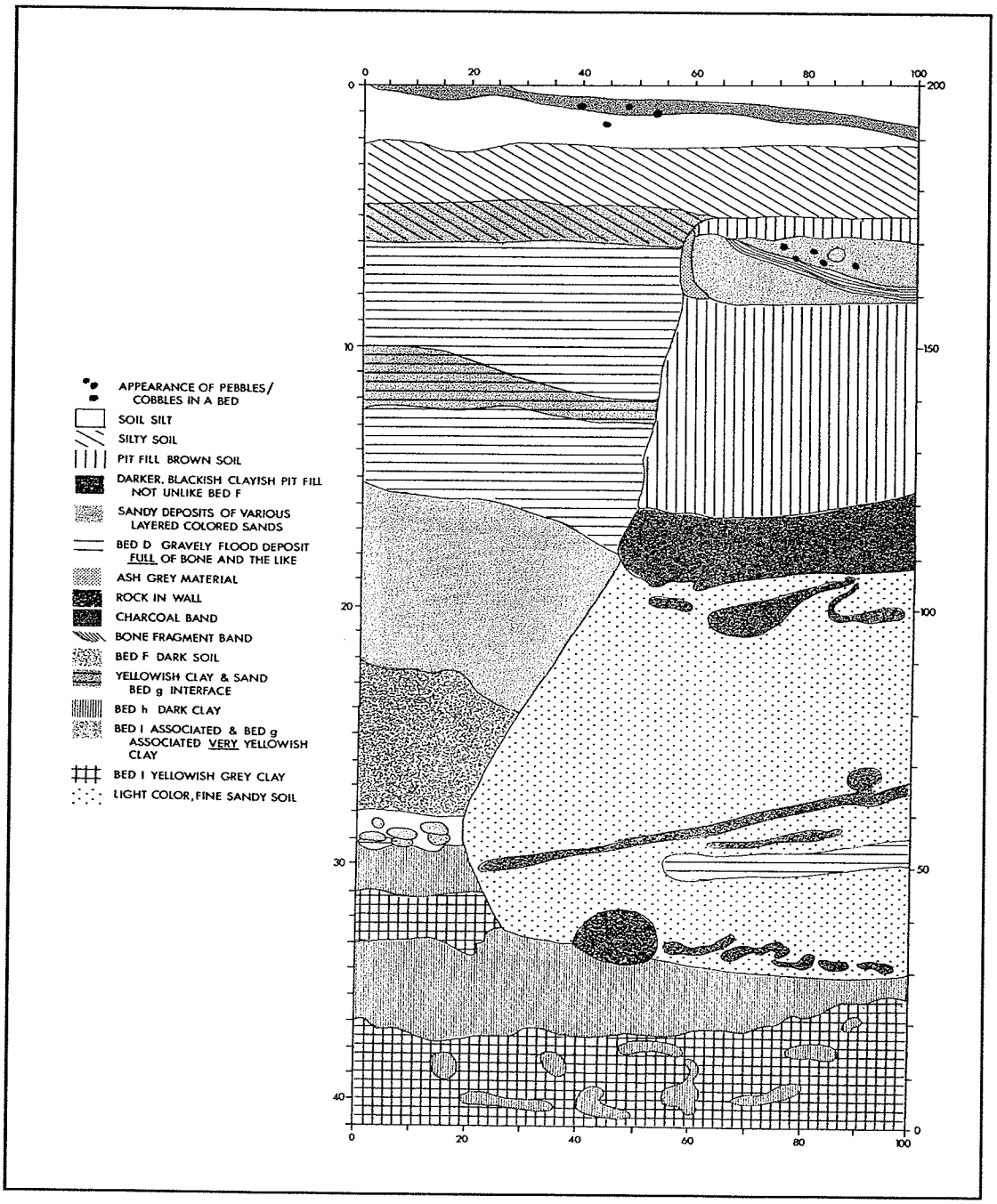


Figure 17: Large bell shaped pit (Feature 7, South Wall) (based on a drawing by C. Trottier)

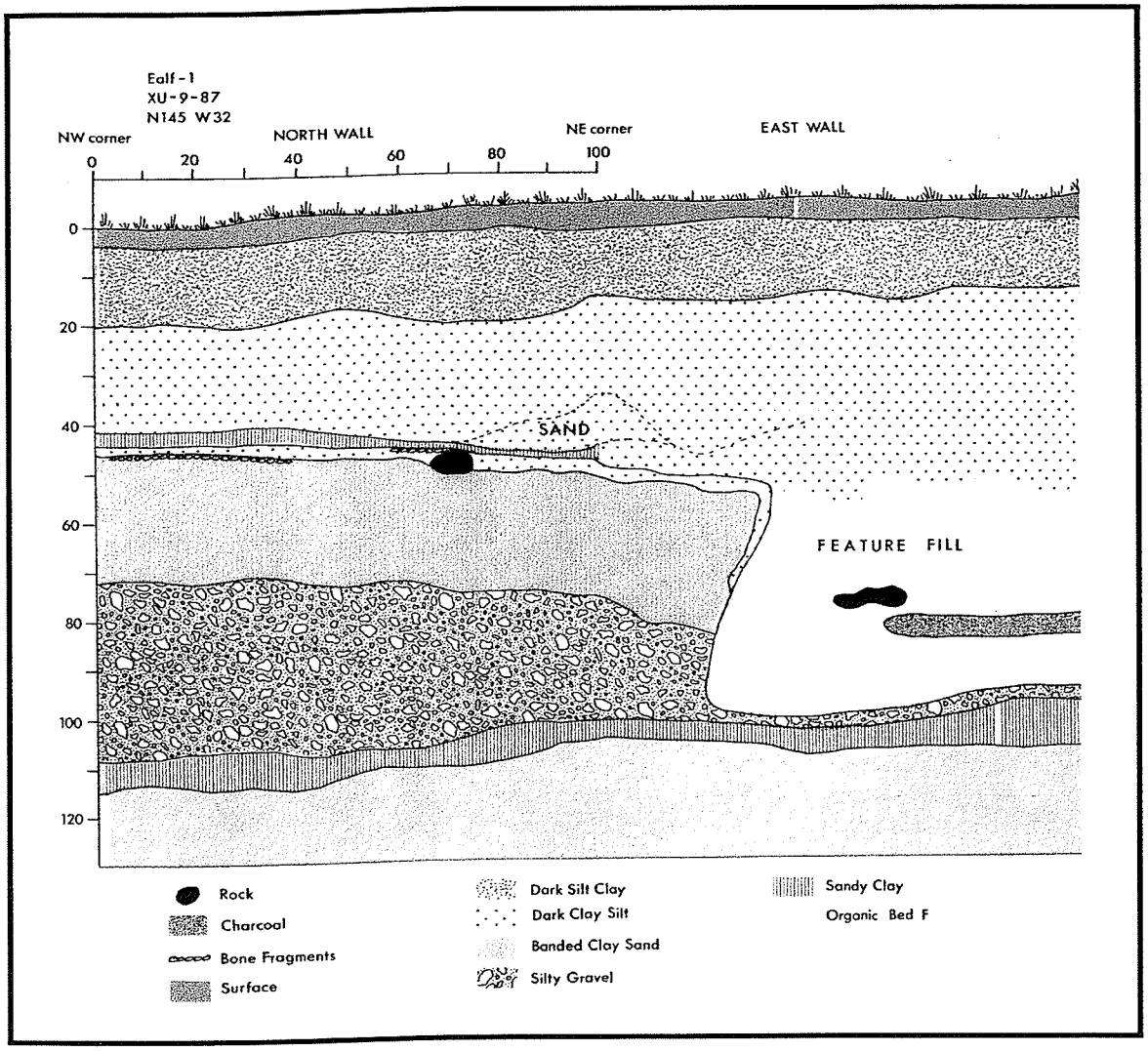


Figure 18: Profile of a small bell shaped pit (based on a drawing by C. Trotier)

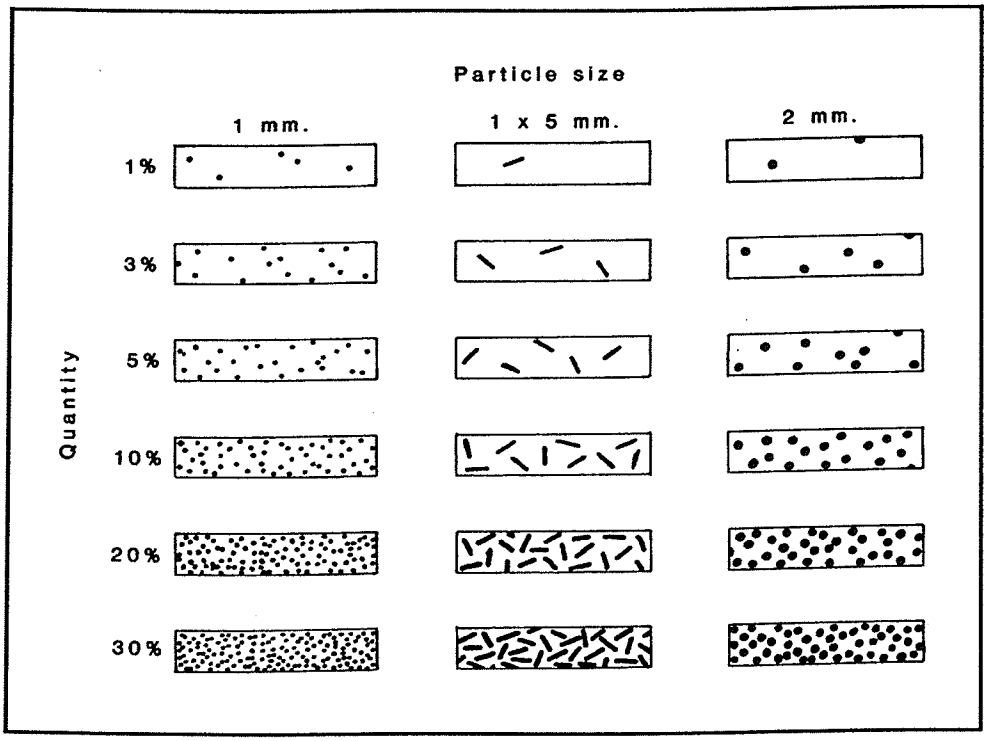


Figure 19: Temper density and particle size (from Rice 1987:349)

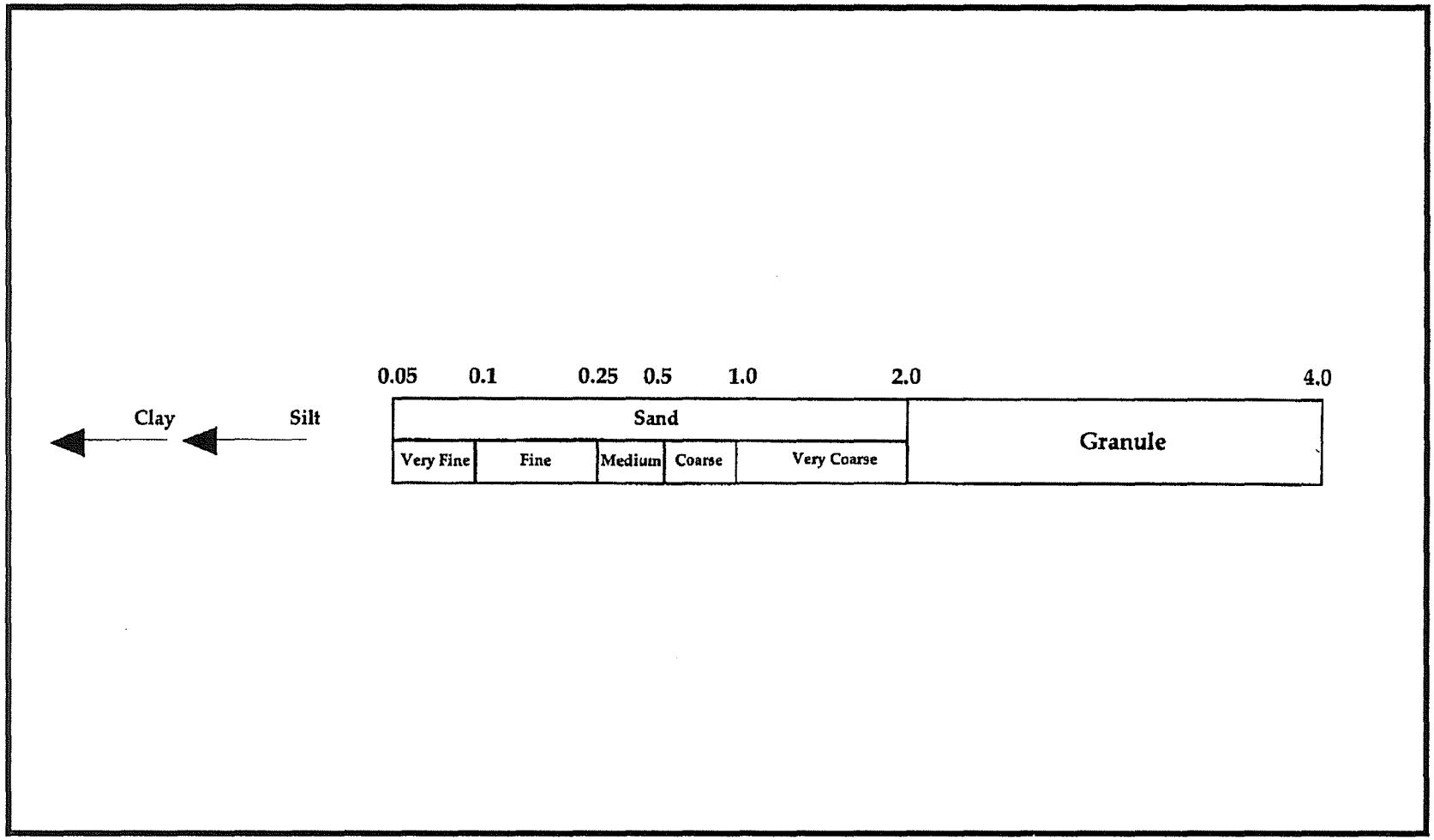


Figure 20: Modified version of the Wenworth Scale of Particle Sizes (based on Rice 1987:38)

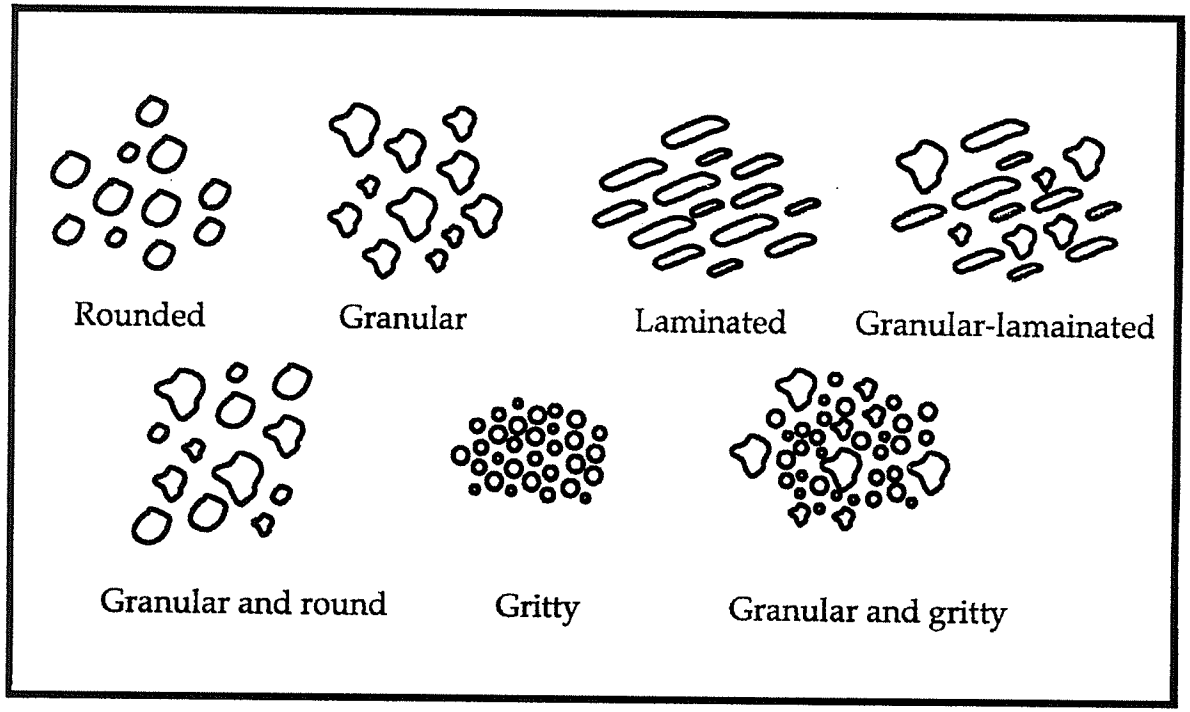


Figure 21: Temper shape

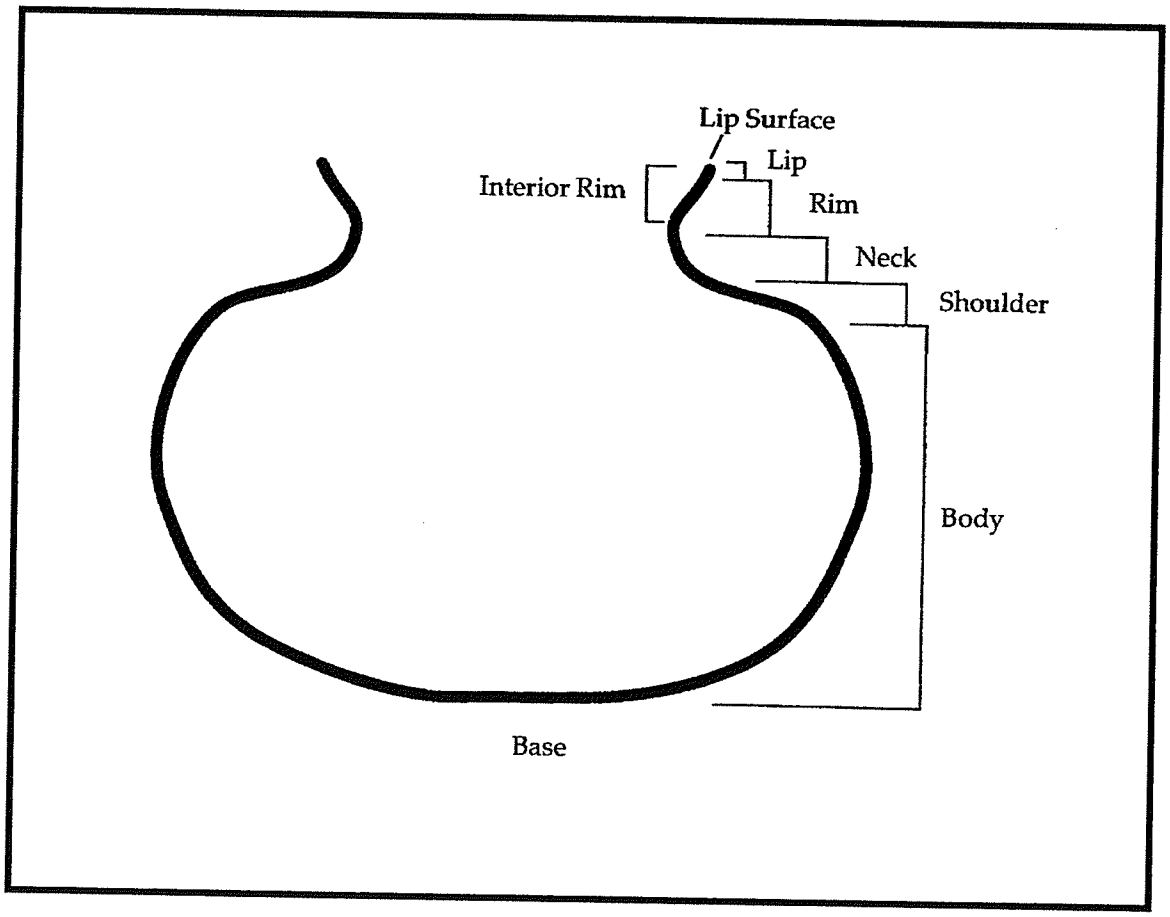


Figure 22: Stylized profile of a precontact ceramic vessel showing major landmarks

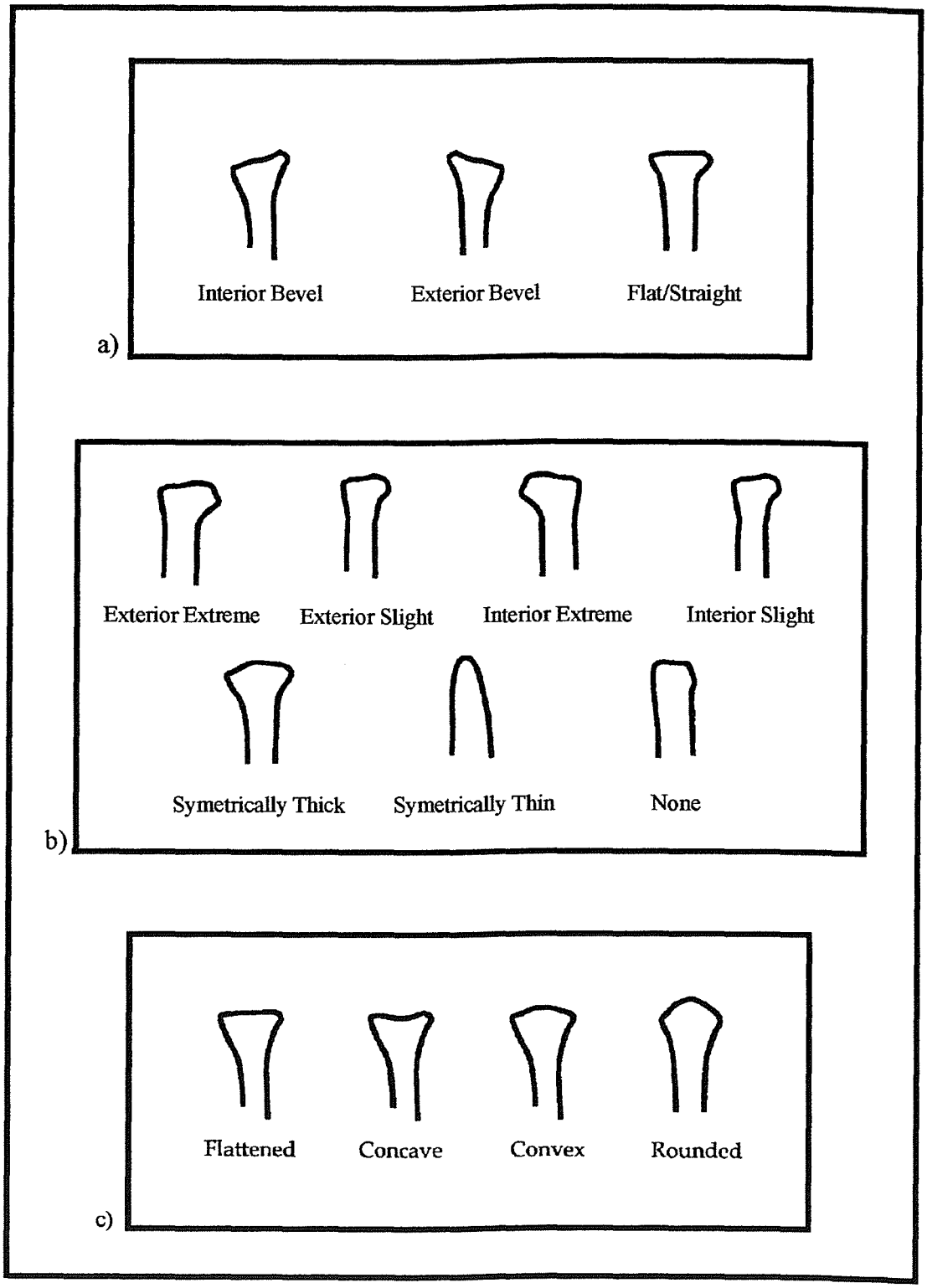
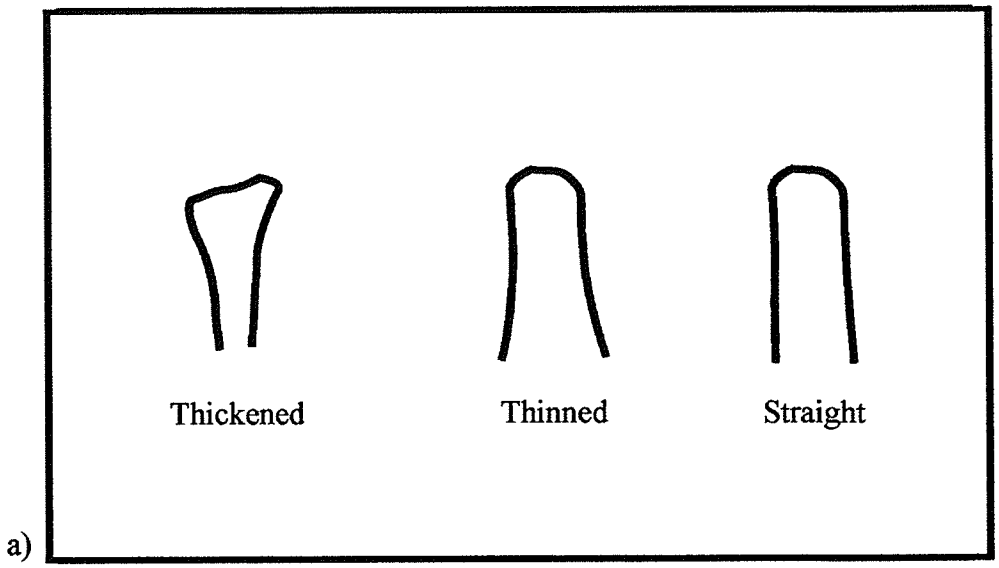
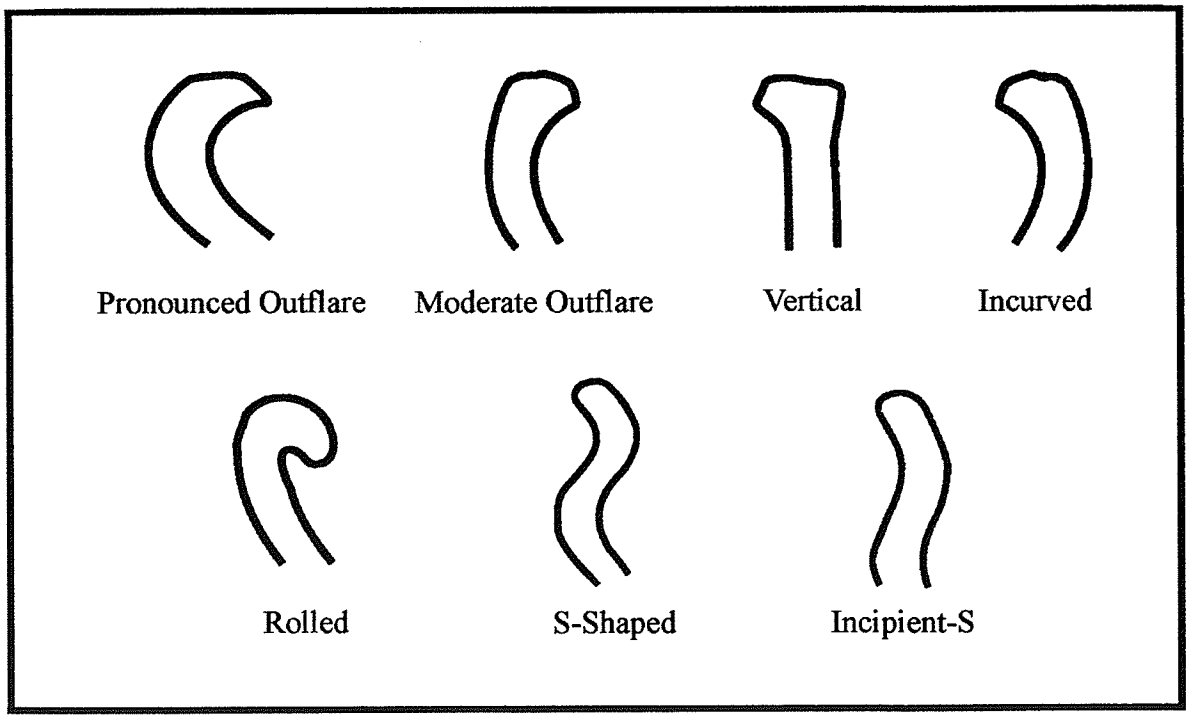


Figure 23: Lip morphology (interior to left) a) orientation; b) eversion; c) surface



a)



b)

Figure 24: Stylized rim profiles (vessel interior to left) found on precontact ceramic vessels showing decorative zones a) rim shape; b) rim orientation

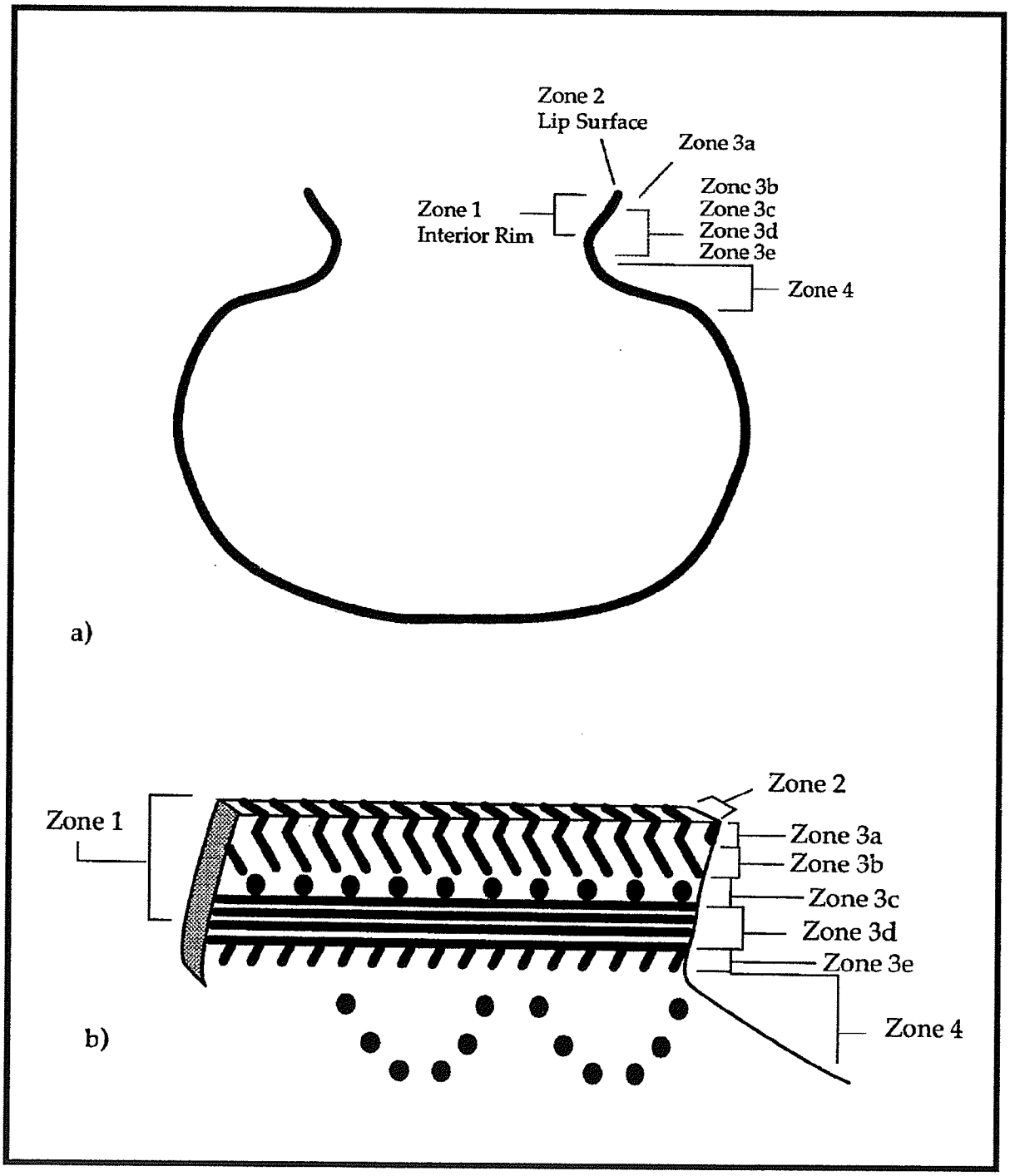


Figure 25: Stylized profile of a precontact ceramic vessel showing a) general vessel profile; b) decorative zones on vessel

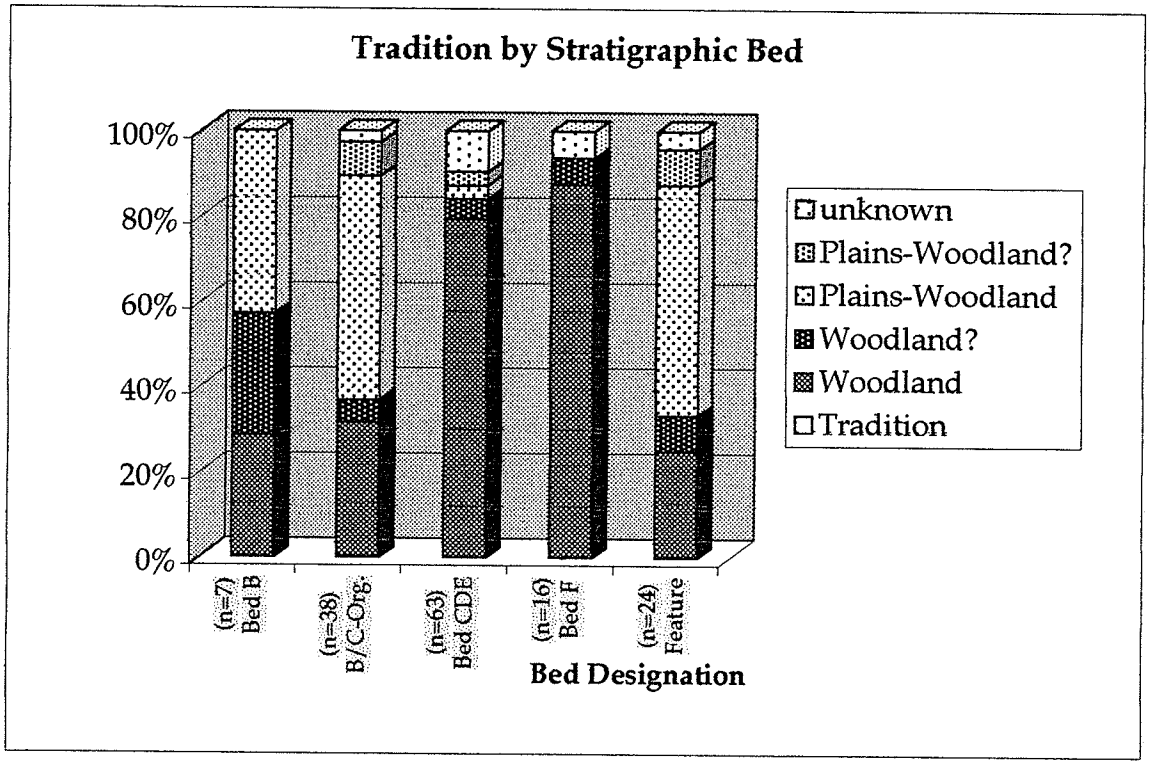


Figure 26: Ceramic tradition by stratigraphic bed

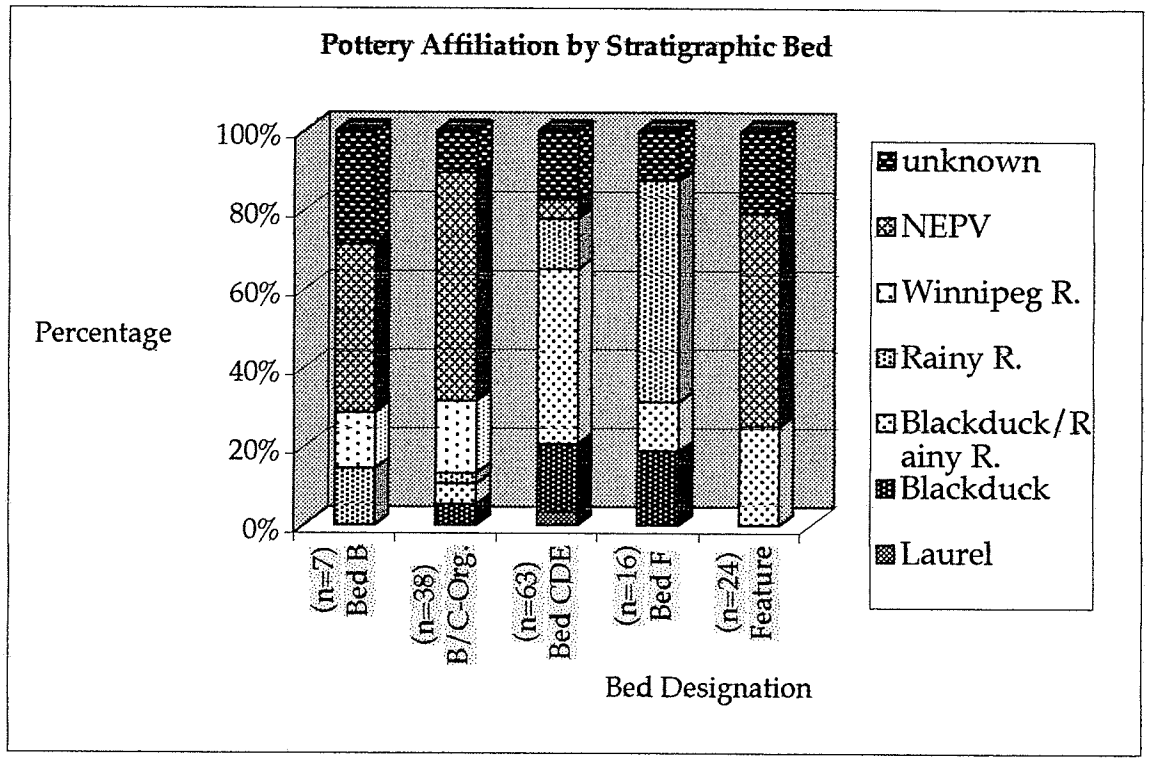


Figure 27: Pottery affiliation by stratigraphic bed

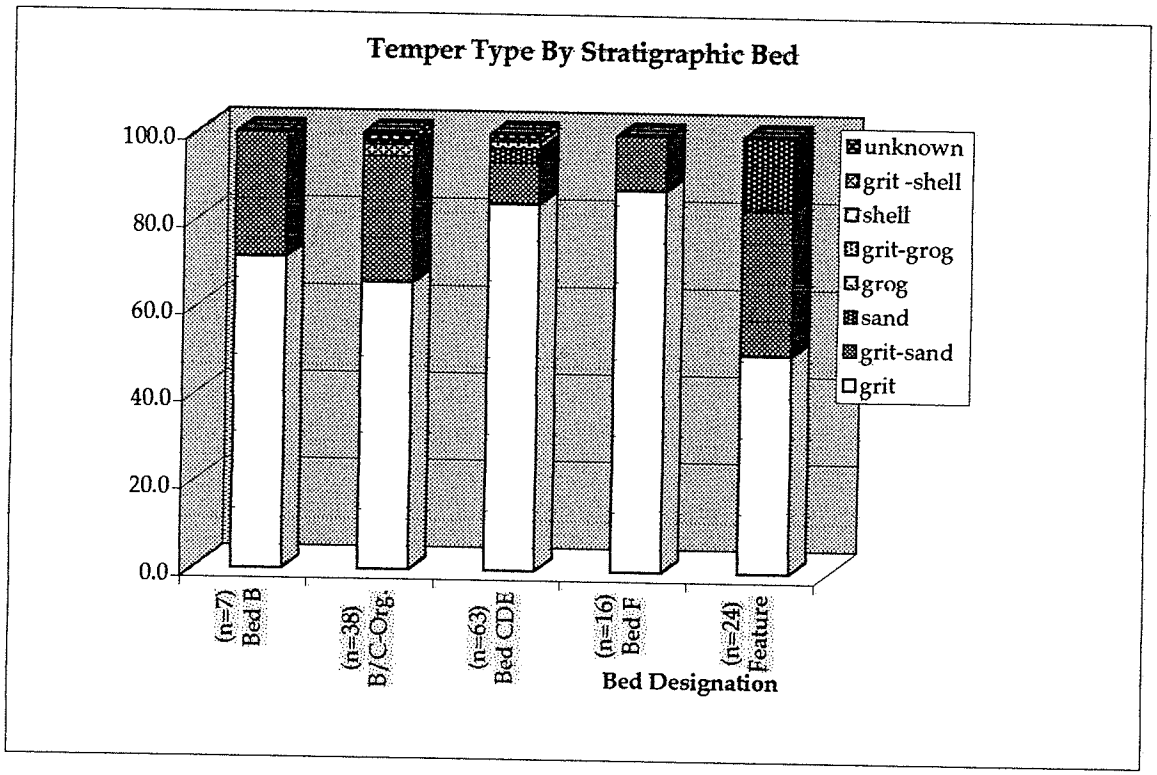


Figure 28: Temper type by stratigraphic bed

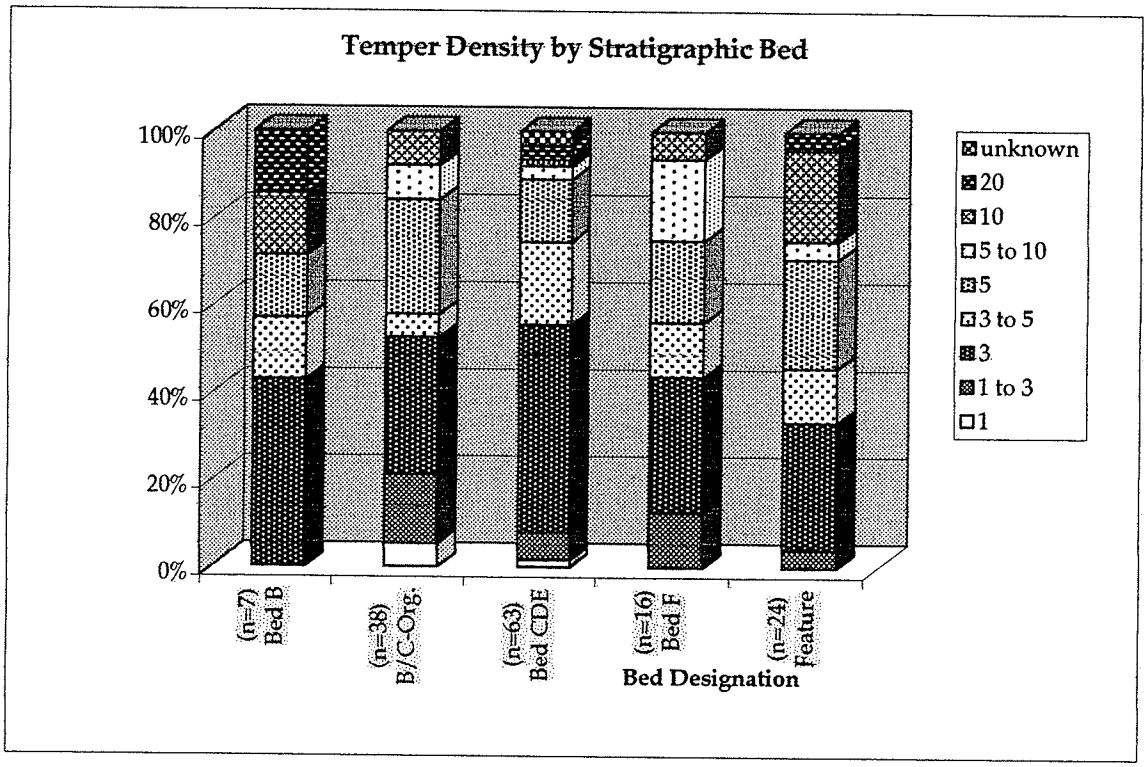


Figure 29: Temper density by stratigraphic bed

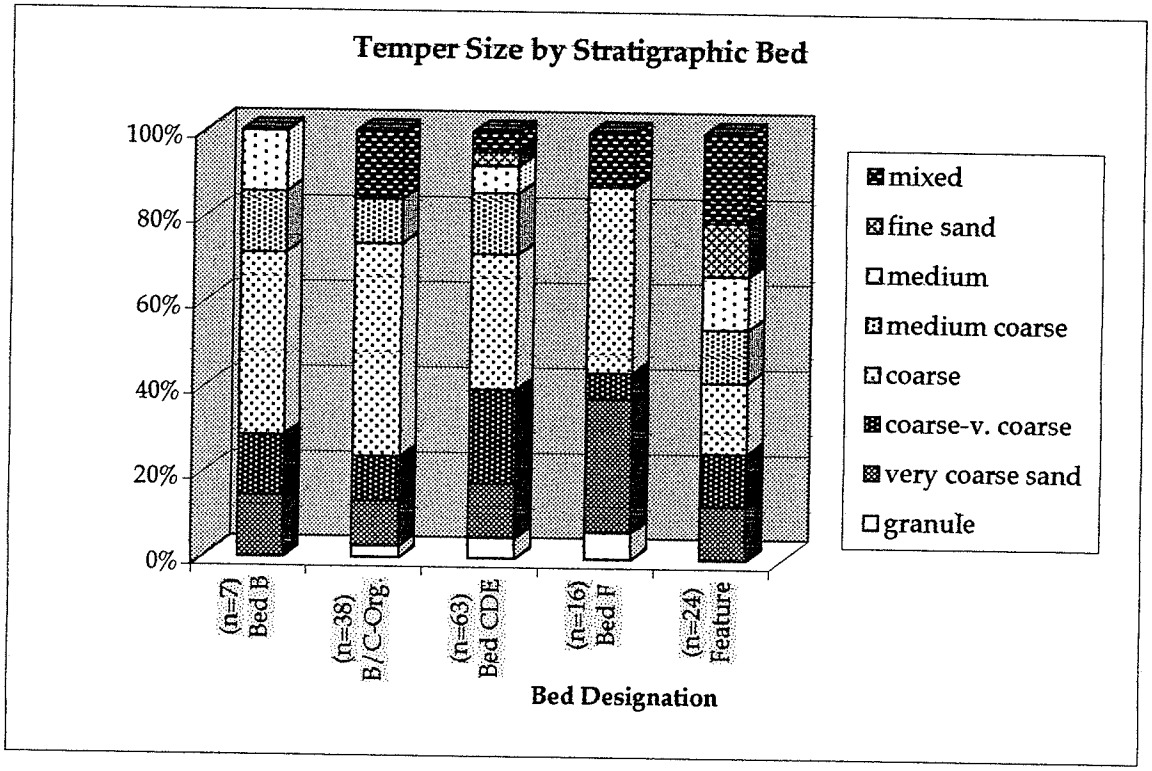


Figure 30: Temper size by stratigraphic bed

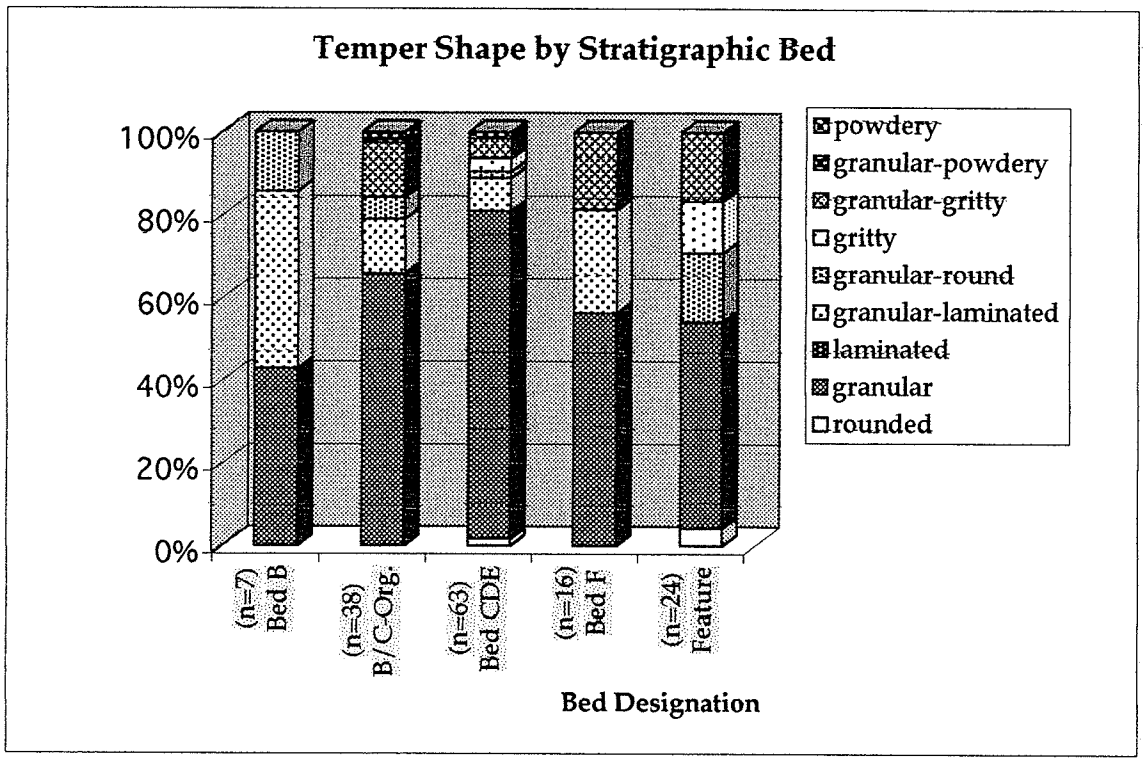


Figure 31:Temper shape by stratigraphic bed

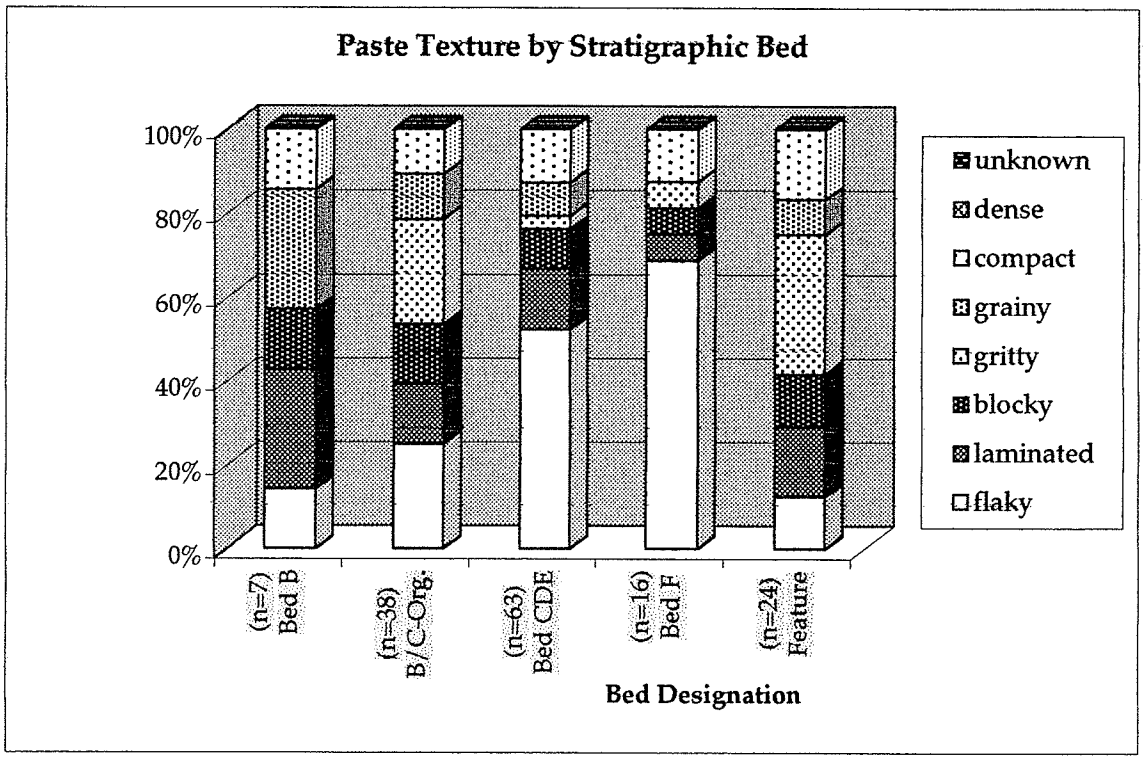
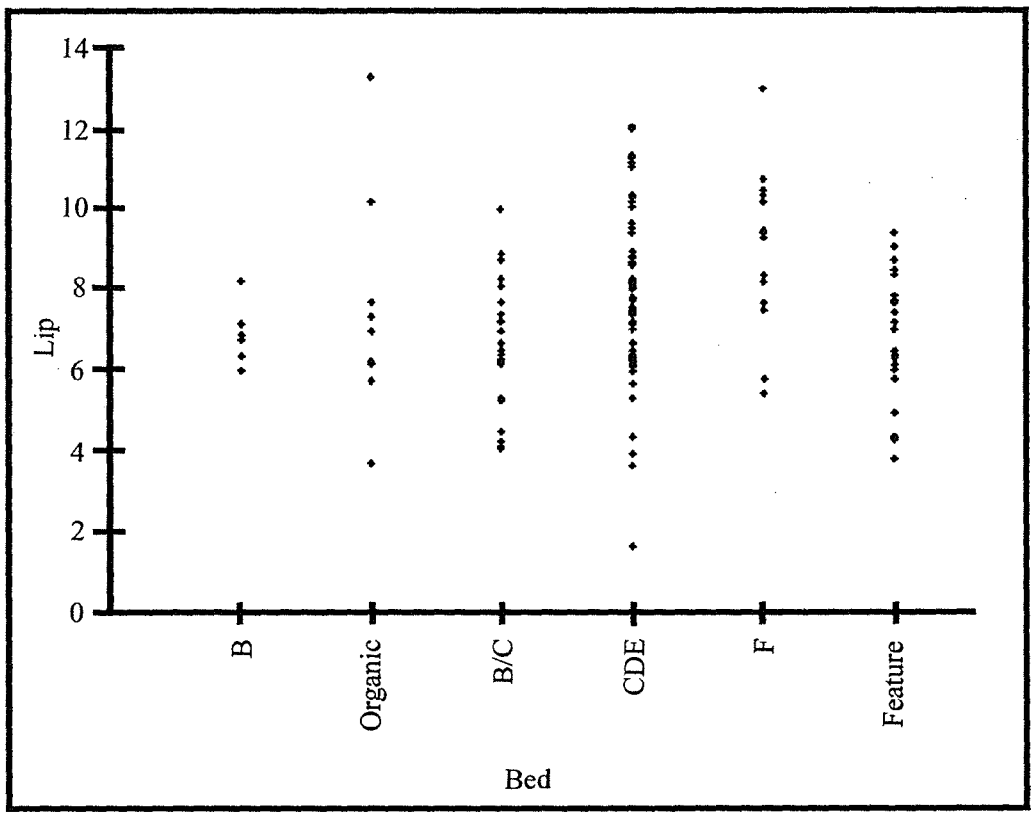
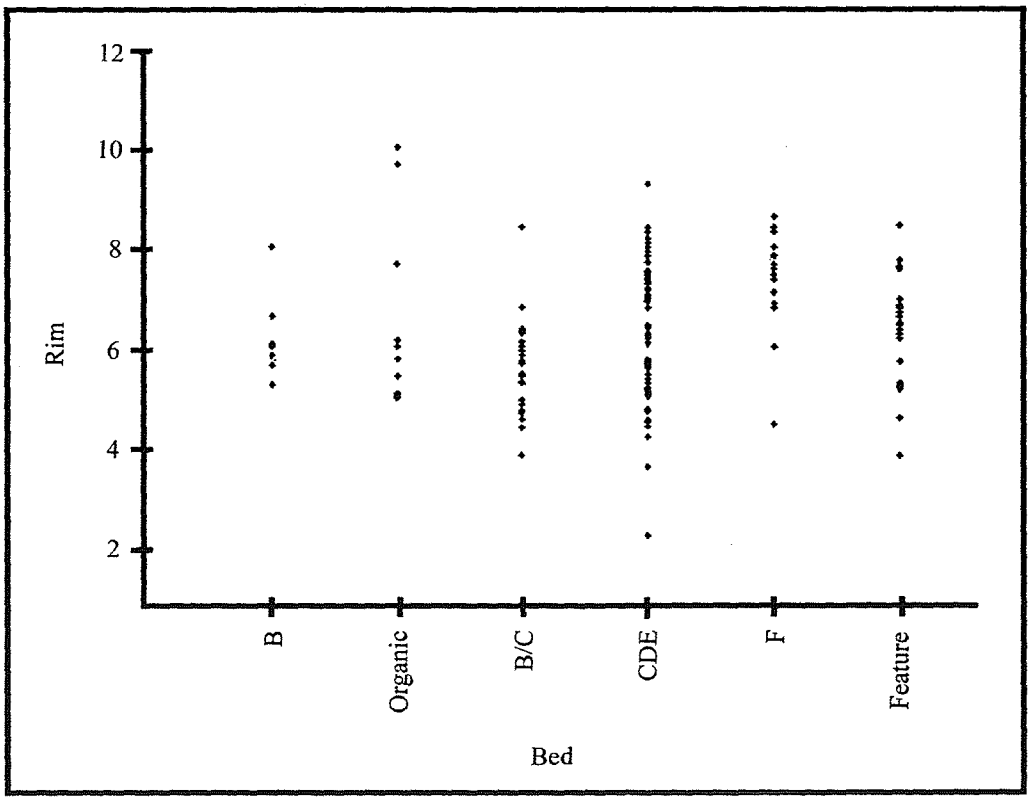


Figure 32: Paste texture by stratigraphic bed



a)



b)

Figure 33: a) Lip Thickness; b) Rim Thickness

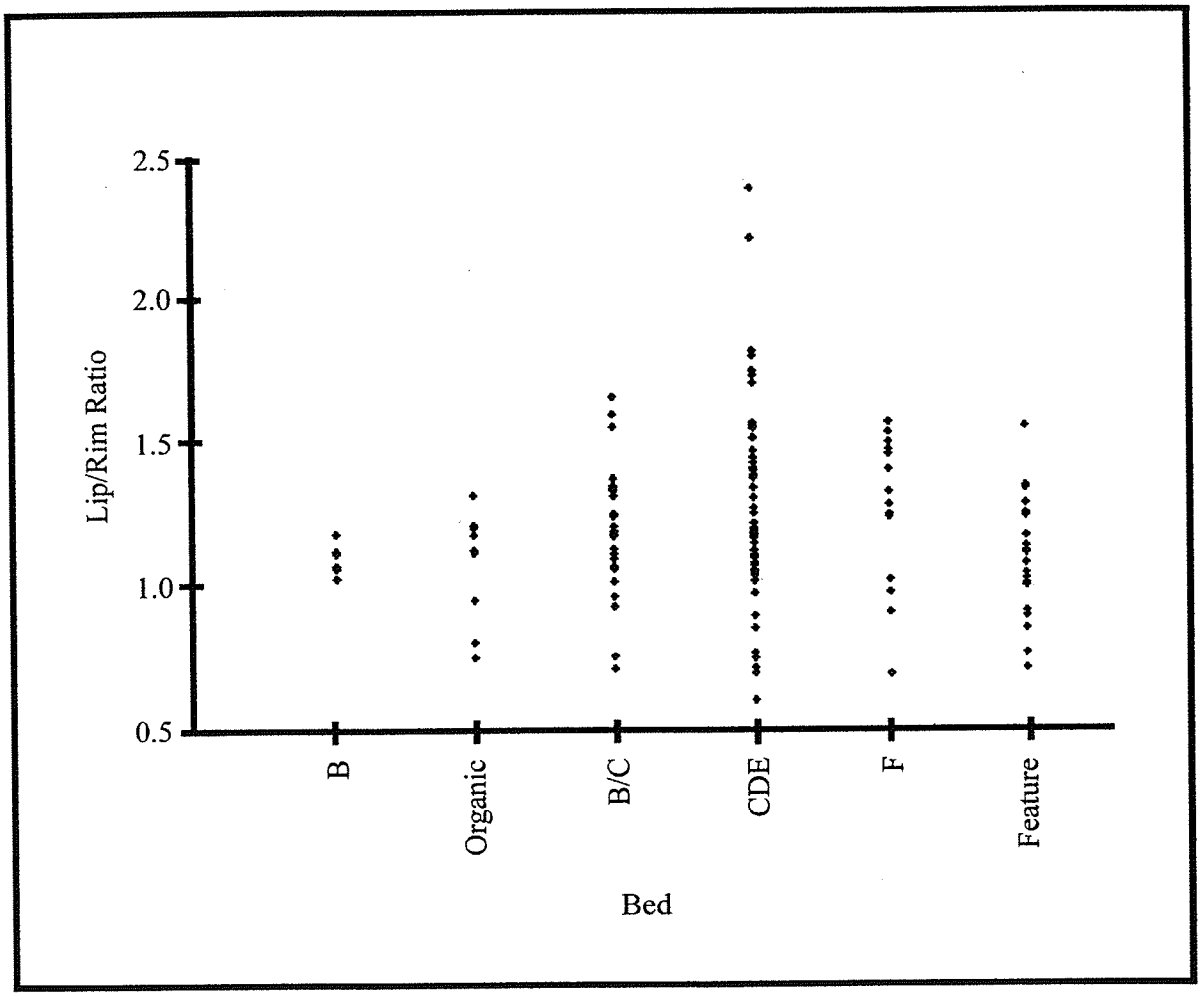


Figure 34: Lip and rim thickness ratio by stratigraphic bed

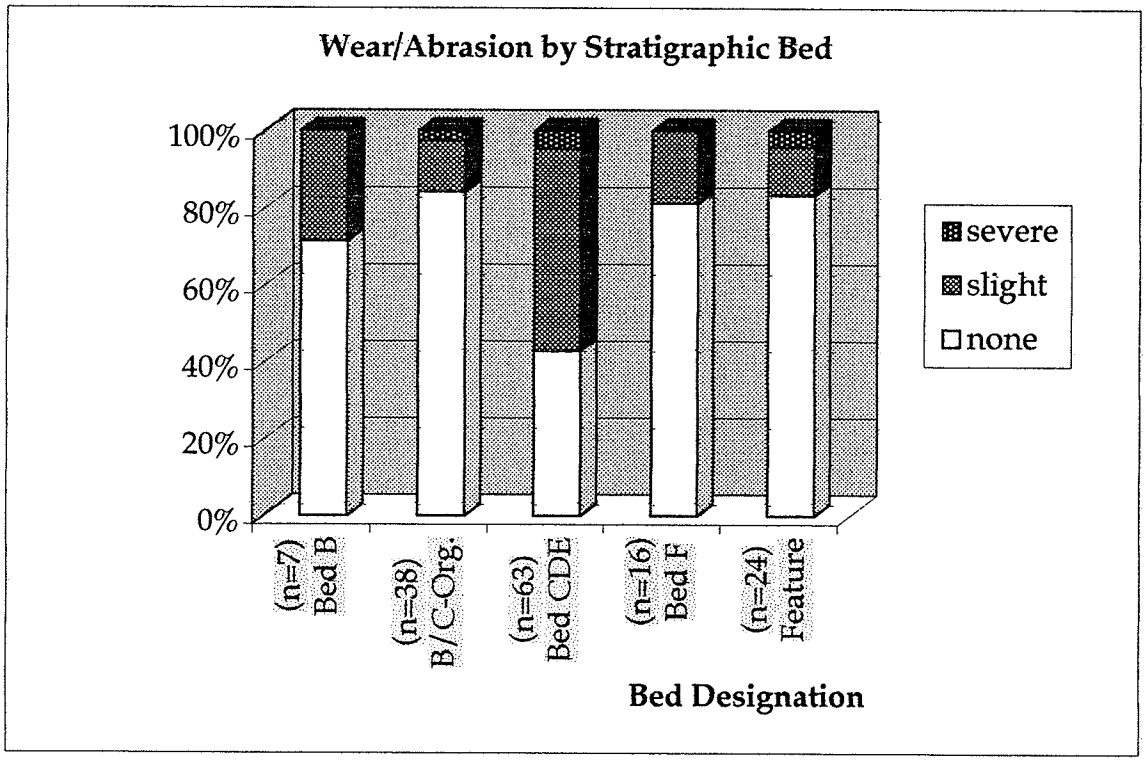


Figure 35: Wear/Abrasion by stratigraphic bed

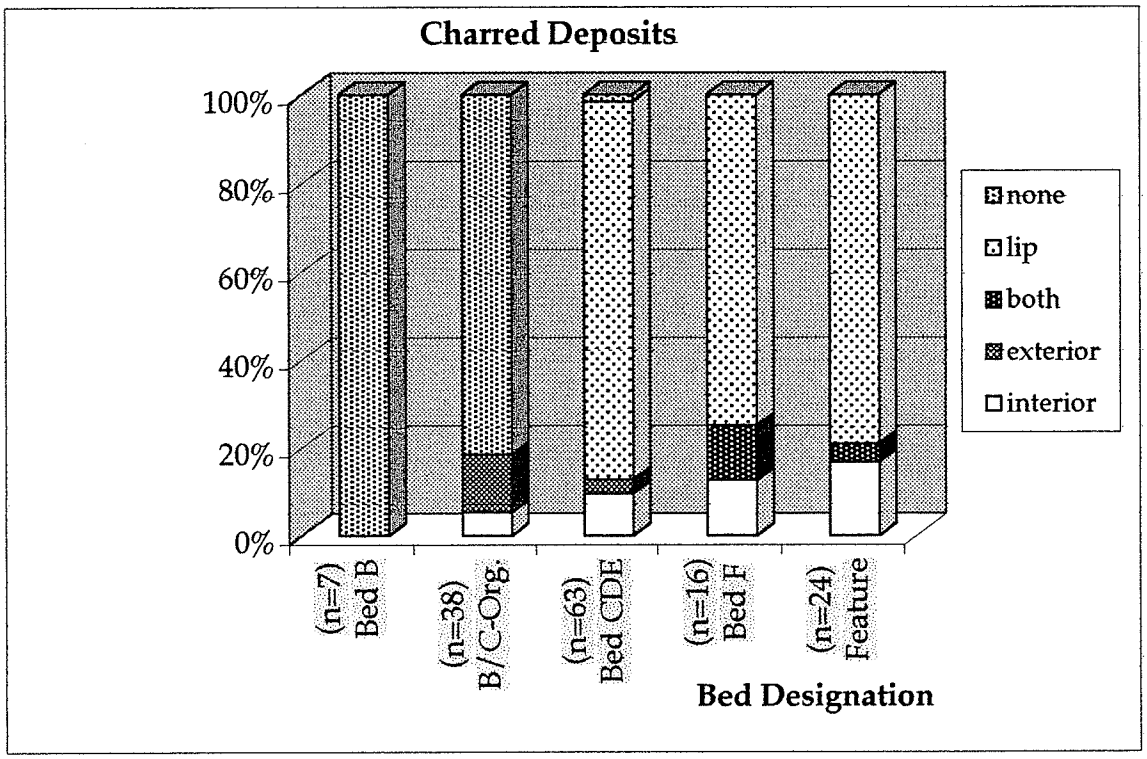


Figure 36: Charred deposits by stratigraphic bed

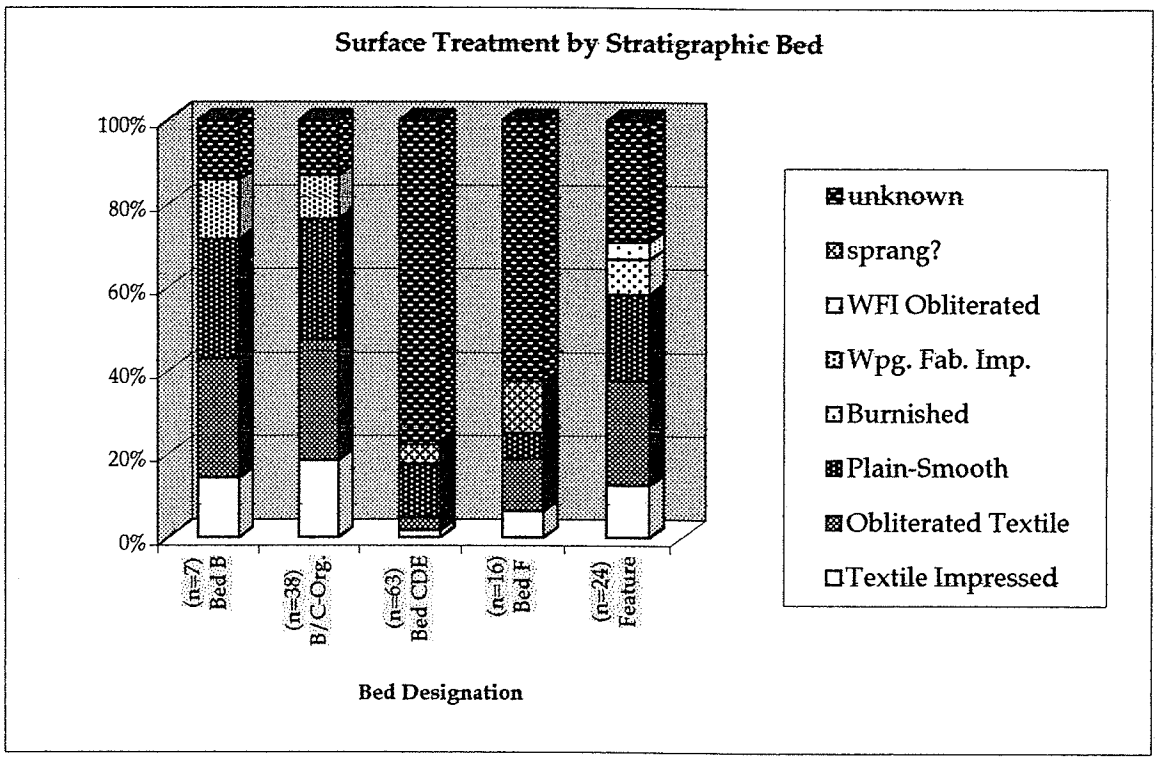


Figure 37: Surface treatment by stratigraphic bed

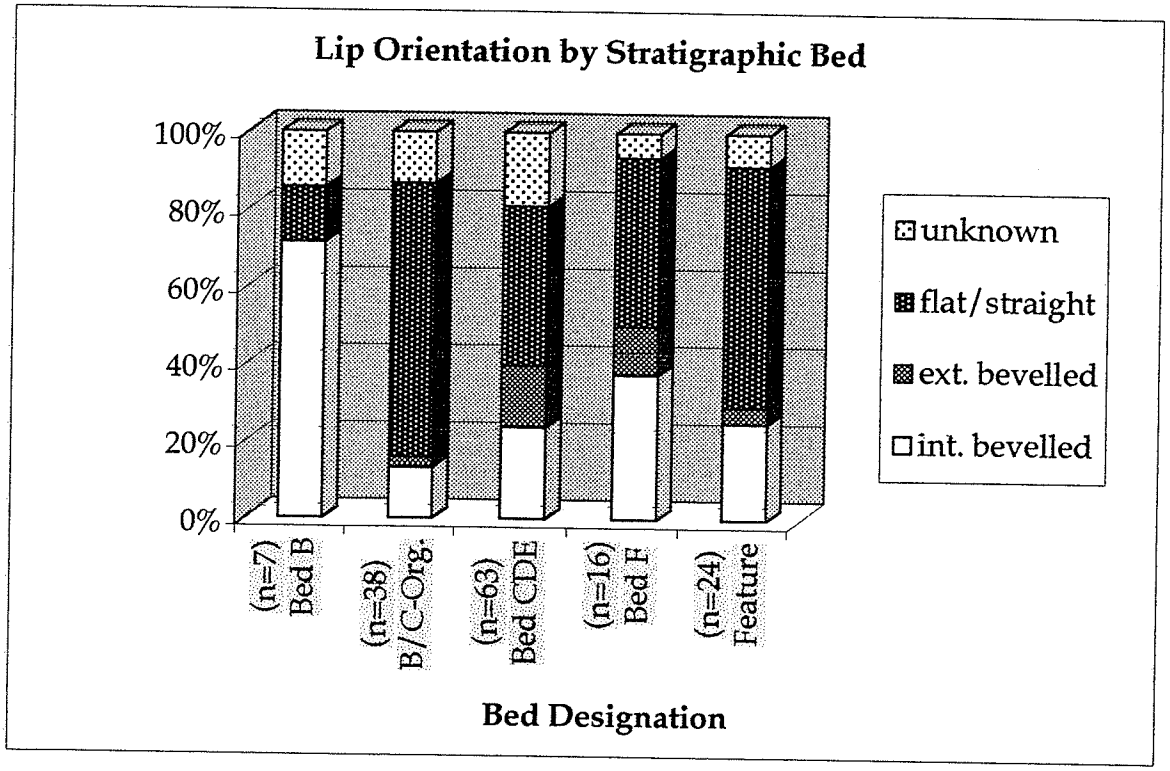


Figure 38: Lip orientation by stratigraphic bed

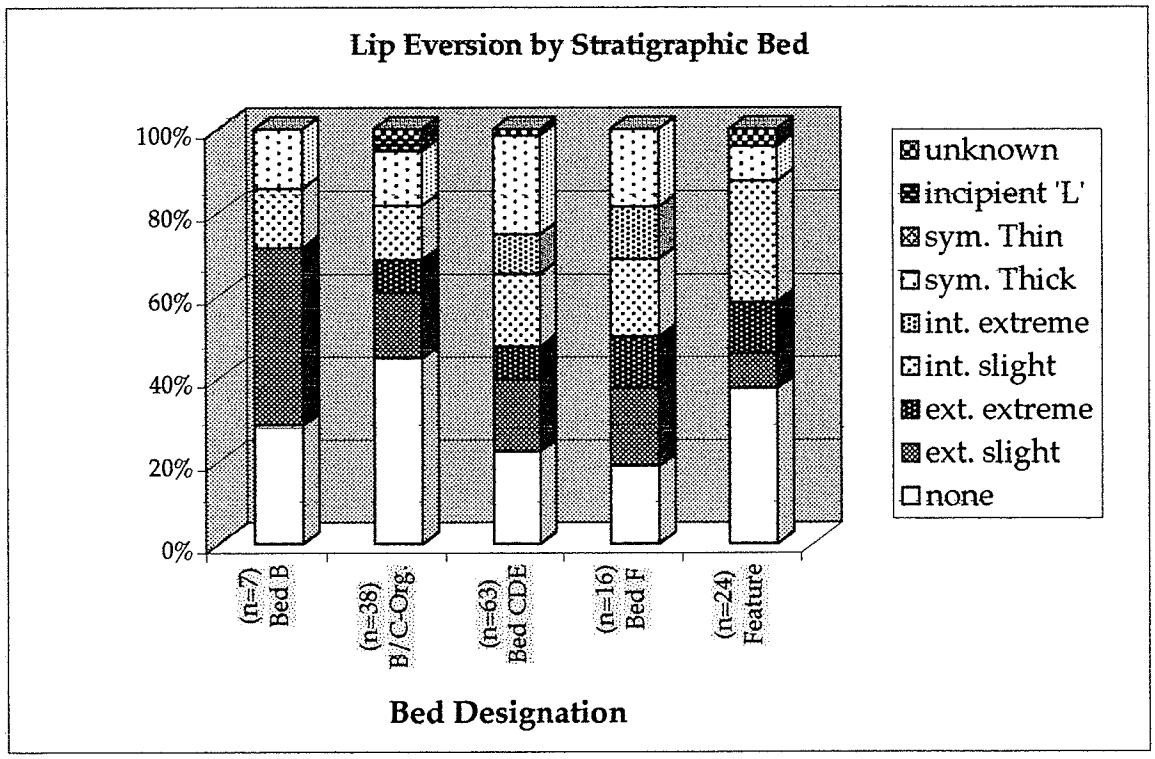


Figure 39: Lip eversion by stratigraphic bed

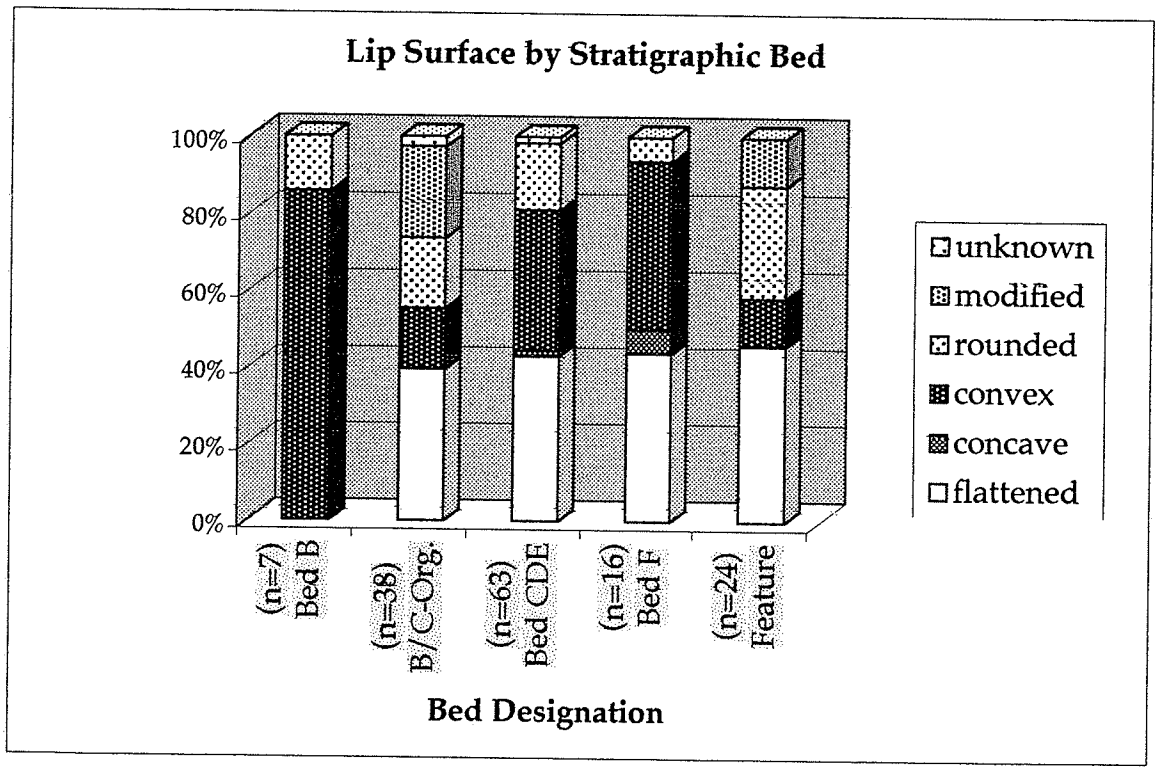


Figure 40: Lip surface by stratigraphic bed

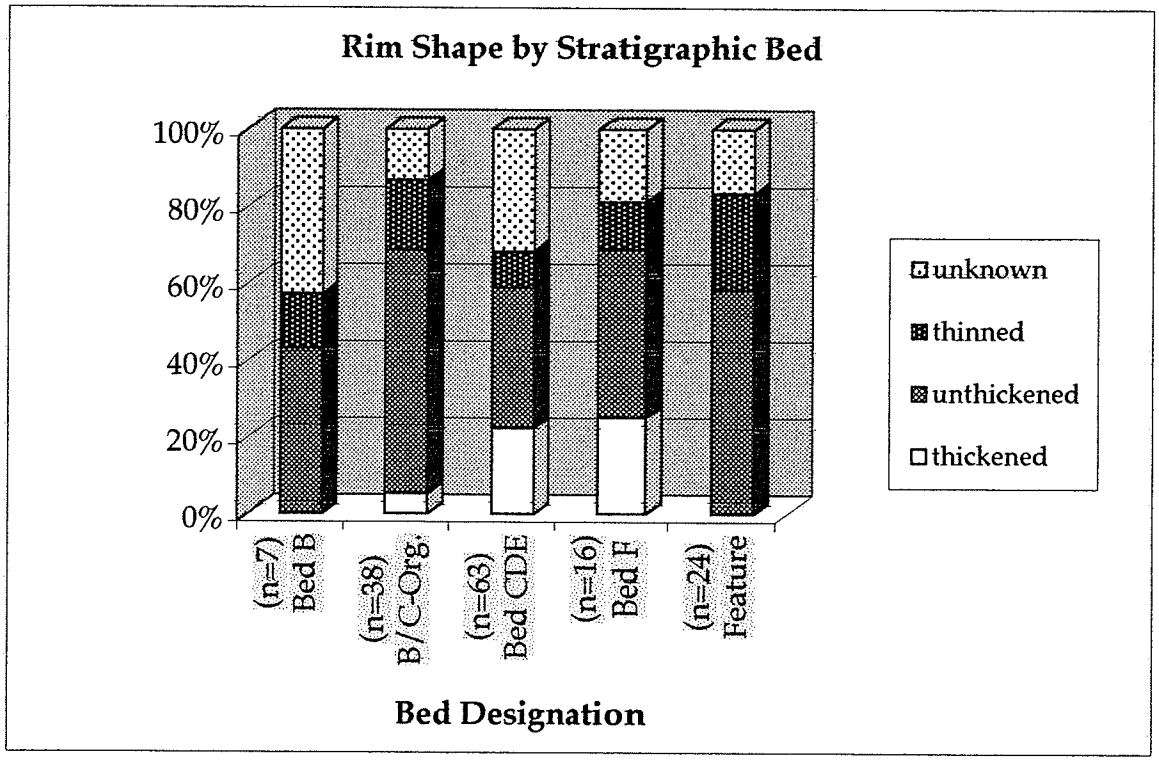


Figure 41: Rim shape by stratigraphic bed

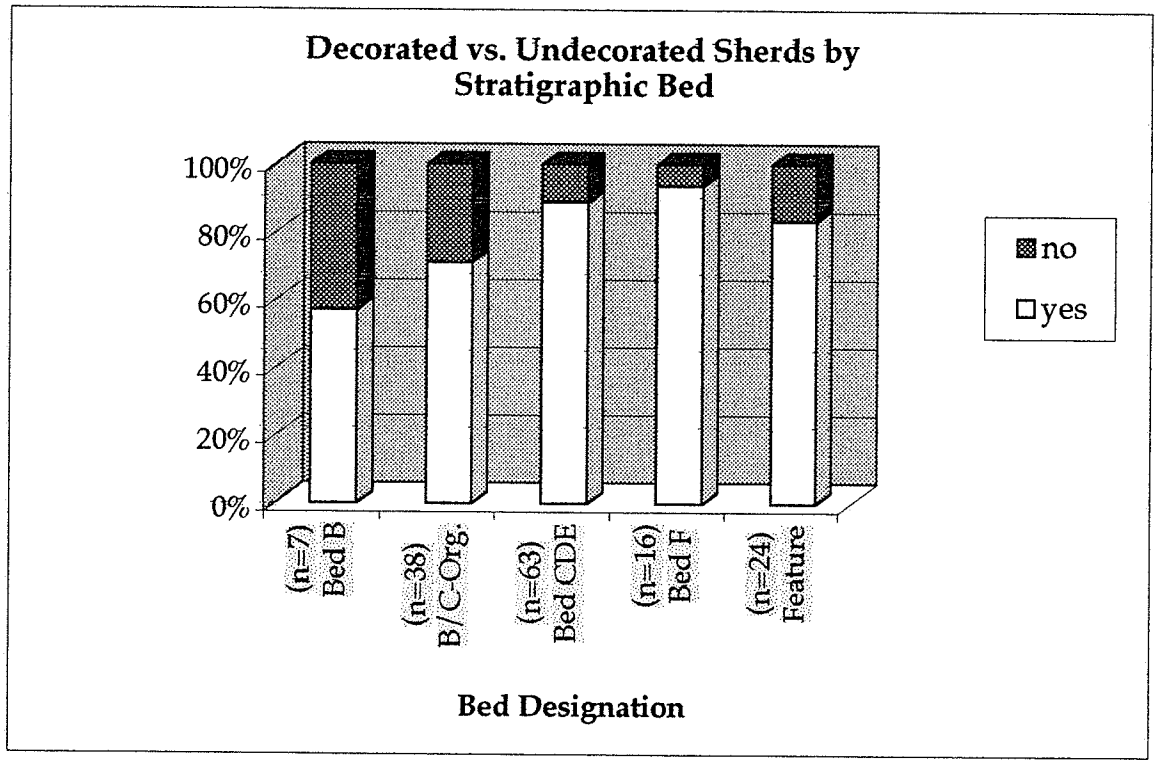


Figure 42: Decorated and undecorated sherds by stratigraphic bed

Cultural-Historical Overview of Northeastern Plains and Adjacent Areas

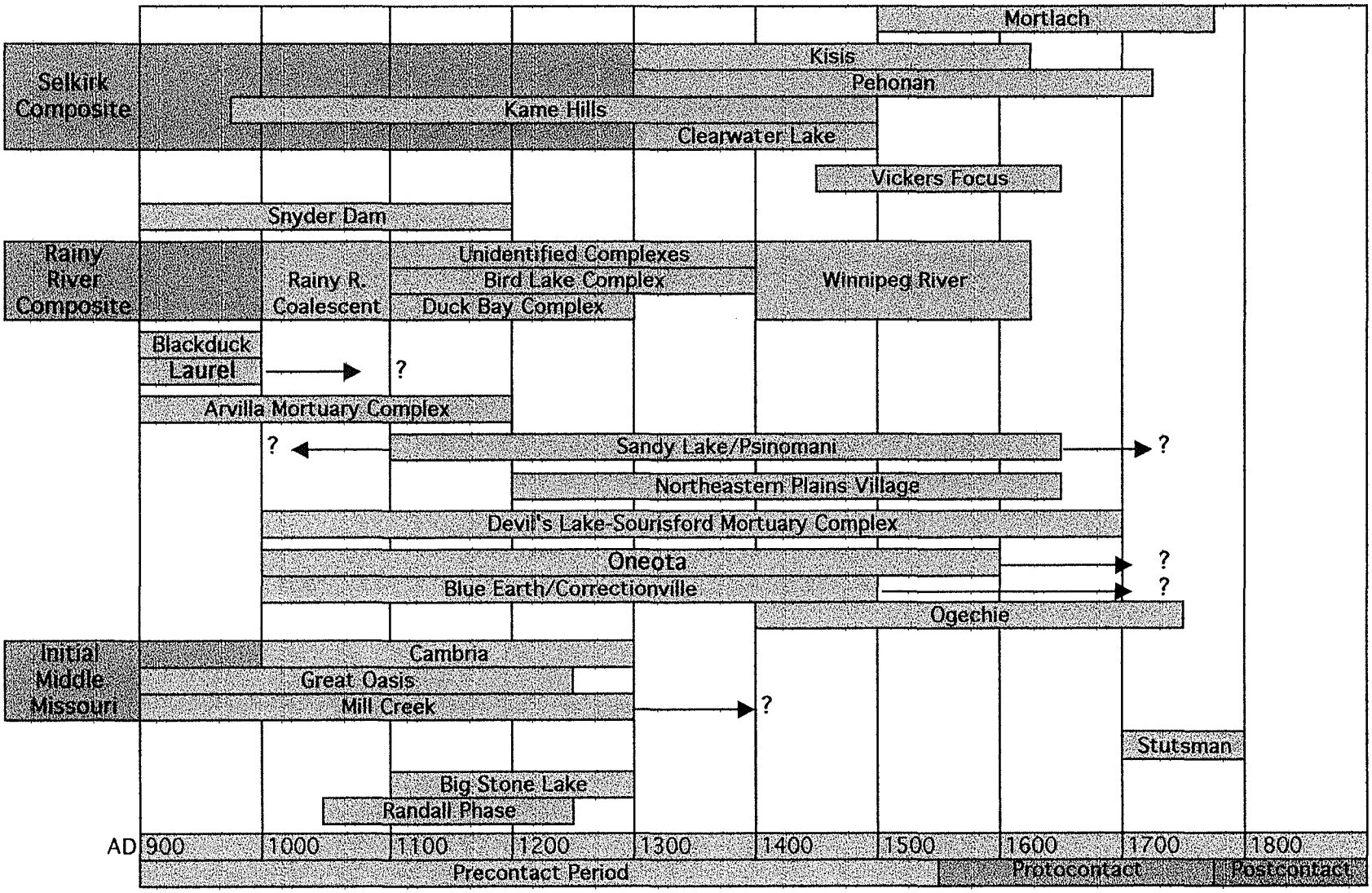


Figure 44: Selected archaeological cultures of the Northeastern Plains for the later Precontact Period

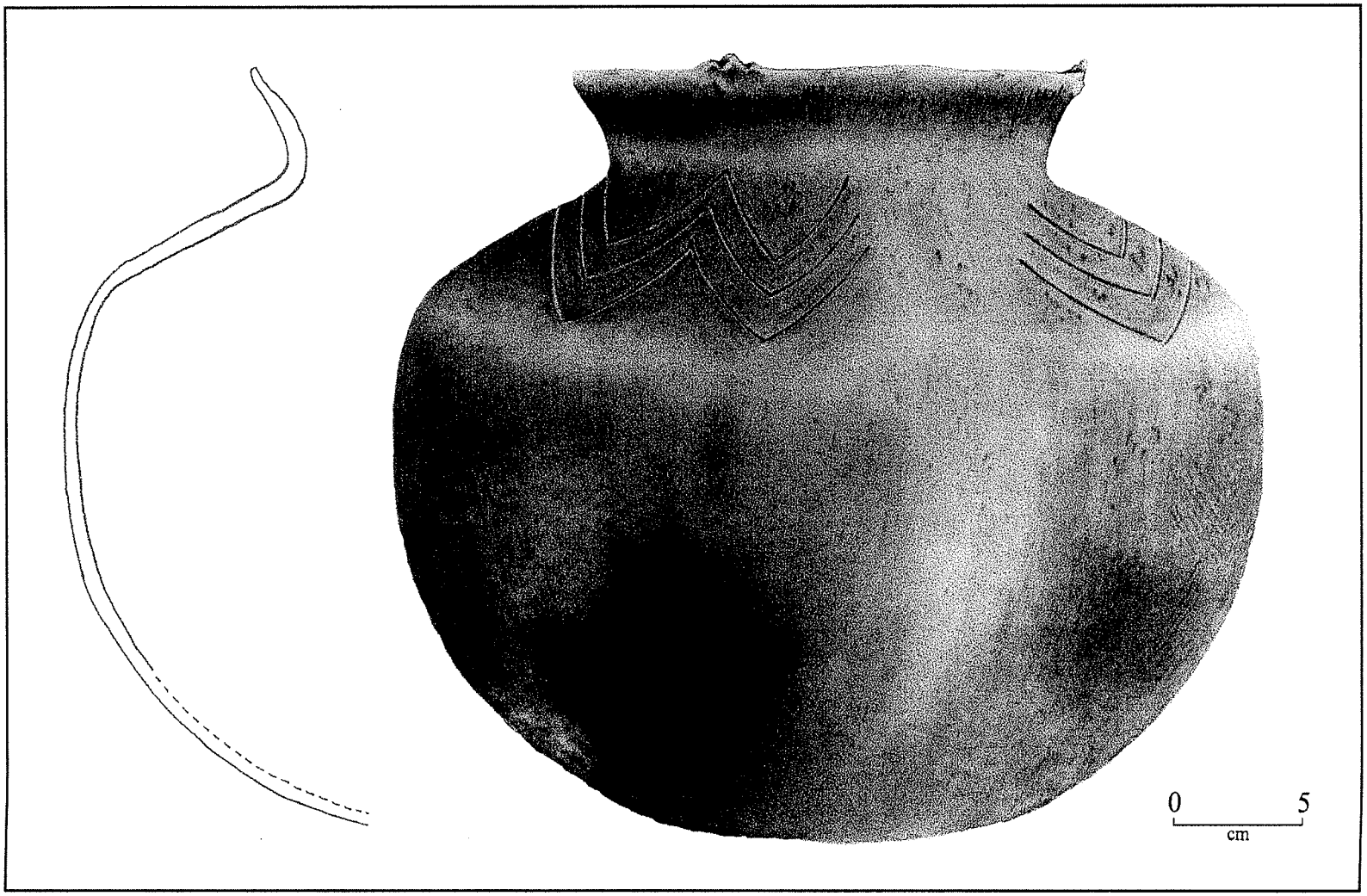


Figure 44: Lockport ceramic vessel (artist's reconstruction, drawing by C. Flynn)

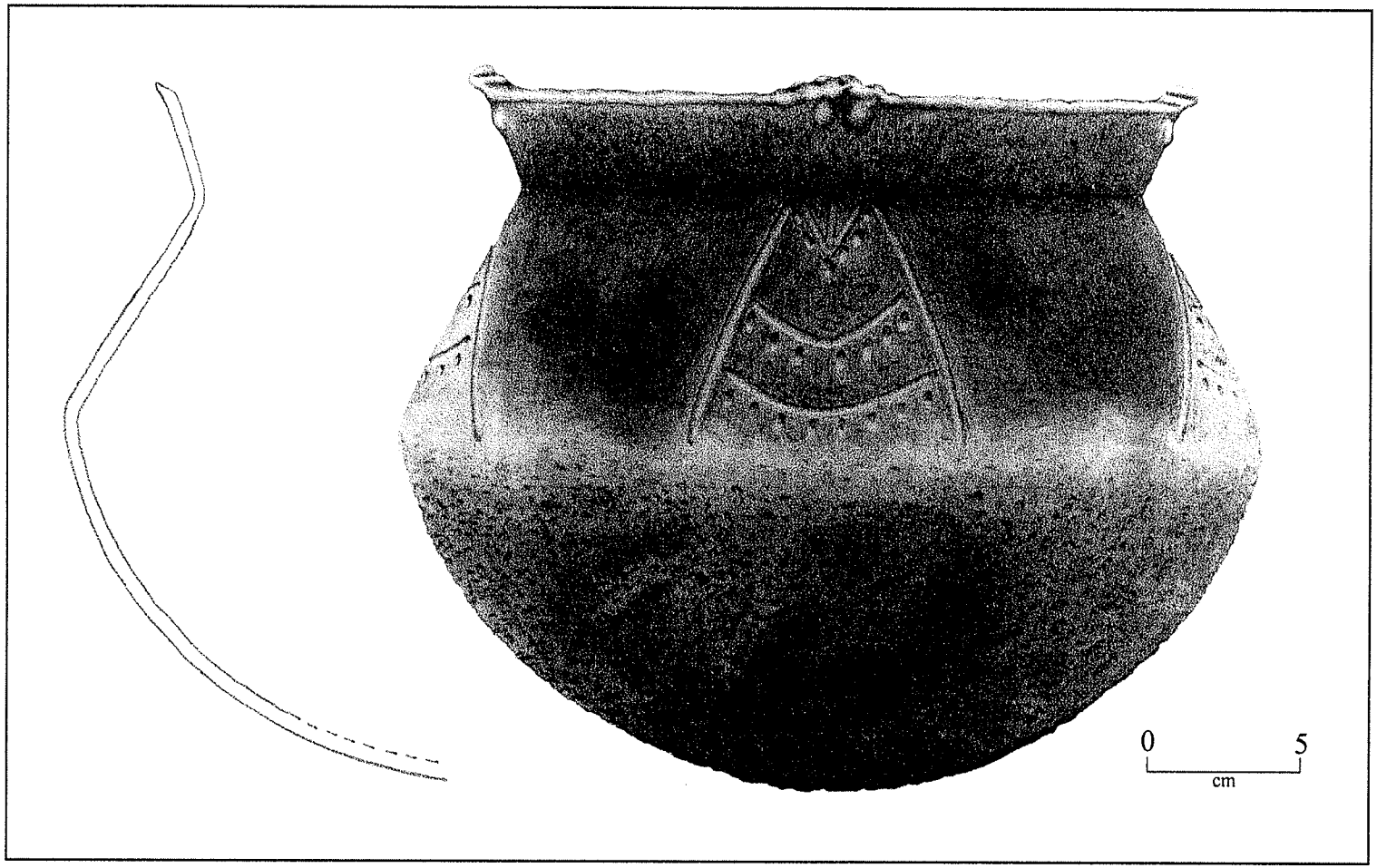


Figure 45: Lockport ceramic vessel (artist's reconstruction, drawing by C. Flynn)

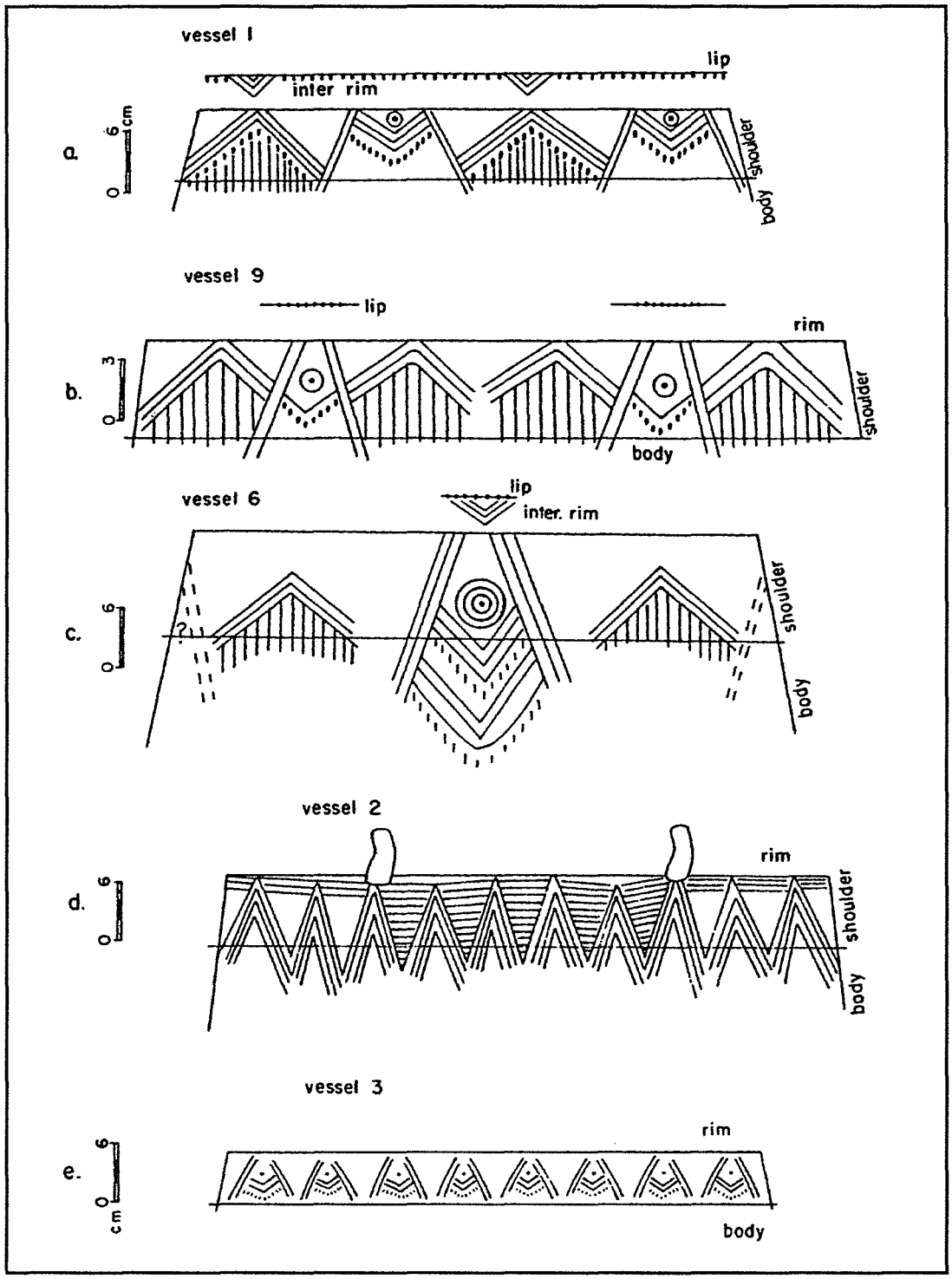


Figure 46: Decorative motifs (from Benn 1980:244)

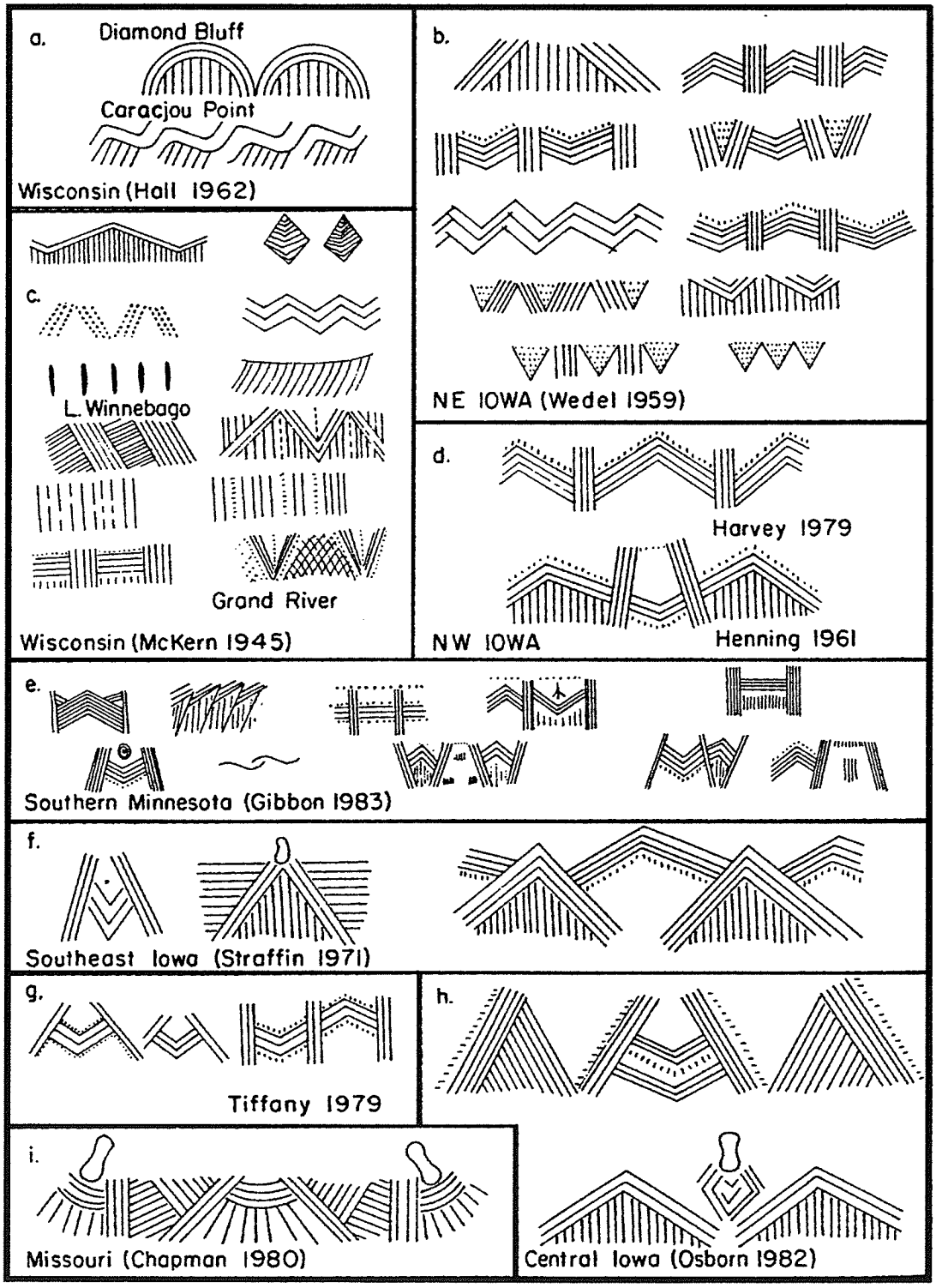


Figure 47: Decorative motifs (from Benn 1989:246)

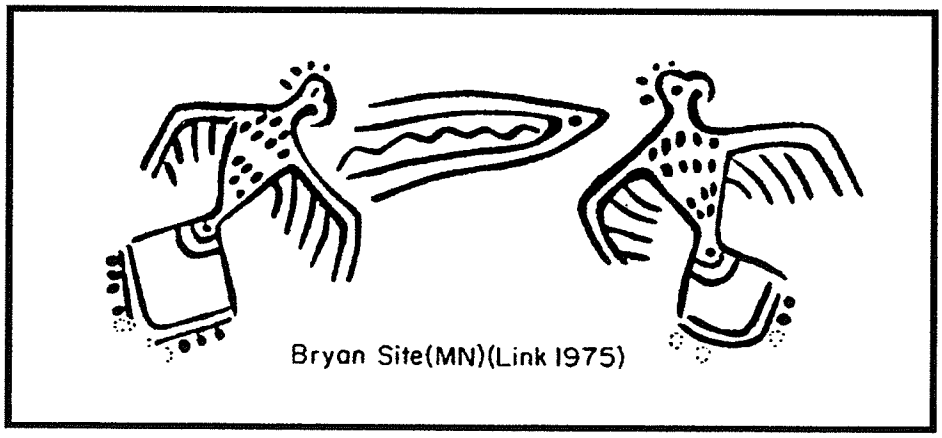


Figure 48: Decorative motif (from Benn 1989:247)

Appendix II

Tables

	Count	Percentage
Bed B	7	4.7
Bed B/C	38	25.7
Bed CDE	63	42.6
Bed F	16	10.8
Feature	24	16.2
totals	148	100.0

Table 1: Sample breakdown by stratigraphic bed

MacNeish's Stratigraphic Zones and Cultural Foci

Stratum	Description	Level	Focus
Zone A	A humus layer containing cultural refuse from the Selkirk Focus, includindg scapula hoes, bell-shaped storage pits, and shell tempered ceramics.	1 and 2	Late Selkirk
Zone B	A layer of sand, interspersed with layers of "refuse". Included in this zone was a layer of banded sands and silt which were supposed to represent as many as 28 flood events	3 and 4	Selkirk
Zone C	A layer of "dark refuse".	5 and top of 6	Manitoba
Zone D	A layer of sterile sand	6	----
Zone E	A zone composed primariy of "dark refuse" but with clay, sand, and charcoal as well. At the bottom of zone E were patches of clean sand.	lower 6 and upper 7	Nutimik
Zone --	A thin horizontal zone between E and F which included cultural material from both	8	
Zone F	A zone of brown-gray clay	9 and 10	Anderson
Zone G	A zone of gray clay, grading to a dense yellow clay with patches of burned floor.	11	
Zone H	A zone of tightly knit yellow clay with burned floors in it.	12	Larter
Zone I	A sterile, tightly-knit yellow clay with large, rounded boulders in it.	13	

Table 2: MacNeish's stratigraphic sequence (adapted from MacNeish 1958)

(precise depths of levels and base of excavation unknown, mostly excavated in arbitrary six inch levels. Base of excavation probably 6-7 feet).

Buchner's Stratigraphic Beds and Cultural Phases

Stratum	Description	Approximate Level	Phase
Bed A	Sandy clay-loam	1 and 2	Modern
Bed B	Clay loam	3 to 8	Selkirk
Bed C	Sandy loam	9 to 12	Blackduck-Horticutural
Bed D	Dark clay loam	13 to 15	
Bed E	Sandy loam	16 to 20	Blackduck
Bed F	Clay loam	21 to 29	Laurel
Bed G	Silty loam	30 to 32	Mixed
Bed H	Silty clay	33 to 37	Larter/Pelican Lake
Bed I	Clay	38 to 40	Glacial Lake Agassiz clays

Table 3: Buchner's stratigraphic sequence (adapted from Buchner 1988)

(levels were excavated in arbitrary five centimeter levels. Base of excavation approximately two meters.

Hems/Flynn Stratigraphic Beds and Cultural Occupations

Stratum	Description	Approximate Level	Occupation
Bed A	Sod, evidence of the 1950 flood, access road, silty clay, and plough zone	1 to 4	Modern to Late Homestead
Bed B	Brown to black silty soil	5 to 8	Early Homestead to "Selkik"
Bed B/C	Fish scale, cultural remains, charcoal fragments, faunal remains in a silty sand, capping many horticultural occupation features (eg: bell-shaped pits)	9 and 10	Unnamed Horticultural
Bed C	Finely bedded sand and silty clay	11 and 12	Blackduck/Rainy River
Bed D	Mixed silt, clay, sand, and gravel	13 to 15	
Bed E	Fine white sterile sand	16 to 20	none
Bed F	Dark, silty clay loam	21 to 29	Classic Blackduck to Late Laurel
Bed G	A zone of gray clay, grading to a dense yellow clay with patches of burned floor.	30 to 35	Laurel
Bed H	A zone of tightly knit yellow clay with burned floors in it.	36 to 40	Unnamed Pre-Laurel
Bed I	Olive gray clay grading to yellow gray clay	41 to 44	Larter/Pelican Lake
Bed I 1	oOlive gray clay below first charcoal horizon	45 to 47	Unnamed Pre-Larter (no diagnostics)
Bed I 2	Olive gray clay below second charcoal horizon	47 to 50	

Table 4: Hems/Flynn stratigraphic sequence

(Excavated was done in combined 5 cm. arbitrary and natural stratigraphic levels. Base of excavation between 2 and 3 meters)

Correlation of the Three Major Stratigraphic Interpretations Used at the Lockport Site, EaLf-1

MacNeish				Buchner				Hems/Flynn			
Zone	Level	Depth (inches)	Cultural Affiliation	Bed	Level	Depth (cm's)	Cultural Affiliation	Bed	Level	Depth (cm's)	Cultural Affiliation
A	1 to 2	0 to 12	Late Selkirk	A	1 to 2	0 to 10	Modern	A	1 to 4	0 to 20	Modern to Late Homestead
B	3 to 4	12 to 24	Selkirk	B	3 to 8	10 to 40	Selkirk	B	5 to 8	20 to 40	Early Homestead to Selkirk
C	5 to 6	24 to 36	Manitoba	C	9 to 12	40 to 60	Blackduck/ Horticultural	B/C	9 to 10	40 to 50	Horticultural
D	6	36 to 42	-----	D	13 to 15	60 to 75	Blackduck/ Horticultural	C	11 to 12	40 to 60	Blackduck/Rainy River
E	6 to 7	36 to 48	Nutimik	E	16 to 20	75 to 100	sterile	D	13 to 15	60 to 75	Blackduck/Rainy River
F	9 to 10	54 to 66	Anderson	F	21 to 29	100 to 145	Laurel	E	16 to 20	75 to 100	Sterile
G	11	66 to 72	Larter	G	30 to 32	145 to 160	mixed	F	21 to 29	100 to 145	Classic Blackduck
H	12	72 to 78	Larter	H	33 to 37	160 to 185	Larter/ Pelican Lake	G	30 to 32	145 to 160	Laurel to Late Laurel
I	13	78 to 84	Glacial Clays	I	38 to 40	185 to 200	Glacial Clays	H	33 to 37	160 to 185	Pre-Laurel to Early Laurel
sub-I	below 13	below 6 ft.	Glacial Clays	sub-I	below 40	below 2 m.	Glacial Clays	I	38 to 40	185 to 200	Larter/Pelican Lake
								sub-I	below 40	below 2 m.	Larter/Pelican Lake to unnamed pre-ceramic

Table 5: MacNeish, Buchner, and Hems/Flynn Stratigraphic Interpretations

Conventional C14 Dates (1984-1986)

	Bed	Lab Number	Age (years BP)	Standard Deviation	Calendar years	Weight (grams)	Material	Date within one SD
a	B	S-2852	315	235	1635 AD	12.3	Charcoal	1400-1870 AD
b	B/C	S-2850	470	270	1480 AD	8.0	Charcoal	1201-1750 AD
c	D	GX-10866	620	105	1330 AD	40.0	Charcoal	1225-1435 AD
d	C-E	S-2849	635	90	1315 AD	24.5	Charcoal	1225-1405 AD
e	E/F	S-2851	1005	280	945 AD	17.0	Charcoal	665-1225 AD
f	E/F	S-2853	1095	250	855 AD	95.0	Charcoal	605-1105 AD
g	E/F	S-2848	1185	255	765 AD	22.2	Charcoal	510-1020 AD
h	E/F	S-2854	1185	255	765 AD	9.1	Charcoal	510-1021AD
I	F	GX-10865	1410	290	540 AD	155.0	Collagen	250-830 AD
j	G/H	GX-10864	2315	85	365 BC	785.0	Collagen	280-450 BC
k	H	GX-10863	2515	140	565 BC	216.0	Collagen	425-705 BC
l	H/I	S-2847	3300	295	1350 BC	111.9	Charcoal	1055-1645 BC

Notes: Buchner's dates were obtained largely on small clusters of charcoal resulting in wide standard deviations, which may or may not date the occupation itself.
All dates are uncorrected.
B/C = Horticultural occupation as defined by Hems and Flynn 1987
All AMS dates are obtained from hoes and corn from the horticultural occupation

AMS Dates (1987-1988)

	Bed	Lab Number	Age (years BP)	Standard Deviation	Calendar years	Weight (grams)	Material	Date within one SD
a	Hort. Layer	RIDDL1272	595	80	1355	unknown	scapula hoe	1245-1435 AD
b	Hort. Layer	RIDDL1273	705	75	1245	unknown	scapula hoe	1170-1320 AD
c	Hort. Layer	RIDDL1274	520	100	1430	unknown	scapula hoe	1330-1530 AD
d	Hort. Layer	RIDDL1275	940	120	rejected by lab	unknown	charred food	n/a
e	Hort. Layer	RIDDL1330	525	85	1425	split sample	charred corn kernel	1340-1510 AD
f	Hort. Layer	RIDDL1331	510	80	1440	split sample	sonication test	1360-1520 AD
g		split sample average			1436			1356-1516 AD
h	Hort. Layer	RIDDL 1332	765	85	contamination test	unknown	100 microgm OH extract	n/a (gives date of contaminant)
	average of dates a,b,c, and g			83	1367			1284-1450

Table 6: EaLf-1 Radiocarbon dates

	Bed B (n=7)	B/C-Org. (n=38)	Bed CDE (n=63)	Bed F (n=16)	Feature (n=24)
Tradition	Percentage	Percentage	Percentage	Percentage	Percentage
Woodland	28.6	31.6	79.4	87.5	25.0
Woodland?	28.6	5.3	4.8	6.3	8.3
Plains-Woodland	42.9	52.6	3.2	0.0	54.2
Plains-Woodland?	0.0	7.9	3.2	0.0	8.3
unknown	0.0	2.6	9.5	6.3	4.2
total	100.0	100.0	100.0	100.0	100.0
Ware Type	Bed B (n=7)	B/C-Org. (n=38)	Bed CDE (n=63)	Bed F (n=16)	Feature (n=24)
Laurel	0	0.0	3.2	0.0	0.0
Blackduck	0	5.3	17.5	18.8	0.0
Blackduck/Rainy R.	0	5.3	44.4	12.5	25.0
Rainy R.	14.3	2.6	12.7	56.3	0.0
Winnipeg R.	14.3	18.4	0.0	0.0	0.0
NEPV	42.9	57.9	4.8	0.0	54.2
unknown	28.6	10.5	17.5	12.5	20.8
total	100.0	100.0	100.0	100.0	100.0
Temper Type	Bed B (n=7)	B/C-Org. (n=38)	Bed CDE (n=63)	Bed F (n=16)	Feature (n=24)
grit	71.4	65.8	84.1	87.5	50.0
grit-sand	28.6	28.9	9.5	12.5	33.3
sand	0.0	0.0	3.2	0.0	16.7
grog	0.0	0.0	0.0	0.0	0.0
grit-grog	0.0	0.0	1.6	0.0	0.0
shell	0.0	0.0	0.0	0.0	0.0
grit -shell	0.0	2.6	0.0	0.0	0.0
unknown	0.0	2.6	1.6	0.0	0.0
total	100.0	100.0	100.0	100.0	100.0
Temper Density	Bed B (n=7)	B/C-Org. (n=38)	Bed CDE (n=63)	Bed F (n=16)	Feature (n=24)
1	0.0	5.3	1.6	0.0	0.0
1 to 3	0.0	15.8	6.3	12.5	4.2
3	42.9	31.6	47.6	31.3	29.2
3 to 5	14.3	5.3	19.0	12.5	12.5
5	14.3	26.3	14.3	18.8	25.0
5 to 10	0.0	7.9	3.2	18.8	4.2
10	14.3	7.9	1.6	6.3	20.8
20	14.3	0.0	3.2	0.0	4.2
unknown	0.0	0.0	3.2	0.0	0.0
total	100.0	100.0	100.0	100.0	100.0
Charred Deposits	Bed B (n=7)	B/C-Org. (n=38)	Bed CDE (n=63)	Bed F (n=16)	Feature (n=24)
interior	0.0	5.3	9.5	12.5	16.7
exterior	0.0	13.2	3.2	0.0	0.0
both	0.0	0.0	0.0	12.5	4.2
lip	0.0	0.0	85.7	75.0	79.2
none	100.0	81.6	1.6	0.0	0.0
total	100.0	100.0	100.0	100.0	

Table 6: Data analysis categoried by stratigraphic bed

Surface Treatment	Bed B (n=7)	B/C-Org. (n=38)	Bed CDE (n=63)	Bed F (n=16)	Feature (n=24)
Textile Impressed	14.3	18.4	1.6	6.3	12.5
Obliterated Textile	28.6	28.9	3.2	12.5	25.0
Plain-Smooth	28.6	28.9	12.7	6.3	20.8
Burnished	0.0	0.0	0.0	0.0	8.3
Wpg. Fab. Imp.	14.3	10.5	0.0	0.0	0.0
WFI Obliterated	0.0	0.0	0.0	0.0	4.2
sprang?	0.0	0.0	4.8	12.5	0.0
unknown	14.3	13.2	77.8	62.5	29.2
total	100.0	100.0	100.0	100.0	100.0
Temper Size	**Bed B (n=7)**	**B/C-Org. (n=38)**	**Bed CDE (n=63)**	**Bed F (n=16)**	**Feature (n=24)**
granule	0.0	2.6	4.8	6.3	0.0
very coarse sand	14.3	10.5	12.7	31.3	12.5
coarse-v. coarse	14.3	10.5	22.2	6.3	12.5
coarse	42.9	50.0	31.7	43.8	16.7
medium coarse	14.3	10.5	14.3	0.0	12.5
medium	14.3	0.0	6.3	0.0	12.5
fine sand	0.0	0.0	3.2	0.0	12.5
mixed	0.0	15.8	4.8	12.5	20.8
total	100.0	100.0	100.0	100.0	100.0
Temper Shape	**Bed B (n=7)**	**B/C-Org. (n=38)**	**Bed CDE (n=63)**	**Bed F (n=16)**	**Feature (n=24)**
rounded	0.0	0.0	1.6	0.0	4.2
granular	42.9	65.8	79.4	56.3	50.0
laminated	0.0	0.0	0.0	0.0	0.0
granular-laminated	42.9	13.2	7.9	25.0	0.0
granular-round	14.3	5.3	1.6	0.0	16.7
gritty	0.0	0.0	3.2	0.0	12.5
granular-gritty	0.0	13.2	4.8	18.8	16.7
granular-powdery	0.0	2.6	0.0	0.0	0.0
powdery	0.0	0.0	1.6	0.0	0.0
total	100.0	100.0	100.0	100.0	100.0
Paste Texture	**Bed B (n=7)**	**B/C-Org. (n=38)**	**Bed CDE (n=63)**	**Bed F (n=16)**	**Feature (n=24)**
flaky	14.3	25.0	52.4	68.8	12.5
laminated	28.6	14.3	14.3	6.3	16.7
blocky	14.3	14.3	9.5	6.3	12.5
gritty	0.0	25.0	3.2	6.3	33.3
grainy	28.6	10.7	7.9	0.0	8.3
compact	14.3	10.7	12.7	12.5	16.7
dense	0.0	0.0	0.0	0.0	0.0
unknown	0.0	0.0	0.0	0.0	0.0
total	100.0	100.0	100.0	100.0	100.0
Wear/ Abrasion	**Bed B (n=7)**	**B/C-Org. (n=38)**	**Bed CDE (n=63)**	**Bed F (n=16)**	**Feature (n=24)**
none	71.4	84.2	42.9	81.3	83.3
slight	28.6	13.2	52.4	18.8	12.5
severe	0	2.6	4.8	0.0	4.2
total	100.0	100.0	100.0	100.0	100.0

Table 6: Data analysis categoried by stratigraphic bed

Lip Orientation	Bed B (n=7)	B/C-Org. (n=38)	Bed CDE (n=63)	Bed F (n=16)	Feature (n=24)
int. bevelled	71.4	13.2	23.8	37.5	25.0
ext. bevelled	0.0	2.6	15.9	12.5	4.2
flat/straight	14.3	71.1	41.3	43.8	62.5
unknown	14.3	13.2	19.0	6.3	8.3
total	100.0	100.0	100.0	100.0	100.0
Lip Eversion	**Bed B (n=7)**	**B/C-Org. (n=38)**	**Bed CDE (n=63)**	**Bed F (n=16)**	**Feature (n=24)**
none	28.6	44.7	22.2	18.8	37.5
ext. slight	42.9	15.8	17.5	18.8	8.3
ext. extreme	0.0	7.9	7.9	12.5	12.5
int. slight	14.3	13.2	17.5	18.8	29.2
int. extreme	0.0	0.0	9.5	12.5	0.0
sym. Thick	14.3	13.2	23.8	18.8	8.3
sym. Thin	0.0	0.0	0.0	0.0	0.0
incipient 'L'	0.0	2.6	0.0	0.0	0.0
unknown	0.0	2.6	1.6	0.0	4.2
total	100.0	100.0	100.0	100.0	100.0
Lip Surface	**Bed B (n=7)**	**B/C-Org. (n=38)**	**Bed CDE (n=63)**	**Bed F (n=16)**	**Feature (n=24)**
flattened	0.0	39.5	42.9	43.8	45.8
concave	0.0	0.0	1.6	6.3	0.0
convex	85.7	15.8	36.5	43.8	12.5
rounded	14.3	18.4	17.5	6.3	29.2
modified	0.0	23.7	0.0	0.0	12.5
unknown	0.0	2.6	1.6	0.0	0.0
total	100.0	100.0	100.0	100.0	100.0
Rim Shape	**Bed B (n=7)**	**B/C-Org. (n=38)**	**Bed CDE (n=63)**	**Bed F (n=16)**	**Feature (n=24)**
thickened	0.0	5.3	22.2	25.0	0.0
unthickened	42.9	63.2	36.5	43.8	58.3
thinned	14.3	18.4	9.5	12.5	25.0
unknown	42.9	13.2	31.7	18.8	16.7
total	100.0	100.0	100.0	100.0	100.0
Rim Shape	**Bed B (n=7)**	**B/C-Org. (n=38)**	**Bed CDE (n=63)**	**Bed F (n=16)**	**Feature (n=24)**
moderate outflare	14.3	15.8	19.0	31.3	25.0
pronounced outfla	14.3	5.3	6.3	12.5	0.0
incurved	0.0	0.0	3.2	0.0	4.2
incipient-s	0.0	5.3	0.0	6.3	16.7
s-shaped	0.0	0.0	0.0	0.0	4.2
vertical	0.0	18.4	1.6	0.0	4.2
rolled	0.0	0.0	4.8	0.0	0.0
unknown	71.4	55.3	65.1	50.0	45.8
total	100.0	100.0	100.0	100.0	100.0
Decorated?	**Bed B (n=7)**	**B/C-Org. (n=38)**	**Bed CDE (n=63)**	**Bed F (n=16)**	**Feature (n=24)**
yes	57.1	71.1	88.9	93.8	83.3
no	42.9	28.9	11.1	6.3	16.7
total	100.0	100.0	100.0	100.0	100.0

Table 6: Data analysis categoried by stratigraphic bed

Possible Push Factors	Possible Pull Factors
raiding	group safety
warfare	increased distance from endemic hostility
shortage of suitable habitation sites in safe areas	good habitation site
shortage of arable land	well-drained sandy soil
drought	cheap, direct migration route
coercive, agressive Oneota	abundance of required natural resources*
southern part of Red River corridor possibly caught between east-west	ability to continue using existing technological system
south is heavily occupied = obstacles on the way	lower relative population density

*riverine, prairie (w. side of river), woodland (e. side of river) wetland (Netley Marsh) plus local raw materials including workable clay, cherts, wood, permanent water course

Table 8: Push-pull factors influencing decision to migrate to Lockport

Possible Push Factors	Possible Pull Factors
raiding	group safety
warfare	increased distance from endemic hostility
shortage of suitable habitation sites in safe areas	good habitation site
shortage of arable land	well-drained sandy soil
drought	cheap, direct migration route
coercive, agressive Oneota	abundance of required natural resources*
southern part of Red River corridor possibly caught between east-west	ability to continue using existing technological system
south is heavily occupied = obstacles on the way	lower relative population density

*riverine, prairie (w. side of river), woodland (e. side of river) wetland (Netley Marsh) plus local raw materials including workable clay, cherts, wood, permanent water course

Table 8: Push-pull factors influencing decision to migrate to Lockport

Source	Dates	Proxy Data	Location	Visible Effect	Archaeological Correlate
Hall 1988	150-950 AD	humic soil formation, rodent, mollusk, pollen	Osage Plains, Oklahoma	warm moist interval	increased site visibility
Gregg 1985	600-1050 AD	pollen, sedimentological	central and northern Plains	warm, moist interval	population growth, expansion of agriculture
Cronin, 1999	900-1100AD	sea surface temperatures	northern hemisphere	1 degree C. elevation	none cited
Grove and Swistur 1994	900 - 1200 AD	forest advances and glacial retreat	Canadian Rockies	warm summers	none cited
Hall 1988	950 - 1100 AD	humic soil formation, rodent, mollusk, pollen	Osage Plains, Oklahoma	warm, dry interval	apparent occupational gaps possibly caused by erosion
Gregg 1985	1050-1250 AD	pollen, sedimentological	central and northern Plains	drought	abandonment of some areas, development of fortified villages, increased inter-group conflict
Hughes and Diaz 19954	1090-1450 AD	tree rings	Sierra Nevada	warm summers	none cited
Jirikowic and Damon 1994	1100-1250 AD	isotopic and historical records show Medieval Solar Maximum	global	possible factor in MWP	none cited
Hughes and Diaz 1994	1110-1350 AD	tree rings	Polar Urals	warm summers	none cited
Larson and Michaelson, 1990	1120-1150 AD	tree rings, stream flow volumes, historic records	southern Great Basin	severe drought	widespread abandonment
Gregg 1990	1200's AD	aeolian sediments	North Dakota	severe drought	abondonment of uplands
Hughes and Diaz 1994	1200's AD	glacial retreat	Northern Europe	warm, dry summers	none cited
Raab and Larson 1997	1209-1350 AD	tree rings, lake stands	Sierra Nevada	"epic" drought	Site abandonment, high rates of disease, increasing levels of inter-group violence
Creel, Scott, and Collins 1990	1300's	fluvial sedimentology	southern Plains	moist interval following drought	impacts on large game resources -- 900-1300 AD: few bison, 1300-1650 many bison
Lamb 1982	mid 1300's	historic records, tree rings, storm data, glacial re-advance	Northern Europe	cold wet interval	farms abandoned, increased disease, crop failure, Norse settlements fail, ergot outbreaks, flooding

Table 9: Selected sources and evidence for MWP/LIA climate change

Appendix III

Explanation of ceramic analysis categories

Appendix III
Analysis categories

GENERAL SITE INFORMATION

These data were recorded for data management purposed only.
This area also allowed for a brief condition report, a small sketch, and photo record data if required. Sketches were made of all sherds.

SUMMARY PROVENIENCE DATA

"Year", "Bed". "Origin of Feature" were used as data management tools. With the exception of "Bed", these were not included in the analysis.

"Type", "Affiliation", and "Tradition" are explained in Chapter 7: Methods and Techniques and Chapter 8: Data Description and Analysis

PHYSICAL CHARACTERISTICS

A) FABRIC

1) TEMPER/INCLUSIONS

TYPE was identified according to the following categories (limestone is presumed to be a natural inclusion):

a) grit (crushed granite, including fragments of quartz, feldspar, mica etc.;
b) grit and sand
c) sand (like grit but greater numbers of smaller, more rounded particles)
d) grog (crushed pottery)
e) grit and grog
f) shell (crushed mollusk shell)
g) grit and shell
h) grit and limestone
i) limestone
j) sand and limestone

DENSITY was defined according to categories established in Rice (1987). These were initially designated in the numbered categories, 1%, 3%, 5%, 10% and 20%; however, it was necessary to use intermediate categories to accommodate the variability visible in individual sherds. It is important to note that these "percentages" are based on a diagrammatic representation rather than on weight ratios of clay to temper. It may be that the physical measurement of clay and temper would yield quite different percentages. The categories were important in order to allow consistency of measurement but may not accurately reflect temper to clay ratios in a strict numerical sense.

a) 1%
b) 1% -3%
c) 3%
d) 3%-5%
d) 5%
e) 5%-10%
f) 10%
g) 20%
h) unknown (particles too small or too dense for an accurate point count)

SIZE is also based on Rice (1987:38) in an adapted version of the classic Wentworth scale. Intermediate categories were used to accommodate particle sizes that did not fall neatly into a single range.

a) granule 2 - 4 mm
b) very coarse sand 1 - 2 mm
c) coarse- very coarse sand
d) coarse sand .5 - 1 mm
e) medium - coarse sand
f) medium sand .25 - .5 mm
g) fine sand .1 - .25
h) mixed (as in with grit and sand together)

Temper shape describes the shape of the visible particles in the sherd without respect to size. However, the shape also ends up describing the type of temper

as different inclusions have different characteristic shapes. For instance, granular shape is characteristic of grit temper, while gritty shape is characteristic of sand.

SHAPE was based on the physical appearance of the temper particles as described below.

1) rounded
2) granular (angular or faceted)
3) laminated (like mica)
4) gritty (like sand)
5) powdery (like limestone or disintegrated shell)

2) PASTE

TEXTURE describes the look of the fired clay along the broken edge of the sherd according to categories established below.

a) Flaky (loose and unstructured like pie crust
b) laminated (structured layers)
c) blocky (like a developed clay-loam horizon in a dry wall profile)
d) gritty (as with a sand temper)
e) grainy (denser, more finely textured than gritty;
f) compact (few visible layers or spaces;
g) dense (appearing hard and highly fired.

HARDNESS -- discarded as an analytical category

B) <u>METRIC DATA</u>

1) SHERD THICKNESS was measured in millimeters with sliding calipers.
LIP thickness was measured at the lip-rim junction
RIM thickness
SHOULDER thickness was measured at the shoulder inflection. Mostly this portion of the vessel was not present.
BODY thickness was measured below the shoulder inflection. This portion of the

the vessel was rarely present
UNKNOWN was applied where there was not enough sherd to measure, or where there was significant spalling.

2) SHERD WEIGHT -- discarded as an analytical category

3) WATER WORN was a subjective assessment of the degree of abrasion visible on the sherd. The sherd was then assigned to one of three categories a) severely; b) slightly; c) not at all

4) CHARRED DEPOSITS was used to assess the presence or absence of charred remains on the various surfaces of the rim sherd.

MANUFACTURE

A) FORMING -- discarded as an analytic category
B) FINISHING
1) SURFACE TREATMENT was designed to assess the surface treatment on the exterior of the vessel. However, since surface treatment is mainly visible below the rim, the majority of rims had to be designated "unknown"

VESSEL CHARACTERISTICS

A) MORPHOLOGY

1) LIP
ORIENTATION
Lip orientation was described according to the following categories.
a) interiorly bevelled
b) exteriorly bevelled
c) flat/straight

EVERSION
Lip eversion was described according to the following categories.
a) none

b) exterior slight
c) exterior extreme
d) interior slight
e) interior extreme
f) symmetrically thickened

SURFACE
Lip surface was described according to the following categories.
a) flattened
b) concave
c) convex
d) rounded

2) RIM
SHAPE
Rim shape was described according to the following categories.
a) thickened
b) thinned
c) unthickened

ORIENTATION
Rim orientation was described according to the following categories.
a) pronounced outflare
b) moderate outflare
c) vertical
d) incurved
e) rolled
f) S-shaped
g) incipient 'S'

RIM/BODY ANGLE
The measurement of rim/body angle is described in Chapter 7: Methods and Techniques and Chapter 8: Data Description and Analysis

MOUTH FLARE ANGLE

The measurement of mouth flare angle is described in Chapter 7: Methods and Techniques and Chapter 8: Data Description and Analysis

3) BODY

ESTIMATED VESSEL CIRCUMFERENCE

The measurement of the estimated vessel circumference at orifice is described in Chapter 7: Methods and Techniques and Chapter 8: Data Description and Analysis

B) DECORATION

1) PLASTIC TECHNIQUES

DECORATED

This category was used to differentiate between decorated and undecorated vessels. However, undecorated rims are not always indicative of undecorated vessels, especially on Northeastern Plains vessels where decoration is highly zoned and may include large portions of undecorated surface.

APPENDAGES

This category was used to indicate the presence or absence of lip tabs, handles, effigies or other attachments. Lip decorative techniques may include "Tabs" which are small nodes of clay pulled up from the otherwise flat lip surface. "Notches" which are pressed into the lip surface with a variety of tools and may be shallow or quite deep. And "Castellations" which can be either larger tabs or very deep notches that stand up from the surface of the lip. These may be applied separately or pinched off the vessel while the paste is still wet. These occur on the lip of a vessel and may very in size.

TYPE

a) incipient tab: An incipient tab describes a very small lip tab, pulled up from the surface of the lip. It resembles more a bump on the lip surface than an actual tab.

b) tab: A lip tab is larger than an incipient tab, generally .5 cm or greater. They frequently occur in fours, to divide the vessel into quarters but may be found in greater multiples as well.

c) handle: A handle is an applied loop or strap that generally articulates at the lip or rim. These are not usually present on Late Woodland vessels in this area.They are more common on Oneota vessels.

d) castellation: A castellation resembles a lip tab but is squared off to resemble the top of a castle wall. These may occur regularly around the surface of the vessel frequently appearing as extra deep cord-wrapped object impressions.

e) effigy: This category describes the presence of small animal-like appliques on the rim, neck, or shoulder of the vessel.

f) broken: Broken handles, effigies, lip tabs etc. will leave an area of roughness behind. The nature of the attachment will not be known, but it is possible to tell that something was present during the use-life of the vessel.

g) none: Self-explanatory.

LOCATION

The location of the appendage was assessed according to decorative zones outlined below under #4 Arrangement.

SIZE

Where appendages were present they were measured in two dimensions, length and width, in millimeters.

STAMPS

These were described first as present or absent.

TECHNIQUE

The type of tool used to make the stamp was assessed using a piece of soft plasticene to make an impression of the stamp. This frequently allowed the tool to be identified, especially in the case of cord-wrapped tool edge, where the marks of the cordage on the edge of the tool could be easily seen. Other tools were described as angular tool edge, angular tool end, rounded tool edge,

rounded tool end, other, and unknown.

LOCATION of the stamps was assessed according to the decorative zones described below

SHAPE of the stamps was described according to the following categories:
a) round -- round (obviously)
b) ovoid -- like round but more oval, longer than it is wide.
c) rectilinear -- a skinny rectangle with or without rounded edges.
d) rectangular -- rectangular
e) square -- square
f) other -- described on analysis sheet where required.

METRICS
Where present, stamps were measured in three dimensions, length, width, and depth in millimeters.

4) ARRANGEMENT:
Location:
The placement of decorations on the surface of the vessel was described according to a series of zones.
a) Zone 1 is the interior rim;
b) Zone 2 is the surface of the lip;
c) Zone 3 is the area immediately below the lip. After this, all zones are defined by their location relative to Zone 3;
d) Zone 3a is immediately below 3;
e) Zone 3b is immediately below 3a etc.

Motif:
This describes the arrangement of the decorative elements. Rows of punctates, oblique or horizontal cord-wrapped object impressing, trailed line decorations in linear or curvilinear shapes etc. may all be found on the lip, rim, neck, and shoulder of a vessel.

Technique:
This is used to describe the decorative element itself.

a) "Cord-wrapped object impressed" (usually abbreviated as "cwoi") is understood to mean some sort of tool such as thin bone, stick or twig wrapped with cordage frequently arranged in horizontal rows or lines of parallel obliques encircling the lip, rim, or neck, or all of those together.

b) A "punctate" is a hole in the outside of the sherd made by pressing a rounded object into the surface of wet clay.

c) A "boss" is the reverse of a punctate and leaves a small bump on the surface. Bosses and punctates may occur on either the interior or exterior surface.

d) A "stamp" is generally a small impression on the surface of the vessel which is wider than it is deep. A stamp may occur in a variety of shapes and sizes.

e) Decoration is described as "trailed" when it occurs in straight or curvilinear lines that are wider than they are deep. Trailed decoration is applied to wet paste possibly with with a small, smooth spatulate tool.

f) Incised lines, on the other hand, are deeper and narrower and are applied to drier, perhaps leather hard paste with a pointier tool.

5) NON-PLASTIC TECHNIQUES

a) slip: Slip is a suspension of fine clay particles in water with or without a colourant/oxide that is applied to the surface of a vessel when it is leather hard. This slip will add durable colour to the surface of the vessel, generally in tones of red, black, white, or yellow. No vessels with applied slip decoration were present in the collection from EaLf- 1

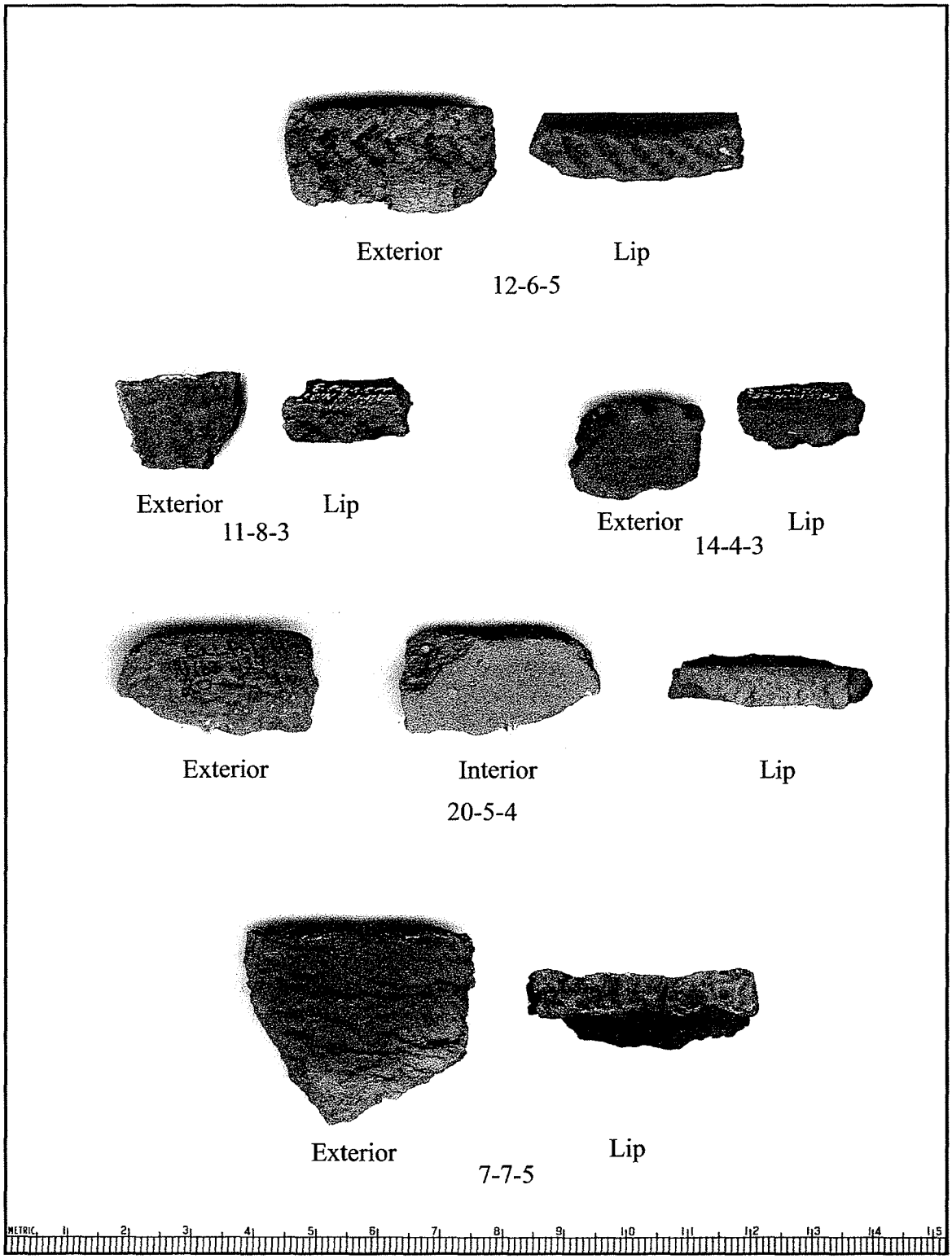
b) wash: A wash is a suspension of colourant or oxide (usually iron) in water. This is applied to the surface of the vessel before or after firing and will leave a residue on the surface. Ochre (red iron oxide) is sometimes found on the exterior surfaces of vessels from this area.

c) present but unknown: This was a contingency category that, in the end, was not required.

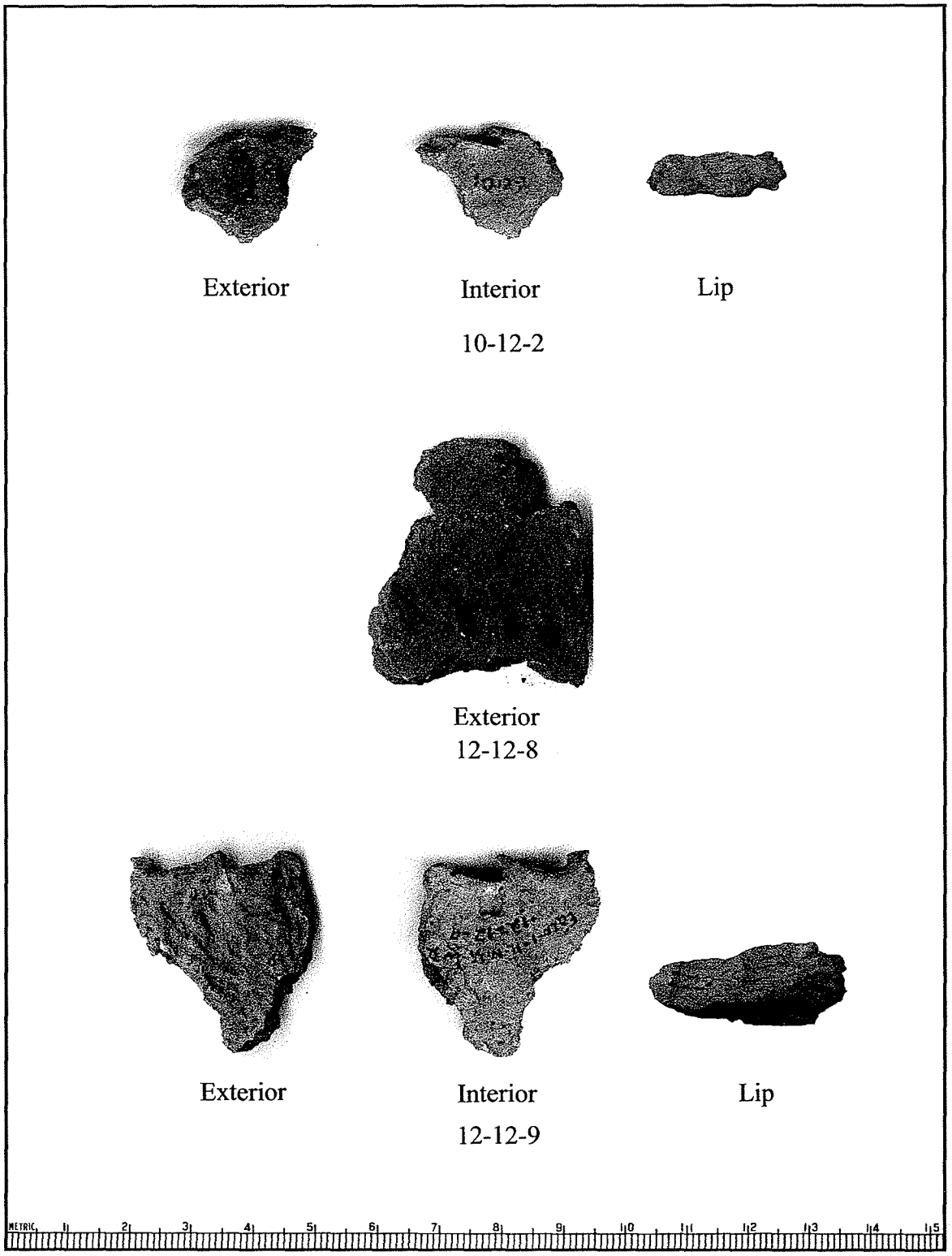
d) none.

Appendix IV

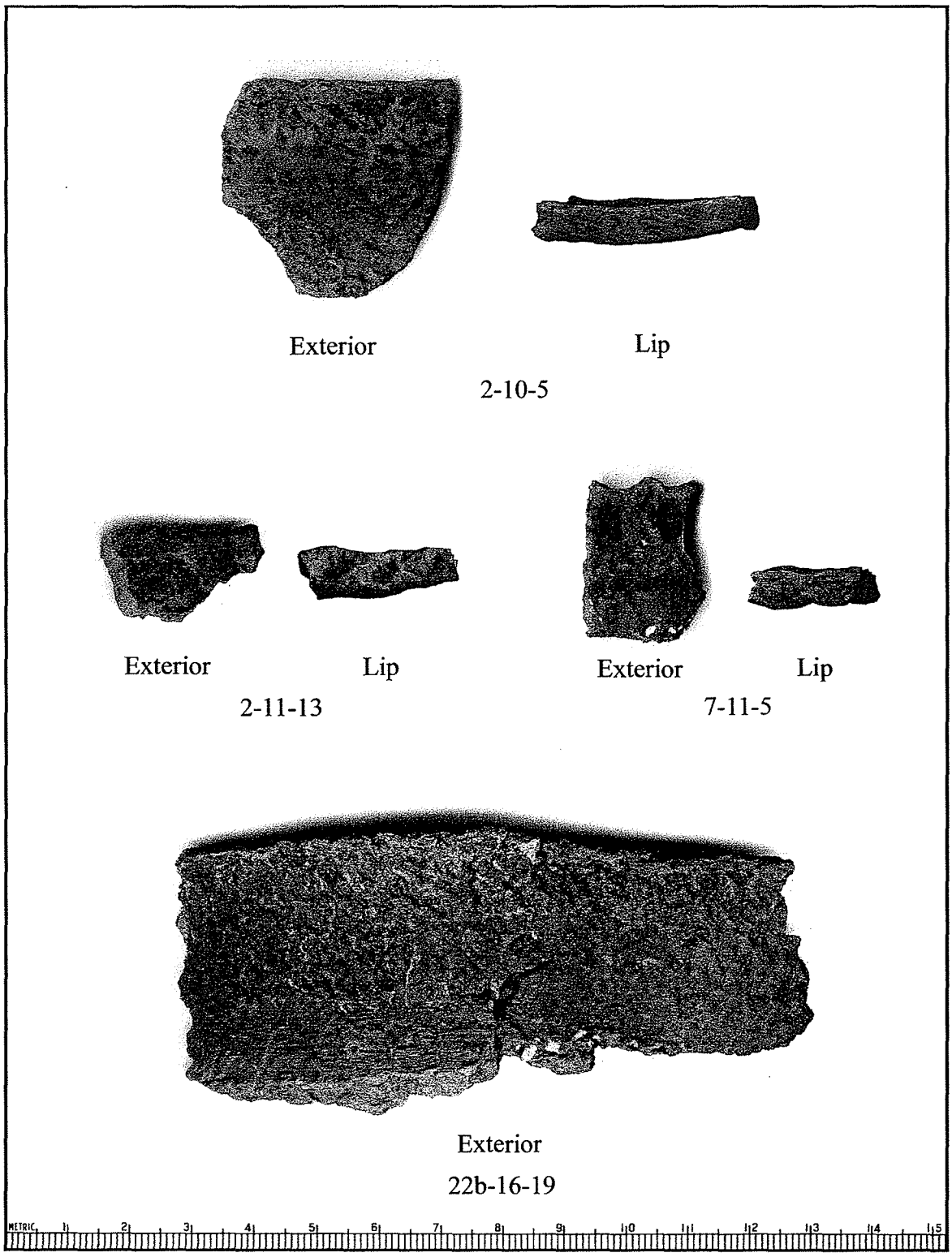
Rim sherd photographs


Exterior
Lip
12-6-5
Exterior
Lip
11-8-3
Exterior
Lip
14-4-3
Exterior
Interior
Lip
20-5-4
Exterior
Lip
7-7-5
METRIC

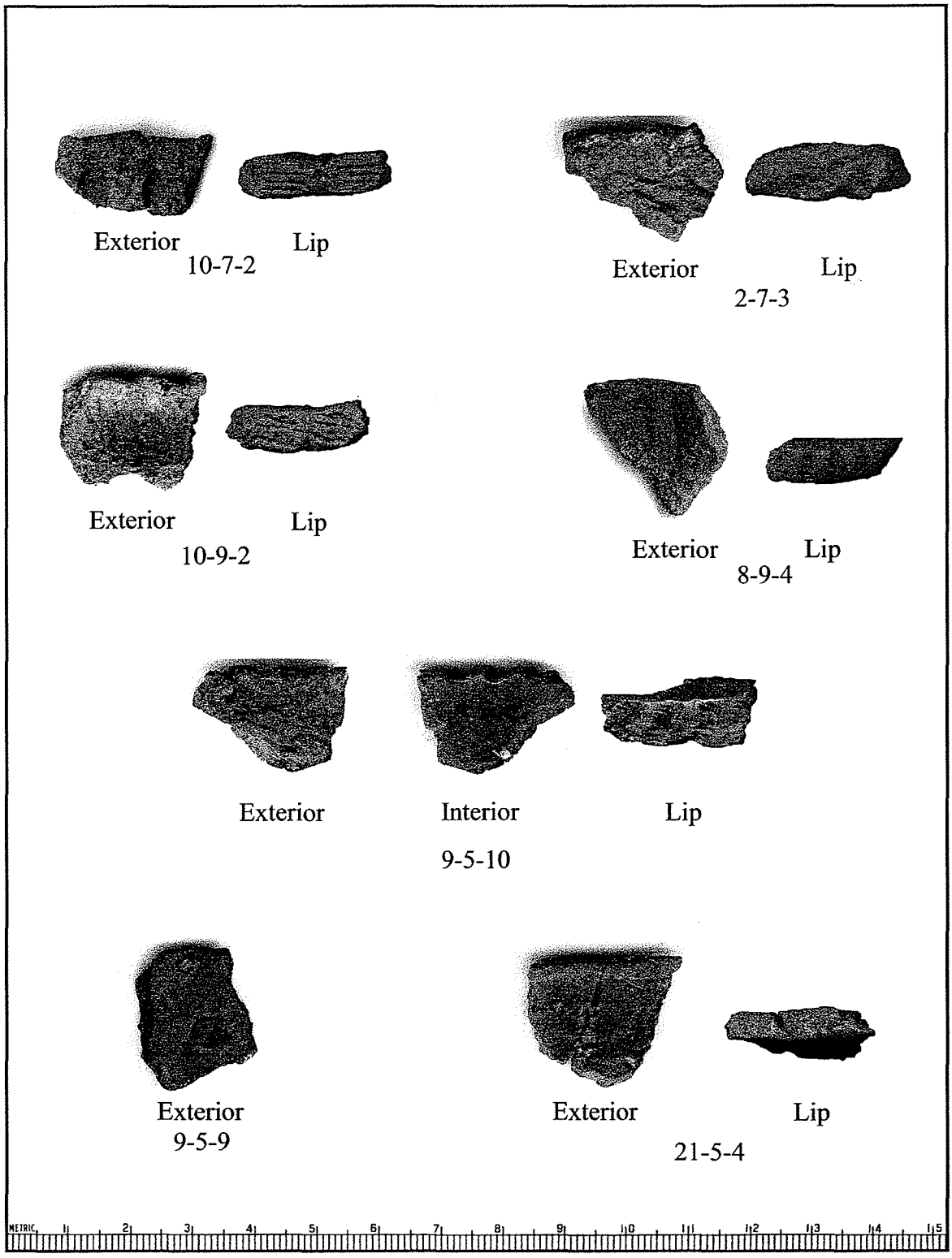
Bed B



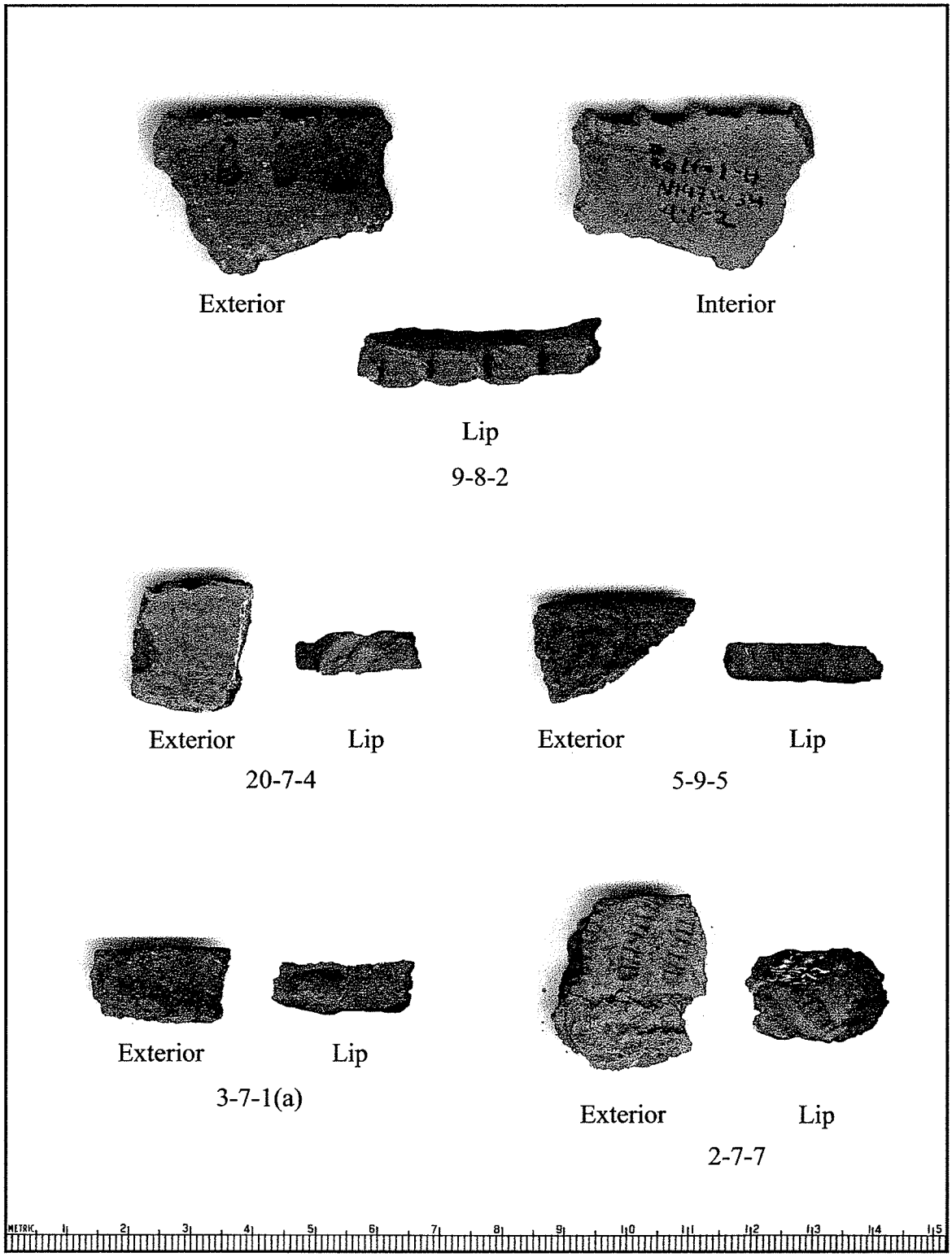
Organic Layer



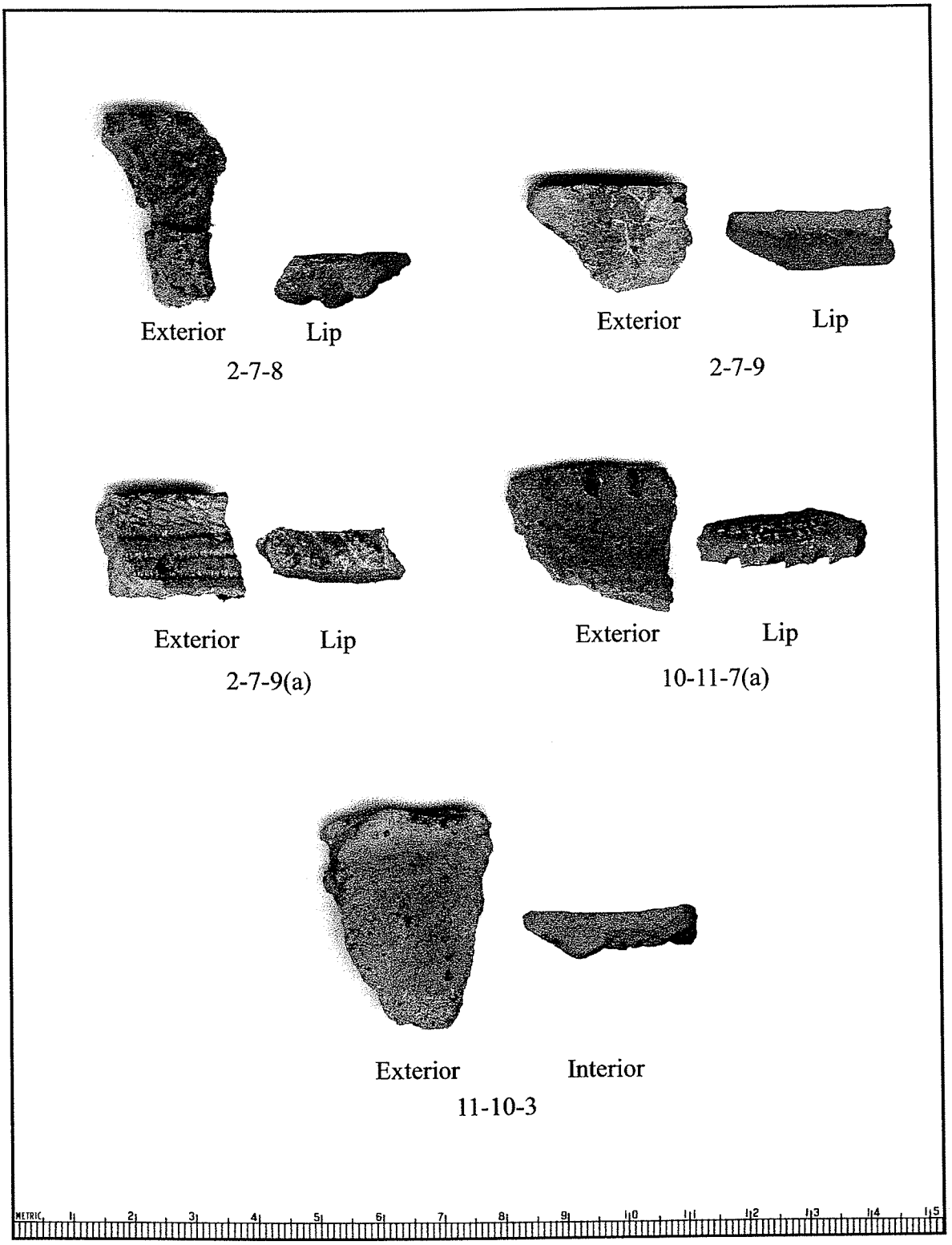
Organic Layer


Exterior
Lip
10-7-2
Exterior
Lip
2-7-3
Exterior
Lip
10-9-2
Exterior
Lip
8-9-4
Exterior
Interior
Lip
9-5-10
Exterior
9-5-9
Exterior
Lip
21-5-4
METRIC

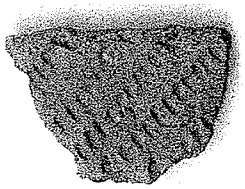
Bed B/C


Exterior
Interior
Lip
9-8-2
Exterior
Lip
20-7-4
Exterior
Lip
5-9-5
Exterior
Lip
3-7-1(a)
Exterior
Lip
2-7-7
METRIC

Bed B/C


Exterior
Lip
2-7-8
Exterior
Lip
2-7-9
Exterior
Lip
2-7-9(a)
Exterior
Lip
10-11-7(a)
Exterior
Interior
11-10-3
METRIC

Bed B/C

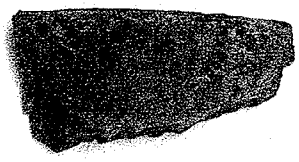


Exterior

Interior

Lip

11-W-9

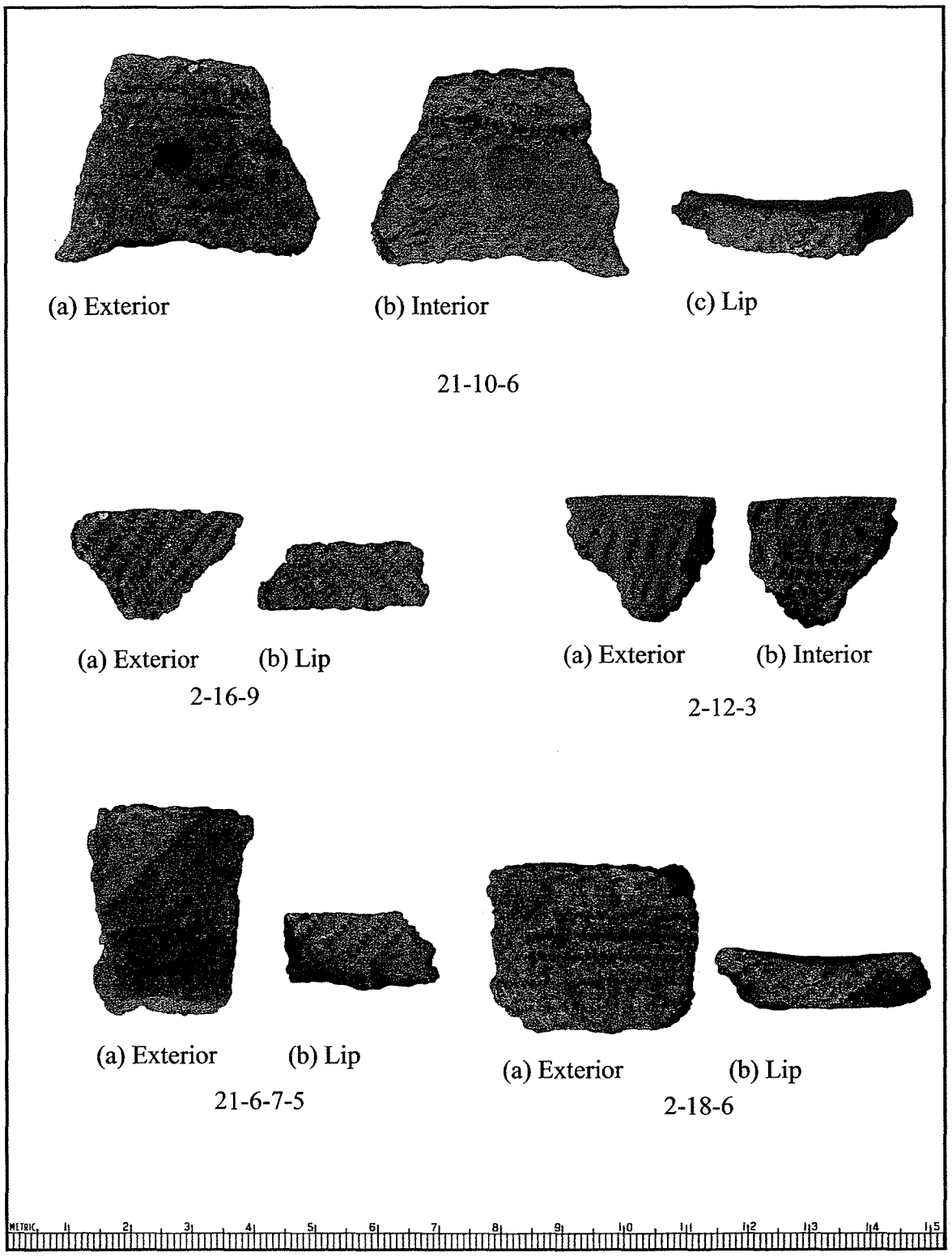


Exterior

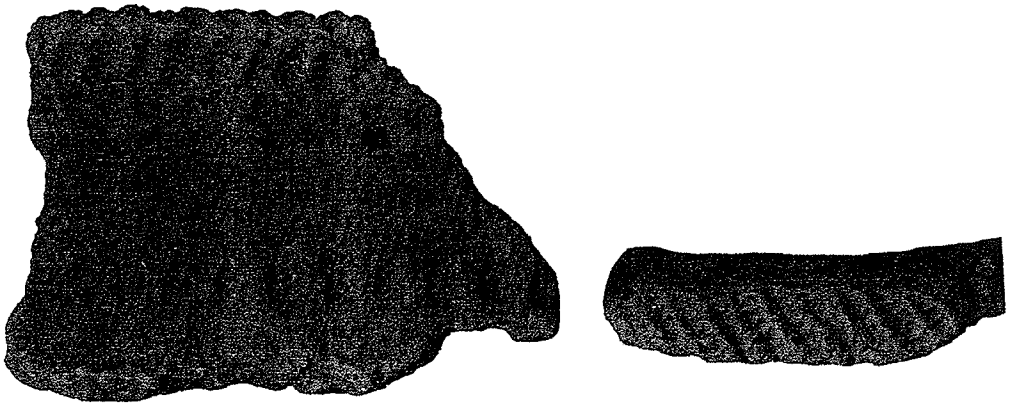
Lip

11-8-7

Bed B/C


(a) Exterior
(b) Interior
(c) Lip
21-10-6
(a) Exterior
(b) Lip
2-16-9
(a) Exterior
(b) Interior
2-12-3
(a) Exterior
(b) Lip
21-6-7-5
(a) Exterior
(b) Lip
2-18-6
METRIC

Bed CDE

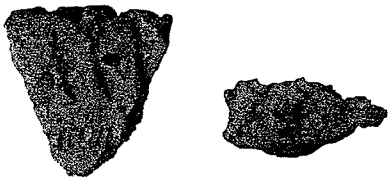


(a) Exterior (b) Lip

4-19-1

(a) Exterior (b) Lip

4-20-1



(a) Exterior (b) Lip

5-17-1

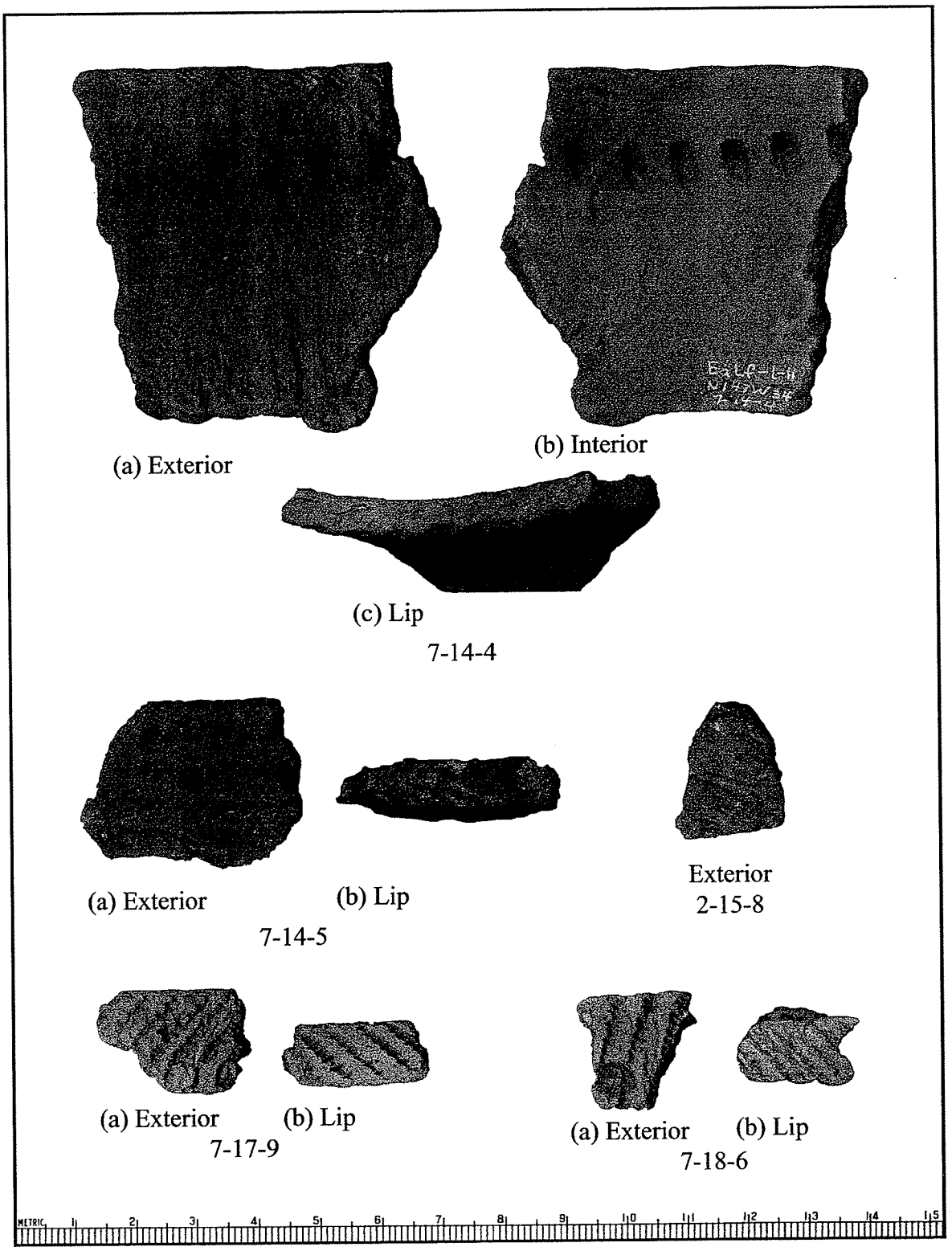
(a) Exterior (b) Lip

5-18-2

Exterior

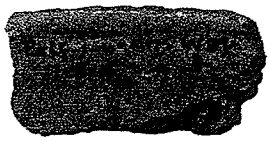
6-13-6

Bed CDE


(a) Exterior
(b) Interior
(c) Lip
7-14-4
(a) Exterior
(b) Lip
7-14-5
Exterior
2-15-8
(a) Exterior
(b) Lip
7-17-9
(a) Exterior
(b) Lip
7-18-6
METRIC

Bed CDE

(a) Exterior



(b) Interior

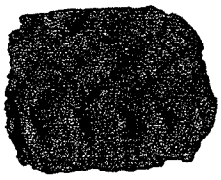
(c) Lip

7-8-5

(a) Exterior

(b) Lip

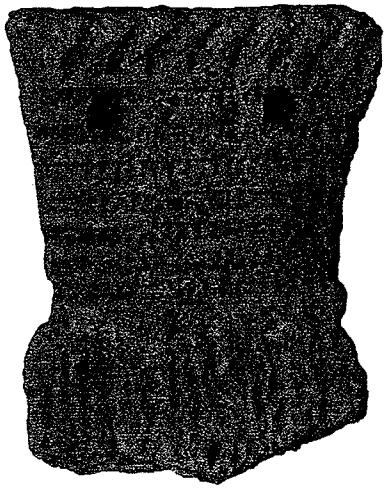
8-16-4



(a) Exterior

(b) Interior

8-17-6

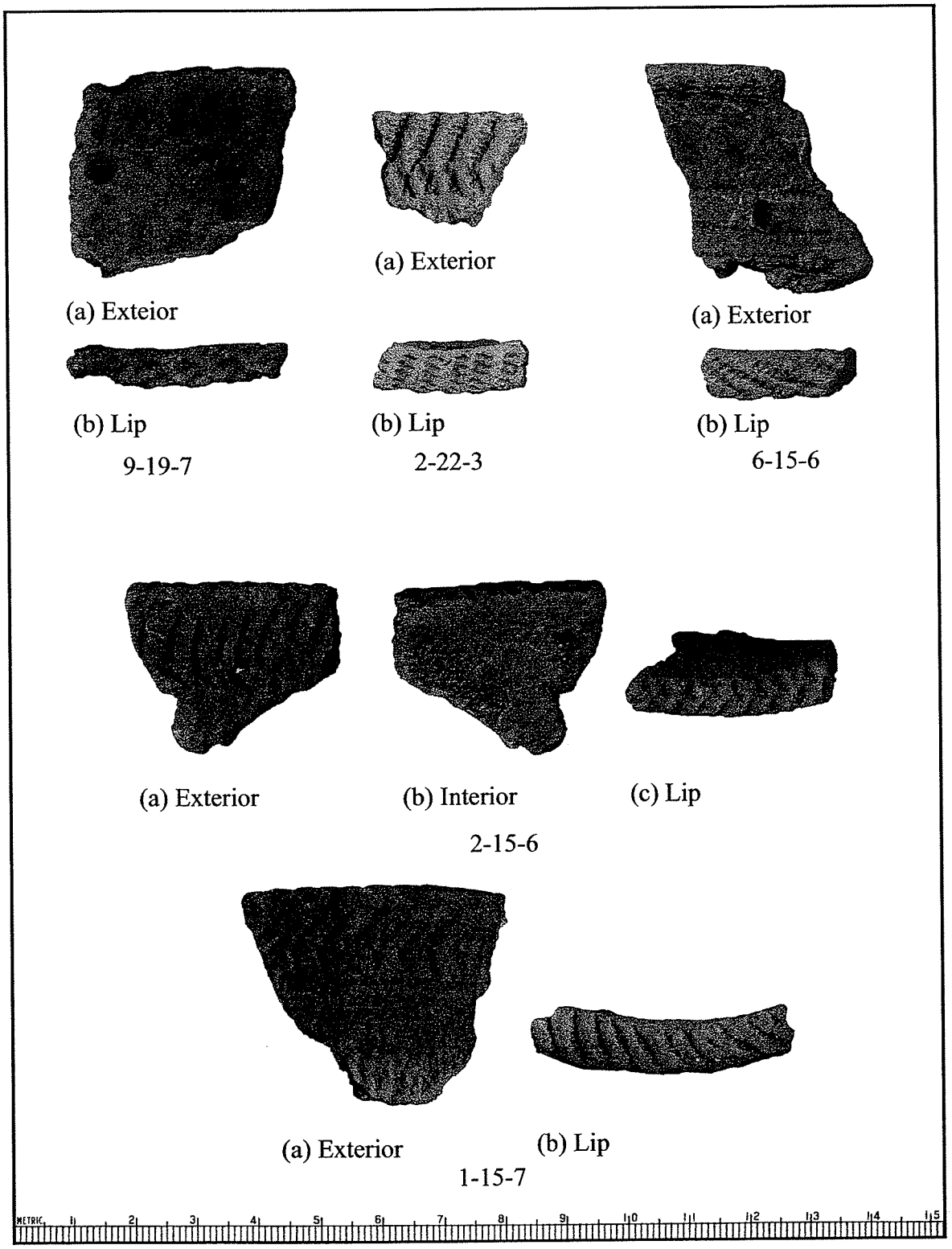


(a) Exterior

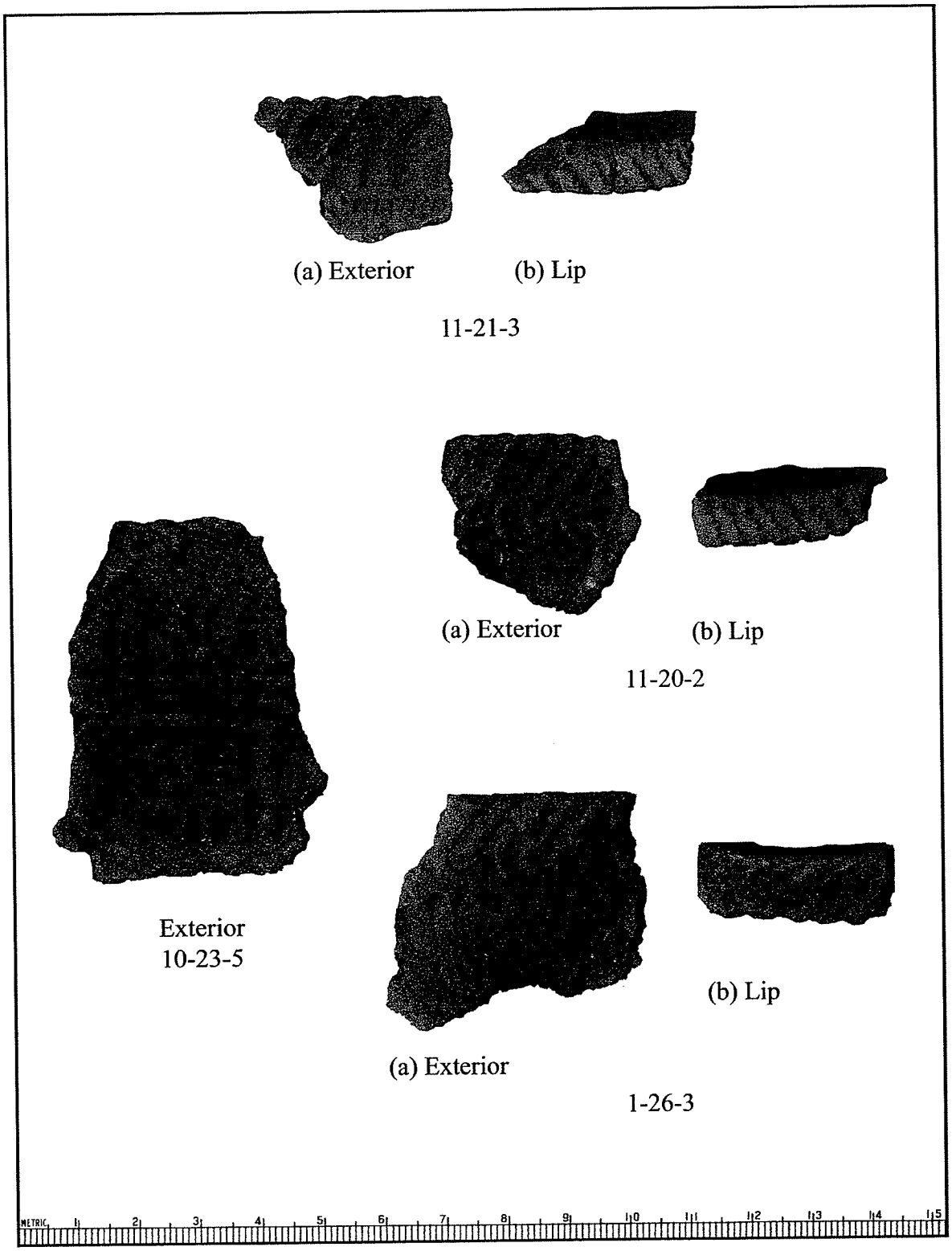
(b) Lip

8-19-4

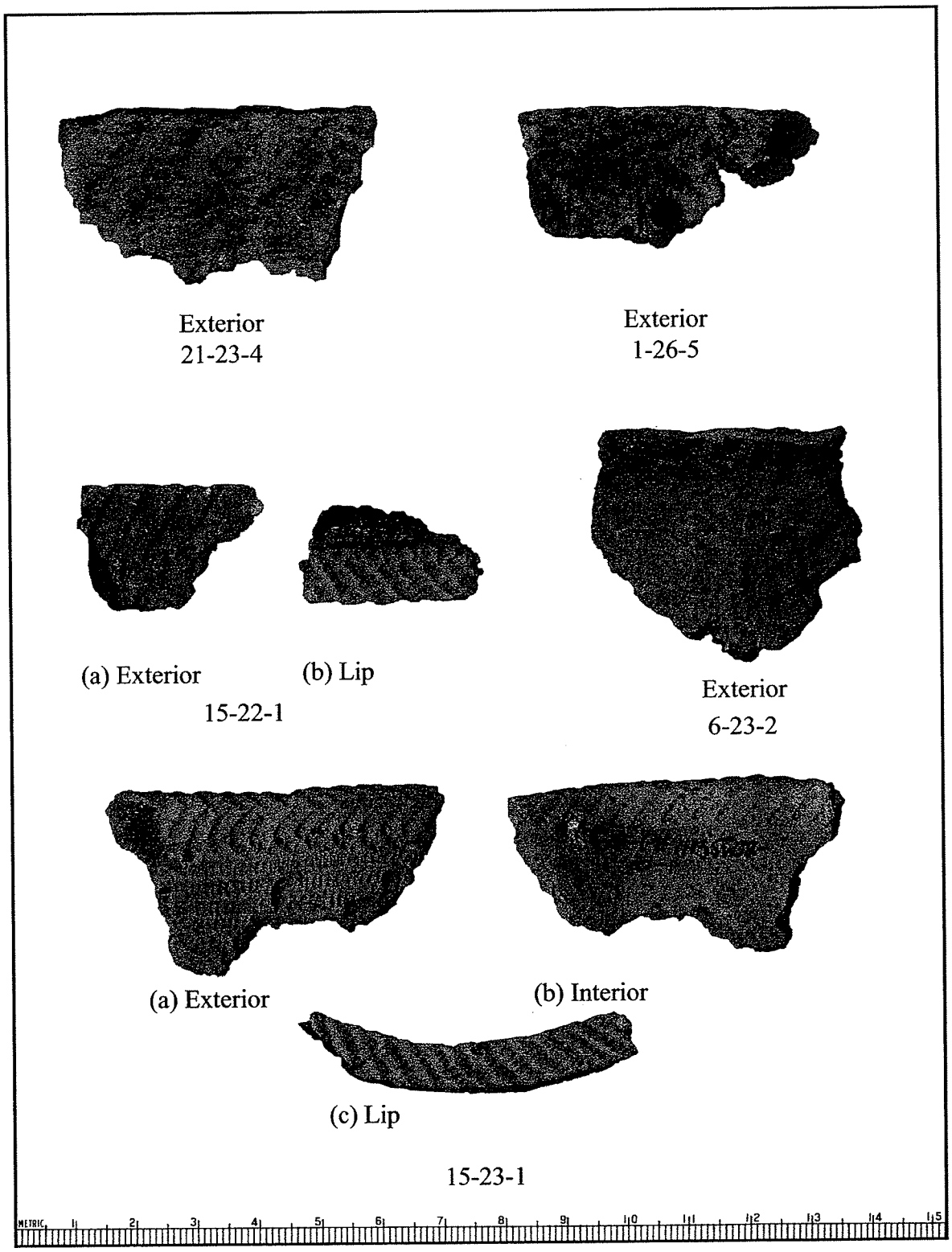
Bed CDE


(a) Exteior
(a) Exterior
(a) Exterior
(b) Lip
(b) Lip
(b) Lip
9-19-7
2-22-3
6-15-6
(a) Exterior
(b) Interior
(c) Lip
2-15-6
(a) Exterior
(b) Lip
1-15-7
METRIC

Bed CDE


(a) Exterior
(b) Lip
11-21-3
(a) Exterior
(b) Lip
11-20-2
Exterior
10-23-5
(b) Lip
(a) Exterior
1-26-3
METRIC

Bed F


Exterior
21-23-4
Exterior
1-26-5
(a) Exterior
(b) Lip
15-22-1
Exterior
6-23-2
(a) Exterior
(b) Interior
(c) Lip
15-23-1
METRIC

Bed F

(a) Exterior

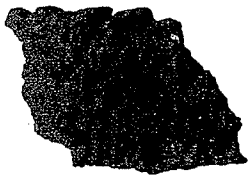
(a) Exterior

(b) Lip

21-23-5

(b) Lip

6-26-4



Exterior
8-25-4

(a) Exterior

(a) Exterior

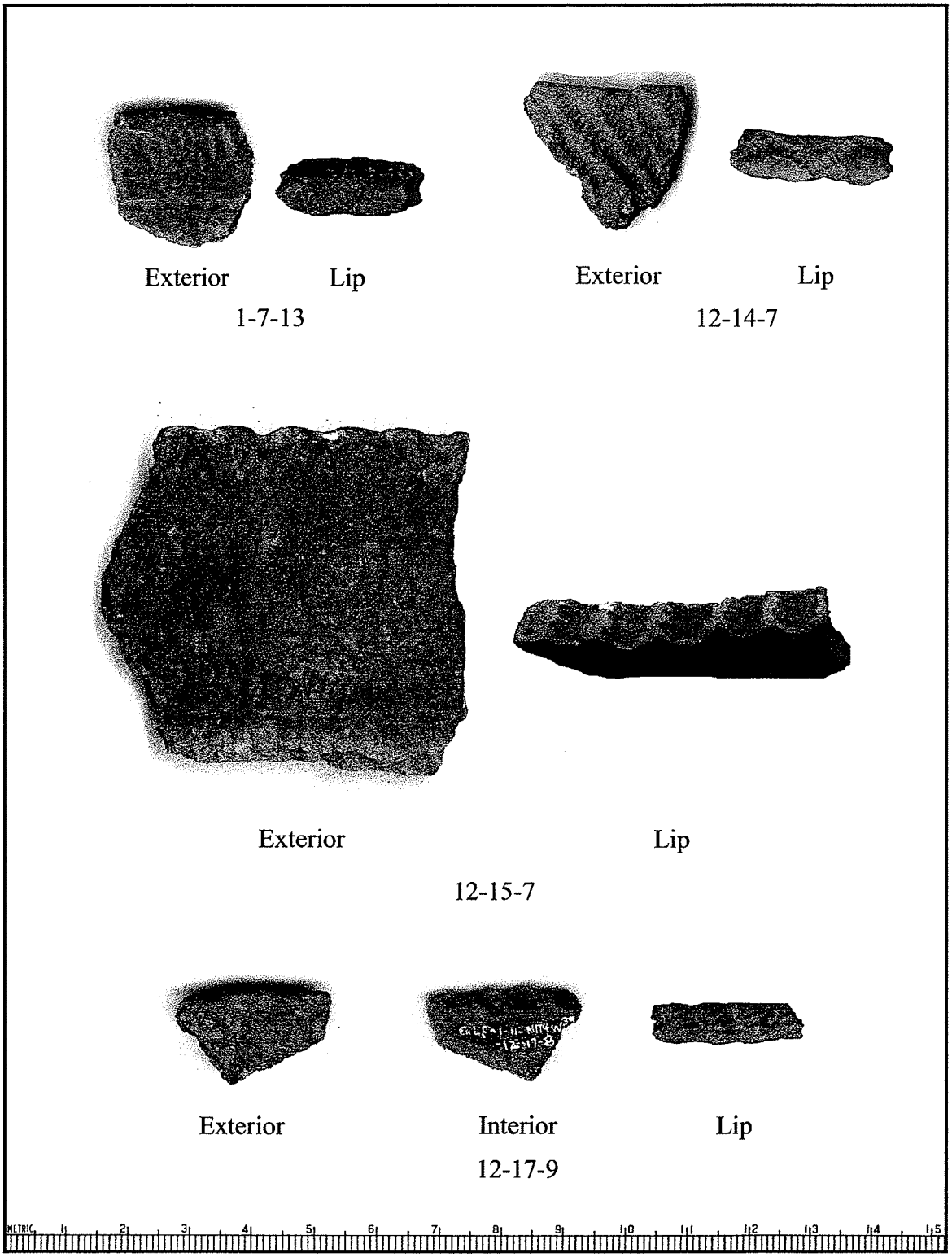
(b) Lip

8-24-4

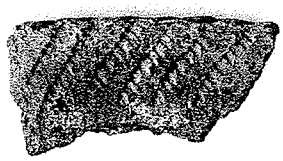
(b) Lip

8-24-5

Bed F


Exterior
Lip
1-7-13
Exterior
Lip
12-14-7
Exterior
Lip
12-15-7
Exterior
Interior
Lip
12-17-9
METRIC

Feature



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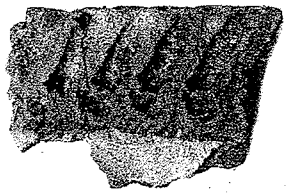


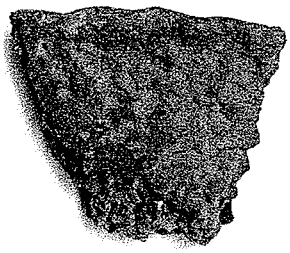
Exterior

Lip

12-7-12

Lip

4-29-1



Exterior

Lip

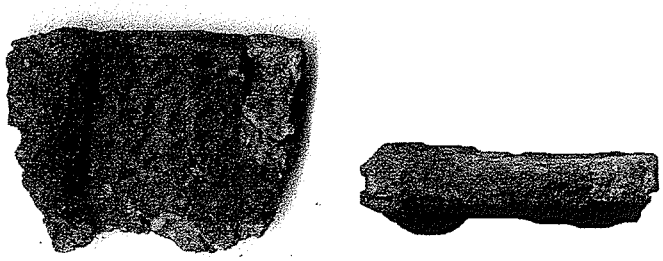
4-23-5(a)

Exterior

Lip

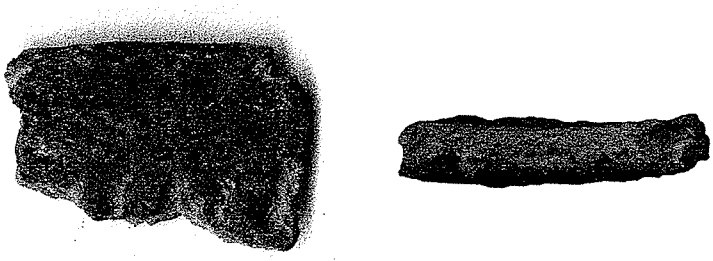
10-17-7

Feature



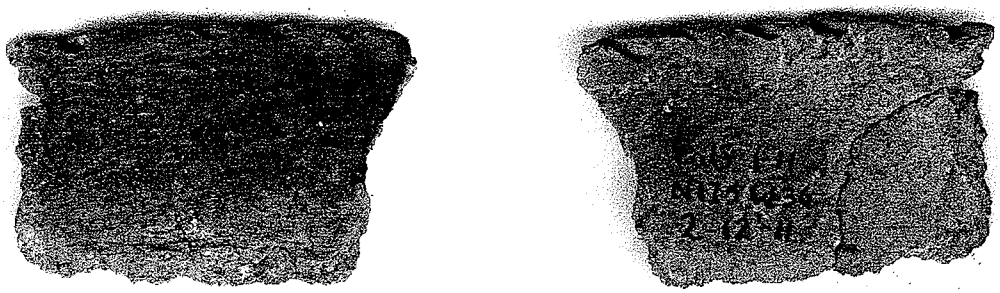
Exterior Lip

4-37-5



Exterior Lip

2-12-10

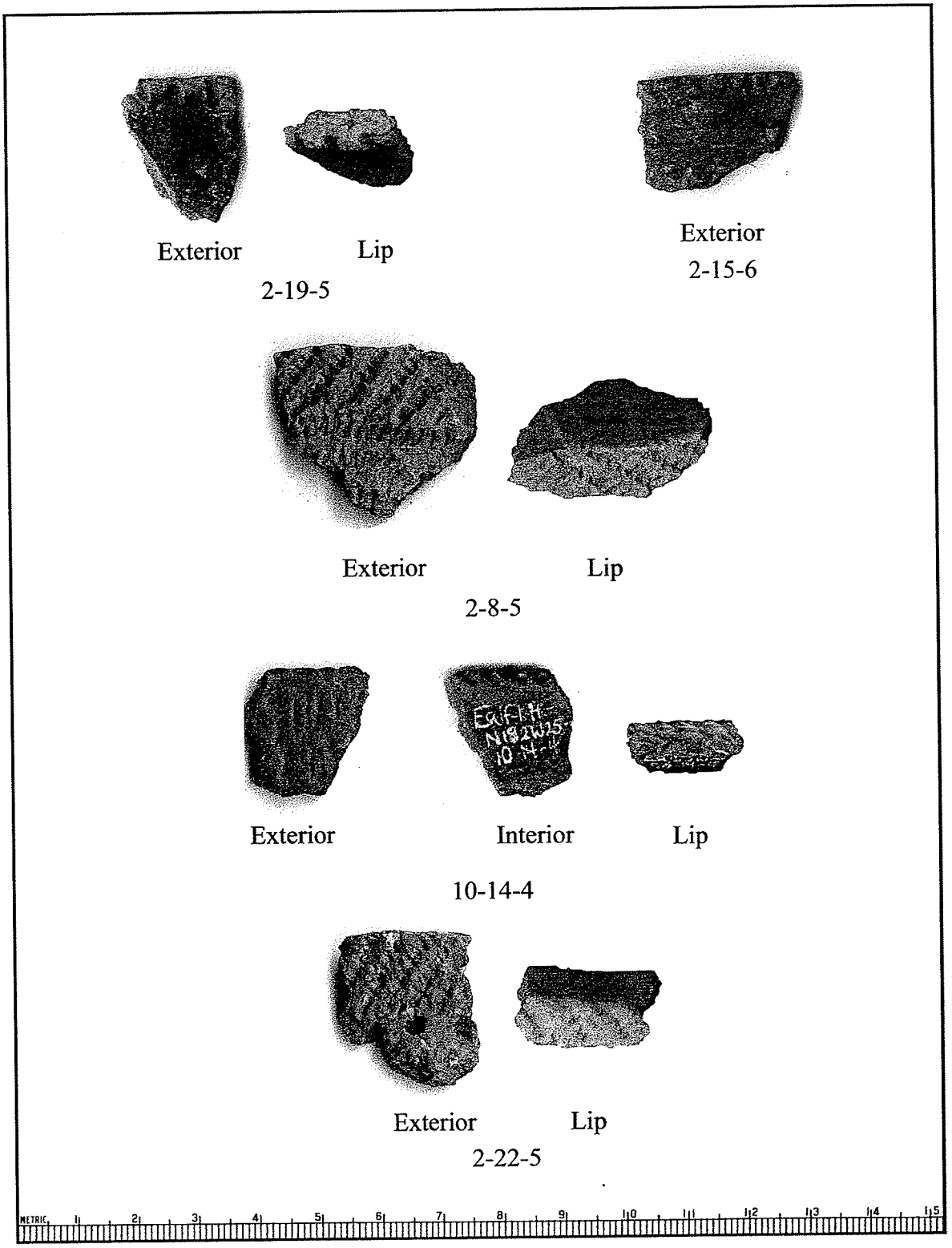


Exterior Interior

Lip

2-12-11

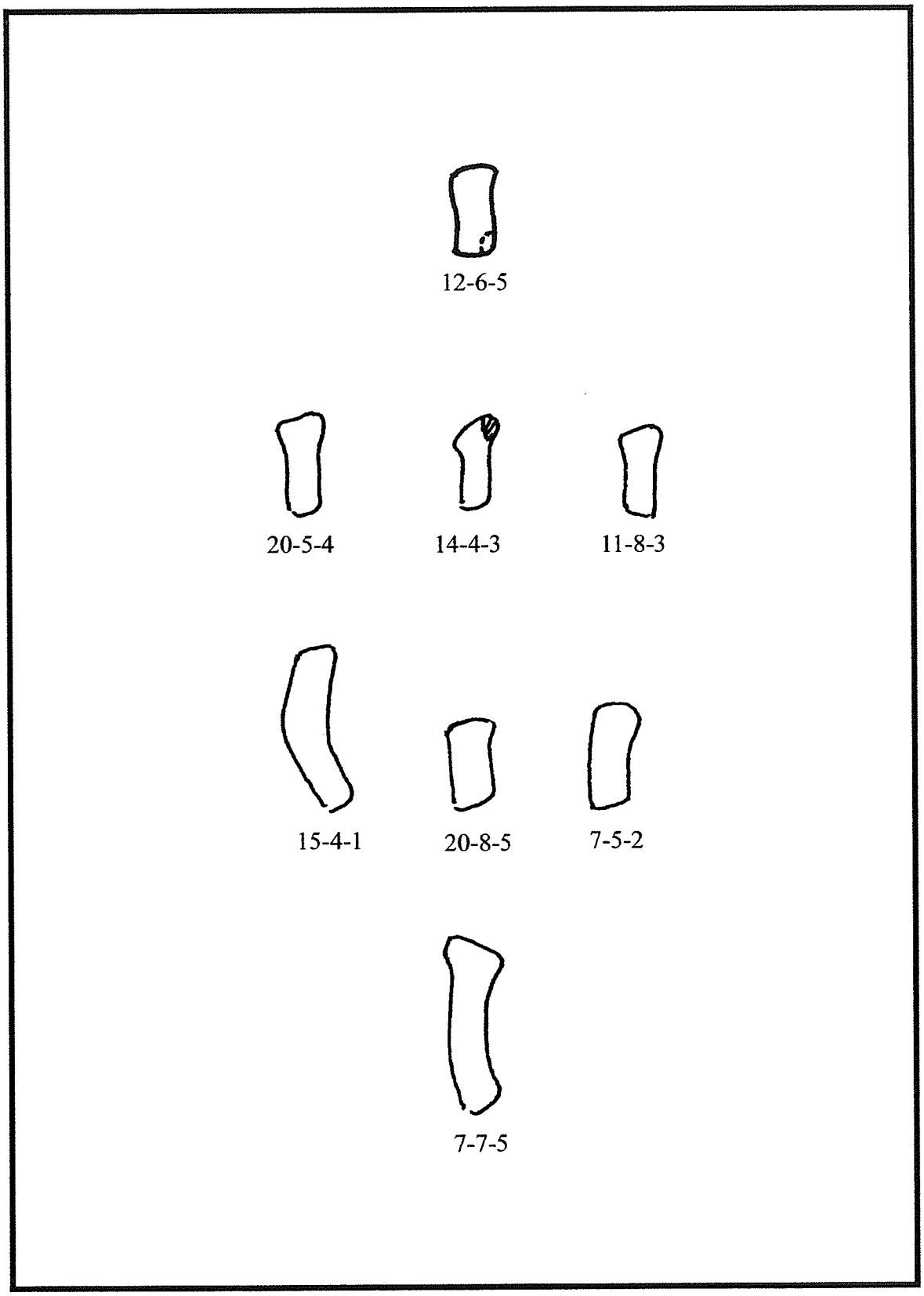
Feature


Exterior
Lip
2-19-5
Exterior
2-15-6
Exterior
Lip
2-8-5
Exterior
Interior
Lip
10-14-4
Exterior
Lip
2-22-5
METRIC

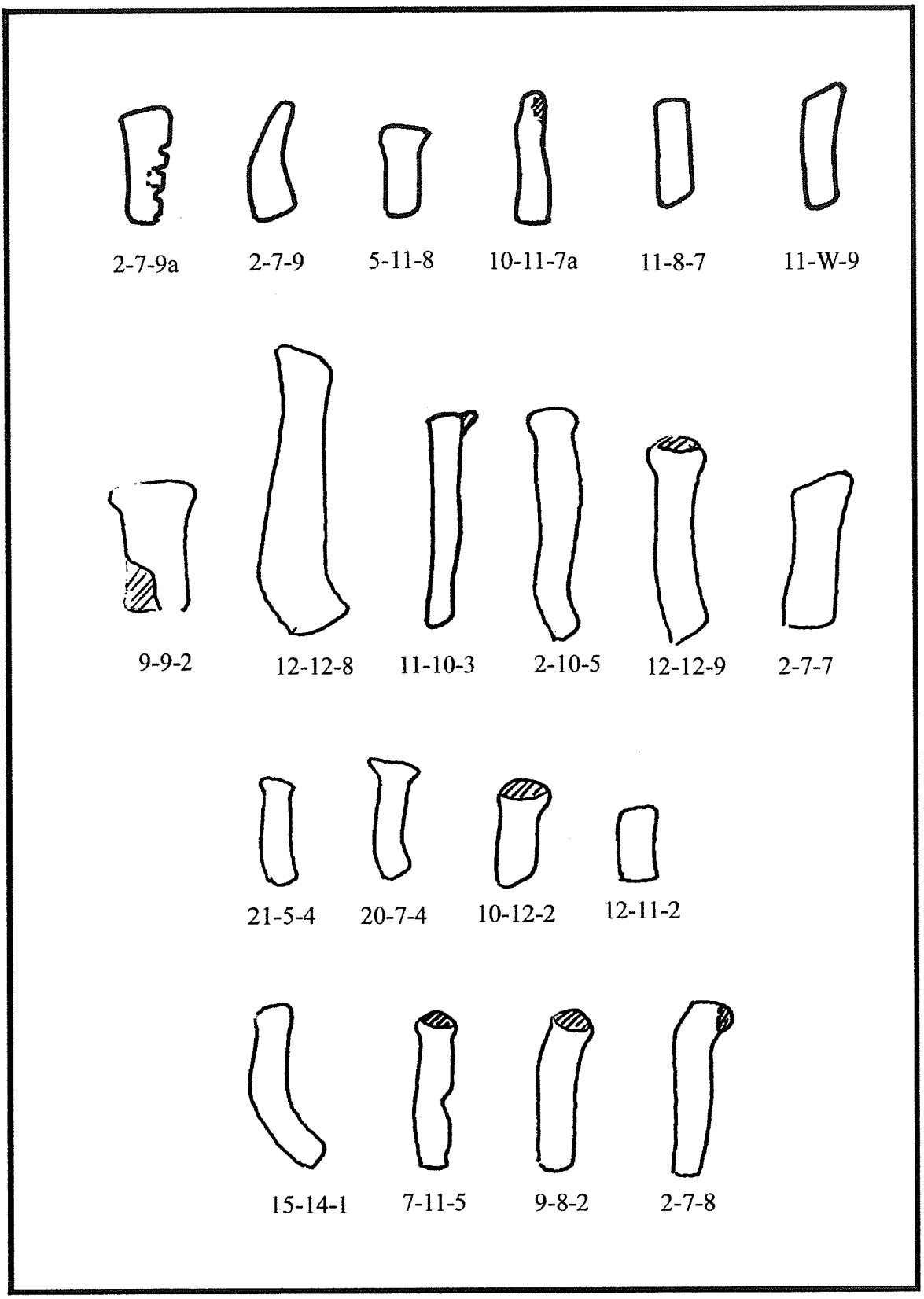
Feature

Appendix V

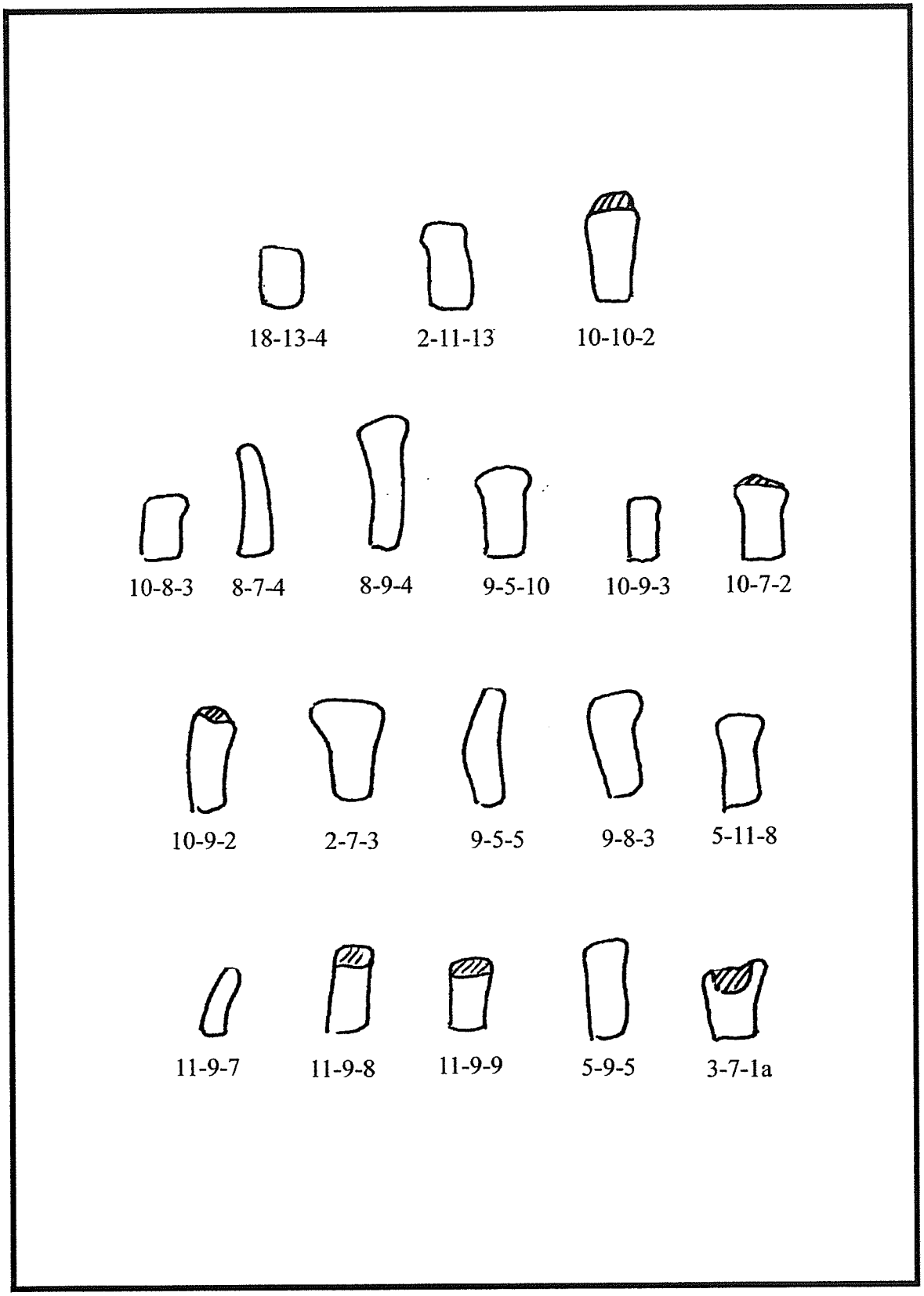
Rim profiles



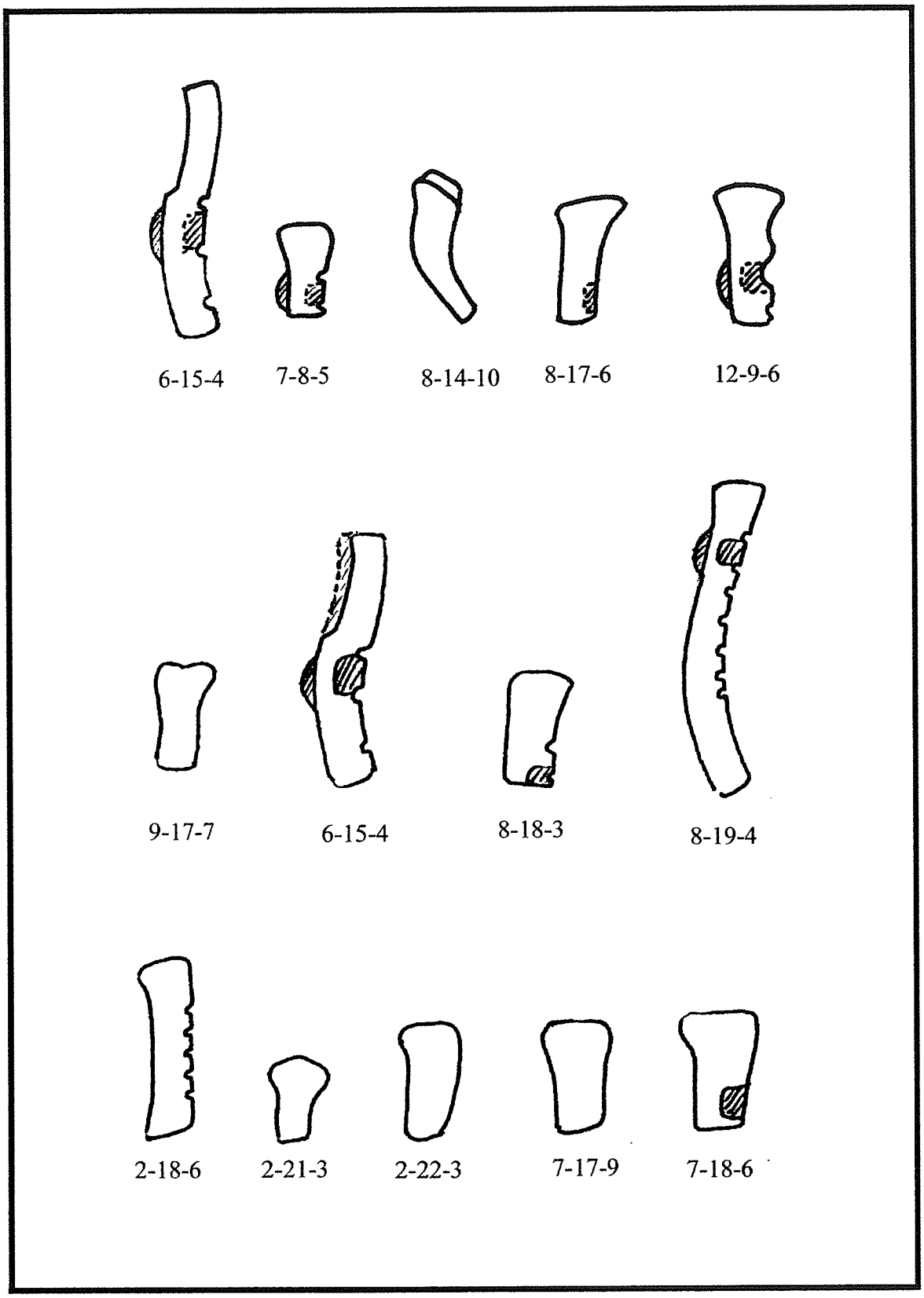
Bed B (interior to left)



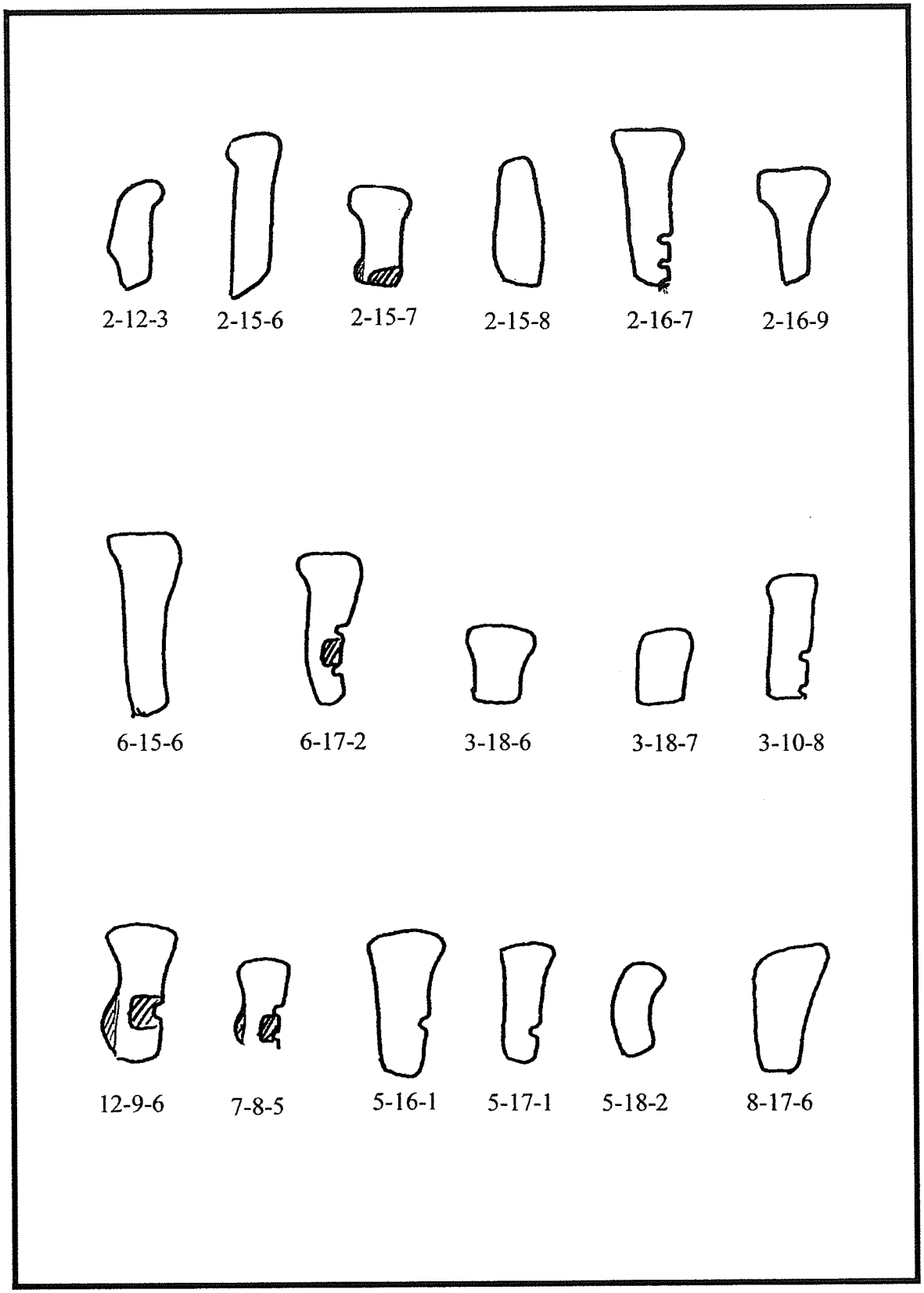
B/C and Organic Layer (interior to left)



B/C and Organic Layer (interior to left)



Bed CDE (interior to left)



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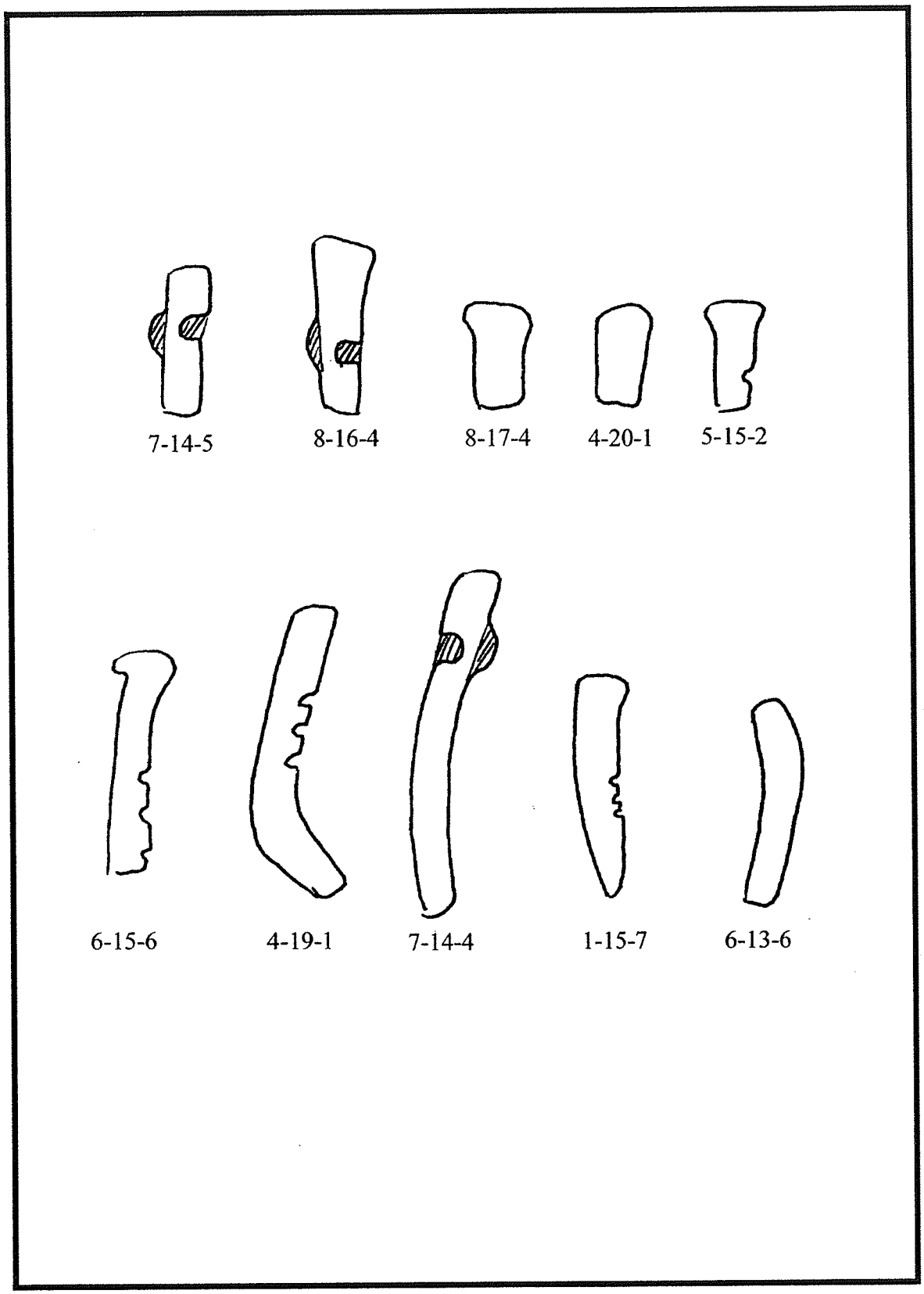
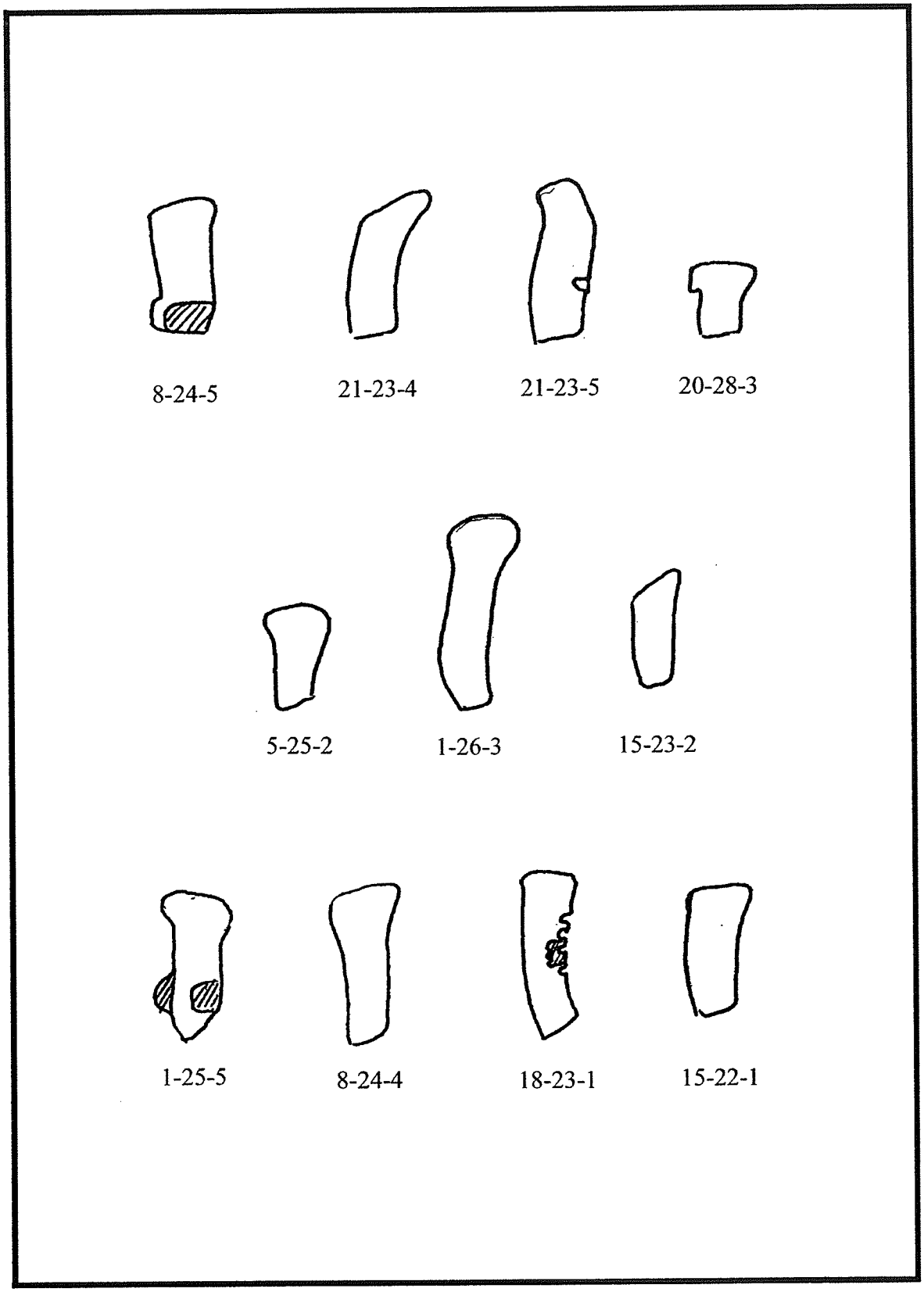


Bed CDE (interior to left)



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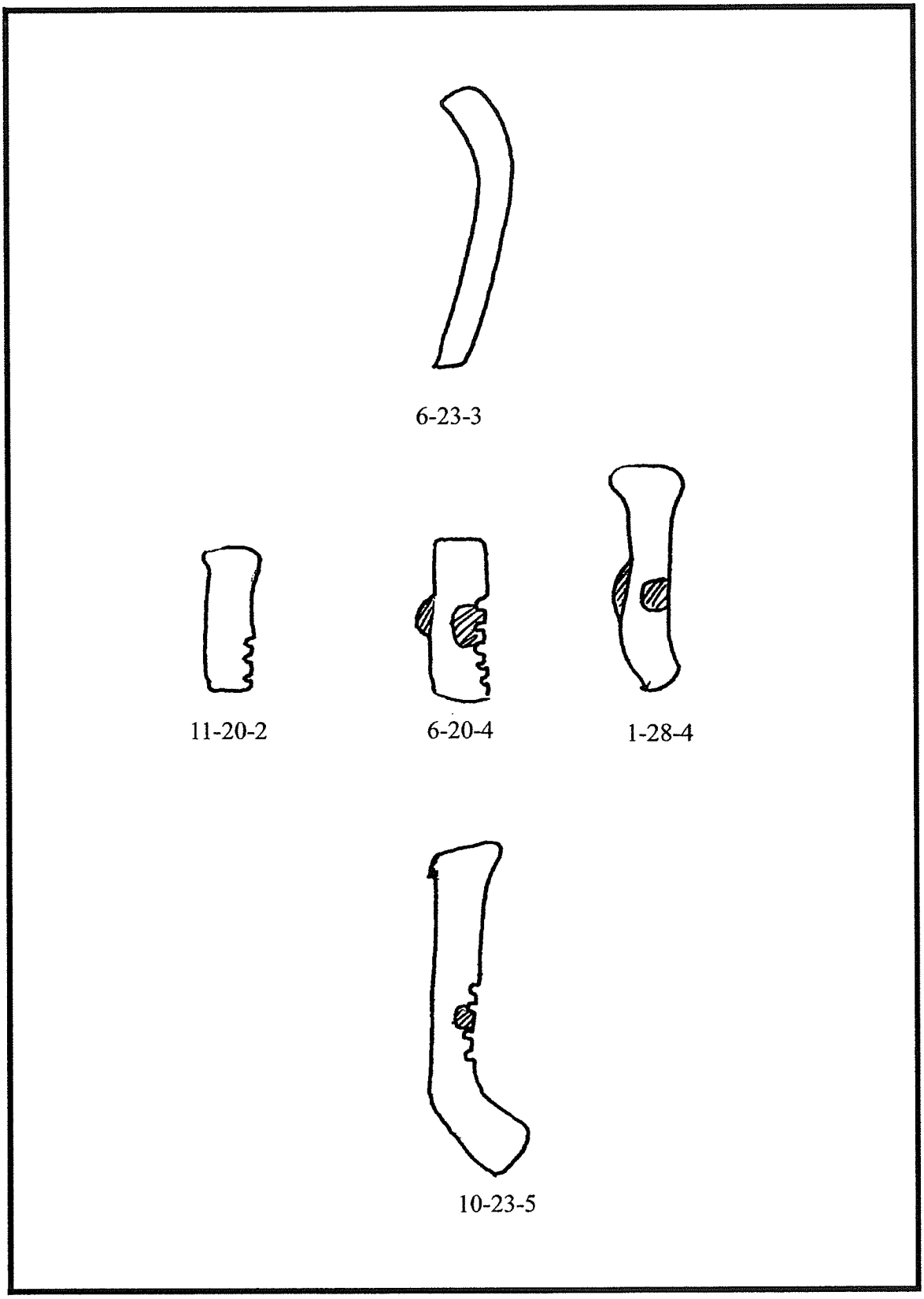
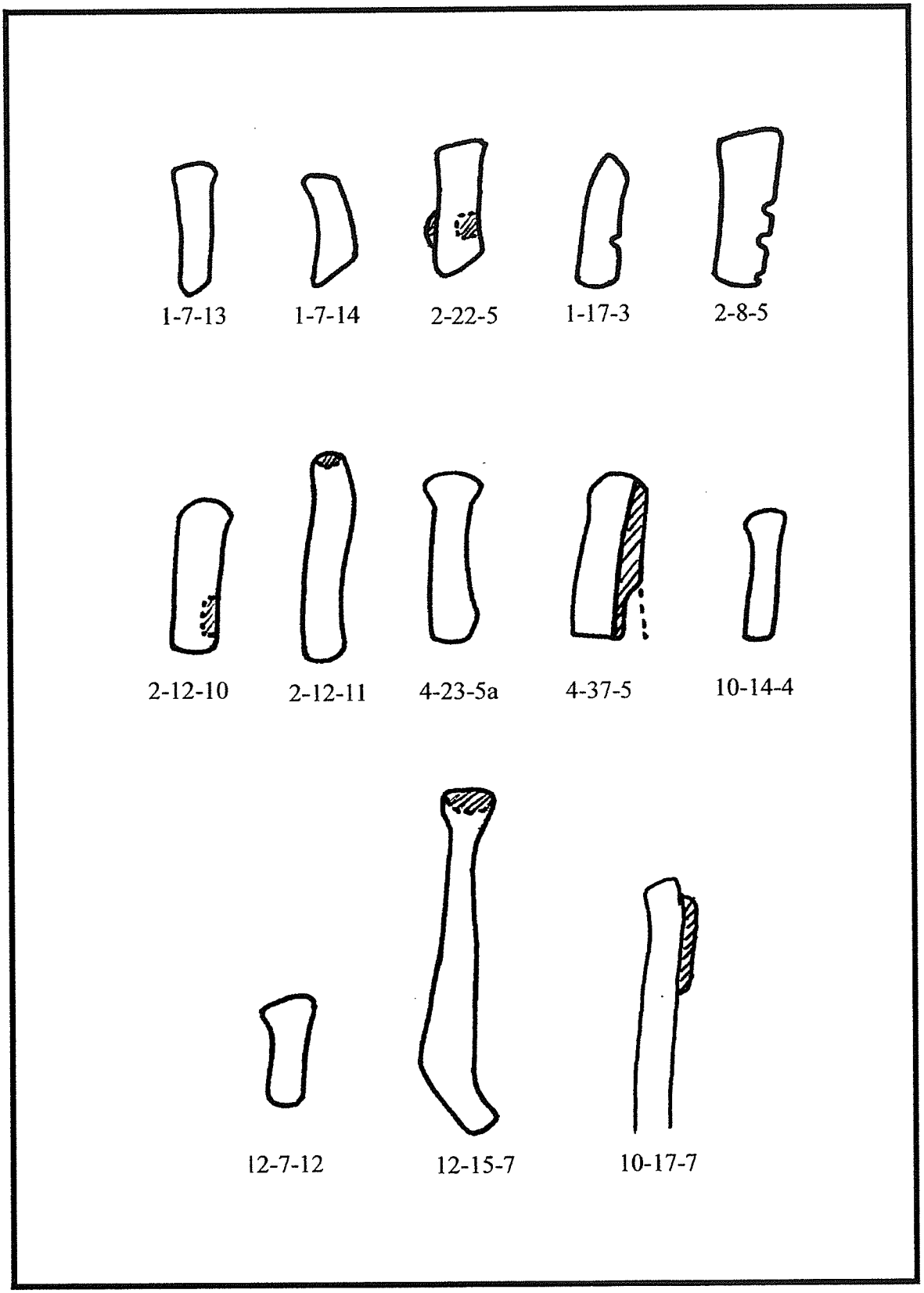
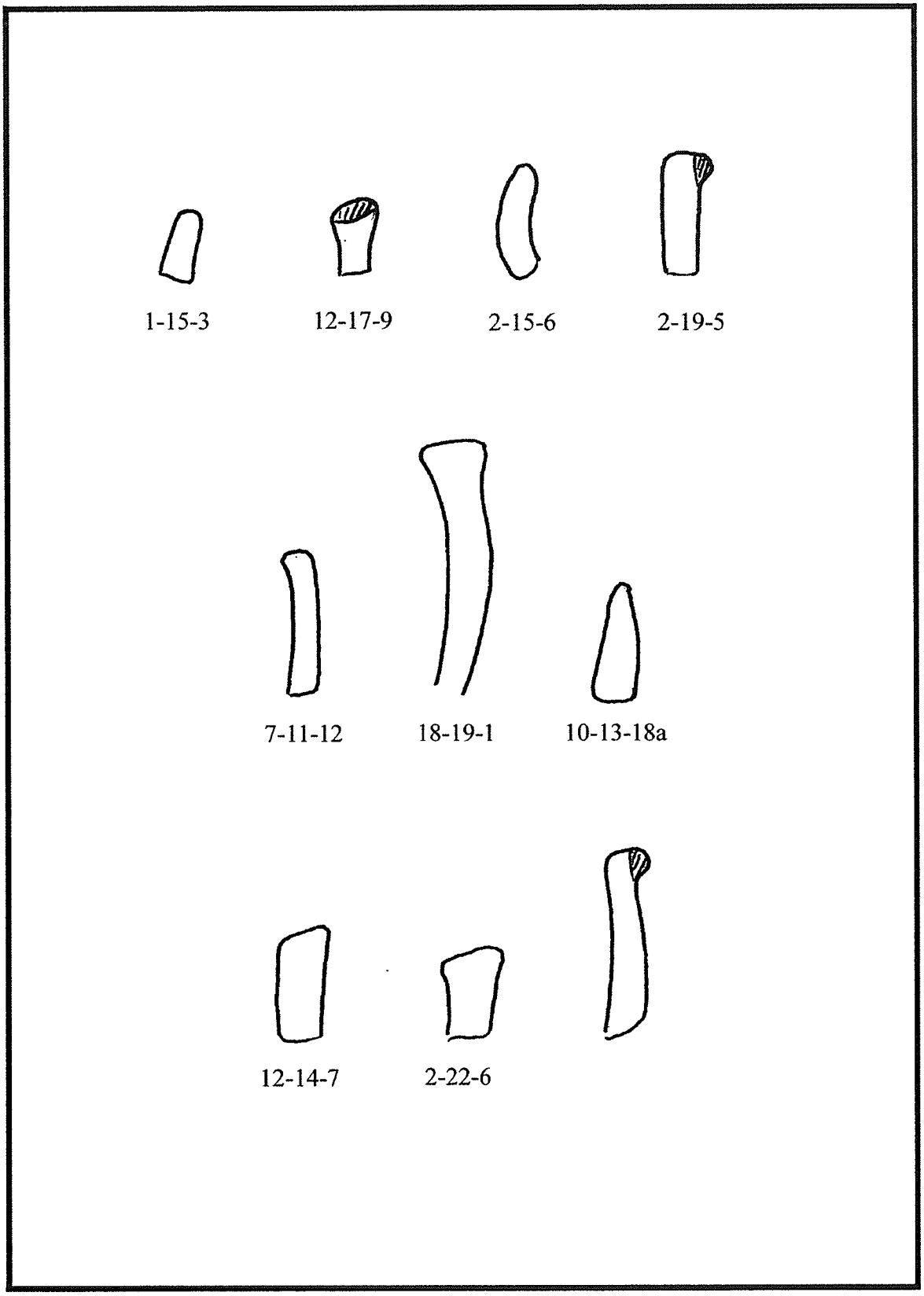


Bed F (interior to left)



Feature (interior to left)



Feature (interior to left)

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Cultural Responses to the Medieval Warm Period on the Northeastern Plains: the example from the Lockport Site (EaLf-1)

BY

CATHERINE M. FLYNN

A Thesis
Submitted to the Faculty of Graduate Studies
in Partial Fulfillment of the Requirements
for the Degree of

MASTER OF ARTS

Department of Anthropology
University of Manitoba
Winnipeg, Manitoba

THE UNIVERSITY OF MANITOBA

FACULTY OF GRADUATE STUDIES

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CHAPTER 10
EXTRA-REGIONAL CONTEXT: MIDDLE MISSOURI AND UPPER MISSISSIPPI CULTURAL HISTORICAL BACKGROUND

10.1 INTRODUCTION TO THE CULTURE HISTORY OF THE PLAINS VILLAGE AND ONEOTA TRADITIONS

During the Late Precontact Period on the more southerly potions of the Northeastern Plains and its surrounding areas, there are three major cultural traditions each of which is identified by a reliance on intensive maize horticulture, settlement in permanent or semi-permanent villages, and finely made, globular ceramic vessels. These are the Middle Mississippian, the Oneota (generally regarded as Upper Mississippian), and the Plains Village traditions (Anfinson and Wright 1990).

Middle Mississippian Tradition components are found in southeastern Minnesota from about 1200 to 1300 AD, although these are found earlier farther to the south and east. The Plains Village Tradition manifests itself in an eastern division of the Initial Middle Missouri Variant seen in the form of the Great Oasis, Cambria, and Mill Creek phases between approximately 900 and 1300 AD (Anfinson and Wright 1990). These three, Cambria, Great Oasis and Mill Creek, either individually, or in a variety of combinations, have all been regarded as ancestral to the Middle Missouri Tradition. Great Oasis has affinities with both Late Woodland and Plains Village Traditions, while Cambria appears to be related to Plains Village, Oneota, and Middle Mississippian Traditions (Anfinson 1982). Both the Middle Mississippian and Plains Village Traditions are very short lived in Minnesota. Neither lasts beyond 1300 AD, nor do they span more than a

couple of hundred years (Anfinson and Wright 1990) although the Plains Village Tradition persists in the Middle Missouri sub-area to the west until contact. The Oneota, though only peripherally present on the Northeastern Plains, are a pervasive presence in adjacent areas. The Oneota appear to displace the eastern manifestations of the Initial Middle Missouri Variant and flourish from that time until at least 1500 AD in many places, and as late as the 1700's in some where European trade goods are found in association.

All of these various traditions possess a maize-based subsistence system and all begin as replacements to the indigenous Late Woodland Tradition. They continue to co-exist with Late Woodland groups in the southeastern portions of the Northeastern Plains until around 1300 AD. In more northern areas, the Late Woodland continues more or less uninterrupted until the Protocontact Period. To the south, this tradition appears to be replaced by the Mississippian Tradition. However, it is unclear whether these Late Woodland groups are absorbed by, displaced by, coexist with, or are transformed into the many local manifestations of Plains Village and Oneota (Anfinson 1982). The level of complexity within this region as a whole means that the origins, development, interrelationships, and ultimate demise of all these various traditions are not well understood (Anfinson 1982).

Of these various phases and traditions, only a few will be treated in detail in this section. I will provide a more general overview of the Middle Missouri Plains Village and Oneota Traditions without examining all their myriad internal subdivisions. From there, I will treat the eastern phases of the Initial Middle Missouri Variant more comprehensively for a number of reasons:

1) While these are perhaps less well understood they also provide the earliest evidence of the Plains horticultural way of life, which is ultimately manifested in its most well developed form in the Middle Missouri trench;

2) The eastern expressions of the Initial Middle Missouri may also bridge the gap between Late Woodland hunting and gathering adaptations and later, horticultural groups; and

3) These Initial Middle Missouri Variant groups are also part of a larger cultural and technological revolution which occurs along the prairie-forest border between about 1100-1300 AD. The arrival of maize horticulture at Lockport is also part of this larger process.

Therefore it is appropriate to examine these early manifestations of the Middle Missouri Tradition in greater detail than the later, mature Middle Missouri phases which do not have much bearing on the problem at hand. I will also examine some of the more northerly Oneota phases such as Blue Earth and Ogechie in greater detail because geographically, these are the nearest expressions of Oneota to the study area and may have some relationship to Oneota-like ceramics which can be found further to the north.

10.2 The Plains Village Tradition of the Middle Missouri Sub-Area

This section will be approached somewhat differently than the previous chapter with its many cultural subdivisions. If the Middle Missouri sub-area were treated as the hierarchical equivalent of the Northeastern Plains, I would address each phase and variant of Middle Missouri sub-area separately, a monumental task better accomplished by specialists in the field. Moreover, the cultural chronology of the Middle Missouri has undergone several revisions in the last 20 years. Since this not a thesis on the Middle Missouri Tradition, it is more effective

to present the bulk of this material in a single section with some of the suggested chronological revisions. However, certain phases of the Initial Middle Missouri Variant, such as Cambria and Great Oasis, for instance, may have a bearing on later cultural developments on the Northeastern Plains. Therefore, I will address some of these earlier cultural historical divisions individually.

However, the Middle Missouri sub-area still deserves special attention because of its close proximity to the study area. In addition, various authors (Buchner 1986; Nicholson 1990; Syms 1980; Pettipas 1996) have postulated that Middle Missouri groups probably both interacted with, and influenced populations to the north in what is now southern Manitoba. Evidence for this interaction comes in the form of Middle Missouri ceramics in southwestern Manitoba, and the presence of various elements of a horticultural subsistence system such as bell shaped storage pits at sites like the Snyder site. Much is made of Hidatsa oral traditions that tell of a time when they went north to a land of snow and moose during which time they lost their corn (Ahler et al. 1991). However, whether these archaeological clues indicate the movement of people, ideas, goods or some combination of these is unknown.

Archaeologically, the entire Middle Missouri sub-area is well surveyed and researched as a result of the archaeological salvage program instituted in the years following World War II (Logan 1977). Much of the subsequent survey work has been directly related to mitigations of the frequent inundations of major rivers along the Missouri Trench. Interestingly enough, for all the work done in the area, the origins and development of the Middle Missouri Tradition are still not as well understood as one might expect (Lovick and Ahler 1982).

10.2.1 Definition and taxonomic problems:

Lehmer, in 1954, was the first to formally define the Middle Missouri Tradition (Tiffany 1983). The taxonomic system he developed to impart chronological order to the area is terminologically dense and remained with few alterations for many years. However, the system has not been without its problems. Lehmer's work has been criticized for both its inflexibility (Lovick and Ahler 1982) and for its inability to adequately account for the origins of Middle Missouri Plains Villagers (Lovick and Ahler 1982; Tiffany 1983). In more recent taxonomic systems (Gregg 1990), "Plains Village", like Plains Woodland or Plains Archaic would be seen as a "tradition" rather than as a "pattern" as Lehmer suggested, while the Middle Missouri Coalescent would be classified as a "complex" -- a sub-unit of a tradition rather than as a "variant". Unfortunately, these suggested terminological revisions have been adopted unevenly. For example, while the term "tradition" has been adopted by many authors, terms like "variant" still remain in common parlance.

In Gregg's conception of archaeological taxonomy, cultural traditions are:

> ... lifeways or general adaptive strategies defined in terms of variation in reliance upon hunting, gathering, and gardening for food production, the subsistence resources exploited, and the use of ceramic containers for cooking and food processing.
>
> (Gregg 1990: B.7).

Traditions are roughly equivalent to stages of cultural development in an anthropological sense; however, these traditions are not temporally exclusive, since groups living according to different adaptive strategies could have been, and indeed frequently were, each other's contemporaries (Gregg 1990).

A cultural complex is somewhat more problematic as it has been used by different authors to express different concepts; however, in North Dakota, culture complexes are seen as "groups of similar remains that have been found at numerous sites in an area or sub-area" (Gregg 1990: B.9). The diagnostic artifact types of a given complex are generally stylistically similar and such artifacts may include ceramics, point types, mortuary behavior, and settlement patterns (Gregg 1990). This is similar, but not identical to Syms (1977) definition of a cultural complex.

Again, confusion surrounding the terminology does not serve to clarify this matter. Lehmer (1971) suggests the Middle Missouri Tradition was part of the Plains Village Pattern, while in the other schemes the Middle Missouri Tradition is part of the Plains Village Tradition. This duplication of the term 'Tradition' is not terribly helpful and serves to obscure the critical fact that the Middle Missouri horticultural mode of production is a sub-unit of a larger and much more widespread cultural unit known by the term Plains Village "Tradition" or "Pattern". This way of life extended well beyond the bounds of the Middle Missouri sub-area.

The Plains Village Tradition, as it is understood in Gregg's terminology, is spread over a wide area including Oklahoma, north central Texas (Bell 1983), Kansas, Nebraska, Iowa, Missouri, South Dakota, and North Dakota (Benn 1983). However, it is concentrated within the major river valleys, especially the Missouri and its primary tributaries. The Middle Missouri then, should be understood as one of three sub-areas within the Northern Plains which includes the Northwestern Plains, the Northeastern Plains, and the Middle Missouri (Gregg 1990). Unfortunately, the fact that the term "Middle Missouri" designates

both a sub-area and a horticultural way of life within that sub-area complicates things. But, for purposes here the two geographic sub-divisions of major importance are the Middle Missouri sub-area and the Northeastern Plains sub-area.

The Plains Village way of life is distinguished by a reliance on intensive horticulture, primarily corn, with a lesser reliance on beans, squash, and sunflowers. The production of a dependable, storable food surplus is also characteristic, in this case primarily of corn (Gregg 1990; Lovick and Ahler 1982). High population densities and large, fortified semi-permanent villages also characterize this way of life with semi-sub earth lodges clustered along major rivers (Michlovic and Schneider 1993). Often these villages are situated on terraces overlooking major rivers in close proximity to the garden plots (Michlovic and Schneider 1993). These villages are large, being populated by hundreds and perhaps as many as 1000 residents at a time (Michlovic and Schneider 1993).

Other characteristics include floodplain garden plots, dependency on bison, some gathering and hunting of smaller game, and rectangular or circular semi-subterranean earth lodges for eight to ten occupants or more. Winter settlements tended to be located on floodplains where gallery forests provided some shelter from the elements (Michlovic and Schneider 1993). The artifact assemblages are characterized by bison scapula hoes, a varied bone tool kit, large bell-shaped storage pits, and a distinctive ceramic series the general characteristics of which include globular vessels with S-shaped or straight rims. Most of the internal ceramic divisions here are based on rim form, lip form, exterior surface treatment, and rim and shoulder decoration. Bison scapula hoes

are present, and settlements generally include large and prominent middens as well as deep and often bell-shaped storage features, presumably for corn (Lovick and Ahler 1982; Tiffany 1983).

10.2.2 Distribution: The Middle Missouri is a well defined sub-area of the Northern Plains which includes the Missouri River from its junction with the White River in South Dakota to its confluence with the Yellowstone River in North Dakota. It also includes the Little Missouri River, a northern tributary of the Missouri River, which flows north through South and North Dakota.

10.2.3 Type site: There is no "type site" per se for either the Middle Missouri or the Plains Village Tradition. The definition of the sub-area and the way of life arose largely out of the work mandated by the U.S. Bureau of Reclamation as portions of the Missouri River and its many tributaries were dammed up and large areas were inundated for flood control and reservoirs from the 1930's through the 1960's. Archaeologists were permitted to survey these areas prior to inundation. The end result of this was the many publications of the Smithsonian Institution River Basin Surveys Papers series. This, and other publications which arose from it, form the foundation for what is known about this area but it was Donald Lehmer (1971) who provided the first major synthesis of this work.

10.2.4 Associated ceramics: The ceramic wares of the Middle Missouri sub-area are exceedingly well studied and, as a result, are correspondingly complex. Because of this, it is necessary to treat the ceramics in a very general fashion.

However, the ceramics are integral to Middle Missouri archaeology, so much so that one cannot do any archaeology in the area without some understanding of this artifact class (Gregg 1985, 1990). The following is a general overview of the basics of Middle Missouri ceramic typology.

Within the Middle Missouri sub-area vessel, rim, and lip form, surface treatment and decoration are all highly diagnostic (Gregg 1985). Comparative analysis is accomplished by means of wares, and wares are then subdivided into types (Gregg 1985). Wares share such basic characteristics as fabric, surface finish, vessel, and rim form. Types possess many of the features of wares but are commonly distinguished by variations in surface treatment, decoration, and rim form (Gregg 1985).

Vessels tend to be locally made and are usually round bottomed. Surface treatment may be plain, smoothed, simple stamped, or check stamped. Both simple and check stamping are accomplished by means of malleation with a carved, grooved, or thong wrapped paddle over the vessel exterior. Cord marking is, on the other hand, considered generally diagnostic of woodland ceramics (Gregg 1985). Plains rims may be S-shaped or straight, with variations in the form thereof. Diagnostic decorative techniques include single strand cord impressing, cord wrapped tool impressing, incising, trailing, tool impressions, fingernail impressing, and stab and drag techniques (Gregg 1985).

While written descriptions may make Late Woodland and Plains Village ceramics sound superficially similar, visual inspection of photos and of the ceramics themselves reveals that the two are immediately and strikingly different. In comparison with Late Woodland ceramics, Plains ceramics appear finer and better made. The fabric is more compact and the paste better worked

and more compact. The temper is smaller and more uniform. Impressions are made with more tightly wrapped cord and are executed with great care and precision. Plains Village vessels are large and have a final appearance of being higher fired than the standard Late Woodland pottery.

10.2.5 Chronological placement: Much effort has been expended over the last forty or more years at internal chronological ordering based on various combinations and permutations of archaeological data, ceramic analysis and Mandan/Hidatsa oral tradition and ethnography. The most often cited of these various chronologies is that of Donald Lehmer (1971), the pre-eminent Middle Missouri archaeologist. Therefore, it is important to have at least a general understanding of the terms employed when discussing Precontact cultures in the Middle Missouri sub-area.

The culture divisions and subdivisions within the Middle Missouri way of life (as opposed to sub-area) are based largely on ceramics, which have been exhaustively studied and used to sort out cultural and chronological problems throughout the sub-area. The ceramics, like the chronology itself, do not suffer from lack of detail but rather than belabour ware types and subtypes, I will present a brief summary of Lehmer's (1971) chronology based on the interpretations, as well as some of the suggested revisions, presented in Lovick and Ahler (1982), Tiffany (1983) and Gregg (1990). The criticisms presented here are also to be found in the above sources.

Up until the florescence of the Plains Village lifeway, the area under consideration undergoes a more or less normal progression from Paleo-Indian through to Late Woodland. With the introduction of maize, the Woodland

Tradition ends and the Middle Missouri Plains village way of life begins. The following sections provide a basic, pared down outline of Lehmer's chronology.

10.2.5.1 Middle Missouri Tradition: This spans the period from approximately 1000 AD to 1400 AD and is the earliest period in Lehmer's chronology. It describes that time period during which there was an initial influx and expansion of Plains Villagers into the area. In cultural terms, it is generally agreed that this tradition accounts for the movement of proto-Mandan and Hidatsa into the area, possibly from the woodlands to the east.

The Middle Missouri Tradition consists of three *variants*: Initial, Extended and Terminal. During the Initial Middle Missouri Variant, the ancestral Mandan and Hidatsa are thought to have arrived in the sub-area. During the Extended Variant, these groups extended their dominance throughout the sub-area. Finally, they are thought to have retreated to the north during the Terminal Variant, as a result of conflict with the groups of the Coalescent Tradition (Proto-Arikara).

10.2.5.2 Coalescent Tradition: The Coalescent Tradition begins some 300 years later than the Middle Missouri Tradition and is composed of four variants: Initial, Extended, Post-Contact, and Disorganized. During the Initial Variant there is an intrusion from the south into the Middle Missouri sub-area. These immigrants are probably Proto-Arikara and the initial intrusion is followed by an expansion upriver at the expense of the ancestral Mandan and Hidatsa groups during the Extended Variant. The

Extended Variant groups shared ideas with and partially absorbed their northern neighbours during the early historic Post-Contact Variant, but finally collapsed under sustained Euro-american settlement during the Disorganized Coalescent Variant.

As previously noted, the Middle Missouri tradition is generally and quite solidly associated with the ancestors of the Mandan and Hidatsa (Tiffany 1983; Gregg 1990).

10.2.6 Explanatory cultural dynamics: With regards to the problem of cultural genesis there are two major schools of thought concerning the origins of the Plains Village Middle Missouri Tradition groups:

(1) They are an indigenous development which grew out of the local Late Woodland populations on the plains (Benn 1983; Winham and Lueck 1994); and

(2) They are an outgrowth of developments further south and east along the Mississippi River Valley (Anfinson 1997; Fawcett 1988; Gregg 1990; Johnson 1991; Lovick and Ahler 1982; Tiffany 1983).

The Woodland period for this area spans the period between approximately 500-900 AD (Winham and Lueck 1994). Those who view the Middle Missouri as an indigenous development discuss the fact that there does seem to be some evidence of components which are transitional to full blown Middle Missouri (Winham and Lueck 1994). Woodland phases include Valley, Besant, Sonota, Truman Mound Builders, Loseke Creek and Cross Ranch

(Winham and Lueck 1994). The Valley phase precedes Loseke Creek, which precedes Great Oasis, and the three have almost identical spatial distributions in this region (Winham and Lueck 1994). Such evidence of apparent in situ cultural evolution is used to argue the position. Winham and Lueck (1994) also discuss the Flaming Arrow site in the Knife-Heart region. This site dates to between 920-1230 AD and may have a very early Awatixa-Hidatsa component. This component is similar to Initial Variant of the Middle Missouri Plains Village Tradition, but could also be classified as Late Plains Woodland. This leads the authors to conclude that this occupation is transitional between the two (Winham and Lueck 1994).

> It is likely that the transition from one lifeway (Woodland) to another (Plains Village) is reflected in varying degrees in all Woodland groups present in the Middle Missouri region -- that is, they were all adapting to changing circumstances. It has been suggested...for Great Oasis that some post of those peoples developed a more complete Plains Village lifeway, while others...retained their Woodland lifeway.
>
> (Winham and Lueck 1994:155)

There have also been numerous attempts to find cultural progenitors in the woodlands to the east of the Middle Missouri. There will be much more discussion of this position in the sections on Mill Creek, Great Oasis, and Cambria.

Michlovic and Schneider (1993) offer some middle ground between these divergent opinions. They state that by the 14th century AD, the Plains Village adaptation was well established throughout woodlands west of the Great Lakes. This leads them to suggest that some of the more obvious similarities might be

"functional convergence", while other similarities are a result of contact and cross-cultural influence (Michlovic and Schneider 1993).

Regardless of the divergent opinions about their origins, it is generally agreed that the Middle Missouri Plains Villagers represent the ancestors of the ethnographic Mandan, Hidatsa, and Arikara (Michlovic and Schneider 1993).

10.2.7 Problems: The existing Middle Missouri chronology has been criticized because:

(a) it does not account for developments in the tradition in the northern reaches of the sub-area around the Knife-Heart region (Lovick and Ahler 1982);

(b) it failed to utilize the rich oral tradition of the ethnographically well known Mandan and Hidatsa (Lovick and Ahler 1982);

(c) it is inflexible and cannot accommodate subsequent archaeological developments (Lovick and Ahler 1982); and

(d) it is disproportionately reliant on unidirectional migrations and diffusion of people and cultural elements from south to north (Lovick and Ahler 1982).

Subsequent researchers have also found Lehmer's terminology confusing and unnecessarily complex. While Winham and Lueck (1994) state that Lehmer's 1971 compilation is the most comprehensive overview of the topic, they also believe that his work is now badly out of date. Winham and Lueck (1994) raise further objections to the existing chronology. They suggest that the currently recognized archaeological variants or phases may not even relate, at least not on a one to one basis, with past human groups since some Mandan and Hidatsa groups are virtually indistinguishable in the archaeological record. Without the

benefit of historic data these two groups might be classified as one.

Rather than using the traditions, horizons, and variants of Lehmer's chronological system, the trend in North Dakota at least, has been towards the use of traditions, complexes, and phases (Gregg 1985, 1990) or even just phases (Lovick and Ahler 1982) without the accompanying baggage of variants, etc. In such a reordering, the Plains Village "Pattern" becomes the Plains Village "Tradition" and the Middle Missouri and Coalescent "Traditions" become "Complexes" (Gregg 1990) with smaller internal phase divisions (Lovick and Ahler 1982). Gregg (1990) suggests a third complex be added to the Middle Missouri and Coalescent to accommodate recent archaeological developments in the Northeastern Plains sub-area. He calls this complex the Northeastern Plains Village Complex. However, there is some question as to the suitability of this choice of terms, as subsequent sections will point out.

10.3 The Initial Middle Missouri Variant: Cambria, Great Oasis, Mill Creek and Over

10.3.1 Cambria Phase

10.3.1.1 Definition: Cambria can and has been seen as an eastern manifestation of the Initial Middle Missouri variant (Anfinson 1982). Of those cultural units that are used to designate the eastern portion of the Initial Variant, the Cambria Phase is one of the most enigmatic. It is often cited as a possible source of Middle Missouri Plains Village groups. However, this position is by no means universal because it is a complicated phase, with one of the more diverse and confusing ceramic assemblages.

Cambria ceramics have similarities to Late Woodland, Middle Mississippian, Oneota, and Middle Missouri ceramics (Anfinson 1982). It may be complex interrelationships such as these which lead Anfinson (1979a) to the belief that Minnesota is central to any understanding of the entire mid-continental cultural sequence. This area is, after all, the intersection two major biomes, the Plains and the Eastern Woodlands and, therefore, also of diverse adaptations and cultural traditions (Anfinson 1979a). Within this particular area we see Late Woodland, Early Plains Village, Oneota and Middle Mississippian Traditions, sometimes simultaneously.

Cambria is the least known phase of the Initial Middle Missouri Variant. The Cambria type site was first reported in the early part of this century and excavated by Nickerson in 1913 and 1916 (Anfinson 1997). It was excavated again mid-century by Jenks and Wilford and again by Gibbon and Shane in the 1970's. The combination of repeated excavations, cultivation, and pot hunting has left the original site almost completely destroyed (Anfinson 1997).

Cambria sites, insofar as they can be effectively defined as such, are generally small campsites with Woodland components containing samples of thin, smooth, grit tempered pottery. Other site types include large villages on river terraces, smaller villages on the smaller tributaries, and mortuary sites (Anfinson 1997). Bone horticultural tools, including bison scapula hoes, and the charred remains of maize were all common at the type site. Cucurbits and sunflowers have also been recovered as well as a wide variety of wild food resources, both floral and faunal (Anfinson 1997). Like so many of these ceramic cultures, there is little other than the ceramics combined with changes in subsistence and food storage technology to distinguish these sites from previous

Late Woodland occupations (Anfinson 1997).

Johnson (1991) mentions the association between Cambria sites and flat topped pyramidal mounds, something he takes as evidence for the interaction between Cambria peoples and those of the Middle Mississippi region. However, in Anfinson's (1997) discussion of Cambria, he states that all but two of these mound sites are located in the Big Stone Lake locality and therefore become, in his terminology, part of the Big Stone Phase.

10.3.1.2 Distribution: Obviously in the absence of a reliable definition, assigning a distribution is somewhat problematic; however, Ready (1979a) reports that Cambria sites are distributed through southwestern Minnesota and west central Minnesota. Anfinson (1997) is somewhat more cautious; he states that sites which have non-Great Oasis ceramics and have, by virtue of this, acquired the label "Cambria", are concentrated in southwestern Minnesota although similar sites have also been reported from southeastern and west-central Minnesota (Ready 1979a). Anfinson (1997) however, states that well-defined Cambria ceramics have only been reported from the type site, the Price site, the Lewis Mound site, and from the Silvernale and Bryan sites.

10.3.1.3 Type site: The type site for Cambria ware is the Cambria Village or Low Village Site in south central Minnesota, 25 km northwest of Mankato, Minnesota. It is located on a naturally defensible, intermediate terrace above the Minnesota River (Anfinson 1997). This site is the largest and most complex of all the identified Cambria sites in Minnesota

10.3.1.4 Associated ceramics: Cambria ceramics are primarily confined to the southwest corner of Minnesota and it has been suggested that this phase is affiliated with Lehmer's (1971) Initial Variant of the Middle Missouri Tradition, possibly as a phase of this variant (Ready 1979a). There have been several attempts to make some sense of Cambria ware but, because Cambria is so complex, none of these have been overly successful. For this reason, only the most general characteristics will be dealt with here.

Cambria ceramics have been divided into five types: Powell Plain and Ramey Broad Trailed, both of which are rolled rim types; Linden Everted and Mankato Incised, both of which are outflared rim types; and Judson Composite which is an S-rim type (Gibbon 1993).

Cambria vessels are generally globular, with constricted necks, pronounced shoulders, and flaring rims (Ready 1979a; Anfinson 1997). Both rolled and S-rim types are present within Cambria ware (Anfinson 1997). Although surfaces are generally smooth, a small percentage of sherds may also be cordmarked (Anfinson 1997). The Cambria site itself also yielded a small percentage of sherds that were burnished and some that were painted black (Anfinson 1997). Rim and Lip form are variable and vessels may have strap handles. Temper is primarily grit, although there are shell tempered varieties included within the ware such as Linden Everted or Ramey Incised (Anfinson 1997). Decoration tends to be confined to lip, rim, neck, and shoulder regions, and designs are either incised or trailed. Predominant motifs or design elements include punctates, horizontal lines, chevrons, filled triangles, spirals, meanders, and angular combinations of the above (Ready 1979a). Cambria ware is broken down into a number of types based largely on rim shape, lip morphology, and

decoration.

It should be noted that the rolled rim type, a Ramey Incised-like ware, has only been recovered at the type site itself although these ceramics are clearly locally manufactured and are grit rather than shell tempered (Johnson 1991). This is interesting in light of the fact that the type site is the most eastern of the Cambria phase sites and thus closest to the Middle Mississippian sites. These may have influenced those who manufactured these rolled rim varieties (Johnson 1991).

10.3.1.5 Chronological placement: Cambria is relatively short lived and dates between 1000 AD and 1300 AD (Ready 1979a). Gibbon (1993) suggests that Cambria probably lasts from 900-1300 AD, while Anfinson (1997) gives a somewhat more conservative range of 1000-1200 AD.

10.3.1.6 Explanatory cultural dynamics: Johnson (1991) argues that all of the available evidence points to the development of Cambria out of an indigenous Late Woodland base. He believes that the source and motivation for this transition came from contact with the culture of the Middle Mississippi region possibly through Mill Creek and Great Oasis. Johnson (1991) also argues that the developments visible in Cambria Phase sites arise out of agricultural intensification, the need for river terrace land that could be cleared for gardens, and population growth attributable to horticulture. Some believe that Cambria represents the remains of the ethnographically known Mandan, but this has not been confirmed (Gibbon 1993)

The type-site contains a complex mix of Woodland, Middle Mississippian,

and Plains Village traits in the ceramic assemblage. Johnson (1991) explained this by placing the Cambria site as a dominant centre in the northern extension of a Cahokia-centered trade network which exchanged bison meat and hides, horticultural tools and products, specialized clothing for the elite, and exotic goods. Cambria, Silvernale, and Mill Creek phase sites, he believes, created three northwestern "nodes" of a Cahokia-based system in which the northern zone collected and extracted the resources for trade that were then funneled to Silvernale sites which interacted more directly with the Cahokian trade network (Johnson 1991). He also argued that relations with the Late Woodland populations to the north, the ancestors of the historic Dakota and manufacturers of Onamia and Kathio ceramics, were hostile since these Woodland peoples would have been outside the range in which maize could be effectively cultivated. This phase is seen as a possible origin of the Middle Missouri Plains Village Tradition (Schneider 1982). No Initial Variant components are present in Minnesota by 1250 or 1300 AD:

> ...(W)hen Blue Earth Oneota peoples seem to have gained control of this section of the northeastern prairies. Traits after this date that may derive from the Middle Missouri tradition are a few 'weak' S-shaped rims on Woodland pottery jars from sites in the northern mixed forest zone of the state, simple and check stamping on Sandy Lake pottery vessels in the same general zone...and an S-shaped rim or two in Blue Earth River Oneota sites.
>
> (Gibbon 1993:181).

However he also acknowledges that such traits may be too widespread to be truly diagnostic.

10.31.7 Problems: There is actually very little published data on this phase

(Anfinson 1997). This problem is further complicated by the fact that Cambria, as a taxonomic entity, is very poorly defined and has therefore tended to function as something of a garbage category in the archaeology of southern Minnesota. Non-Great Oasis sites frequently acquire the label "Cambria" which has made the distinction between the two ineffective (Anfinson 1997). There is also the frequent assumption that plain grit tempered sherds in these sites represent Cambria components when, in fact, such pottery might be a product of a Mill Creek, Over, NEPV, or even a Big Stone Phase occupation (Gibbon 1993). Moreover, Cambria sites generally contain assemblages of small sherds that also exhibit great variety. This further complicates any attempt to construct a firm definition of the complex. Overall, Cambria lacks a well-defined ceramic typology with diagnostic types that would allow for the effective definition of archaeological components (Anfinson 1997).

10.3.2. Great Oasis

10.3.2.1 Definition: Great Oasis has been variously labeled an "Aspect" (Winham and Lueck 1994), a "Phase" (Anfinson 1979b) and a "Complex" (Anfinson 1997). Regardless of the taxonomic confusion, Great Oasis has long been regarded as important in ascertaining the origins of the Middle Missouri Plains Villagers (Winham and Lueck 1994). This phase may in fact bridge the gap between the Late Woodland and Plains Village traditions or, alternatively, it may be an eastern manifestation of the Initial Variant of the Middle Missouri (Anfinson and Wright 1990; Henning and Henning 1978; Winham and Lueck 1994). Henning and Henning (1978) see Great Oasis as having a strong relationship with the Late Woodland Tradition, possibly as a development out of

a Late Woodland base. They believe that Great Oasis, along with other phases such as Mill Creek which are clearly related to the Initial Middle Missouri Variant, were not included in this taxon by Lehmer simply because they lay outside the Middle Missouri sub-area (Henning and Henning 1978).

Floral and faunal remains from Great Oasis sites indicate that these folk were exploiting their environment to its maximum potential. There is also evidence for the use of use of horticultural products, but it is not clear how heavily they actually relied on horticulture (Henning and Henning 1978) because Great Oasis peoples apparently had different subsistence strategies in different regions. For the most part, they were hunter-gatherers, but there is also evidence that they practiced some maize horticulture (Anfinson 1997; Winham and Lueck 1994). Within Minnesota, the subsistence pattern appears, for the most part, to be a continuation of the broadly based, non-agrarian pattern of Late Woodland groups (Anfinson 1979b). Here, Great Oasis has a much more "Woodland appearance" and the ceramics are less varied (Anfinson 1979b).

Subsistence during the Great Oasis Phase outside Minnesota appears to be based on mixed agriculture and on hunting and gathering (Anfinson 1979b). However, Winham and Lueck (1994) speculate that Great Oasis may have split into two sub-groups in response to differing environmental circumstances in different portions of their range. They became horticultural where conditions were optimal for maize growing, and remained bison hunters where herds were larger and horticulture less practical. The remains of scapula hoes are rare, but not unknown at Great Oasis sites and, although maize kernels are reported from most of these sites, cobs are uncommon (Anfinson 1979b, 1997). Squash and sunflowers are also present at some sites, along with a wide variety of wild food

remains (Anfinson 1997). Henning (1991) argues that the absence of corncobs and digging implements at Great Oasis sites means that Great Oasis peoples traded for their corn. While the presence of both of these at adjacent Mill Creek sites means that this is where the Great Oasis groups traded for their corn.

Great Oasis sites tend to be located on the smaller tributary streams. When these sites occur on major rivers, they tend to be located at junctions with the smaller tributaries (Henning and Henning 1978). Habitation sites are typically found on the lower terraces of floodplains. Unfortunately there are few large Great Oasis sites most of which contain little evidence of house structures. This paucity of large village sites suggests that the smaller, more temporary camps with small garden plots adjacent to them may have been the most common Great Oasis settlement type (Anfinson 1997). In southwestern Minnesota, settlements are found on islands, peninsulas, and isthmuses of the lakes. Again, these sites lack of evidence for large house structures. Where houses do occur, they are semi-subterranean and rectangular, with eastward facing entrances, a central fire pit, and many trash/storage pits (Henning and Henning 1978).

10.3.2.2 Distribution: Anfinson (1979b, 1997) says that Great Oasis is one of the earliest and most widespread of the Plains Village phases. It is found from east and central South Dakota, through northern Iowa and southwestern Minnesota and into northeastern Nebraska and western Illinois although the core area of their distribution is in northwestern Iowa (Anfinson 1979b, 1997; Henning and Henning 1978). Unfortunately, Anfinson (1997) cites Nicholson (1989) who states that there are Great Oasis ceramics in Manitoba (Anfinson 1997), something which is, at best, unproven at this time.

10.3.2.3 Type site: There is some confusion over the name Great Oasis itself, since this term was initially used to describe an area of Minnesota rather than a site. Furthermore, the Great Oasis type site has been referred to by a number of different names (Anfinson 1997). However, the term Great Oasis for the type site is acceptable (Anfinson 1997). The type site remains the only major Great Oasis village in Minnesota and is actually one of a very few Great Oasis sites in that state (Anfinson 1979b, 1997). First excavated in the 1940's and 1950's by Wilford, the type site remains largely unpublished. Anfinson (1997) has provided a brief summary of the unpublished data collected by Wilford. During the early excavation of the type site, Wilford apparently uncovered a mixture of Great Oasis, Woodland, Cambria, and Oneota ceramics. He believed that both the Late Woodland and Cambria materials were contemporary with the Great Oasis materials and that the Oneota material was later (Anfinson 1997). The site contained many storage/trash pits, but no scapula hoes (Anfinson 1997).

10.3.2.4 Associated ceramics: Great Oasis vessels are globular with round bottoms and shoulders, constricted necks, and flaring rims. Vessels are primarily grit tempered, but can be shell tempered. Surface treatment is either smoothed or cordmarked, although rims are usually smooth. Vessels are probably made using a paddle and anvil. The pottery is partly distinguished by the fact that it is extremely fine and well made (Anfinson 1997; Henning 1991). Design elements include cross hatching or tool impressions. Motifs are overwhelmingly linear, consisting of various arrangements of closely spaced parallel lines, either horizontal or angled to form triangles, obliques, trapezoids, diamonds, or chevrons. Rims may be either high with unthickened, flattened lips, or short and

thickened with flattened lips. These two basic rim forms provide the primary distinction between the two Great Oasis ware types: Great Oasis High Rim and Great Oasis Wedge Lip.

High Rim ware has straight, outflaring rims, flat lips, and sharp shoulders. Decoration consists of trailed lines on the rim exterior which are organized into bands of oblique and horizontal parallel lines in a variety of patterns and motifs (Anfinson 1997). The use of cordmarking on the exterior surfaces suggests that there is some relationship with the Woodland Tradition, potentially as an antecedent of Great Oasis (Anfinson 1997). High Rim ware resembles Chamberlain ware from Mill Creek sites and Anderson High Rim of the Over Phase/Focus in South Dakota. This suggests that Great Oasis may be ancestral to other Initial Middle Missouri Variant High Rim wares (Anfinson 1997).

Great Oasis Wedge Lip has an outcurving rim with a broad, flat outwardly beveled lip. The rim-neck junction is thickened and the rims are thickened to form a wedge shape in profile, which gives the ware type its name (Anfinson 1997). Decoration is found on the lip, rim, and shoulder and consists of fine trailed lines, crosshatching or tool impressions. Shoulder decorations usually consist of fine, trailed closely spaced parallel horizontal lines (Anfinson 1997). Great Oasis Wedge Lip ware looks like Mill Creek Sanford ware and some of the Anderson wares which have been assigned to the Over Focus.

There seems to be some regional variation in the proportions of Wedge Lip to High Rim. It is important to note that there are no S-rims in Great Oasis which, in combination with the lack of fortifications at Great Oasis sites, is why Tiffany argues that Great Oasis is not part of the Middle Missouri Plains Village tradition (Anfinson 1997).

10.3.2.5 Chronological placement: The date range given for the Great Oasis Phase is 900 to 1200 AD (Anfinson 1979b, 1997; Henning 1991). However, Great Oasis may begin as early as 800 AD and end at 1250 AD (Anfinson 1997).

10.3.2.6 Explanatory cultural dynamics: Many authors place Great Oasis as ancestral to and partially contemporary with the Mill Creek and Over Phases of the Initial Middle Missouri Variant (Anfinson 1979b, 1997; Henning and Henning 1978; Winham and Lueck 1994). Henning and Henning (1978) state that the two Mill Creek phases; the Big Sioux and Little Sioux phases, together with the Over Phase:

> "...are phases of several hundred years duration, having Great Oasis antecedents combined with elements derived from elsewhere. The bulk of these 'outside' elements are probably derived from consistent contact with Mississippian peoples on the Mississippi and Illinois River valleys and possibly those of the Central Plains and Caddoan areas as well."
>
> (Henning and Henning 1978: 14)

The posited relationship with Mill Creek is based on similarities in tool types, pottery vessel paste, color and finish as well as the overall way of life. As such they argue that the obvious similarities between Great Oasis, Cambria, Mill Creek and Over phases suggest that these should all be considered as phases of the Initial Middle Missouri (Henning and Henning 1978).

There is evidence to suggest that Great Oasis grew out of Late Woodland antecedents (Anfinson 1979b). And, because Great Oasis simultaneously predates and is contemporary with the Initial Middle Missouri Variant (especially the Mill Creek Phase), it is often held out as a direct ancestor (Anfinson 1979b, 1997;

Winham and Lueck 1994). There is also some evidence of transitional Late Woodland to Great Oasis ceramics in the form Angelo Punctated from western Wisconsin. Late Woodland pottery with a distinct incised, pendant triangle motif is often seen as a diagnostic Great Oasis trait (Boszhardt 1994). Unfortunately, the evidence is too slim to permit anything but the suggestion of Great Oasis influence and the suggestion that these incised pendant triangles may be an important horizon marker (Boszhardt 1994).

Cambria, Great Oasis, Mill Creek, and the Over Focus/Phase are all regarded as related and as variants of the Initial Middle Missouri tradition (Anfinson 1979b). In Iowa, Great Oasis villages are usually found near Mill Creek villages (Henning 1991). The close proximity of these two obviously separate but related phases of the IMM has led Henning (1991) to suggest that they had an important symbiotic relationship. Henning (1991) believes that Great Oasis peoples initiated trade with Emergent Mississippian peoples to the south and east and that this relationship was then "expanded and enhanced" by Mill Creek peoples. Anculosa shell formed an important part of this trade relationship. The lack of evidence for Mississippian influences in Great Oasis sites combined with the obvious Mill-Creek-Mississippian influences, seen most clearly in the presence of seed jars, bottles, effigy handles, and the occasional use of red slip in Mill Creek ceramics, leads to the suggestion that the Mill Creek culture received a broader range of trade goods and hence cultural influence from Mississippian peoples than the Great Oasis culture. In fact, this Mississippian influence was sufficiently strong to lead some earlier researchers to argue that Mill Creek was a direct outgrowth of Emergent Mississippian cultures (Henning 1991).

10.3.2.7 Problems: There is no universal agreement on whether this phase, complex, or aspect is part of the Middle Missouri Tradition mainly because this material looks more Late Woodland than any of the other Initial Middle Missouri variant phases (Anfinson 1997). The fact that there is no evidence of fortifications is important because these are regarded as an important component of the definition of IMM variant. However, there does seem to be some general agreement that Great Oasis is probably ancestral to the IMM (Anfinson 1997). The fact that Great Oasis both pre-dates and is contemporary with the IMM seems to be the source of much of this confusion

10.3.3 Mill Creek Culture/Complex

10.3.3.1 Definition: Mill Creek is considered an Iowa manifestation of the Initial Middle Missouri Variant which contains two major phases: Big Sioux and Little Sioux (Lensink 1993). Recently, however, on the basis of work in the Perry Creek Valley, Henning (1996) has suggested a third phase: the Perry Creek Phase. This is a late phase distinguished by the unusual recovery of both Mill Creek and Great Oasis ceramics within a single cultural component at the Larson site.

In general, there has been a lack of consistency concerning the exact taxonomic position of Mill Creek, which has occupied a number of different positions in the Midwestern Taxonomic System (Anderson 1981). The term is frequently employed with no taxonomic identifier whatsoever, although the trend now seems to be to label it a "complex" (Anderson 1981).

Mill Creek sites are characterized by earth lodge villages, a reliance on corn horticulture combined with wild game such as deer, elk, and bison as well

as a variety of wild plant resources (Lensink 1993). Mill Creek artifact assemblages contain evidence of Middle Mississippian influence which can be seen in both the form and decoration of ceramic items (Lensink 1993; Henning 1996) and in the presence of actual trade items, which can sometimes be recovered in very large quantities. These trade items come in many forms and suggest a far-flung and active trade network (Henning 1996).

Many Mill Creek sites are characterized by midden deposits, some as thick as three meters. Initially these were mistaken for mounds by early archaeologists, but later excavations revealed that these were earth covered trash accumulations that probably collected around the exteriors of house structures (Fishel 1996).

During the 1940's, archaeologists working in this area noticed that Iowa Mill Creek components and the newly defined Over Focus materials from South Dakota were very similar. Mill Creek was then relabeled an "aspect" and subsumed within the Over Focus. By the 1950's, the South Dakota material had been removed once again and was placed within the Chamberlain aspect along with the Anderson and Monroe Foci (Anderson 1987). By the 1980's, Anderson states that, in general, the most closely related materials to Mill Creek tended to occur within the "poorly known" Over Focus, and he suggested that these all be made part of the Initial Middle Missouri Variant.

It is not clear at this time exactly what has been done with the Over Focus. The term seems to have fallen out of common usage although one still finds it in the literature (e.g.: Anfinson 1997; Lass 1981). In his discussion of the Perry Creek Valley sites, Henning (1996) lumps Mill Creek and Over sites into the same category with the term "Mill Creek-Over", which suggests that Over Focus sites

have been dumped into Mill Creek, at least by some authors.

10.3.32 Distribution: Mill Creek sites tend to occur within the Big Sioux and Little Sioux River drainages. The majority of sites occur in the northwestern corner of Iowa in the Mill Creek area (hence the name). Related materials are also recovered in southeastern South Dakota, where they were formerly known as the "Over Focus".

10.3.3.3 Type site: The Broken Kettle West site in Iowa was first excavated in the early part of the 20th century and was subsequently subjected to frequent archaeological excavations (Anderson 1987). The term "Mill Creek" was applied later because this was the area that possessed the greatest concentration of Broken Kettle West-type sites (Anderson 1987). Some other major sites include Chan-ya-ta, Brewster, Braunschweig, and Kimball Siding (Anderson 1987).

10.3.3.4 Associated ceramics: Mill Creek ceramics have been broken down into ware categories distinguished on the basis of variations in rim profiles (high, wedge, and S-shaped). These vessel profiles, as well as the variations in general vessel form and surface finish, are considered important diagnostic traits, (Anderson 1981; Henning 1996).

Mill Creek ceramic wares include Sanford, Chamberlain, Mill Creek and Foreman. Basic characteristics common to all include the fact that these vessels are mostly grit, grit and sand, or (occasionally) limestone tempered. Paste is comparatively coarse for this area, but sherds are both hard and difficult to break. Vessels are generally "sub-globular" and may be either decorated or

plain.

Decorative motifs generally include various arrangements of incised or trailed parallel lines that encircle the rim. Triangular motifs and diagonal lines may occur within this field or on their own. The lip-rim juncture may be decorated with a variety of tool impressions. Handles and lip nodes may also be present. Some sherds also display wide, trailed curvilinear motifs reminiscent of Middle Mississippian Ramey Incised pottery although these Mississippian-style Mill Creek vessels are locally manufactured, and not imported (Anderson 1981).

Unusual Mill Creek ceramic attributes include the application of red slip, the presence of effigy figures, and a number of unusual forms such as seed jars and bowls (Anderson 1981; Henning 1996). Many of these latter traits are considered a result of either direct or indirect Middle Mississippian influence. Characteristic Mississippian ceramics, such as Powell Plain and Ramey Incised jars, are also found on Mill Creek sites and are probably imports from Middle Mississippian sites to the south. Evidence for older, anachronistic Middle Mississippian pottery is thought to represent broken curated or heirloom pottery (Henning 1996). No Mississippian pottery or Mississippian derived forms are found on Great Oasis sites (Henning 1996).

10.3.3.5 Chronological placement: Mill Creek radiocarbon dates range between 810 AD and 1510 AD, but over ninety percent of these fall between 900-1400 AD (Fishel 1996). Recent chronological revisions narrow this range, suggesting that Mill Creek culture falls between 950-1275 AD (Fishel 1996). Henning (1996) argues that, while Mill Creek did undergo significant decline by 1300 AD, a few Mill Creek Villages may have persisted as late as 1350 AD.

10.3.3.6 Explanatory cultural dynamics: There are a number of models that have been developed to account for the origins and development of Mill Creek. Griffin's (1946: cited in Anderson 1987) original model suggested a migration across Minnesota of Mississippian peoples who initially inhabited the Cambria site before moving on into northwestern Iowa. By the 1950's, others had suggested that Mill Creek derived from the movement of Old Village Phase people out of Cahokia who later adopted a plains way of life. Over time, the movement has been away from migration models to an emphasis on in situ developmental sequences (Anderson 1981).

In 1967, Henning argued that neither the radiocarbon dates nor the inclusion of local ceramic forms within the earliest dated Mill Creek assemblages supported the Mississippian migration models. He also suggested that Mill Creek origins might instead be found in a hybridization of Great Oasis and early Middle Missouri with some cross-fertilization from Middle Mississippian culture (Anderson 1987). As a result, this Middle Mississippian emphasis was rejected, and some postulated (Anderson 1987) that Mill Creek origins could be found within indigenous Late Woodland populations who adopted Middle Mississippian traits through trade, diffusion and intermarriage. Anderson (1987) suggests that a concatenation of various climatological and cultural factors between 800-900 AD created a physical, biological, and cultural environment which encouraged the emergence of Mill Creek out of a local Late Woodland base. Subsequent cultural "budding off" resulted in migrations creating Mill Creek occupations outside the Big Sioux/Little Sioux drainage system (Anderson 1987).

Currently, the trend seems to be to place the origins for Mill Creek out of

a local base with a great deal of cultural and biological influence from Great Oasis, with the addition of Mississippian-derived cultural traits (Henning 1996; Lensink 1993). Henning (1996), one of the major proponents of this model, points out that evidence for this scenario has been somewhat scanty -- no Great Oasis component has ever been recovered at the base of a Mill Creek site. Nor is there evidence for a Great Oasis-type ceramic tradition at the bottom of a Mill Creek midden. In fact, these two traditions appear to be extremely conservative through both space and time -- sufficiently so that some authors have used this evidence to argue for matrilineal/matrilocal marriage and residence patterns within Mill Creek and Great Oasis groups (Anderson 1981; Henning 1996 {based on Deetz 1965}). The fact that both Great Oasis and Mill Creek ceramic assemblages show a high degree of overall conservatism coupled with subtle local and regional variations offers some support for this notion.

Late Woodland and Mill Creek groups apparently existed simultaneously in Iowa (Anderson 1987). The same holds true for Mill Creek and Great Oasis and for Mill Creek and Oneota. Henning (1996) suggests that the onset of drier conditions which occurred around 1200 AD may have driven bison herds further east, to the plains-prairie edge, luring Woodland peoples west onto the Prairie Peninsula. The movement of different groups into the same area, exploiting the same resource at the same time may have resulted in increased conflict between groups. The establishment of early Oneota villages in this area between about 1100 to 1300 AD suggests that they were in direct conflict with both Great Oasis and Mill Creek peoples at this time (Henning 1996). This inter-group conflict probably drove Mill Creek groups into the smaller, secondary drainages and initiated the end of Great Oasis peoples, possibly through their integration with

Mill Creek populations (Henning 1996).

There is support for this hypothesis in the archaeological evidence. First, there is virtually no evidence for any crossover of ceramic traits between Mill Creek and Oneota, suggesting that these two groups, while contemporary, were on less than friendly terms (Anderson 1981). Second, Mill Creek sites show that around 1200 AD the villages become larger and there is evidence for fortifications through the addition of palisades and ditches. Third, by 1400 AD, most of the Mill Creek villages in Iowa are abandoned, possibly as Mill Creek populations moved westwards, out of harms' way, and merged with the historically known groups of the Missouri River (Anderson 1981; Lensink 1993). Terminal Mill Creek sites show evidence of consolidation and abandonment indicative of cultural stress which may relate to both climatic and cultural factors such as the aridification accompanying the Pacific Climatic episode and the expansion of the Oneota, both of which began around 1200 or 1250 AD (Anderson 1987; Henning 1996). The final nail in the Mill Creek coffin was probably the collapse of the Middle Mississippian system.

> If Mississippian trade and contacts were in any way vital to the traditional Mill Creek way of life, the termination of Mississippian influence upon its 'nodal points' by no later than 1300 could have had some effect upon the Mill Creek occupations in northwest Iowa. Certainly the increase in bison populations ... the arrival of Oneota peoples ... the shift away from the Neo-Atlantic to Pacific I climatic regimes ... and the decline of Ramey State influence ... combined to affect the resident Mill Creek populations.
>
> (Henning 1996: 95)

It has often been noted that Mill Creek and Great Oasis sites tend to occur in close proximity to one another, which has led to speculation that the two must

have had a close relationship, possibly centering on trade with Middle Mississippian groups (Henning 1996); prior to this discovery, however, the general view was that the two had led a "contemporaneous but separate" existence (Henning 1996). The recovery of these two different ceramic categories within a single component site has forced a re-evaluation of this relationship. Although many of the potsherds remain identifiable as either Mill Creek or Great Oasis, a minority of the sherds shows a mingling of the two traditions. Henning (1996) has suggested that this evidence may signal the end of Great Oasis as a distinct cultural entity.

The consensus seems to be that there is an enormous amount of similarity between the Over Focus material from southeastern South Dakota and Mill Creek from Iowa. There is also general agreement that, collectively, this material shows a great deal of influence from Middle Mississippian groups. However, the exact nature of these relationships remains unclear.

The question of trade relationships with Middle Mississippian groups remains one of the central problems. There is abundant evidence that Mill Creek groups participated, probably directly, in the Middle Mississippian trade network (Henning 1996). However, Henning (1996) also argues that these people were not part of the socio-religious life of the Mississippians since neither Mill Creek nor Great Oasis villages were never "called upon" to construct flat topped temple mounds. There are, however, sufficient quantities of exotic trade goods to support the notion that Mill Creek villages functioned as outlying "nodal points" in a Middle Mississippian trade network (Gibbon 1974; Henning 1996).

10.3.3.7 Problems: Ceramic and, therefore, cultural relationships in

northwestern Iowa and southeastern South Dakota are complex. Even though there has been a great deal of systematic ceramic analysis, it has only succeeded in creating a profusion of ceramic and cultural historical categories. There are broad similarities that can be seen in the ceramics over a relatively large area, but these are obscured by subtle inter-assemblage variability in ceramic attributes. This has resulted in controversy over the correct placement of the various foci, phases, and complexes, the subtleties of which elude all but the most seasoned systematist. As a result, the origins, subsequent movements, and later demise of Mill Creek populations are not well established at this time.

10.3.4 Over Focus/Phase

10.3.4.1 Definition: The Over Focus or Phase is a subdivision of the Initial Middle Missouri Variant of the Plains Village Tradition. However, Lass (1981) reports that the term is not in common usage at the present time. Over Focus/Phase sites were originally regarded as a separate but related South Dakota manifestation of Iowa Mill Creek. These sites are viewed as constituting the earliest village cultures in South Dakota, transitional between Late Woodland and "mature" Middle Missouri village sites (Lass 1981).

Over Focus/Phase sites generally share a number of characteristics. They are generally located close to rivers, situated on promontories with three steep, defensible sides. A ditch, a palisade or both (Lass 1981) generally defend the fourth side. These villages consist of groups of semi-subterranean rectangular earthlodges. These were made of larger wooden posts interwoven with smaller sticks and mud, all roofed with sod and timber. The houses frequently had enclosed entryways with central fire pits and interior cache pits of various sizes

(Lass 1981). Subsistence was probably a mixture of horticulture -- corn, beans, squash and sunflower -- combined with extensive wild resource harvesting which included large and small game, fish, birds, shellfish, wild plants, and a variety of aquatic resources. Many sites contain evidence of scapula hoes and other gardening implements. There is limited evidence of bison ceremonialism (Lass 1981).

10.3.4.2 Distribution: Over Focus/Phase sites are generally found in the extreme southeastern corner of South Dakota along the James and Big Sioux rivers.

10.3.4.3 Type site: There are a number of sites that were included in the original Over Focus. These include: Twelve Mile Creek, Ethan, Brandon, Bloom, Mitchell and Swanson (Lass 1981).

10.3.4.4 Associated Ceramics: Typical ceramics are similar to those of Mill Creek sites (see discussion of Mill Creek pottery above). Vessels are globular, grit tempered and may be either smoothed or cord marked. Paste texture is relatively coarse. There is evidence that vessels were made using the paddles and anvil technique (Lass 1981). Handles, effigies, and pinched nodes may occur on the vessels. Decorations may be incised, trailed, or tool impressed. Rim forms include collared, high rimmed, and S-shaped varieties (Lass 1981).

10.3.4.5 Chronological placement: This manifestation of the initial Middle Missouri Variant probably ranges between about AD 1000 and 1250 AD.

10.3.4.6 Explanatory cultural dynamics: Lass (1981) suggests that the sites in southeastern South Dakota and northwestern Iowa present an east-west cultural gradient from Mill Creek through Over to full blown Middle Missouri. The Over Focus/Phase can be regarded as transitional between the eastern origins of Middle Missouri and the settled village horticulturalists of the Middle Missouri itself. In this regard, Great Oasis is viewed as something of a throwback, retaining its Late Woodland roots both culturally and technologically, while contemporary groups such as Mill Creek, moved on.

Lass (1981) specifically mentions the Randall component of the Scalp Creek site as one occupation which presents good evidence of a transitional Late Woodland to Middle Missouri cultural group. However, later research (Habermann 1993) has suggested that this component actually belongs in a separate phase -- the Randall Phase -- precisely because of its intermediate position and because it is not closely related to pre-existing cultural historical categories such as Mill Creek, Great Oasis, and the Lower James Phase

10.3.4.7 Problems: Beyond the original site reports, discussions of the Over Focus/Phase are hard to come by, especially synthetic treatments that place it in a larger cultural context. There seems to be some movement to subsume it within Mill Creek. For example, Dale Henning (1996) uses the term Mill Creek-Over, although I am not yet aware of any formal discussion in this regard. The position of the Over Focus/Phase appears to have presented a problem almost since it was first defined. It has moved back and forth vis-a-vis Mill Creek for the last fifty years and its position is by no means clear even now. Lass (1981) reports

that it is not a term which is any longer in common usage but then continues her discussion as though the Over is still, and should remain a separate cultural historical taxon.

10.4 THE ONEOTA

10.4.1 Definition: McKusick (1973) states that the word "Oneota" itself is an Iroquoian word and recounts and incident in which the Oneida were apparently asked the name for the upper Iowa River and they replied "Oneota" meaning "People who sprang from a rock".

Under the nomenclature of the Midwestern Taxonomic System, all Oneota materials were formerly lumped into the Oneota "Aspect". Later this became the Oneota Tradition (Dobbs 1982). "Tradition" is being used here in a sense roughly equivalent to that of the Middle Missouri Tradition. In this sense, the Oneota Tradition is a separate and distinct taxonomic entity, not to be lumped into the Plains Village Tradition as Michlovic and Schneider (1993) and Gregg (1994) have suggested. While it is true that this development is part of a widespread shift to settled village horticulturalism around 1000 AD, it is also arguable that this is either an independent or convergent development, possibly with common ancestry. However, it is not generally considered part of the Plains Village Tradition as it is understood in North and South Dakota.

Gallagher and Stevenson (1982) outline the economic pattern for the Oneota of the La Crosse area of Wisconsin. Here the general pattern is a "diffuse" economic adaptation that incorporated horticulture as one aspect of a broadly based subsistence system. Village sites tend to be located on well

drained terraces near good agricultural soil, but proximity to other resource zones, especially marshy areas, is also important. This general pattern is observed for Oneota settlements elsewhere in the upper Midwest such as those in eastern Wisconsin and in southeastern Minnesota (Gallagher and Stevenson 1982). It is interesting to note that at the State Road Coulee site, in the La Crosse area of Wisconsin, wild rice is integral part of the Oneota subsistence system (Anderson 1995).

In general, the Oneota augmented an intensive use of wild resources with maize horticulture and other cultigens, the precise expression of which seems to vary but may include the addition of beans (Anderson 1995). Other aspects of Oneota subsistence include intensive aquatic resource utilization, native seed cultivation, wild seed harvesting, and big game hunting (Benn 1983; Brown 1982). The development of maize horticulture never reached "full intensity" because "light duty" tools such as bison scapula hoes were of no use on tough prairie sods and intractable riverine clays (Brown 1982). The overall impression of Oneota subsistence is that no matter where the Oneota are found, they make complete use of local floral and faunal resources. The situation of Oneota of sites is selective in the extreme, and appears designed to permit them to exploit their environment to its fullest. It has been noted that Oneota sites tend to cluster into small areas, rather than being spread out widely across the landscape as was the case with earlier Late Woodland settlements in the same areas (Sasso 1993).

Most sites are relatively large village sites. These sites contain many pit features, both bowl and bell-shaped. The artifact assemblage, apart from the ceramics, does not serve to distinguish the Oneota clearly from other contemporaneous Upper Mississippian cultural manifestations (Harvey 1979).

Bison scapula hoes are part of the tool inventory, but the bone tool industry is neither as abundant nor as varied as that of adjacent plains cultures (Harvey 1979). European trade items are sometimes recovered at later Oneota sites.

10.4.2 Distribution: There are various regional expressions of Oneota distributed across an area which includes Wisconsin, Minnesota, South Dakota, Iowa, Missouri, Illinois, Nebraska, and Kansas -- roughly coincident with an area known as the "Prairie Peninsula" (Harvey 1979). The northernmost expression of Oneota culture is found in southern Minnesota, northwestern Iowa, and eastern South Dakota (Michlovic and Schneider 1993).

10.4.3 Type site: One cannot really talk of a type site as such given the scope and diversity of the Oneota.

10.4.4 Associated ceramics: The standard Oneota vessel is squat and globular to elliptical with shell temper (Harvey 1979). It has "flamboyant" decorations trailed into soft paste, mostly at the shoulder but sometimes on interior rims and lips as well. The decorative motifs are highly recognizable and almost always include trailed chevrons or variations thereof (Benn 1989; Harvey 1979). Motifs generally span either halves or quarters of the vessel circumference as symmetry and balance were both important design considerations (Benn 1989). Decorative lip treatments made of various types of tool impressions are also common and many vessels also have handles.

One of the most helpful clues in the interpretation of Oneota "culture" is Oneota symbolism, which is confined largely to the ceramics. Their iconographic

system appears to be closely tied to Mississippian symbolism. Predominant Oneota symbols include the chevron and many variations on the chevron theme. Based on more comprehensive studies of Mississippian symbolism, Benn (1989) believes that these chevrons and their many variations are stylized representations of peregrine falcons, especially their wings and tails. This principle is most clearly illustrated by the very well known Bryan site vessel from the Red Wing area of Minnesota, which shows a rare complete representation of a stylized bird, possibly a peregrine falcon. This complete representation shows the clear relationship between the isolated partial representations of the bird and its whole. This peregrine falcon theme is repeated at various levels of abstraction on ceramics from all Oneota sites (Benn 1989).

Recognizable portions of this bird motif are seen on sherds from many sites, not only within the expected range for the Oneota Tradition, but also at sites as far afield as the Red River Valley (Mooney and Lockport for example), at the Shea site along the Maple River in North Dakota, and at a variety of sites across the James and Sheyenne drainages. There is also one body sherd bearing evidence of such a motif from the Aschkibokahn site in central Manitoba as well.

Oneota designs then, are widely distributed; yet, they actually incorporate variations on less than six major themes (Benn 1989). This peregrine falcon abstraction is not only an important part of Mississippian iconography, but is also prevalent in the iconography of the "Southern Cult" (Benn 1989). It is important to note that Southern Cult motifs such as the "forked" or "weeping" eye are suggestive of a hawk man or anthropomorphized peregrine falcon and that this motif is prevalent in Devils Lake-Sourisford mortuary complex symbolism (Syms 1979).

10.4.5 Chronological placement: Oneota sites span the period from 1000 AD to at least the beginning of the 17th century AD. So far though, Oneota sites with European trade goods are rare. One possible exception to this is the Utz Site (Petersen 1979). However, sites that would allow archaeologists to directly link the Oneota with historically known cultural-linguistic groups such as the Winnebago have been difficult to come by.

10.4.6 Explanatory cultural dynamics: The Oneota Tradition is not a single monolithic taxon. Instead, it is composed of a series of later Pre-contact cultures, the remains of which are found throughout the Midwest, and are defined primarily on the basis of their associated ceramics since there is nothing terribly distinctive about the remainder of the assemblages (Gallagher and Stevenson 1982). The variations in the ceramics have led to the definition of the many regional phases of Oneota (Gallagher and Stevenson 1982) such as Brice Prairie, Pammel Creek, Lake Winnebago, Moingona, Grand River, Lake Koshkonong, and Chariton River, to name just a few.

The Oneota Tradition has been more intensively studied and is, by extension, better understood than many of the archaeological cultures of the same time period. The origins of this tradition appear to lie in Iowa, Minnesota and Wisconsin "largely north of and outside of the zone of penetration of complex Mississippian cultures" (Brown 1982:107). The Oneota, therefore, are not a simple offshoot of Mississippian culture. But, like so many other Pre-contact groups, their ancestry, origins and general cultural processes are not well understood (Benn 1989; Brown 1982). The shift from Late Woodland to Oneota is abrupt and involved dramatic changes in both settlement and subsistence

patterns. This naturally leads to the suggestion that there was an accompanying shift in the ethnic composition of the groups inhabiting these sites as well (Dobbs and Shane 1982). Other archaeologically visible changes include evidence for the development of increased social complexity and for a wide trading sphere. This group, or groups, however, lacked the same degree of social complexity that is so strikingly visible in Middle Mississippian culture (Benn 1989).

Benn (1989) believes that maize cannot be seen as the cause for the emergence of the Oneota way of life since all of the evidence for intensive maize horticulture so far post-dates 1200 AD. Some time afterwards, we see evidence for the emergence of the Oneota as an archaeologically distinct culture.

Interestingly, the decline of Cahokia as a major regional power center begins during the 14th century AD. This process is comparatively rapid and it is during this same time period that Oneota influence increases (Porter 1984). In the American Bottom, where Middle Mississippian cultural influence was so pervasive, the Oneota tradition is regarded as a northern-based culture which moved south at about this time, apparently with little conflict with or resistance from established local groups (Porter 1984). There is, though, no explanation or insight into the precise nature of the relationship between the Oneota and Mississippian groups (Brown 1982). Oneota sites in the American Bottom also demonstrate a significant degree of contact with the northern Midwest (of the United States) and with the plains as well (Kelly et al. 1984b). This all occurs as part of a period of dramatic cultural change from ca. 1300-1400 AD which is very poorly understood (Kelly et al. 1984b). This period is also poorly understood in many other areas of the continent and seems to correspond with cultural changes in the boreal forest, on the plains and in the woodlands.

Benn (1989) sees the meaning embedded within Oneota ceramic decorative motif as fundamentally aggressive. This is not purely speculation on his part but based on a comprehensive knowledge of Mississippian iconography. Benn (1989) regards this uniformity in the symbols and motifs as part of a system that was designed to intimidate competitors and sublimate ethnic identity in those competitors. The "hawk man" was one means of expressing power and of reifying leadership roles by associating leaders with the "cosmic archetype of predatory bird men" (Benn 1989). The purpose of such symbols was to assist in exacting resources or tribute from member groups and to turn this into "social surplus" (Benn 1989). Benn (1989) points out that the transition from Late Woodland into Oneota was, in fact, exceedingly rapid, spanning less than one or two generations. This process presumably subsumed many Late Woodland groups within the Oneota system, such that by ca. 1200 AD, Late Woodland culture was virtually wiped out in many areas. The Oneota then, are viewed as a multi-ethnic, expansionist group, and Benn (1989) believes that this may explain some of the obvious incongruities visible at Late Woodland sites. These "incongruities" may be viewed as submissive groups adopting the "trappings" of a more powerful and aggressive group as part of the process of participating in a far-flung exchange network designed primarily for the benefit of the Oneota. This is consistent with the Minnesota evidence which suggests that the there are numerous regional phases of the Oneota that point to the simultaneous transition of late Woodland groups into Oneota (Anfinson 1979a). Benn (1989) sees the Oneota as neither Late Woodland nor Mississippian, but does not address where their origins may then lie. He does suggest, though, that the Oneota probably arise out of a complex and varied set of circumstances that

include such things as population density, environmental setting, economic base, and historical necessity.

By 1400 AD, Oneota village culture is well established in many areas and is generally associated with Siouan groups who were maize growers, bison hunters, and gatherers of wild foods. Those practicing this type of subsistence pattern can be characterized as hunter-farmers (Michlovic and Schneider 1993). Citing McKusick (1973), Michlovic and Schneider (1993) state that some Oneota were living in rectilinear lodges or elliptical houses with subterranean storage pit features. The bell-shaped storage/trash pits show up in western Oneota manifestations where they are more similar to the well known storage/trash pits from Plains Village sites than the usual bowl shaped Oneota pits (Michlovic and Schneider 1993). Bison scapula hoes are also more common at western Oneota sites (Michlovic and Schneider 1993). These east-west cultural gradients, which are visible in the archaeological evidence of the prairie region of northwestern Minnesota and eastern North Dakota, usually occur in an area where bison hunters were in contact with more "organizationally sophisticated" peoples to the southeast and to the west (Michlovic and Schneider 1993).

104.7 Problems: One of the first major problems is one that plagues all archaeological cultures -- one of definition. Were the Oneota an ethnographic reality, or is this label merely archaeologically convenient (Gibbon 1982)? The Oneota are commonly regarded as a biological, ethnic, and linguistic group that emerged in historic period as Chiwere speaking Siouans. The main problem, however, is that Oneota is primarily defined as a ceramic culture and therefore non-Siouan groups could have adopted or developed an Oneota material culture

(Gibbon 1982). Gibbon believes that there is still no satisfactory historical link between ethno-historically known Chiwere Siouans and the Oneota however, this is not universally held. While there can sometimes be simple correlations between material culture and linguistic, ethnic, sociopolitical, and biological groups, this is not always the case (Gibbon 1982). Gibbon (1982) asks whether the archaeologically visible Oneota pattern is more likely the result of differential adoption of diffusing ideas or of the actual movement of people. Given the complexity of this group and the evidence for numerous regional manifestations one may well ask why it has to be one or the other? Why not both? It is possible that Siouan groups, ethnically Oneota if you will, provided the seeds of this visible archaeological culture. Local groups succumbing to the expansionist tendencies of a more aggressive group might explain the numerous regional transformations of groups to something archaeologically identifiable as Oneota. Such a transformation could be cultural, ethnic, linguistic, or some combination of all three. In some areas, perhaps more peripheral to the core of Oneota distribution, what we interpret as archaeologically "Oneota" may be merely the visible stylistic manifestations we see in the ceramics.

Another major problem that plagues those who study these groups is the question of Oneota origins. Gallagher and Stevenson (1982) state that the question of Oneota origins remains unresolved and can probably only be understood with careful examination of economic strategies used to adapt to the different physical environments of the Midwest. There are two major competing schools of thought regarding Oneota origins: migration and in situ development (Gibbon 1982). The earliest and most successful model, put forward by Griffin (1946), postulated that the Oneota were a product of the northward movement

of Middle Mississippian peoples from Cahokia to the upper Midwest during the Old Village Phase. This initial intrusion could be seen at places such as Aztalan (Gibbon 1982). Oneota culture, as we know it, developed from this base as an adaptation to the colder northern climate and/or climatic deterioration ca. 1300 AD (Gibbon 1982).

McKusick's (1973) data from the upper Iowa River seems to suggest that Oneota groups replaced indigenous Late Woodland groups very quickly without any accompanying evidence for a pre-Oneota Mississippian population. He (McKusick 1973) suggests that the "transition" to Oneota may have been both rapid and spatially limited. Once it occurred, it was very successful and therefore spread rapidly. McKusick seems to support the idea that the Oneota separated from Middle Mississippian forebears and he suggests that the originating cultural group lies to the east or south of Iowa. The upper Iowa River valley has some of the most abundant Oneota remains "Yet, Oneota is intrusive here, appearing early and without antecedents." (McKusick 1973: 3)

So far, however, the radiocarbon dates do not support this model. Old Village cultural florescence takes place around 1150 AD which is far too recent to account for the early Oneota sites which have dates ranging from 950 AD to 1060 AD (Gibbon 1982). Such sites include Carcajou, Lasley's Point and Valley View in Wisconsin, Bartron in Minnesota, and the Grant Village in Iowa (Gibbon 1982).

In situ development models, the alternative approach to Oneota origins, suggest that the Oneota arose out of resident Late Woodland populations who modified their lifestyle as a response to contact with Middle Mississippian groups (Gibbon 1982). However, some have suggested an unspecified common ancestor for both, although no candidates have been located so far, because Middle

Mississippian and Oneota seem to develop more or less simultaneously (Gibbon 1982)

Gibbon (1982, citing Gibbon 1972) suggests that a portion of the Early Late Woodland Effigy Mound culture in Wisconsin may have been ancestral to the Wisconsin branch of the Oneota. The transition from Late Woodland to Upper Mississippian Oneota way of life came as a result of the adoption of horticulture and some Middle Mississippian cultural traits (Gibbon 1982).

There are two important but separate processes which occur simultaneously: the transformation to a new settlement/subsistence pattern which was widely occurring throughout the northeastern portion of the continent and the adoption/invention of a distinct complex of widely "diffusing Mississippian traits" (Gibbon 1982). So far, there is no widespread agreement concerning which Late Woodland group might constitute the "donor population" for this process (Gibbon 1982).

Gibbon (1982) favours the in situ developmental models since Oneota assemblages are generally quite diverse and since the C14 dates do not show a "wave of advance" pattern in the spread of Oneota cultural patterns (Gibbon 1982). However, one obstacle to this model lies in the fact that there are no obvious developmental Oneota assemblages and in the fact that similar transformations were occurring all over the continent at about the same time. Therefore, the persistent problem is the lack of transitional links between the Late Woodland and Oneota Traditions (Gibbon 1982)

There is evidence for early Middle Mississippian interaction with Late Woodland peoples visible in the Lohman and Stirling phases in the extreme southeastern Wisconsin (Hendrickson 1996). Here, Late Woodland ceramics are

primarily Madison Cord Impressed and Madison Fabric Impressed. These are identified with Effigy Mound tradition as part of the Horicon Phase dating 650-1200 AD, which is thought to appear early in the Late Woodland (Hendrickson 1996). Another Late Woodland ceramic type that shows evidence of interaction with Middle Mississippians is Aztalan Collared, defined from vessels recovered at the Aztalan site (Hendrickson 1996).

10.5 BLUE EARTH/CORRECTIONVILLE

10.5.1 Definition: Blue Earth is a phase subdivision of the Oneota Tradition in Minnesota (Peterson 1979) and part of Henning's Northwestern Iowa "group continuity" (Anfinson 1997). For some authors, Blue Earth and Correctionville are synonymous terms; however, Anfinson (1997) points out that there is no universal agreement on the relationship between the two since there are subtle stylistic differences in the ceramics and some evidence for differences in settlement and subsistence patterns as well. There has been some suggestion that Blue Earth be divided into four sub-phases: Correctionville, Red Wing, Center Creek, and Ft. Ridgely, the four of which are distinguished mainly on the basis of stylistic differences in the ceramics.

Blue Earth archaeological sites represent semi-sedentary villages on river floodplains and minor campsites in lacustrine environments. There have been attempts to subdivide Blue Earth settlement patterns based on intensive research with surface collections (Anfinson 1997). However, the largest and most obvious of the villages are located on the floodplains of small tributaries and there are also many Blue Earth components at other sites (Peterson 1979). Along the Blue

Earth River, sites are almost always located on the floodplain at the confluence of smaller creeks, especially at Willow and Center Creeks where there are major site concentrations (Anfinson 1997). Here, the sites are found on elevated patches of outwash (Anfinson 1997). Smaller, special purpose sites can be found in outlying areas within the same region.

The subsistence base was broad and probably included maize, beans and sunflowers, as well as a variety of wild foods such as deer, elk and smaller game. Intensive exploitation of aquatic resources such as fish and shellfish was also important. (Petersen 1979; Anfinson 1997; Anfinson and Wright 1990).

10.5.2 Distribution: The distribution of Blue Earth Oneota sites is confined primarily to southern Minnesota, northwestern Iowa, southeastern Nebraska, north central Missouri, and southwest Wisconsin (Peterson 1979). Major site concentrations occur along the Big Sioux River of Northwestern Iowa and along the Blue Earth River in south central Minnesota (Anfinson 1997). Anfinson (1997) states that Blue Earth components are not common east of the Blue Earth River valley.

10.5.3 Type site: The Humphrey site in Minnesota and the Correctionville site in Iowa are regarded as the type sites for the Blue Earth Phase (Petersen 1979).

10.5.4 Associated ceramics: As mentioned above, Blue Earth ceramics are similar to Correctionville Trailed as defined by Harvey (1979) and Anfinson (1997). Blue Earth pots are primarily globular with constricted necks and possess

vertical to outflaring rims, although rim height can be quite variable (Anfinson 1997). Vessel shoulders tend to be broad and curved. Most vessels are shell tempered, but some vessels also have grit temper (Peterson 1979). There is, however, some dispute over whether or not these anomalous, grit tempered pots really represent Blue Earth vessels or whether they might be Late Woodland sherds instead (Anfinson 1997). Vessel surfaces are generally smooth, although there is the occasional sherd which shows smoothed over cord marking (Anfinson 1997). Jars may have loop or strap handles, or none at all.

Decoration usually consists of rectilinear trailed line decoration applied to a wet paste at the shoulder. Motifs include curvilinear, chevron, angular or vertical lines, embellished with small tool impressions, as well as shorter trailed lines or punctates, crosses, concentric circles, or spirals (Anfinson 1997: Peterson 1979). It is common to see alternating patterns of chevrons bordered by bands of vertical lines (Anfinson 1997). Lips may be notched or tool impressed and strap handles may be decorated when they are present (Peterson 1979). Motifs are generally arranged to span either halves or quarters of the vessels. Balance and symmetry were likely important considerations in the Oneota aesthetic (Benn 1989). Vessel lips are simple and thinned, whereas rims are thick relative to the rest of the vessel.

There is some suggestion of temporal trends within the ceramics. During the terminal stages of Blue Earth, the ceramics become cruder and less well made and there are other stylistic trends within the assemblages that have led some to suggest a developmental sequence for Blue Earth (Anfinson 1997). However, this temporal sequence has not yet been widely adopted. Thus, while the ceramics are well studied, the cultural ramifications of these data are less certain.

10.5.5 Chronological placement: The chronological position of Blue Earth extends from 1000 AD to at least 1500 AD in most places (Anfinson and Wright 1990) and may last as late as 1650 AD (Anfinson 1997). Although it has been argued that Blue Earth may extend into the Post-contact period in some areas (Anfinson and Wright 1990), to date there have been no Blue Earth sites excavated which contain European trade items (Anfinson 1997).

10.5.6 Explanatory cultural dynamics: Around 1000 AD, there are major changes in settlement and subsistence patterns throughout this area (Dobbs & Shane 1982). Archaic and Woodland sites are generally scattered, thin, small and located along river bluffs, in bottomlands, and along the shores of prairie lakes, whereas Oneota sites become tightly grouped in two major clusters, both of which are located at creek confluences with the Blue Earth River on the Elm, Center and South Creeks areas (Dobbs & Shane 1982). There are no sites located along lakes after this time despite intensive archaeological survey in these areas (Dobbs & Shane 1982). The subsistence pattern also changes from a transhumant, hunting and gathering way of life with low population densities, to a system of much larger, semi-permanent horticultural villages with a reliance on maize (Dobbs & Shane 1982). Together, this all suggests that the ethnic composition of the groups inhabiting this area probably changed at this time as well (Dobbs & Shane 1982).

Oneota settlement patterns are well studied and it is now known that they used a very specific set of criteria to select suitable habitation sites. In general, Oneota villages were located where a number of resource zones converged

including river valley, closed deciduous forest, marsh or wetland, semi-open oak savanna and prairie. For Blue Earth sites in the Willow and Center Creek areas, habitations are also adjacent to good alluvial bottomlands where the river valley becomes significantly wider. These are also localities that are sheltered, protected from fires, severe storms, and flooding (Dobbs & Shane 1982). Soil type appears to be of only secondary importance after primary access to the varied resource mosaic, a sheltered site location and close proximity to good farmland. Dobbs and Shane (1982) also argue that socio-cultural factors, such as proximity to neighboring villages, may have been a consideration in Oneota site selection process.

10.5.7 Problems: There seems to be very little mention of the extended use during the Oneota period of the indigenous Late Woodland horticultural complex. This existing complex is apparently completely replaced by the Oneota system (Anderson 1995). This suggests that the Oneota did not develop from a local Late Woodland cultural base since it begs the question why would a local group suddenly cease the use of developed horticultural way of life in favour of what appears to be an entirely different subsistence strategy? There is some variability in the horticultural complexes though, which also suggests that there were various locally adapted branches of the Oneota. (Anderson 1995)

So far, there have been no sites located that link the earlier Woodland tradition with the Oneota. There is also very little to link the Oneota with historically known groups, although the Ioway, Oto and Omaha are known to have inhabited southern Minnesota in the 17th century (Dobbs & Shane 1982).

10.6 OGECHIE

10.6.1 Definition: The Ogechie series is related to Oneota and Upper Mississippian groups and appears to be associated with a Mississippian-Woodland blend culture (Ready 1979b). This ceramic series represents the furthest known northern extent of the Oneota Tradition. Ogechie also appears to be closely associated with Sandy Lake ceramics and may extend into the southern Red River Valley (Ready 1979b).

10.6.2 Distribution: This ware is distributed primarily in central Minnesota (Ready 1979b) although Ogechie ceramics may extend as far north as the southern Red River valley of west central Minnesota (Ready 1979b). This represents the furthest known northern extent of the Oneota Tradition.

10.6.3 Type site: The type site for the Ogechie Phase is Petaga Point (Ready 1979b).

10.6.4 Associated ceramics: There are two main ceramic types: Alamakee Trailed, which is a widespread Oneota ware, and Ogechie Plain, which lacks any decoration except lip notching. Vessels are generally globular and possess constricted necks, straight rims, flat lips, and round shoulders and bottoms. Some vessels may have loop handles applied in pairs; lip notching is also common. Decorative techniques include the application of broad trailed lines on the shoulder. These may be arranged vertically, obliquely, or as chevrons, often in association with linear punctates (Ready 1979b). Some vessels are completely plain except for the aforementioned lip notching.

10.6.5 Chronological placement: Ogechie sites date to the period between 1400 and 1750 AD (Ready 1979b).

10.6.6. Explanatory cultural dynamics: The closest ceramic relationships are to Orr phase materials in southeastern Minnesota and northwestern Iowa; Ready (1979b) also states that there are close associations between Ogechie and the more Woodland of the Sandy Lake ceramics. Ogechie is often regarded as a northern variant of Oneota (Michlovic and Schneider 1993; Ready 1979b).

10.6.7 Problems: Ogechie Plain ware seems to be another one of those east-west hybrid assemblages which consists of a better known regional ceramic type, possibly Alamakee trailed, with Sandy Lake ware in the ceramic collection as well.

10.7 CONCLUSIONS: OVERVIEW OF ONEOTA, CAMBRIA, GREAT OASIS AND MILL CREEK-OVER

Great Oasis is the earliest Mississippian intrusion into the area, closely followed by Cambria and Blue Earth. Great Oasis is generally seen as having affinities to both Late Woodland and generalized Plains Village cultures (Anfinson 1982). However, there is a certain degree of confusion surrounding the place of such archaeological cultures in the development of post-Late Woodland chronology. For example, Anfinson (1982: 69) refers to Great Oasis and Cambria as the earliest Mississippian aspects in the Prairie Lakes region yet, not ten pages later, he also refers to them as the two earliest Plains Village

phases in the same region. There does seem to be a certain level of ambiguity regarding the place of these early Mississippian-related or Plains Village phases and unfortunately, the exact position of these cultural units is by no means clear in the literature.

Great Oasis and Cambria sites tend to cluster around 1000-1200 AD but are limited to the extreme western edge of Minnesota by 1300 AD. Middle Mississippian-related complexes cluster in the one hundred years between 1200 AD and 1300 AD and are gone from the region by 1300 AD. The Oneota, on the other hand appear to flourish throughout this period and beyond, virtually to the contact period in some areas (Anfinson and Wright 1990).

The Oneota are regarded as peripheral to both this area and to the Northeastern Plains, although there is some evidence that goods were funneled through Cahokia to sites along the Minnesota River such as the Cambria Site (Shay 1990). This addresses, to a certain extent, the visible eastern influences on the James, Sheyenne, and Red rivers (Shay 1990). Cahokia is seen to be at its peak ca. 1100 AD. There is evidence for the presence of the Oneota that is of equal antiquity in Iowa, Minnesota, and Wisconsin. It is possible that this region is the centre of Oneota growth and development, a process that cannot then be regarded as merely an outgrowth of similar developments in the Mississippi River basin (Brown 1982). One of the major problems with regard to these developments, and one that is of central importance to this thesis, is the fate of the generalized Late Woodland peoples in the face of this horticultural expansion. Were these hunter-gatherers destroyed, displaced, absorbed, transformed, or did they co-exist with these horticulturalists and agriculturalists (Anfinson 1982)?

Oneota influence quickly expands through the period around 1200 AD. At this time, non-Oneota village complexes begin to add fortifications to main villages while the outlying villages are abandoned (Anfinson and Wright 1990). At the Sheffield site, dated ca. 1300 AD, the Oneota component there is both preceded and succeeded by a Late Woodland, non-horticultural Kathio/Blackduck component (Gibbon 1973). This suggests at least a certain degree of reluctant displacement of non-horticultural Late Woodland groups by expansionist maize growers such as the Oneota. The position of the Plains Villagers in all of this is unclear. Their suggested eastern origins point towards some population movement, a possible relationship to the Oneota, to Mississippian developments, and perhaps some displacement and absorption of indigenous non-horticulturalists.

Cambria and Mill Creek were once assumed to be ancestral to the Middle Missouri tradition but are now more widely regarded as an outgrowth of the Great Oasis phase that ultimately derives from a Late Woodland base (Gibbon 1993). Gibbon (1993) argues that this was part of a more widespread "structural transformation" on the Plains and in the northeastern Woodlands which occurred between 900 AD and 1000 AD. This transformation included major changes in settlement patterns, subsistence, and in material culture. In this area these changes are seen as the movement to semi-permanent fortified villages, the cultivation of maize, and the appearance of new ceramic wares and changes in existing ceramic technology (Gibbon 1993).

It is not known what got this process rolling; it seems to have been social and interregional in nature rather than the result of local response to environmental change. Both the Great Oasis and Cambria phases are expressions

of this emergence and should be studied within this enlarged sociopolitical context (Gibbon 1993: 182). Great Oasis has been viewed alternately as either terminal Late Woodland or as incipient Plains Village (Gregg 1994). It is present in southwestern Minnesota and northern Iowa, and in eastern South Dakota from around 1000 AD (Gregg 1994). It manifests a variety of adaptations that range from hunting and gathering in the prairie-lakes region to possible horticulture in northeastern Iowa and southeastern South Dakota (Gregg 1994). Where this complex is horticultural, it resembles Initial Middle Missouri groups (Gregg 1994).

The disappearance of Cambria and Great Oasis in Minnesota by 1200-1300 AD is a difficult problem since this appears to be part of further reorganization of the entire upper Midwest and of the large trade networks which were evident at this time. The appearance of the Oneota seems to be an important part of this phenomenon. In fact, Gibbon says that the Oneota "swept" across southern Minnesota and northern Iowa and that this process may have pushed Plains Villagers in a westwards direction (Gibbon 1993).

Again, this process seems to be part of a more extensive regional cultural reorganization and not just a local phenomenon. Gibbon states that the Middle Missouri tradition presence in Minnesota may have ended when IMM Variant ends around 1200 or 1300 AD and entertains the possibility that large numbers of these people may have moved from what is now Minnesota to the Missouri trench at about this time. Both the emergence and disappearance of Middle Missouri tradition cultures seems to be a part of a larger phenomenon which involved significant, widespread cultural changes that affected everything from subsistence and material culture to politics and ideology. It "... is arguably the

most radical culture change in tempo and magnitude to have occurred in the upper Midwest..." (Gibbon 1993:183).

10.8 The Later Pre-contact Period on the Northeastern Plains: Synopsis and Speculation

For the Northeastern Plains as a whole there is, as mentioned above, an apparent north-south running corridor, which extends from the lower/northern Red River Valley of Manitoba, along the border between Minnesota and North Dakota and into southeastern South Dakota. This corridor contains distinctive archaeological components and sites dating between approximately 1100 and 1500 AD that share a number of things in common. First, when compared to contemporaneous assemblages from the same area, the ceramics present a perplexing blend of eastern Late Woodland and western Plains Village attributes. The precise nature of the traits appearing on these sherds depends on how far north or south one is within the corridor. To the south, we see a merging of Woodland, Great Oasis and Initial Middle Missouri elements (some would place Great Oasis in the IMM Variant). Further to the north, ceramics from the Big Stone phase display a commingling of Late Woodland Lake Benton and Plains Village traits. While in the Red River Valley and adjacent drainages, the ceramics frequently show an admixture of Late Woodland Sandy Lake, Oneota, and Plains Village traits.

These sites tend to be larger than Late Woodland encampments in the same area. On the other hand, these villages are smaller and less intensively occupied than classic Plains village sites and they rarely show evidence of the

major earth lodge architecture that is so characteristic of full-blown Plains Village occupations. Fortifications are rare but present at some sites. Corn and scapula hoes are in evidence, but are not particularly abundant. Evidence of other cultigens common to Plains Village Tradition sites is rare to non-existent. Wild plant and animal foods such as bison, fish, and wild rice, remain an important part the overall subsistence pattern. Finally, many of these sites also show some influence, albeit indirect, from agricultural groups to the east such as the Oneota.

Basing his definition on the work of Michlovic and Schneider (1993), Gregg (1994) used these traits to define the Northeastern Plains Village Complex (see above). I have already stated my reservations about the use of the term "Plains Village"; moreover, I don't think the distribution of this complex extends far enough south or west to warrant the use of this term. There are substantial differences in the ceramics as one ranges from north to south along this corridor and these differences have been used to reject the notion of any relationship between these areas. However, I also believe these hybrid assemblages to be part of a cultural dynamic resulting from the behaviour of Siouan groups along the Prairie-Woodland edge. During the latter portion of the Pre-contact period, the pottery found in sites along this corridor is strikingly different from the globular, grit tempered, corded wares that we generally associate with Algonkian groups in the woodlands and boreal forests at this time. If Sandy Lake pottery can be related to the historically known Dakota, as Michlovic has suggested (Michlovic 1984, Michlovic and Schneider 1988, 1993) and, if the Oneota represent a branch of the Siouan linguistic family, then it is possible that these apparently "hybrid" pottery types represent the work of Siouan groups with links to both the east and west. These groups are not Oneota but perhaps

have political, economic, and cultural ties to them. I would suggest that these groups were not on altogether friendly terms with the Oneota. This may explain why they show up in what was probably marginal maize growing territory just as the Oneota are becoming a dominant force to the south and east. Michlovic and Schneider (1988) suggest that these villages represent an independent development of the village way of life. This suggests to me that they need to be regarded as both separate and distinct from the Plains Village pattern and to subsume them under this moniker does them an injustice.

Based on a combination of historical evidence and Mandan/Hidatsa traditional knowledge, many authors have suggested that the origins of at least part of the Middle Missouri Plains Village Tradition lie to the east (Winham and Lueck 1994). It may be possible that some of these hybrid assemblages along the Prairie/Woodland transitional zone represent a general westward movement of some of these peoples out of the woodlands and onto the plains. As with many long distance migrations, not everyone wants to keep moving. Some are happy to stay at home, some quit part way, and others want to keep going. The strange ceramic assemblages which defy tidy explanation everywhere in this zone may be just that. As some groups moved out of the Woodlands, they retained aspects of their economy and ceramic style -- both of which would doubtlessly alter as they moved westward and made contact with different groups of Plains-oriented people. In more southerly, maize friendly areas, horticulture was adopted. Further north, where maize horticulture was a more marginal pursuit, gardening came and went as resource availability varied, and as climatic constraints dictated. In the most northerly extremes, where intensive maize farming was not feasible, wild rice became the preferred food and may have

reached the stage of incipient cultigen.

Bison seems to have remained important throughout this zone ultimately perhaps providing one of the attractions of the move. For those groups that continued on the path westwards, some may have settled on the Missouri River, finally moving to a fully developed Plains Village Tradition way of life. There is no reason to suppose that these groups ceased all contact with one another. The regular forms of cultural interaction that accompany widely dispersed cultural groups -- trade, raiding, warfare, intermarriage, ritual gift giving etc. may have helped create ceramic assemblages that are not a comfortable typological fit in any single taxon. It is logical to expect that less sedentary groups were the ones to develop more variable pottery.

This entire period of time between about 900 and 1300 AD appears to be one in which there were large and wide ranging movements of Siouan speakers out of the east, perhaps in response to growing inter-group hostility as shown by the development of fortified villages quite early on. Later, some of these may have developed into the many regional variants of Oneota, Great Oasis, Initial Middle Missouri, Sandy Lake, Big Stone, and Randall phase. Those who continued moving westward perhaps became the historically known Mandan and Hidatsa. There are some compelling arguments for lumping all these assemblages, from southern South Dakota to southern Manitoba into a single composite. Red River, Psinomani, Stutsman, Big Stone, Randall, and others as yet unidentified might all be considered complexes of this composite. The fact that they all appear to be east-west hybrids, that they all exist along the corridor that essentially defines the boundary between the Plains and the Woodlands, that they all exhibit a roughly similar subsistence-settlement strategy (with some

internal variation), and the fact that none of them fit neatly with any other identified cultural complexes immediately to the east or west suggests that they are more closely related to each other than they are to contemporary and better understood cultural entities in immediately adjacent areas. The visible north-south differences in this hypothetical composite could be accommodated by the creation of different complexes within the composite.

The Northeastern Plains Village Complex has already been defined; however, I would like to propose elevating it to a differently named composite due to the taxonomic consistency of the "Complex"- "Composite"- "Configuration" system. Furthermore, there are good reasons for creating a larger Configuration which encompasses the Oneota (but which does not subsume them under the rubric "Plains Village"). Such a designation should include both the regional variants and attenuated versions of Oneota further to the north and west, such as Ogechie and perhaps Red River/Northeastern Plains Village Ware. There is also considerable overlap between this potential cultural-historical entity and that of the Initial Middle Missouri Variant which should perhaps be examined as a common ancestor of both.

The later Pre-contact period on the Northeastern Plains and adjacent areas is dynamic and complex. In many areas the Late Woodland settlement-subsistence system comes to an end and this ushers in a semi-sedentary, horticultural way of life. All of which is accompanied by the development of larger, fortified villages probably as a result of is increased inter-group conflict. Some areas, like the Red River corridor, seem to fluctuate back and forth between a nomadic hunter-gatherer and semi-sedentary horticultural way of life. The Middle Missouri and Oneota/Upper Mississippian areas emerge as separate

and distinct, while the area in between the two shows influences from both areas. The northern portions of the Northeastern Plains, in southern Manitoba, northern Minnesota and North Dakota, and southern Saskatchewan, possess sites that contain evidence, largely in the form of ceramics, for major movements of people presumably from areas to the south. It is probably not a coincidence that in other areas of North America this same period of time is also one in which there is a great deal of cultural upheaval. Where exactly the Oneota fit within this equation is still something of a mystery. They might be a motivator -- the group which provided some of the impetus for large scale movement out of the woodlands -- or they may be part of the process, being pushed themselves by Middle Mississippians perhaps, who were extending their empire as far north as Aztalan in Wisconsin at about this time as well.

It is interesting that this period of time, one that is so culturally complex, also corresponds with the climatic intervals known as the Medieval Warm Period and the beginning of the Little Ice Age. The influence of these climatic changes on the inhabitants of the Northeastern Plains has been debated (Anfinson and Wright 1990, Bamforth 1990) but without any firm resolution. Gregg (1994) maintains that the MWP was hard on the Plains and portions of the Northeastern Plains and there is certainly evidence from other areas of North America, such as the Southwest (Jones et al 1999), that suggests this period was a difficult one both culturally and economically. Yet, the relationship between cultural change and the MWP on the Northeastern Plains has not yet been explored.

SECTION 4

Discussion and Conclusions:

11. Culture Change on the Northeastern Plains
12. Synthesis: Macro-regional Push/Pull Factors Environmental Change and Migration

CHAPTER 11
ENVIRONMENT, CULTURE CHANGE, AND POPULATION DYNAMICS IN THE MIDDLE MISSOURI AND UPPER MISSISSIPPI SUB-AREAS AND THE NORTHEASTERN PLAINS CA. 1000-1400 AD

11.1 CULTURAL CHANGE CA. AD 1000

All over the central continent, the Late Woodland Period is ushered in by a general shift in social organization accompanied by an intensification of existing subsistence and settlement patterns that seems designed, at least in part, to support larger numbers of people. Evidence for this intensification includes the widespread adoption of the bow and arrow, increased use of large food storage facilities, increased sedentism, and the refinement of ceramics in order to enhance their efficacy as cooking vessels (Benn 1983; Braun 1983; Shay 1990). However, by the end of the Late Woodland, many areas appear to have reached the end of their ability to absorb and support these increases in population. Apparently this system has reached its functional limit as an effective settlement and subsistence strategy (Benn 1983) over much of the central continent and adjacent areas to the north. This apparent demographic saturation sets the stage for a sweeping series of changes in subsistence and settlement patterns, many of which are linked to the development and spread of maize.

11.2 THE LATE WOODLAND

The Late Woodland Period in the central portion of the continent saw a number of important changes in both demographic and subsistence patterns. These include trends toward increasing sedentism, a broadening of the

subsistence economies, and an increase in the importance of items of status and personal adornment (Steponaitis 1986). Smaller villages begin to amalgamate into larger ones and there is evidence for the development of expanded social networks (Ford 1974). All of this suggests some degree of demographic pressure accompanied by shifting social and political relations. In many areas, the Late Woodland Period sees the culmination in the efficiency of the forest-based hunter-gatherer subsistence pattern (Ford 1974) as well as changes in technological adaptations, demographics and subsitence-settlemment systems. On the shield, and in the Minnesota prairie-lakes areas, wild rice exploitation increases, sites are occupied for longer periods of time, and there is a trend towards increasing sedentism as well. Most of these changes occur between 400 and 800 AD (Benn 1983; Ford 1974; Fowler 1969; Steponaitis 1986; Shay 1990). It is this pre-existing reliance on incipient, low-level horticulture, combined with the fact that many non-agricultural subsistence systems appear to have reached their maximum carrying capacity, that partially accounts for the rapidity of the spread of maize (Shay 1990).

However, the introduction of maize, in and of itself, probably did not directly precipitate the shift from hunting and gathering to horticulture. Rather, maize was merely a convenient overlay on a well established complex of indigenous domesticates which developed independently in many places during the Middle and Late Woodland periods (Arzigan 1987; Benn 1983; Gallagher 1989; Steponaitis 1986; Watson 1989). There has even been some suggestion that groups were 'flirting' with the idea of (non-maize-based) horticulture as early as the Archaic (Brown 1987) such that many indigenous cultigens were already domesticated in the Eastern Woodlands by 1000 BC. Horticultural complexes are

visible in the archaeological records at many sites by 500 BC (Watson 1989). By 200 BC, the cultivation of a complex of native plants was well established in many areas of the central Mississippi Valley (Struever and Vickery 1973), the northeast (Watson 1989), and in the north central United States or Western Prairie Peninsula (Benn 1983). The set of indigenous domesticates consists of starchy, oily, and protein rich seed plants including pigweed (*Amaranthus*), lamb's quarter or goosefoot (*Chenopodium*), knotweed or smartweed (*Polygonum*), marshelder (*Iva*), ragweed (*Ambrosia trifida L.*), sunflower (*Helianthis annua*) and others (Benn 1983; Struever and Vickery 1973; Watson 1989).

Because this complex of indigenous domesticates developed long before the introduction of maize horticulture, the span of 'early horticulture' is technically quite long -- 1000 to 3000 years (Watson 1989). This period sees a slow trend towards increasing population density and increased settlement size as part of a complex of irreversible and sweeping changes which occur over much of the continent east of the high plains by the end of the Late Woodland Period whether or not maize has been introduced.

11.3 The Development and Spread of Maize Cultivation in North America

The spread of maize cultivation in North America is a complex process. It is well known that the most probable origin of its domestication lies in Mesoamerica, as well as that of the origin of other 'tropical' domesticates such as beans, squash/pumpkin, and bottle gourd (Streuver and Vickery 1973). The major concern here is with corn (*Zea mays*).

Maize was probably introduced to North America fairly early -- possibly as much as 1000 years prior to its gaining any significance as a cultigen (Fowler 1969). It has been recovered in association with early dates ranging from ca. 200 AD in the American Southwest (Shay 1990), to ca. 300 AD from the southeast (Steponaitis 1986; Watson 1989). From these areas, the cultivation of maize spread rapidly over the continent. In fact, its spread throughout North America is much more rapid than the spread of agriculture during the European Neolithic (Shay 1990). By 1000 AD, the spread of maize as an important, although not necessarily primary, component of the diet is all but complete, and maize is well established throughout the southeast, southwest, Midwest, and northeast of North America (Arzigan 1987; Benn 1983; Ford 1974; Fowler 1969; Gallagher 1989; Shay 1990).

Clearly, the first varieties of introduced maize would not have been well adapted to a temperate climate. As a southern plant, its low tolerance for frost and short northern nights means that initial yields would have been low (Gallagher 1989). However, maize is also renowned for its ready adaptability to new climates and its amenability to genetic manipulation. In the move from Meso-America the plant went from being a tall, sub-tropical, small eared, long season plant to a short, hardy, large eared, short season plant (Moody and Kaye 1969; Struever and Vickery 1973). It was, in fact, this final innovation, the development the hardiest variety of Native corn, Northern Flint -- also known as Harinoso de Ocho or Eastern 8 row -- which facilitated the final rapid spread of maize to the northern reaches of its limit. This variety was readily adopted because it is insect resistant, high yielding, and frost tolerant (Gallagher 1989). In light of these improvements, it is interesting to note that in many places maize

was not adopted gradually, but suddenly and wholesale (Steponaitis 1986).

For example, maize is believed to have been introduced into the upper Midwest by approximately 600 AD (Gallagher 1989). But by 900-1000 AD, a mere 300 years later, maize cultivation has become an important component of the diet over much of the eastern half of the continent. Maize cultivation is also an important consideration in a series of social, political, and demographic changes that occur all over the central eastern and north central continent. Whether or not maize was merely an overlay on a pre-existing pattern, its introduction seems to have been accompanied by considerable cultural change (Gallagher 1989). During this period, just prior to, and slightly after 900 AD, there is a widespread shift from hunting and gathering supplemented by horticulture to intensive horticulture supplemented by wild foods (Gallagher 1989; Watson 1989). The introduction of horticulture or agriculture is accompanied by a number of dramatic trends. The introduction of maize is synchronous with dramatic increases in population density, increased sedentism, movement to larger localized population distributions, new forms of political organization, evidence for agricultural intensification in the form of garden plot selection and preparation, and increases in the size, number, and distribution of food storage facilities (Arzigan 1987; Benn 1983; Brown 1982, 1987; Ford 1974; Fowler 1969; Gallagher 1989; Shay 1990).

These changes, in turn, seem to have had an impact on many aspects of social organization. The shift to larger social aggregates seems to engender a concomitant shift in social relations and political organization (Brown 1987) which is entirely consistent with the suggestion that major economic shifts also entail corresponding shifts in the social realm (O'Shea 1987). Frequently, further

rapid population growth follows, accompanied by increases in cultural complexity (Gallagher 1989). After maize is introduced, populations also begin to concentrate along the major river valleys. In the north, these include the Missouri, James, and Red River systems (Shay 1990). This pattern appears to have spread at the expense of contemporary Late Woodland populations.

11.4 Social and Cultural Changes Accompanying the Spread of Maize Horticulture in the Middle Missouri and Upper Mississippi

Although maize does not become widespread until after ca. 1000 AD, it appears almost simultaneously in many different areas, frequently as an overlay on a pre-existing complex of native cultigens (Shay 1990; Steponaitis 1986). The introduction of maize is accompanied by the introduction of beans, the development of ridged fields, greater effort in site selection, cultivation, and ground preparation, and increased land clearance (Gallagher 1989; Steponaitis 1986) which, together, suggest some degree of accompanying horticultural intensification.

It is generally agreed that the shift to maize was precipitated by widespread "demographic stress". This stress seems to continue since the adoption of maize triggers further population increases as it becomes incorporated into the diet (Kelly et al. 1984a). Demographic stress is shown by a general decrease in occupied land area with an accompanying increase in the number of structures per unit area. Together these may reflect an adaptation to population pressure in which suitable plots of arable land were at a premium (Kelly et al. 1984a).

The exact sequence of these changes remains unclear. Whether these changes result from the introduction of hardier strains of maize, whether they were precipitated by more intensive horticulture, or whether widespread demographic stress was directly responsible for intensification and accompanying social and political changes has been a matter of some debate (Arzigan 1987; Steponaitis 1986). As Gallagher (1989: 572) notes: "It is clear that no single factor was responsible for a shift to intensive agriculture in the Late Precontact Midwest. In fact, many of the basic ingredients were present in earlier periods". In truth, it would appear that the combination of small scale horticulture, the introduction of hardy, high yield, nutritious cultigens, demographic changes, and social and political developments acted in concert to promote sweeping changes which brought the hunting and gathering economy of the Late Woodland period to a dramatic close in many areas of the continent.

This trend culminates in the development of the classic Mississippian cultures -- large, complex, centralized sociopolitical formations -- by ca. 850 AD (Steponaitis 1986). While these show some basic continuity with earlier Late Woodland cultures there are also some distinct changes in both the ceramics and house form (Steponaitis 1986). This fact, combined with evidence for increased confrontation and hostility between Late Woodland and emergent and expanding Mississippian peoples has led some to suggest that Mississippian groups grew partially at the expense of Late Woodland cultures (Ford 1974). The newly developed Mississippian political formations expand rapidly to encompass broad areas of eastern and central North America (Steponaitis 1986). Shay (1990) infers the existence of a dense population by the development of complex ceremonial societies and by the visible increase in the importance of status

differentiation. Also, there is a growth in the importance of long-distance trade at this time -- a development that may be attributable to the same causes since population growth increases the demand for trade goods by creating more consumers (Shay 1990). This expansion in trade resulted in a wide distribution of Mississippian traits without any evidence of altered social organisation in recipient cultures (Ford 1974). The growth of permanent and semi-permanent villages provided convenient central places at which goods could be exchanged. In this light, the growth of Cahokia can be seen partly as the establishment of an important central core from which to conduct trade (Shay 1990).

At this time, we also see the emergence of densely populated, maize cultivating settlements in the Middle Missouri and along the upper reaches of the Mississippi. Whatever the cause, by 1000 AD larger, maize dependent subsistence-settlement systems such as the Plains Village Pattern are well established along the Missouri River and are also becoming established in southwestern Minnesota, western Iowa, and the lower James River (Kordecki and Gregg 1986).

11.5 The Spread of Maize and Cultural Developments on the Northeastern Plains

Terminal Late Woodland cultural developments outside the Middle Missouri sub-area are not well understood at all. In fact it is only in the last decade or so that we have been able to suggest that there were pre-contact, post-Woodland cultural developments at all. These trends are interesting both for their similarity to and difference from Middle Missouri cultural developments in

roughly the same time period.

Aspects of the Plains Village pattern appear somewhat later further to the north and east, although to the east the distinctions between Plains Village and Mississippian Patterns becomes increasingly blurred. Further north on the James and Red rivers, maize makes its appearance between 1200 and 1300 AD (Gregg et al. 1986; Michlovic and Schneider 1993). However, unlike the better known manifestations of the Plains Village Pattern, these areas generally lack any evidence for cultigens other than maize.

Gregg (1990) described his Northeastern Plains Village (NEPV) complex as arising approximately 900-1000 AD. The complex includes: diagnostic ceramics, abundant Knife River Flint, catlinite, semi-sedentary villages, mound mortuary features, Devil's Lake-Sourisford mortuary complex, and a primarily hunter-gatherer mode of subsistence with some corn horticulture which, while important, was not as intensive as that practiced in the Middle Missouri villages. These NEPV complex settlements frequently remain unfortified. Sites fitting this description occur most frequently in the James, Sheyenne, and Red River drainages in southeastern North Dakota and northwestern Minnesota (Gregg 1990; Michlovic 1984).

One of the characteristics of these sites is that they often possess both different ceramics from those expected in the region, as well as unclassifiable pottery types which indicate interactions with their neighbours to the east, south, and west (Gregg 1990). Apparently, sites dating later show increasing influence from the Middle Missouri and Coalescent Tradition groups to the west and southwest.

On the Northeastern Plains, there is a visible increase in Mississippian

influence throughout this period. While the core of these cultural developments remains the central and lower Mississippi Valley, their sphere of influence encompassed a broad area including many parts of the north central, eastern, and southeastern United States (Anfinson 1979b). This Mississippian intrusion into Minnesota brought the Late Woodland period there to an end in the southern portion of the state, and appears to initiate the development of a number of new, but related horticultural complexes there, including Great Oasis, Cambria, and Blue Earth Oneota (Anfinson 1982, 1997).

Maize continued to spread throughout the late Precontact and Protocontact Periods. Although the Precontact limit of Native horticulture was believed to be in North Dakota (Moodie and Kaye 1969; Nicholson 1990), there was also some suggestion by Syms (1980) that if horticulture was not present in southwestern Manitoba, according to a combination of ethnohistoric data, climatic data, and his Co-influence Sphere model, maize horticulture should be found there. In 1974, Syms located a deep, bell shaped pit feature at DgMg-15 in the southwestern corner of the province. This site dated ca. 1610 AD (uncorrected) and provided tantalizing evidence that horticulture might have existed in southwestern Manitoba during the Precontact period. However, the lack of any direct evidence for maize, and of gardening implements such as scapula hoes, prevented him from suggesting that the pit was linked with Precontact horticulture (Syms 1974).

There is well documented evidence for post-contact maize horticulture in Manitoba. Moodie and Kaye (1969) examined some of the early accounts of corn growing in Manitoba. Apparently, Henry Schoolcraft makes the first mention of Native corn horticulture north of the Middle Missouri sub-area in 1805, when he

observed that the Netley Creek Indians were growing corn and potatoes. Later, in 1821, these same people were reputed to have provided the Selkirk settlers with seed. After this time, Native horticulture became much more widespread in the north. Moodie and Kaye (1969) also report that the Netley Creek Ottawas were well aware of maize farming practices but did not do so themselves until they were given the seed in 1805. At this time, garden plots were placed in strategic provisioning locations and, by the 1850's, they had added beans and even melons to their inventory. The practice of gardening quickly diffused to other Woodland groups and was spurred by the demand for provisions by traders who had significantly depleted the wild resource base by then. They also state that, of all of the known varieties of maize, the Mandan Flints were the hardiest (Moodie and Kaye 1969) and therefore the best suited to this northern environment.

Moodie and Kaye (1969) state that the Hidatsa brought corn to its furthest known northward extension during the Precontact Period in the Knife-Heart region of North Dakota. This variety could have moved further north and not have over-extended its biological limitations: "Mandan corn, however, was capable of penetrating still higher latitudes, though it would produce a crop only under the most favorable local conditions" (Moody and Kaye 1969: 526). This seems to indicate that during the Protocontact Period corn had, in fact, reached the effective limit of cultivation as a consistent and reliable dietary staple except under exceptional circumstances.

Moodie and Kaye (1969) note that the choice of Netley Creek for Native garden plots was an exceptionally good one. Not only was the soil loose and sandy, the very soil type noted for producing the earliest harvests, it was also

well drained. In addition, there was ample moisture and a longer than average frost-free period due to the close proximity of Lake Winnipeg. "Elsewhere in the lower Red River Valley, corn was an uncertain crop. The Selkirk settlers, for example, were successful with Mandan varieties only on natural levees along main rivers" (Moodie and Kaye 1969: 528). This supports the idea that Natives were acutely aware of the potential advantages and pitfalls of any given garden site and kept these well in mind when locating their plots.

11.6 Cultural Disruption and Dislocation ca. 1250-1400 AD

Cahokia declines quite suddenly as a regional centre in the fourteenth century AD. At this time, the scale of occupation there has been considerably reduced and there is movement of northerly cultures, specifically the Oneota, into the American Bottom. The lack of evidence for conflict there suggests that there was no sizable indigenous population to oppose this movement (Porter 1984). However, to the north, the increasing use of fortifications around villages, as well as incontrovertible evidence for unprecedented levels of inter-group violence, such as that found at Crow Creek (Zimmerman and Bradley 1993), points towards increased hostility (and fear) on the Northeastern Plains, Prairie Peninsula, and Middle Missouri sub-areas. There has been some suggestion that at least some of this hostility is driven by expansionist activities on the part of the Oneota (Anfinson 1997; Benn 1989); however, this may be only one aspect of a larger pattern of escalating fear and tension at this time.

As Cahokia declines, evidence of northern and midwestern plains influences in that area increase which, in turn, seems to be part of a pattern of

general cultural upheaval spanning the period from 1300 AD to 1600 AD. This period seems to be one of considerable cultural dislocation in the Woodlands, on the Northeastern Plains, in the Boreal Forest, in the American Bottom, and in the Middle Missouri. However, most archaeological explanations are limited by the authors' highly local approaches which do not address the broader scope of cultural changes occurring throughout the Woodlands and Plains between 1300-1400 AD.

By 1300 AD, the postulated Plains Village outliers, Cambria and Great Oasis, have retracted to the western edge of Minnesota probably due to hostile relations with the Oneota as they expand into territory formerly occupied by the Plains Village groups (Anfinson and Wright 1990). However, in northern Minnesota, where Oneota expansionism is less of an issue, Blackduck and Kathio ceramics are replaced by Sandy Lake ceramics at about the same time (Anfinson and Wright 1990; Johnson 1979). While in southwestern Minnesota, the Oneota themselves begin to abandon areas which apparently remain unoccupied until the Postcontact Period (Anfinson and Wright 1990).

Lugenbeal (1976) sees evidence for widespread cultural decline over the entire upper Great Lakes region starting at around 1400 AD. He suggests that whole areas were abandoned some of which, as in southwestern Minnesota, were left unoccupied until Contact. Syms (1980) states that there was a generalized population recession around 1450 AD, but says there is insufficient data to allow him to offer any sort of explanation. In many portions of the boreal forest of northwestern Ontario, the Rainy River Composite comes to a halt ca. 1350 AD. At this time the manifestations of this composite collapse back into their heartland around the Rainy River between Ontario and Minnesota (Lenius

and Olinyk 1990). There are no dates associated with any Rainy River mound sites after 1475 AD. While the authors suggest that the composite may have persisted for as long as 200 years following this date, their data does suggest that an important aspect of the composite, mound ceremonialism, was no longer functional (Lenius and Olinyk 1990).

Kordecki and Gregg (1986) see the period between 1200-1400 AD as critical in terms of climate and human adaptation on both the Northeastern Plains and in the Middle Missouri sub-areas. Around 1300 AD, the people of the lower James River were abandoning their villages and some degree of population pressure is suggested by the obvious increases in warfare. The most dramatic example of this trend is the dramatic proto-Arikara, Crow Creek Massacre in South Dakota (Zimmerman and Bradley 1993). There is also an increase in metabolic disturbances reflected in skeletal pathology. Villages in the region also show increasing evidence of fortification. This pattern seems to manifest itself outside the Northeastern Plains and into the Woodlands. There also appears to be some archaeological support for this trend on the northern plains where Zimmerman and Bradley (1993) have postulated the existence of a Late Prehistoric population collapse among Arikara, Mandan, and Hidatsa groups of North and South Dakota at about this time.

Another example of this increased stress can be seen just to the south and east of the Northeastern Plains. The Norris Farms #36 Oneota grave site in west central Illinois shows a remarkable percentage of individuals with traumatic injuries and mutilation. The cemetery was completely excavated and yielded a sample in which 43 of 264 individuals showed evidence of violent death (Milner, Anderson and Smith 1991). Not coincidentally, this cemetery dates to the period

and warfare at settlements within these valleys suggests that these river bottom populations outstripped carrying capacity there as well. In general, this period appears to have been a stressful one for Plains Village horticulturalists; population pressure appears to be responsible for the movements of people and the increases in both inter- and intra-group hostilities visible during the Initial Coalescent (Gregg 1985).

Evidence further afield, from the northern and central Plains indicates that the Precontact cultures there were also in some difficulty. From the Arkansas River region, there is evidence of population retraction and consolidation ca. 1300 AD following an initial period of expansion. By the subsequent Spiro Phase, ca. 1400 AD, mound building and long distance trade have collapsed. The following period also shows evidence of population loss and redistribution (Bell 1983). In the Great Basin, the Freemont culture disappears ca. 1350 AD.

Finally, at Lockport, we know that there is also a major shift in the cultural developments at this time. Indigenous Late Woodland hunter-gatherers are replaced by a group of maize growers who appear to have strong relationships south and east of the study area, among "Northeastern Plains Villagers" and perhaps northern Oneota from Minnesota. In any case, it is clear that there is a 100-150 year period around 1300 AD which is exceedingly difficult for pre-contact Native North Americans both culturally and economically. It should be abundantly clear now that the arrival of horticulture at EaLf-1 between approximately 1300-1400 AD, is part of this general pattern of change, abandonment, and dislocation.

11.7 THE CERAMIC AND CULTURAL HISTORICAL EVIDENCE RECONSIDERED

Looking at the nature and variety of ceramic complexes from Minnesota, North and South Dakota, southeastern Manitoba, northwestern Ontario and from Michigan, Wisconsin and Iowa as well, certain trends begin to manifest themselves. Based on a combination of ethnohistoric data, archaeological recoveries, and oral history, there is widespread agreement that the origins of the Middle Missouri Hidatsa and Mandan groups lie somewhere to the east of the sub-area. Moreover, the position of the Cambria, Great Oasis, and Mill Creek ceramic cultures within the cultural chronology of Minnesota, and North and South Dakota is consistently problematic. Various authors have looked to each of these ceramic cultures to as the origin of Middle Missouri Plains Village groups and yet, there are also persistent attempts to slot all of these into early variants of the Middle Missouri Tradition. These cannot be both originator and part of the Middle Missouri Tradition at once. The ceramics from many of these sites are also problematic since they possess certain aspects of Middle Missouri ceramics but also bear distinct resemblances to Oneota and Mississippian ceramics.

Perhaps, like the Winnipeg River complex or "Red River ware", these are intermediate ceramics that simply do not slot neatly into a predetermined cultural historical category. Furthermore, because Middle Missouri cultural chronology and ceramics are so well studied, there is something of a tendency to work backwards from west to east in assigning ceramic affiliation. Working the other way, from east to west, seems more logical given the hypothesized eastern origins of Middle Missouri Plains Village groups. To the researchers from North Dakota, anything with corn and scapula hoes is likely to be placed into the Plains Village pattern, even though Oneota, a Mississippian-related archaeological

culture, also possesses both corn and scapula hoes. As one moves east, it seems sensible, therefore, to carefully examine the relationships of these corn-growing, hoe-wielding, pit-digging, ceramically-inconvenient archaeological cultures.

The Plains orientation does not stop at the 49th parallel. Snortland-Coles (1979), Nicholson (1987, 1990), Buchner (1986), and Lenius and Olinyk (1990) have all been eager to subsume unusual ceramics into a Middle Missouri-Plains Village mold. Yet, close examination of these materials reveals a definite relationship between the unusual aspects of the Duck Bay ceramic assemblage, "Red River ware", some Stutsman Focus, Devil's Lake-Sourisford, and Oneota ceramics. This may sound radical but is not so odd considering that Duck Bay ceramics are distributed well into the Rainy River region of Northwestern Ontario and Minnesota, and into the Red River corridor as well. There are also Duck Bay ceramics at one site in the headwaters region of Minnesota (Lenius and Olinyk 1990). These relationships appear to extend in a narrow corridor running southwards to northern South Dakota where we see Randall and Big Stone Phase materials that are not entirely dissimilar either in appearance or in the fact that they are difficult to slot taxonomically speaking.

11.8 Population Dynamics and Cultural Interrelationships on the Precontact Northeastern Plains:

Syms "Co-influence Sphere" model of cultural interrelationships has gained widespread acceptance within the Plains archaeological community since it was first published in 1977. His conception of population movements and distributions was a radical rethinking of Precontact population dynamics and has

been widely praised as such (Anfinson 1982; Lenius and Olinyk 1990; Michlovic 1985b). The Co-influence Sphere model provided a fresh conceptual framework in which to rethink preconceptions of regional interaction and inter-assemblage variability (Michlovic 1985b). Despite this, it is only recently that authors have embraced the requisite re-conceptualization of Precontact Period population dynamics. Of primary importance is the discarding of so called "stacked chronologies", defined as linear, exclusive cultural historical frameworks which permit an area to be occupied by only one group at any given time in the past. It is this type of chronology that has dominated the ordering of regional culture histories in North America. The best local example of this is the Middle to Late Woodland Laurel-Blackduck-Selkirk progression, a holy triumvirate in which the culturally relationships and historical developments are far more complicated than this simple chronology suggests.

Syms' model also compels one to discard spatial preconceptions perpetuated by culture area maps which show Native groups occupying single, well-delineated, mutually exclusive areas on the continent. Syms (1980) suggests that most areas of the Northeastern Plains would have been occupied simultaneously by a number of ethnic and/or cultural groups thus rethinking both the spatial and temporal distributions of Precontact populations. In Syms' own words (1980: 112): "The co-influence sphere includes those cultural areas of an ethnic group that are affected, or perceived to be affected, by contact with one or more other ethnic groups". Such influences are suggested to include subsistence strategy, technology, artistic styles, language, myth and religion, oral tradition, biological structure (Syms 1980) and, I might add to the list, political and social relations. It is impossible to understand the events at EaLf-1 without

making use of this framework.

Archaeological evidence from the Northeastern Plains points to a system of interaction that extended both east into the woodlands and west onto the plains (Michlovic 1985b). However, Syms (1980) states that a proper regional perspective on the Northeastern Plains must also incorporate a consideration of the Northern and Central Great Plains, the Boreal Forest, the Aspen Parkland, the Upper Mississippi River, and midwestern riverine systems. All in all, when Precontact cultural relationships are examined in any detail, one quickly sees that the Plains was a culturally dynamic region which saw long distance movements of people, goods, and ideas, frequent fission and fusion of groups, and complex cross-cultural relationships. Where this Co-influence Sphere model is concerned, the degree of influence from other cultures depends on the nature, intensity, and duration of cultural interaction. It is assumed that: "... both natural resources and cultural patterns undergo changes because societies are dynamic, adaptive units responding to environmental and cultural pressures" (Syms 1980: 114). While this may superficially sound like a truism, all too frequently archaeological cultures have been treated as responsive only to the environmental dimension of external pressure and the inter-societal nature of such external pressures has been ignored or given only the most cursory consideration. Unfortunately, these two pressures often function in concert and to ignore one is to do an injustice to the other.

Evidence of the nature of pre-contact cultural relationships is gleaned mostly from the historic and ethnohistoric records and these relationships are projected back into the Precontact Period. While there is ample criticism for the direct historic approach, it is reasonable to assume that Precontact cultures

behaved in at least as complex a fashion as their descendants. There is ample evidence in the material record of the same far-reaching and intricate relationships as those that existed in the Postcontact Period. There is even some suggestion that the relationships and interactions between Precontact societies were more sophisticated than those that were visible to the first European explorers (Dobyns 1983).

Historically, Native groups are known to have covered unexpectedly vast distances over the plains and to have routinely crossed different cultural and environmental zones, a fact that seems to have been the rule rather than the exception (Syms 1980). The home territories of these groups often overlapped to some extent and, in addition to their core area, they also frequented secondary and tertiary areas (Syms 1980). Other historic evidence consists of "poly-ethnic" Native groups that were maintained through a variety of mechanisms such as alliances, group fusion, and inter-marriage (Michlovic 1990; Nicholson and Hamilton 1997). Moreover, historically encountered Natives were frequently multi-lingual, suggesting frequent interactions with other linguistic groups (Michlovic 1990). Population movements and migrations were common and helped to widely distribute people, goods, and ideas (Syms 1980).

Of all of the ways in which these Precontact cultural groups are presumed to have interacted, trade is one of the easiest to prove using the archaeological record. There is a great deal of material evidence to support the existence of extensive trade networks from the Paleo Period onward. Yet trade is consistently misrepresented as being relatively unimportant until the arrival of the Europeans (Vehik 1990). Syms (1980) believes that Precontact groups traded in a way that was both systematic and which spanned most of the North American

continent. This was accomplished partly through exchanges and trade fairs at central places. There is much evidence to suggest an intricate and extensive network of relationships linking the Plains and the Woodlands in Precontact period (Michlovic 1990). Such evidence includes copper from Lake Superior out on the Plains and Knife River Flint from the Plains well into the Woodlands. Both of these exist in steadily declining quantities the further one gets in the opposite direction from their respective sources (Michlovic 1990). Historically, nomadic groups traded such items as meat, hides, fat, robes, catlinite, decorated clothing, and salt for produce and crafts from sedentary horticulturalists (Gregg 1985). It is well documented in the historic record that corn occupied an important place in the hearts (and stomachs) of the nomadic groups who had a special craving for concentrated sources of carbohydrates (Will and Hyde 1964 {1917}). Natives came to the Middle Missouri region from "as far away as" Lake Winnipeg and these groups carried their knowledge of the Hidatsa and Mandan from the Upper Great Lakes to Hudson Bay (Will and Hyde 1964 {1917}). Shay (1990) suggests that this was the operative system during the Precontact Period on the Northeastern Plains as well. Ceramics provide most of the proof of such relationships but interpretations of their distributions may vary with the focus of the researcher (Shay 1990). It is likely that the visible complexity in ceramic distributions are attributable to these many different processes -- trade, intermarriage, migration, seasonal mobility to name just a few, as well imitation by subordinate groups, and sociopolitical influences exercised by more aggressive groups within their sphere.

Gregg (1985) suggests that long term relationships between different groups were probably not common. Rather, these were temporary in order to

maintain flexibility of both territory and the relationships themselves. He also emphasizes the complexity and richness of inter-group contacts in stressing the existence of coexistence, interaction, territorial overlap, use of multiple biomes, trade, conflict, resource sharing, alliances, exchange of marriage partners, technology, and other resources. These are all well documented historically and it seems only reasonable to assume that Precontact cultures did the same. Vehik (1990) believes that such complexity and variability, especially as it pertains to the relationships between Plains Village and non-Plains Village groups, was an important factor in the development of the Plains and the Native cultures found there.

It is certain that the large Missouri River horticultural groups, woodland groups to the north east, plains nomads to the west, and the large complex groups to the south enjoyed widespread, significant, and varied relationships with their respective neighbours. However, very little is known about the relationships between the Middle Missouri, the Mississippi, and the riverine systems directly to the east, particularly the Red River region (Michlovic 1983).

Geographically, the Red River is midway between the western edge of Lake Superior and the Missouri River (Michlovic 1985a). Environmentally, the Red River is at the eastern edge of the Great Plains (Michlovic 1985a) and at the western edge of the Eastern Woodlands. However, the classic conception of the Precontact cultures in this area place the Red River on the periphery of the Eastern Woodlands and the cultural influences firmly within this sphere (Michlovic 1985a).

As discussed earlier, the ceramics recovered from archaeological sites on the Northeastern Plains show a complicated mix of plains and woodland traits.

This would suggest that the area was not a simple extension of either region, but an area unto itself with relationships extending in both directions (Michlovic 1985a, 1990). Michlovic (1990) suggests that this obvious mixing of traits from separate cultural and environmental zones is indicative of exchanges of people as well as goods, technology, and ideas. He sees this interpretation as the only effective means by which to explain the perplexing level of eclecticism visible in the artifact assemblages from this area. One explanation for this perceived eclecticism sees the Precontact culture(s) in this region as an independent development of the Plains Village adaptive pattern with more eastern cultural affiliations (Michlovic and Schneider 1988). Earlier, Michlovic (1983) also suggested that the area was used simultaneously by both classic Plains Villagers and Late Woodland groups. Making use of Syms, (1977) Co-influence Sphere model, Michlovic (1983) saw this pattern as a widespread on the Northeastern Plains and drew an analogy between this sub-area and the steppes of Asia where there were frequent and far flung movements of nomadic groups and where invasions of major centres were fairly common. At that time, Michlovic viewed the grasslands of North America not as a barrier to the movement of people, but as a facilitator of widespread contact and migration. He saw these postulated population movements as creating an "interdigitation" of plains and woodland groups which tended to produce "multi-ethnic" zones where a variety of cultures and linguistic groups made use of the environments, made contact with each other, and initiated exchanges (Michlovic 1983).

These two interpretations -- that of the use of the Northeastern Plains by both plains and woodland groups and that of the area as containing groups which were independent of, but related to, both the plains and woodland groups

-- are not mutually exclusive. The geographic and environmental location of the Northeastern Plains, and especially of the Red River Valley suggests that both processes were likely in operation. It is in no way unreasonable to postulate cultures that grew and developed a horticultural way of life independently of both the Middle Missouri Plains Villagers and the agricultural groups of the woodlands. However, once established this area would have enjoyed extensive contacts in both directions, especially as populations grew and trade became increasingly important and wide ranging. The postulated eastern origins of the Middle Missouri Plains Villagers also suggests that corn horticulture saw its inception to the east and rapidly spread westward, at least partly as a product of the movement of people. However, the diversity of Precontact cultural relationships between the plains and the woodlands immediately suggests that the growth and development of corn horticulture, and the subsequent evidence for growing hostility and abandonment in the Northeastern Plains and Middle Missouri sub-areas was a far more complex process than that. Clearly, any consideration of culture processes on the Northeastern Plains must take into account contemporaneous processes in adjacent areas and must also consider the possible nature and complexity of the Precontact cultural and environmental dynamics that operated between these areas.

11.9 Plains or Woodland?: Population Dynamics and Cultural Change in the Sheyenne, Red and James River valleys

11.9.1 The Sheyenne River valley:

Haury and Schneider (1988) see the Plains Village Complex beginning on

the Sheyenne River ca. 1000 AD at sites with identifiable Plains Village components. However, they also state that it is difficult to consistently differentiate Woodland and Plains Village ceramics in this area. The Hendrickson III site dates to 1400 AD (Good et al. 1977). The ceramics here suggest that this and other "Plains Village" sites in eastern North Dakota represent indigenous groups who developed from a Late Woodland base but were also in contact with both Middle Missouri Plains Villagers and village groups in western Minnesota and northwestern Iowa. In both areas, pottery from Late Woodland sites are unexpectedly diverse and show strong affinities with sites in western Minnesota, and the Red River Valley.

Unfortunately, it appears that North Dakota archaeologists, with their heavy focus on the Middle Missouri, regard anything with corn and scapula hoes as Plains Village. Thus, these anomalous, post-1000 AD archaeological complexes on the James and Sheyenne drainages automatically become variants of that tradition. At the same time, many authors (Gregg 1990; Gregg et al. 1986; Haury and Schneider 1986) draw attention to obvious eastern influences in the ceramics. Rather than attempting to tear a region and its archaeological manifestations in half, it may make more sense to treat these sites and components as something separate from, but still influenced by, the Plains Village Tradition, especially as it is manifested in the Middle Missouri sub-area. The Red River, which divides North Dakota from Minnesota, is especially poorly understood. This is not only due to reasons mentioned in the introduction but also to the fact that established chronologies are simply not well developed enough to explain the visible variability.

11.9.2 The Red River valley

Early archaeological work there led to the conclusion that predominant cultural influences, as far back as the Archaic, were Woodland (Michlovic 1990). However, new data has forced a re-evaluation of cultural relationships in the region (Michlovic 1990). While Late Woodland populations did make extensive use of the area, there were other cultural influences operating during the Precontact Period. Some ceramics resemble Oneota, while others are more closely related to Plains Village pottery from the Missouri Trench (Michlovic 1985a). The ceramics consistently point to a complex combination of influences apparently embedded within some variation of the Late Woodland Tradition, frequently the Sandy Lake/Psinomani complex. Work at Mooney and other sites provide data that point to an integrated east-west interaction network of Northeastern Plains populations.

11.9.3 The James River valley

The Shea site also provides clues concerning these relationships. This is a fortified village site, but without any evidence of Missouri Valley ceramics (Michlovic and Schneider 1988). Again, the ceramics are largely Sandy Lake/Psinomani, but maize kernels, maize plant phytoliths, carbonized maize plant remains, storage pits, and bison scapula hoes all indicate that that corn was grown locally -- not something generally regarded as a Psinomani practice. This remains a late introduction for maize and the site's occupants probably relied more heavily on bison than on horticultural produce (Michlovic and Schneider 1988). The authors suggest that this too, represents a variant of the Plains Village Tradition, but point out the anomalously heavy representation of Late

Woodland ceramics and pipestone, both of which are rare in Middle Missouri sites. These Plains-type ceramics are not similar to either Initial or Extended Variants of Middle Missouri, including Cambria or Mill Creek (Michlovic and Schneider 1988). As Michlovic and Schneider (1988: 39) observe:

> Indeed, the Shea Site deposit does not appear to represent the same kind of village living as the more substantial and more agricultural villages of the Missouri Trench. Reasoning strictly on the basis of the data the Shea Site 'looks like' a community of bison hunters, who hunted or trapped a few other animals and who grew a modest amount of corn. Furthermore, if these people were gardeners on any scale it is surprising that only corn was recovered. There were no squash, beans or sunflowers.

Clearly there were village horticulturalists on the Northeastern Plains who were largely dependent on hunting and who did not grow the "normal" complex of garden crops: maize, beans, squash and sometimes sunflower and tobacco. In light of this, Michlovic and Schneider (1988: 41) suggest that:

> ... the assemblage from the Shea Site represents an independent development of a village adaptation which may have differed from better known prehistoric village cultures. *Cultural relationships are eastern rather than western* " (emphasis mine).

Are 'anomalous' sites with their 'anomalous' ceramic assemblages really Plains Village, or do they belong in a category of their own? Prior to 1990, various authors suggested that these were in fact Plains Village variants (Michlovic 1983; Michlovic and Schneider 1988). Some (e.g. Gregg 1990) continue to assert that these are a Northeastern variant of Plains Village, calling them the Northeastern Plains Village Complex. However, it is increasingly clear that the villages on the Red, James, and Sheyenne Rivers are something unto themselves,

and Michlovic, at least, seems to have retreated somewhat from the assertion that these groups were primarily Plains Village.

11.10 THE ONEOTA ON THE RED RIVER?

Although direct archaeological evidence of the Oneota Tradition has not been found in northern Minnesota, archaeological research in the Red River Valley has revealed that ceramics there are superficially similar to Oneota pottery. It must be made clear however, that these ceramics are not Oneota as such. Ogechie, a central Minnesota variant of Oneota, is sometimes found with Sandy Lake ceramics albeit not so far north. Better known "classic" Oneota materials in Minnesota are restricted to the southern portion of the state around the Blue Earth River Valley and in Northern Iowa (Michlovic 1983). Swenson and Gregg (1988) point out that the utilitarian pottery from the James River Valley of North Dakota is not unlike Devil's Lake-Sourisford mortuary vessels which, in turn, resemble Oneota ceramics at least in their decorative motifs. Swenson and Gregg (1988) also suggest that the Devil's Lake-Sourisford mortuary complex was introduced onto the Plains when Mississippian cultural developments were at their peak ca. 900-1300 AD. They point to existing similarities between these ceramics and those of the Cambria Phase in Minnesota; a phase they believe is influenced by both Great Oasis and Oneota. They suggest that similar ceramics extend in a southerly direction as far as Cahokia, the center of Mississippian culture. They go on to suggest that the "Plains Village" groups of the upper James River were of Siouan linguistic stock, possibly related to the Hidatsa, and participating in Devil's Lake-Sourisford mortuary ritual.

None of this speculation clarifies the relationships between classic Mississippian, Oneota, Middle Missouri Plains Village, and Northeastern Plains groups. Although it does seem clear that the Middle Missouri Plains Village groups originate east of the Middle Missouri sub-area, possibly within archaeologically visible cultures such as Great Oasis, Cambria, and Mill Creek whose present status vis-a-vis the Plains Village Tradition is still being debated. While Oneota may somehow be related to both Middle Missouri and Middle Mississippian maize growers, this "culture" is still regarded as "foreign" in both areas.

It seems evident that these groups are all connected between 900 and 1100 AD. But by ca. 1200 AD, several distinct archaeological cultures become well established and are cultivating maize in the Middle Missouri, Northeastern Plains, and Middle Mississippian sub-areas. It is at this time, or shortly thereafter, that Oneota presence makes itself felt over much of the area. By ca. 1300 AD, their aggressive and expansionist tendencies appear to be in full swing.

This all occurs as part of a generalized period of dramatic cultural change visible throughout much of central North America including the Woodlands, Northeastern Plains, Middle Missouri, Southwest, and Southeastern areas at this same time. Unfortunately, references to this process are frequently vague. There is a general awareness that something important and widespread is occurring at this time, although it is seldom discussed explicitly. There is even some suggestion of occupational gaps in the record in a variety of locations including portions of the Middle Missouri (Gregg 1985), the Aspen Parklands, and at The Forks of the Red and Assiniboine rivers in Manitoba (Ebell 1987). Unfortunately some of this work, notably that for the northern Red River corridor, depends on

a lack of large, stratified habitation sites, as supporting evidence for this hypothesis, a situation which could conceivably change with the survey and excavation of more sites.

11.11 CONCLUSIONS

This complicated dynamic obviously has significant ramifications for the problem at hand. It has been established that migration has a key role to play in the presence of horticulture at Lockport. The ceramic data, combined with the regional culture history point to a possible source area or homeland for the migrants along the Red River valley to the south. In this light, the Red River corridor can be seen as a direct corridor for the north-south/south-north movement of people potentially, at least, lowering transport costs for migratory groups. Substantial movements of people, cultural disruption, dislocation, and significant increases in inter-group hostility all occur within the context of the MWP whose environmental effects resulted in a significantly denuded environment in the uplands of the Dakotas, and the more arid portions of the Northeastern Plains. Clearly many groups at this time were experiencing different types and degrees of stress. However, not all groups made the decision to leave their homes. So, what are the final inducements for a migration northwards to Lockport; what, exactly, were the operative push/pull factors in this specific case?

CHAPTER 12
TYING IT ALL TOGETHER: THE LOCKPORT SITE, PUSH PULL FACTORS, MIGRATION, THE MEDIEVAL WARM PERIOD, AND THE ONEOTA

12.1 INTRODUCTION

This project opened with the question: what are the effects of widespread environmental change on human populations? I also asked how bad things have to get before a population will migrate? I have attempted to answer these questions by presenting the data from the Lockport site as a case study. Was the appearance of a seemingly anomalous horticultural component there driven by "... a complex series of cultural responses to environmental stress precipitated by the MWP?" (chapter 1: p. 3 above)

12.2 EALF-1 SUMMARY

The 1987 and 1988 excavations at Lockport (EaLf-1) resulted in a reinterpreted stratigraphy that suggested a sharp break between the Bed CDE occupations and the overlying B/C- Organic Layer horticultural occupation. The C14 dates indicate that this horticultural occupation occurred during the late 1300's or early 1400's AD following a Late Woodland occupation in Bed CDE which contains no evidence of horticulture whatsoever. The ceramics from Bed CDE are entirely consistent with indigenous, Late Woodland, hunter-gatherer occupation, although it is possible that two Late Woodland occupations (late Blackduck and transitional Rainy River Composite) are mixed in Bed D, the primary artifact bearing bed in the CDE deposit.

The overlying material from the B/C-Organic Layer contains material

consistent with a maize-growing horticultural occupation, including scapula hoes, unusual ceramics, and bell shaped storage pits, as well as kernels and corn plant parts of the domesticate *Zea Mays*. All of the features associated with the horticultural occupation excavated in 1987 and 1988 originate from this bed, which appears to be the flood redeposited remains of a midden. Ceramic analysis supports the contention that this occupation represents a sharp cultural disjunction with the earlier Late Woodland hunter-gatherer occupation. Not only is the material in CDE non-horticultural, but the ceramics are predominantly Blackduck and Rainy River. This is in sharp contrast to the material from Bed B/C-Organic, where the ceramics appear to be locally made but display significant shifts in both manufacturing techniques and decorative motifs. The processes that prompted people to bring maize horticulture with them to EaLf-1 are complex and multi-causal.

12.3 Climate, Environmental Change, and Resource Stress: Visible Archaeological Correlates during the Medieval Warm Period

There is ample evidence of cultural disruption and dislocation all over the central portion of North America between about 1250 and 1400 AD. The combined results of the ceramic analysis and regional cultural history discussed earlier shows that at least one group left the southern Red River valley and moved directly north to establish a horticultural settlement at the northern margins of viable maize horticulture. However, having established that the Lockport horticultural occupation is the product of a migration, it is now necessary to distinguish the various factors that contributed to a decision to

move.

Looking to the work by Dirks (1980), Colson (1979), Rowley-Conwy and Zvelebil (1989), and others, there is evidence for endemic, low-level food stress throughout the Northeastern Plains and beyond from about 1000 AD onwards. The initial shift to maize cultivation is a major alteration in risk-buffering strategy, taking these groups from what was a predominantly diversity-mobility system to one relying more heavily on storage and exchange.

Such shifts in basic economic patterns and risk buffering strategies are in evidence all over the Northeastern Plains. The transition from a Late Woodland hunter-gatherer subsistence-settlement system to a simple New World horticultural economy as outlined by O'Shea (1989), is well underway by 1000AD. Groups of comparatively independent maize growers flourish, and most retain a significant reliance on wild resources, a characteristic of New World horticultural economies in marginal environments (O'Shea 1989). However, by the middle of the MWP, significant environmental changes are disrupting this adaptation.

O'Shea (1989) states that simple New World horticultural systems are dependent on two critical factors: good neighborly relations and a significant land base to allow for the seasonal, supplementary exploitation of wild resources. As the MWP develops into a full-blown drought in some areas, we see these prerequisites dissolve in increasingly hostile relations between groups, combined with a decrease in the productive land base as intensifying aridity simultaneously impacts wild resources and the yields from garden plots. At this point the system must either become a complex system, one in which groups begin to rely more heavily on domesticated products and trade with successful

hunter-gatherers for wild foods, or suffer collapse (O'Shea 1989). However, the responses to this developing crisis are not pre-determined. The archaeological evidence from the larger region indicates that the transition from simple to complex horticultural system was, in fact, underway along the Middle Missouri during this interval. Groups were beginning to become more specialized there, while many other archaeological cultures seem to meet their demise, coming to an end between 1300 and 1400 AD. This certainly suggests that at least some of them were unable to successfully cope with this transition. Other groups shift position in order to get themselves out the way out of various sources of disruption and maintain their existing social and economic systems.

Elements of Dirks recursive famine responses are also visible during this interval. We see the increased importance of status goods and long distance networks of exchange. These also fit within the parameters of effective risk buffering strategies outlined by Rowley-Conwy and Zvelebil (1989). Increases in random acts of violence and raiding of known food stores indicate serious resource stress in the region. There also appears to be an increased attraction to authoritarian power structures potentially as crisis managers and food redistribution systems. One might also point to the Mississippian system as evidence of increased ritual observance, a characteristic of Dirks (1980) alarm phase famine response. Colson (1979) also points to the movement of food storage indoors as another characteristic of endemic food stress. This is visible in the interior food storage pits found in these late Precontact Period horticultural villages.

12.4 THE SOCIO-POLITICS OF BULLYING: THE ROLE OF THE ONEOTA

The ability of the Oneota to flourish during an apparent environmental crisis has been used to suggest that there was no crisis. However, in examining and attempting to explain culture process in the Virgin River Branch of the Southwest, Larson and Michaelson (1990) have also addressed some aspects of culture change and process to the north, where a similar sequence of environmental change and cultural adaptation appears to be operative.

All of the means they postulate as archaeologically visible ways to cope with unusually severe episodes of drought in large, economically specialised populations are also visible in this region. We see increased and improved food storage in the introduction of large bell-shaped storage pits as well as improvements in existing technological systems. Ceramic technology develops to better extract nutrients from a carbohydrate rich diet and scapula hoes are introduced as the gardening implement of choice. The intensification of horticultural practices is seen in the introduction of ridged fields, increased land clearance, and expansion into previously uncultivated areas. Political reorganisation is apparent in Oneota expansion and generalized population agglomeration, nucleation into larger fortified villages, and finally the growth of warfare, trade, and alliances shows that there was also an extension of the network of reciprocal relationships.

The collapse of Cahokia created a power vacuum that allowed the Oneota to expand rapidly and develop a political system designed to assimilate as many groups as possible. This can be viewed as a means of expanding social and political contacts in order to secure and consolidate their subsistence base in a period of climatic flux. Here it is possible to regard Cahokia as one of Rosen's

(1995) "higher order regulators" in which a group with a more specialized economy stresses conformity in situation where innovation would be more appropriate. They find themselves unwilling or unable to either re-tool or innovate, and collapse in a situation where other, more flexible groups might have survived. This result would have been a disruption in the flow of information (Stone 1999) which creates social and political repercussions far beyond the immediate boundaries of Cahokia and its surrounding area. As a "lower order regulator", the Oneota are more flexible, and have the benefit of a diversified economy, as such they are able to move, and to maximize the exploitation of available resources. This is supported by Oneota settlement data which show that their sites were located in very specific areas to maximize the available diversity in the resource base by using lake, river, forest, and prairie resources.

Oneota expansion probably occurred as a result of a combination of many factors. General population growth, the intensification of maize horticulture throughout the woodlands and on the Northeastern Plains, combined with coincident decline of Cahokia, which left room for the Oneota to expand. As a result, Oneota influence moves across the western fringes of the woodlands and spills out onto eastern fringes of the plains during the 1300's and 1400's AD. As the Oneota sphere of influence expands, we see the localized transformation of many indigenous Late Woodland groups into Oneota-like cultural formations. This is suggested by the many regional phases of Oneota visible in Minnesota (Anfinson 1997). Moreover, many Late Woodland Period sites in the Blue Earth area in Minnesota possess Oneota components near the surface suggesting a relatively late expansion into the area, and one which likely both transformed

and displaced Late Woodland hunter-gatherers (Anfinson 1982). It is unclear whether all of these groups were ethnically Oneota. Most likely, they were a hybrid of indigenous Late Woodland hunter-gatherers and Oneota or Oneota-influenced horticulturalists. These groups probably also enjoyed extensive contacts with Plains Village groups from the Middle Missouri sub-area and with Late Woodland hunter-gatherers to the east as well. This period of expansion is followed by general Oneota retraction that may be part and parcel of a more widespread cultural retraction on the continent during the Little Ice Age.

All of these factors together indicate social and political accommodation of an unusually severe climatic episode that is visible on the Northeastern Plains, in the adjacent woodlands, and all over the central continent as well. In fact, it is reasonable to postulate that cultural developments here as well as those which others (Jones et al. 1999; Larson and Michaelson 1990) attempt to address elsewhere, are part of the same period of climatic and cultural disruption of which the Lockport horticultural occupation is a part.

The spread of maize occurred during an extended period of climatic moderation, the warmer, humid early MWP that sees populations grow and spread, adopting maize as an indispensable dietary staple. Meanwhile, this mild period is followed by an equally extended hot, dry period far less conducive to dry land subsistence farming that disrupted existing subsistence strategies. Possibly due to this extended favourable climatic episode, people were unprepared for such alterations in their environment and found it necessary to shift to larger, semi-permanent settlements in river valleys with major permanent water courses such as the Missouri, Mississippi, and Red rivers. Populations aggregate along these major permanent rivers, leading to

overcrowding; the result was increasing population pressure within these valleys. Localized increases in population pressure led to an increase in inter and intra-group hostilities, and the development of aggressive, expansionist groups such as the Oneota who cope by promoting their own survival possibly at others' expense. The flip side of this is the extension of co-operative, friendly relations, such as trade and inter-group alliances, as a means of mitigating increased resource stress.

12.5 Macroregional Push-Pull Factors and Migration: Cultural Responses to Environmental Change and Resource Stress

A striking set of push/pull factors is clearly evident in the regional archaeological data. The broader contextualization of the data within a detailed culture history reveals that the source area and its adjacent regions to the east and west may have been experiencing some difficulty. Benn (1989) has argued that the Oneota exercised a considerable degree of political hegemony over an expanded territory, likely through coercion. Evidence within this sphere for increased inter-group conflict certainly supports his contention. If we pause to examine the Oneota-like decorations on the ceramics from Lockport, it is possible to suggest that groups along the southern portion of the Red River may have been party to some of the less admirable qualities of the Oneota. (The wide trailed chevrons and 'tail of a thunderbird' motifs on Lockport pottery in figures 44 & 45 can be compared to common Oneota ceramic decorative motifs in figures 46 to 49). The desire to escape political coercion in whatever form it took, and seek safe havens elsewhere would have provided the primary push-pull for

the migrant horticulturalists. Assuming the uplands of the Dakotas experienced significantly reduced subsistence potential, as Gregg (1990) suggests they did, resource stress provided additional economic incentive to leave. Populations were forced to settle into the larger river valleys as environmental conditions worsened. This seems to have engendered a certain amount of inter-group tension there, as the evidence for the growth of larger, fortified settlements attests. The location of villages at strategic, defensible locations provides additional support for this idea.

Pull factors include the potential for increased group security. This is shown by the absence of fortifications at EaLf-1, while an absence of obstacles along the way is suggested by the low density of sites along the Red River dating to this period. Lower relative population densities to the north as compared to the south or east may have made it comparatively easy to traverse this region. The presence of a good site with access to a comforting diversity of resources including riverine, lacustrine, wetland, forest, and grassland resources, as well as arable land on sandy soil immediately adjacent to a major water course would have presented the migrants with an attractive destination. It must be assumed that the group had some pre-existing knowledge of the area. In Anthony's (1997) conception of a developing migration we have an excellent set of push-pull factors, a direct transportation route, a lack of intervening obstacles, and an prime area in which to settle that provided clear adaptive advantages over the home territory. It is also unlikely that the move would have precipitated another set of cascading crises since the group was able to continue to use existing technological systems with some success. Site data from the Red River corridor also seems to possess many of the characteristics of a chain migration. The

similar settlement across the river at Lockport West (McKinley 2001) suggests a migration by a closely related group, as well as what might be regarded as a linear site distribution along a narrow pathway with significant gaps in between. This is indicative of "leap-frogging", in which an initial migration becomes the proximate cause of subsequent, kin-based migrations to the same area as information about the new settlement flows back to the home territory (Anthony 1990, 1997).

This cultural dynamic was part of a system of adaptation to adverse climatic conditions, conditions which indirectly facilitated the spread of maize to otherwise marginal areas by rendering northerly areas more amenable to horticulture. The settlement at Lockport was not accidental. It was a conscious and well-considered choice by a knowledgeable group. Most of the soils along the Red River are heavy clays (Moodie and Kaye 1969), the infamous Red River 'gumbo. However, at this time a severe episode of flooding on the Red River left extensive sandy deposits up to one meter deep along the shore immediately prior to the initiation of the episode of corn growing. This created conditions conducive to the establishment of maize gardens by horticultural groups using only scapula hoes to break ground. It is important to note that the earliest maize harvests were on sandy soil (Moodie and Kaye 1969). Garden site selection was a careful, non-random process. It is no accident then, that a horticultural site can be found at EaLf-1, on a strip of sandy soil, in an area which probably enjoyed a frost free period slightly longer than the regional average, as well as higher mean annual temperatures. Any hypothesized lack of precipitation during the MWP would not have inhibited horticulture owing to the close proximity of an abundant and permanent water supply. It is likely that these immigrant groups

already knew of the area. Having resided further south within the Red River valley system they would have been aware of its northern end through trade, kinship, and hunting-gathering-fishing expeditions. However, it may not have been until the MWP that corn growing at this northerly latitude became a viable option.

Oneota influence at Lockport is a result of expansionism; the migration of transformed indigenous Late Woodland groups, intermarriage, the desire to imitate successful and dominant political groups, and coercive political formations. The rapid shift in both subsistence and technology at Lockport, together with the fact that this occupation is both preceded and succeeded by Late Woodland occupations argues for population movement combined with some form of interaction. While there is no evidence for fortifications, it is unknown whether these interactions were friendly or hostile. Perhaps they were both. Such interaction may have included intermarriage as originally suggested by Buchner (1986), since this is part of the traditional means of cementing alliances and extending kinship ties. However, it must be included with the many other modes of interaction that occurred between populations in the region.

The dates at which horticulture occurs at Lockport allow some inferences to be made. Dates in uncorrected radiocarbon years range from 1245 to 1430 AD. Range within one standard deviation is 1170-1530 AD, but the central trend supports a range for the occupation of approximately 100 to 150 years between the late 1300's to mid 1400's AD. This range fits with the introduction of horticulture in other marginal areas on the Northeast Plains but means that EaLf-1 was not occupied during the height of the MWP. The climate, however, had to have been amenable to the growing of early varieties of maize.

12.6 WHY NOT STICK WITH ONE OR THE OTHER?: MIXED ECONOMIES AND ECONOMIC SHIFTS AMONG NORTHEASTERN PLAINS HORTICULTURALISTS

Having placed these Northeastern Plains horticultural groups in their broader regional and historical context, the shift back and forth from horticulture to hunting and gathering on the northern Northeastern Plains can be addressed. Schnirelman (1992) documents circumstances under which subsistence regimes may switch from predominantly hunter-gatherer to farmer and back again. First, in areas marginal to the sustained practice of agriculture, groups will be aware of farming long before they bring it into practice, or they will practice it themselves at a very low level, as a resource buffer not critical to basic subsistence. Visible shifts to a greater reliance on farming will generally come at a time when ecological crisis renders the hunting and gathering economy inefficient, yet simultaneously makes the practice of farming more profitable (Schnirelman 1992). Farmers may return to hunting and gathering when resettlement has been necessary or when the environment suddenly becomes less hospitable to agriculture. Repeated farming to hunter-gatherer shifts are more likely where agriculture is a marginal practice to begin with. He cites the example of Kalahari !Kung San, who farm more when precipitation is better and shift to hunting and gathering when the environment is less reliable

A subsistence crisis may precipitate the shift from hunting and gathering to farming but there are two necessary pre-conditions:

1) Hunter-gatherers require a pre-existing familiarity with a food-producing economy
2) The crisis must develop slowly enough to allow them to adapt

culturally, economically, socially and psychologically to a new subsistence system

"These conditions being absent, a society could decline and disintegrate, or aggressiveness could sharply increase and armed conflicts become more frequent." (Schnirelman 1992: 37)

The heretofore-perplexing tendency of the northern village horticulturalists to shift back and forth from hunting and gathering to maize growing becomes less puzzling. Maize gardening was a well-established practice, but not altogether viable at the northern fringes of the Northeastern Plains. Presumably when conditions were good -- when friendly neighborly relations and adequate access to wild resources prevailed, and when the populations of key wild resources such as bison were healthy -- these northerly groups could continue to rely on hunting and gathering. Some maize may have been grown at an extremely low, perhaps archaeologically invisible, level as a minor resource buffer. Under deteriorating conditions in the wild resources, or if mobility had to be curtailed, then it might have been necessary to supplement the diet more heavily with maize. However, at this northerly latitude, yields would have been unreliable, forcing continued reliance on wild resources. These groups would have settled into a modified version of a horticultural economy, perhaps until local conditions improved. Under conditions where this strategy begins to fail due to hostile relations with neighboring groups the choice is either to continue down the path to an increasingly specialized economy, make the necessary economic, social, and political adjustments or pack your bags and leave, hoping that there is a place where your existing system can continue to exist undisturbed. Clearly there is evidence for both choices on the Northeastern

Plains and its adjacent regions between 1000 and 1400 AD.

12.7 FULL CIRCLE: BACK TO LOCKPORT AGAIN

To return to the questions asked in the introduction. The MWP clearly has serious effects on the environment in various places throughout the central portion of the continent starting around 1250 AD or so. The effects of this interval are spatially and temporally variable but widespread environmental deterioration can be seen in more arid areas. This sets in motion a far-reaching series of responses that are as spatially and temporally varied as the effects of the MWP itself. This does not mean it didn't happen, or that its impacts were not severe and widely felt. It does mean however, that the human element plays a critical role in whether the end result is survival or collapse and abandonment.

Lockport is at the northern fringes of these developments -- a marginal player in some respects -- a single ripple in very large pond. But its position at the northern fringes of viable maize gardening helps us answer the question: what do people do when faced with difficult circumstances in their social and physical environments? These circumstances had a profound effect on the stability and well being of resident groups. Some chose to do nothing. It is likely these are some of the groups that disappear at this time. Others opted to make structural alterations in their subsistence-settlement and social systems. Some of whom likely survived in various forms up until contact with Europeans. Some attempted to keep their way of life unharmed and unchanged -- perhaps being forced to move in order to do so. One such group came to Lockport, assisted by a fortunate concatenation of events. The MWP warming trend created a climate

amenable to northern maize growing. This, combined with a flood of unusual proportions that left soft, sandy deposits in its wake, and a complex series of push-pull factors that prompted the decision to move northwards all acted in concert to bring maize to its northernmost extension in the Precontact period.

The Oneota were trying to make the best of a bad situation. The presence of an aggressive, expansionist culture, as suggested by Benn (1989) makes the presence of Oneota-related symbols and motifs on far flung ceramics (like those from Lockport and Duck Bay) easier to explain. This is not to suggest that there were Oneota groups traipsing up and down the rivers and streams of the Northeastern Plains and Boreal forest in what are now Manitoba and Ontario. However, for a brief period in the fourteenth and fifteenth centuries AD, Oneota influence extended well out of its core area in northwestern Iowa and southeastern Minnesota, into the Boreal forest, onto the plains, possibly as far as central Manitoba. The visible influences along the Red River can be regarded as Oneota- influenced groups responding to external threat during which they also had dealings with many different groups from the Middle Missouri Plains Villagers to the hunter-gatherers of the Rainy River.

The short duration of these horticultural occupations, often both under- and overlain by indigenous Late Woodland occupations, combined with the fact that differences in the ceramics are so marked, points to movements of people. Together with the many other aspects of population dynamics mentioned above, population movements help create the unusual horticultural components up and down the Red River corridor, and in adjacent regions such as the Sheyenne and James River Valleys. Intermarriage and the creation of poly-ethnic residence groups may have played a role in the creation of these assemblages, but were

neither prime mover nor a determining factor. These were merely one part of the complexity and richness of cultural interaction, population dynamics, and socio-political relations between Mississippian, Oneota, Plains Village, and Late Woodland hunter-gatherer populations.

The arrival of horticulture at Lockport post-dates the most difficult portion of the MWP, therefore the Medieval Warm Period was not a determinant, but a catalyst in an already volatile mix of circumstances set in motion just prior to end of the Late Woodland. Environmental change, driven by the MWP, had an important role to play, but the variety of cultural responses visible on the Northeastern Plains underscores the fact that environmental crisis engenders no single predetermined consequence. Crisis does not always equal collapse. What this study should point out, however, is that given an environmental catastrophe accompanied by serious food stress there are certain avenues that are more likely than others.

The arrival of horticulture at Lockport was a part of a larger continental pattern of disruption and dislocation. The latter portion of the Medieval Warm Period was a difficult time in many areas of the continent, including the Northeastern Plains. What the Europeans probably encountered in their initial visits with Native groups of interior North America were people recovering from two hundred years of drought, food stress, disease, warfare, and a sweeping series of social, political, and cultural adjustments as varied as the groups themselves.

Appendix I

Maps and Illustrations

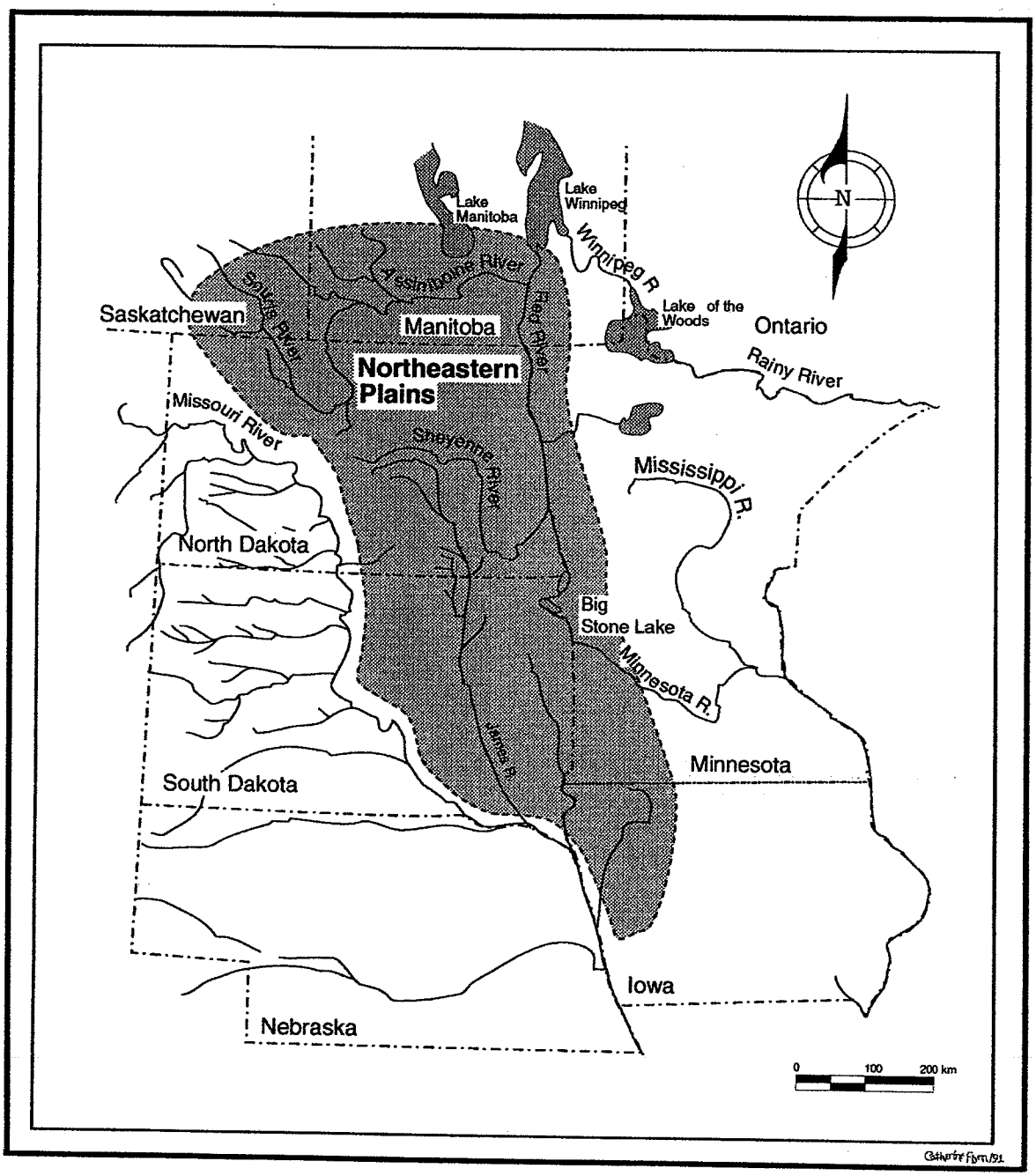


Figure 1: Areal extent of Northeastern Plains and major rivers

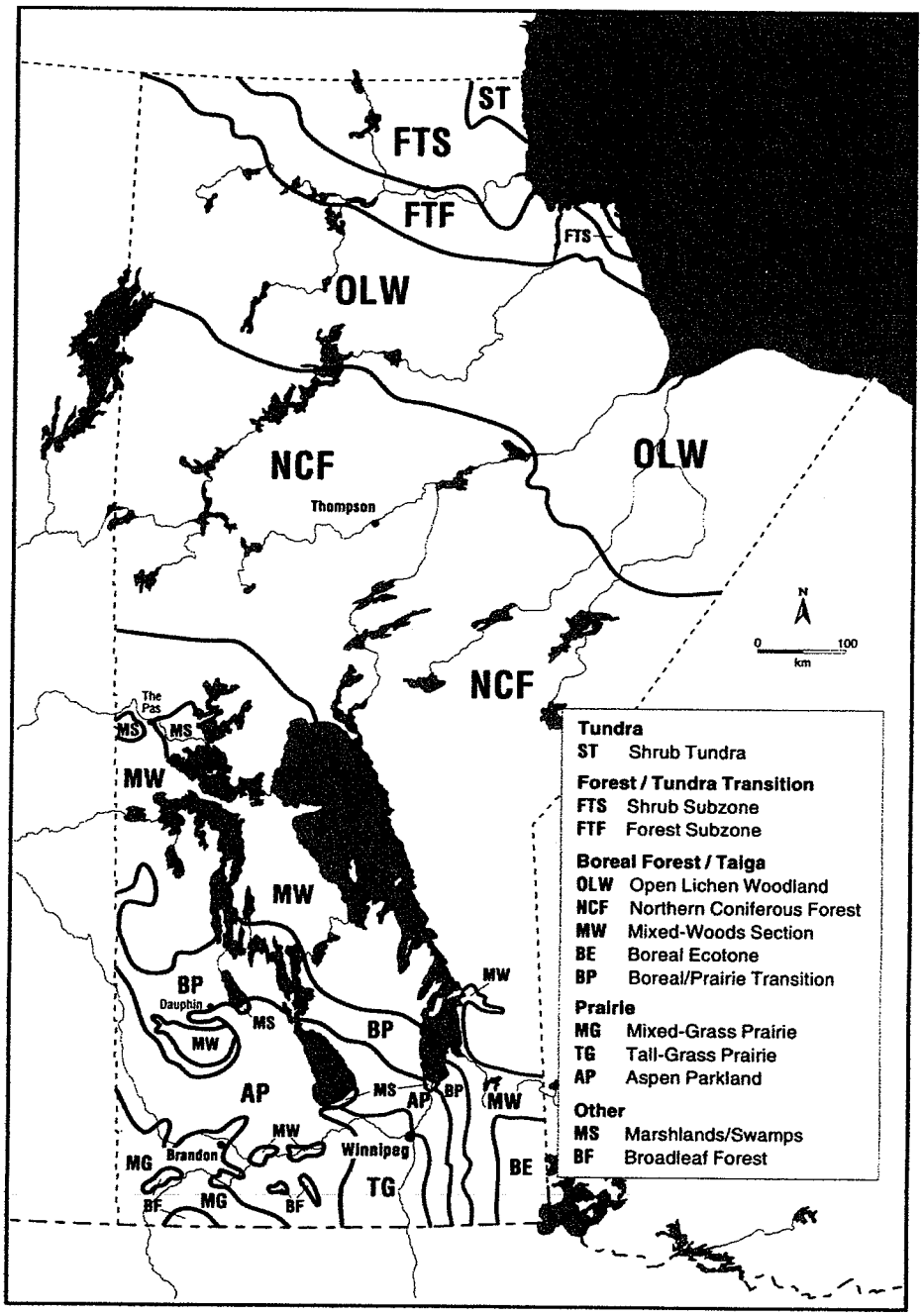


Figure 2: Potential natural vegetation zones of Manitoba (from Scott 1997:45)

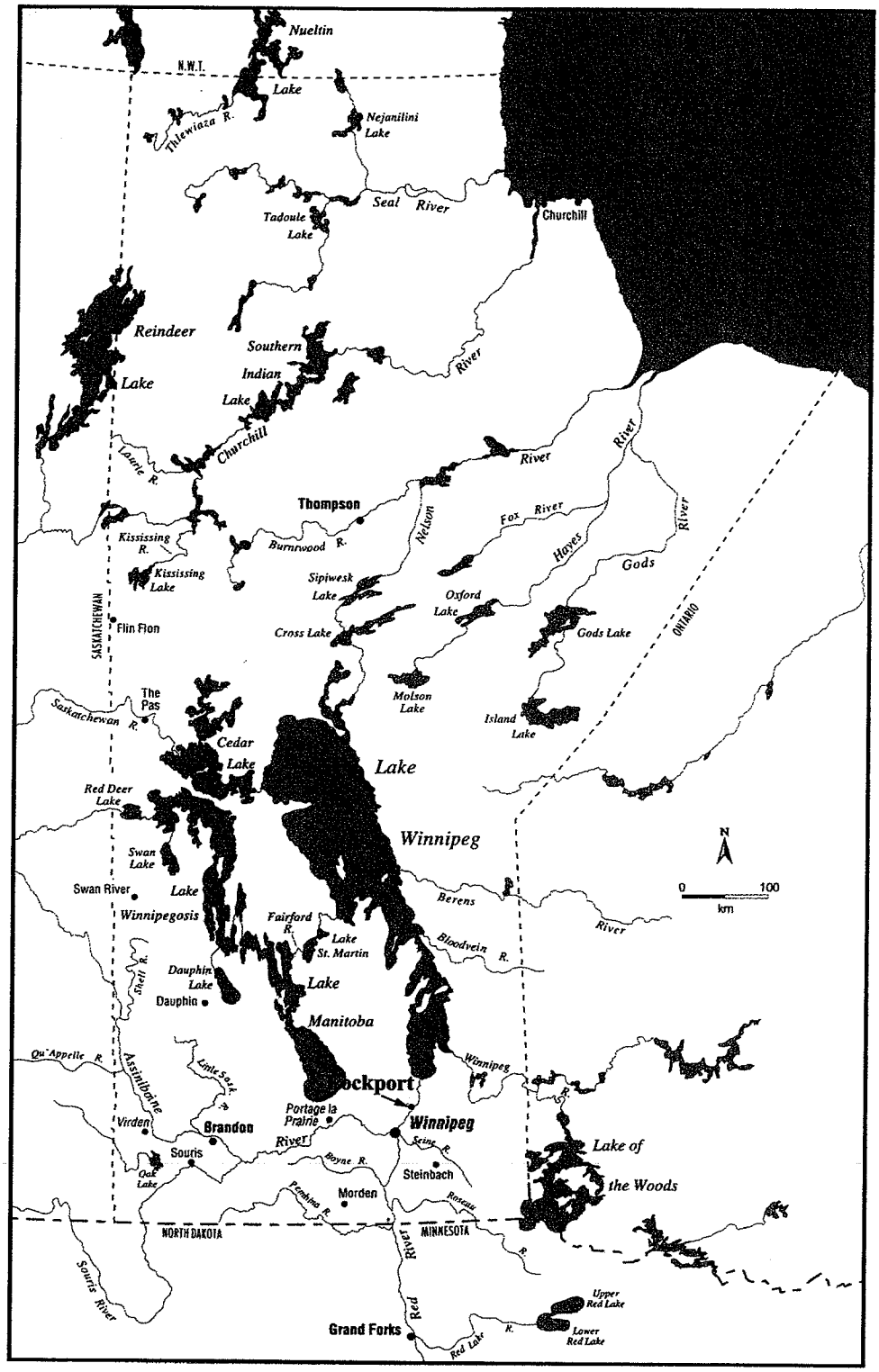


Figure 3: Location of Lockport, Manitoba (modified from Welsted et al.:frontispiece)

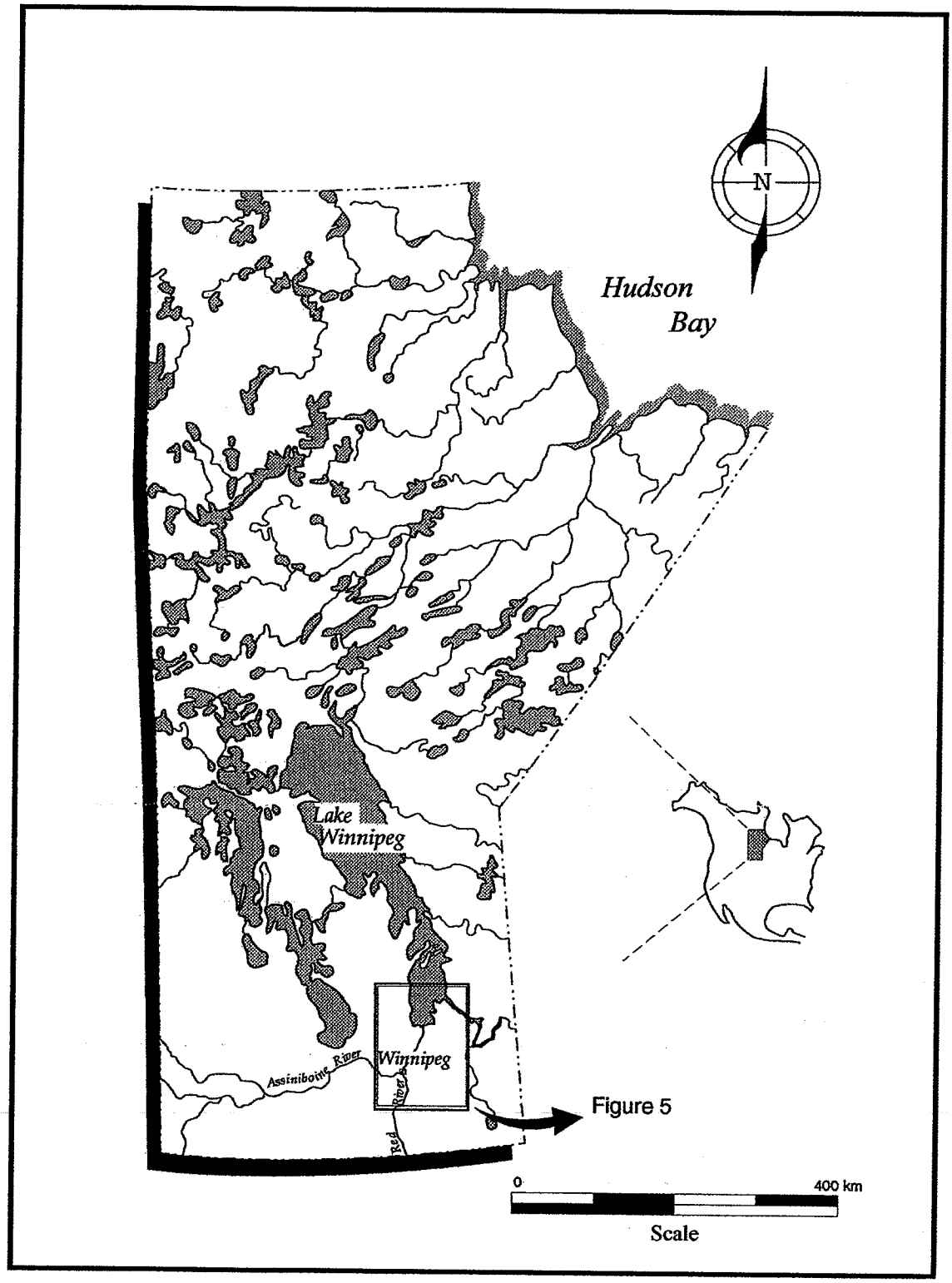


Figure 4: Province of Manitoba showing location of detail (Figure 5)

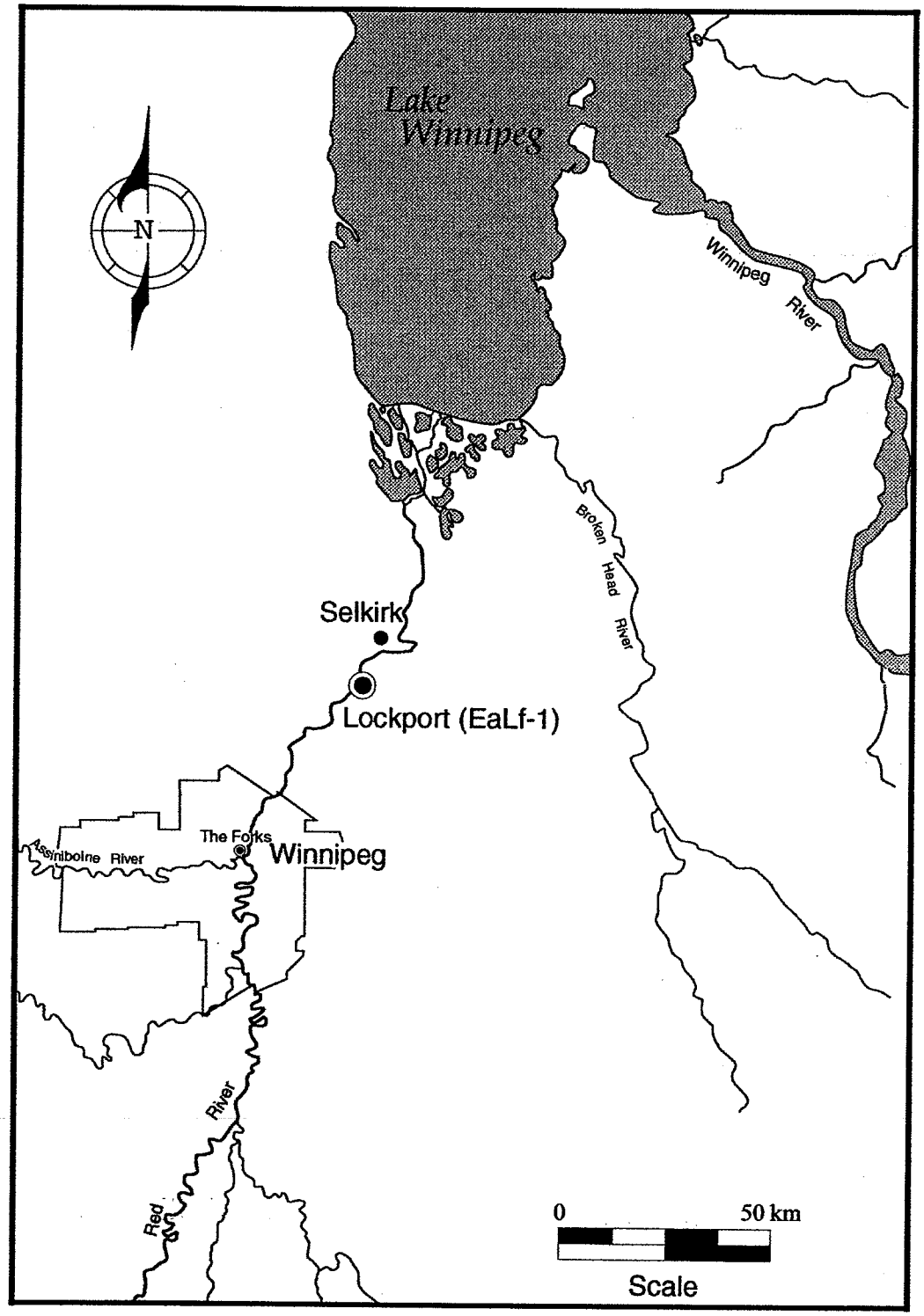


Figure 5: Location of EaLf-1, Lockport, Manitoba

EaLf-1 Lockport, Manitoba

Changes in Riverbank due to erosion 1984 to 1988

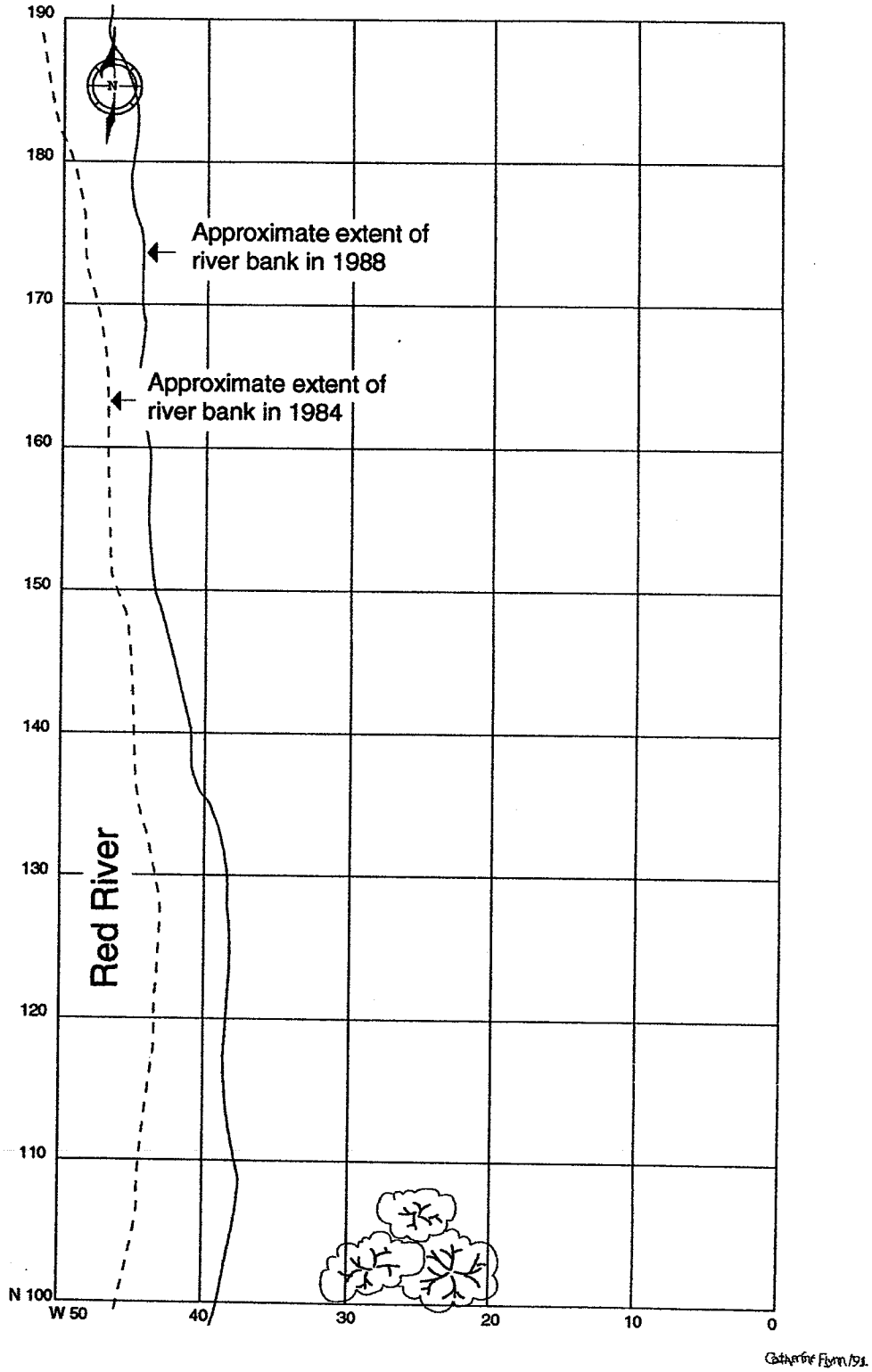


Figure 6: Map showing extent of bank erosion between 1984-1988

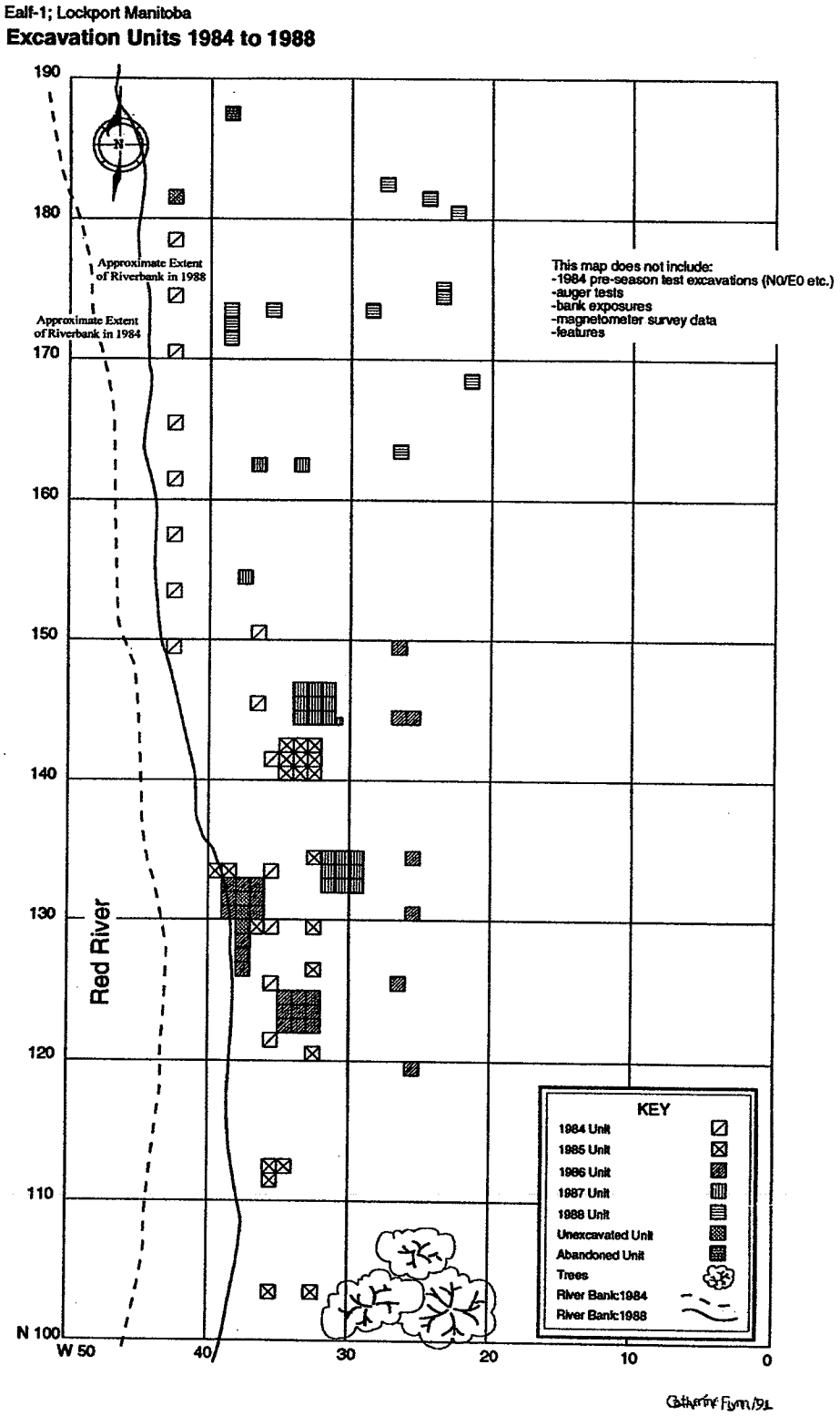


Figure 7: Excavation units at EaLf-1 (1984-1988)

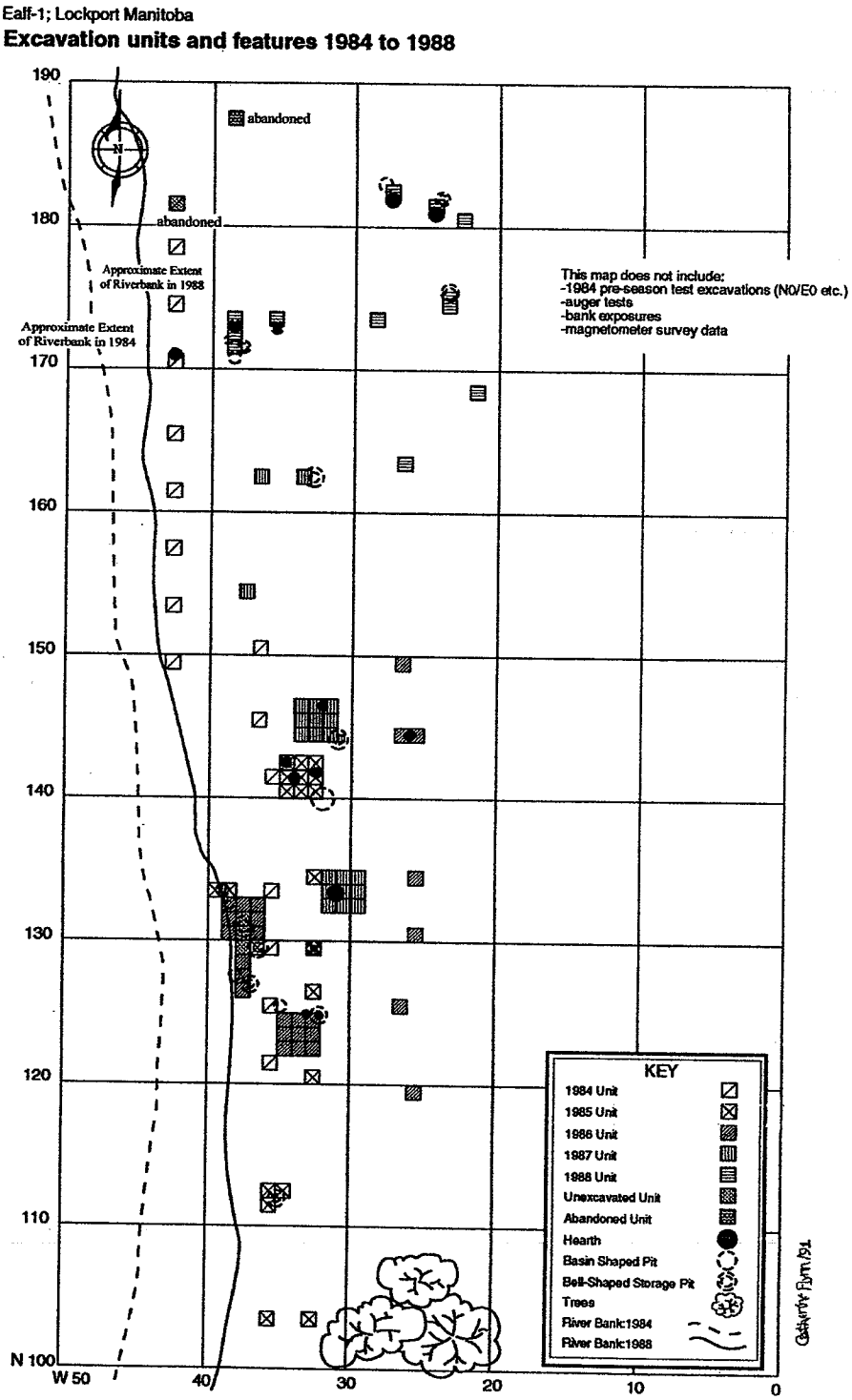


Figure 8: Site map showing all excavation units and features from 1984 to 1988

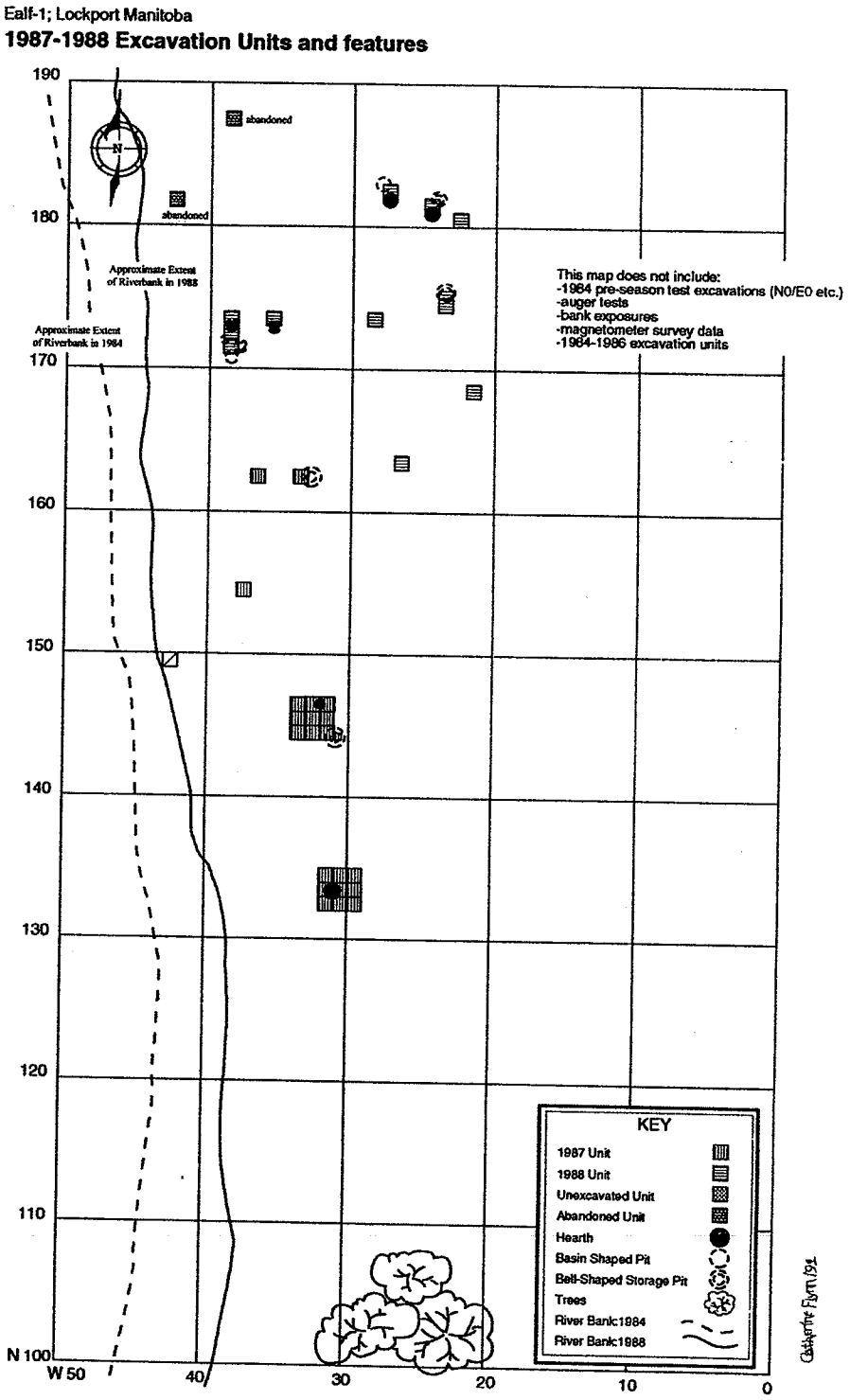


Figure 9: Site map showing all excavation units and features 1987-1988

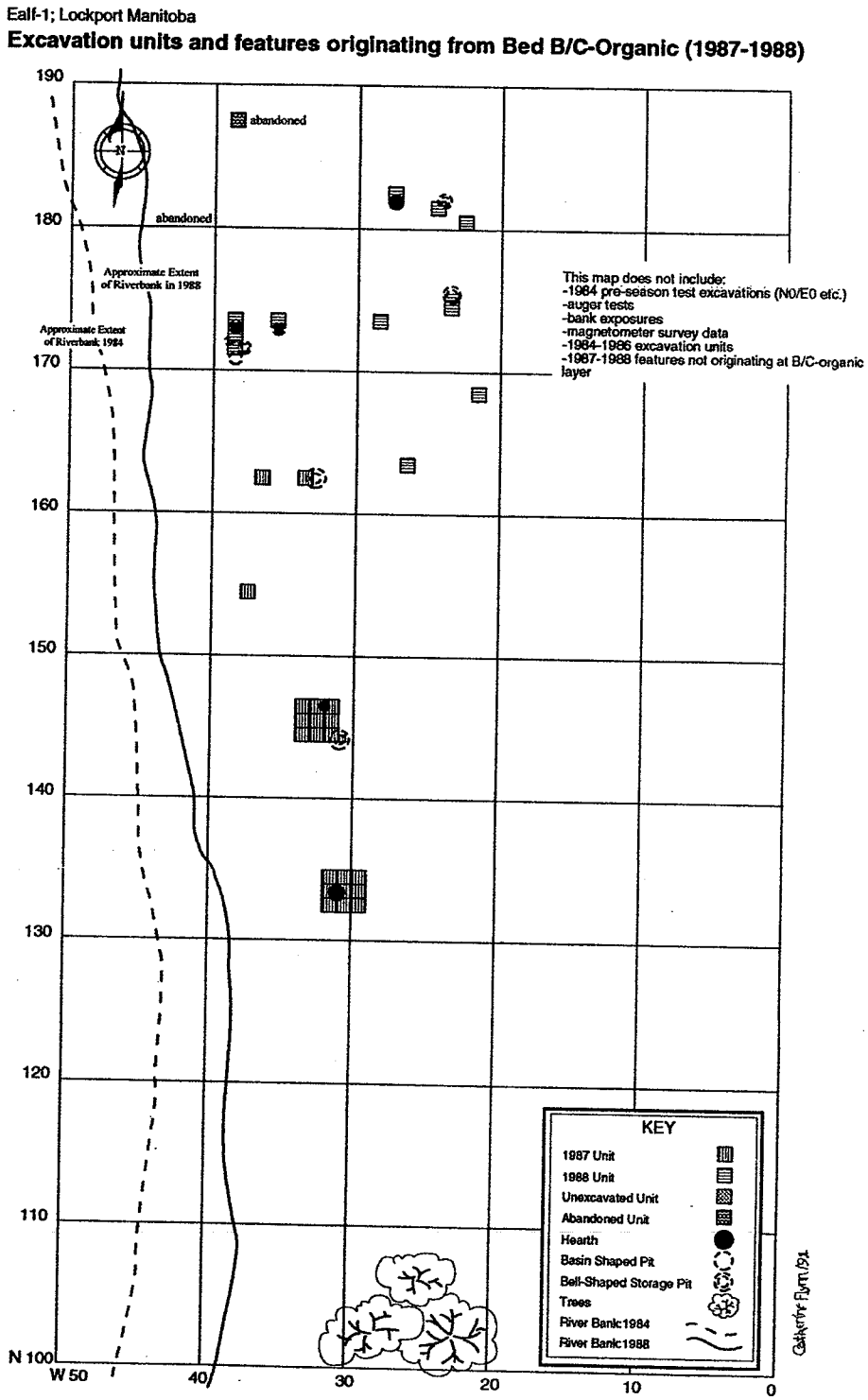


Figure 10: 1987 and 1988 features originating at Bed B/C - Organic Layer

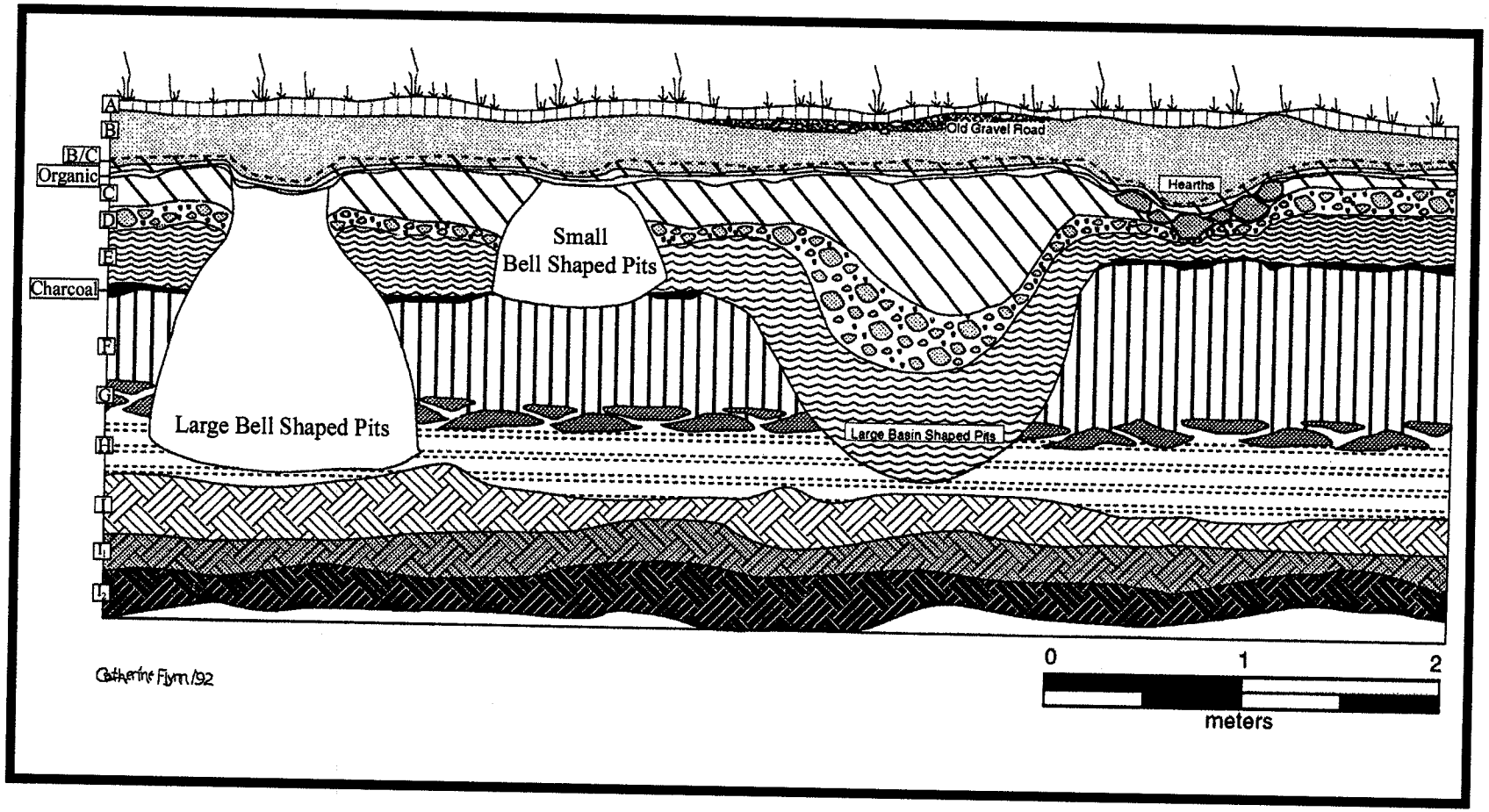


Figure 11: Idealized Lockport (EaLf-1) stratigraphic profile (according to 1987 - 1988 re-interpretation)

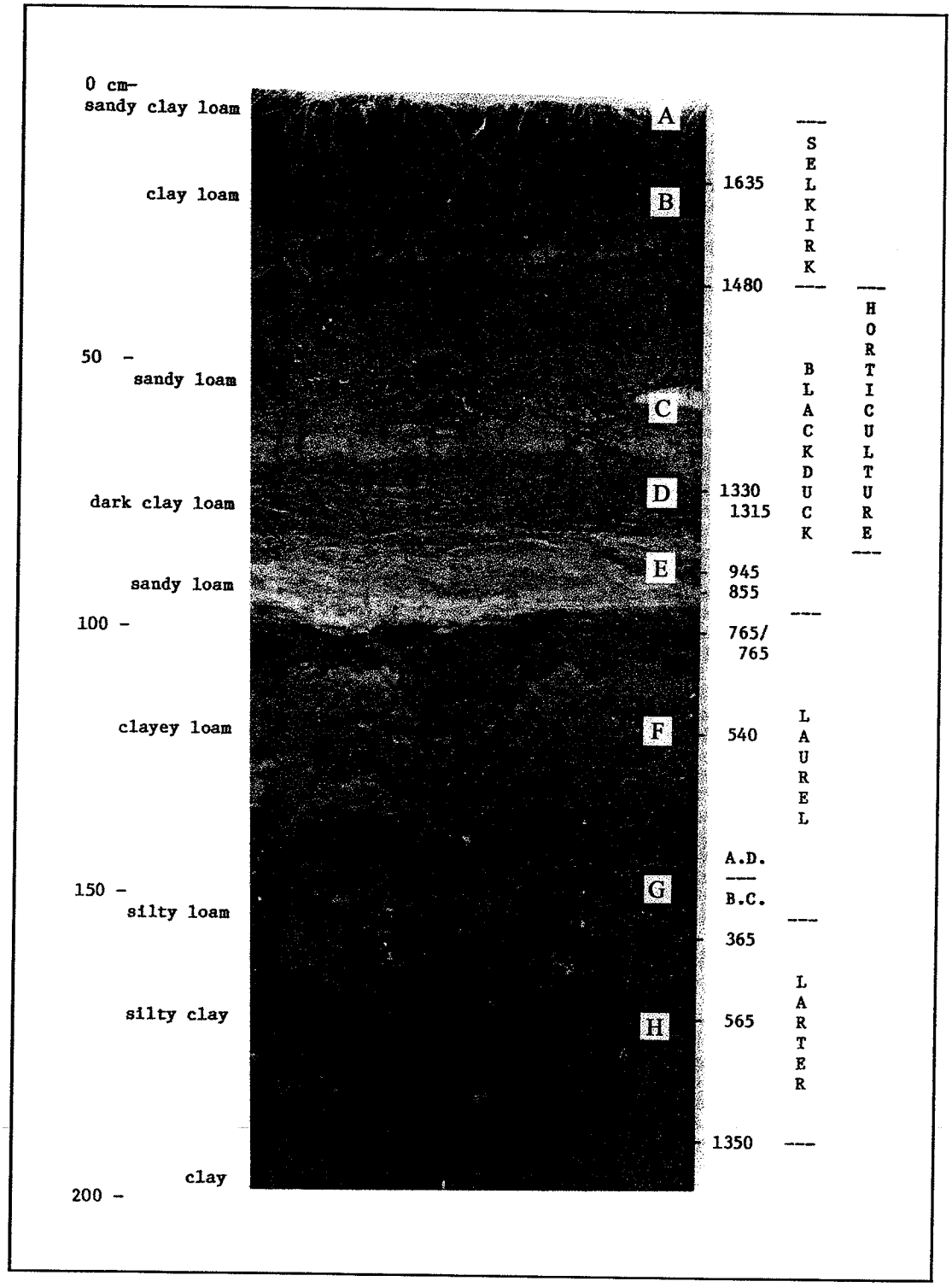


Figure 12: Stratigraphic section (labelled according to Buchner's stratigraphic interpretation) (modified from Buchner 1988).

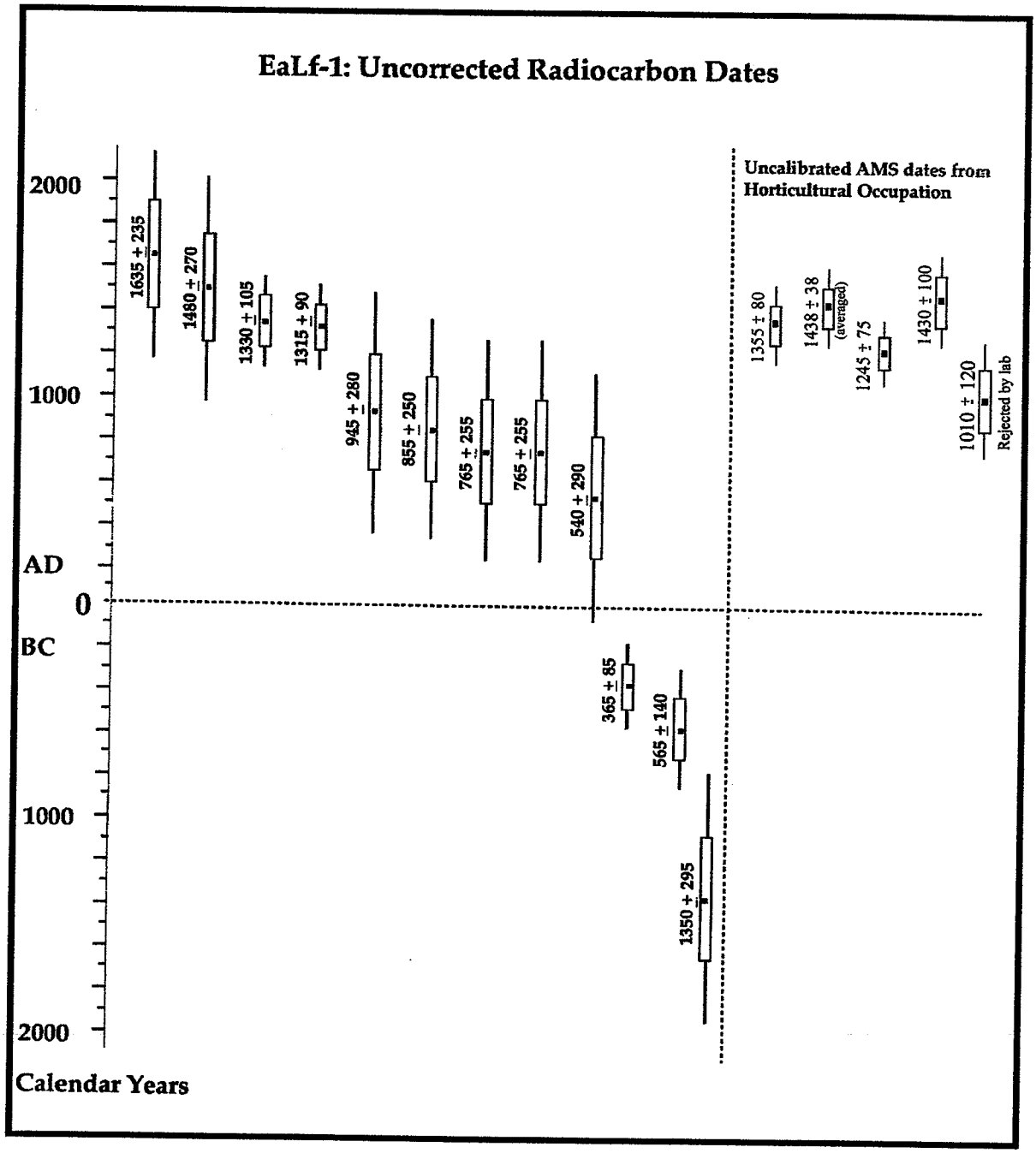
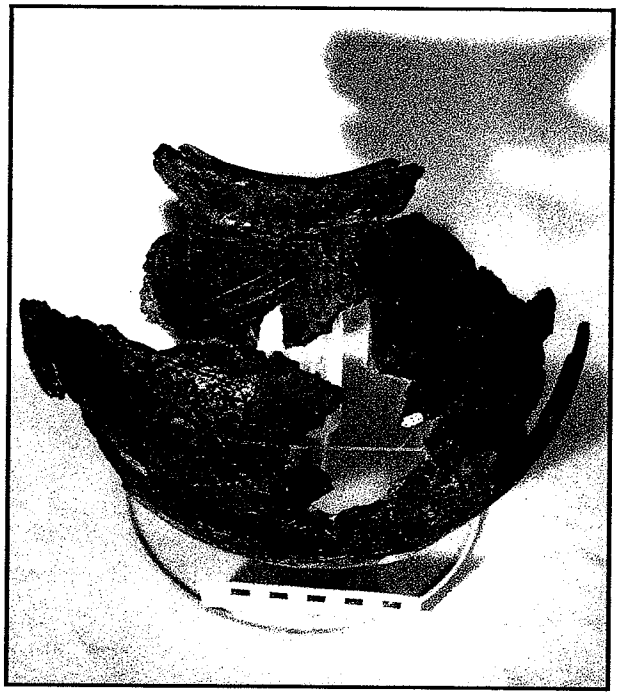


Figure 13: Lockport Site C14 and AMS Dates



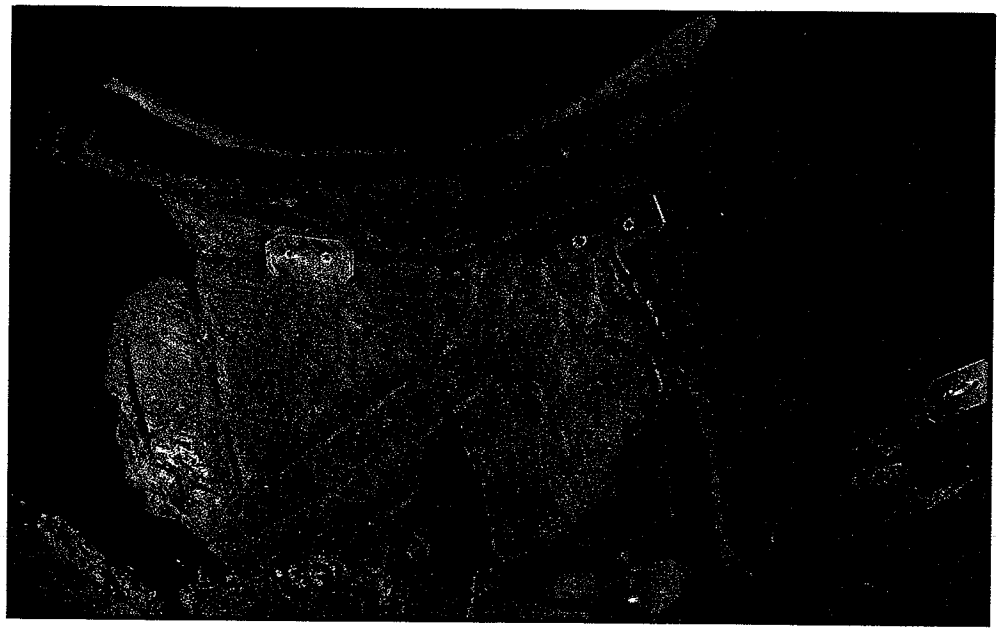


Figure 14: Portion of reconstructed pot showing incised chevron decoration (photographs courtesy of Dr. E.L. Syms, Manitoba Museum)

Figure 15: Portion of a reconstructed pot showing "Tail of a Thunderbird" decoration (photography courtesy of Dr. E.L. Syms, Manitoba Museum)

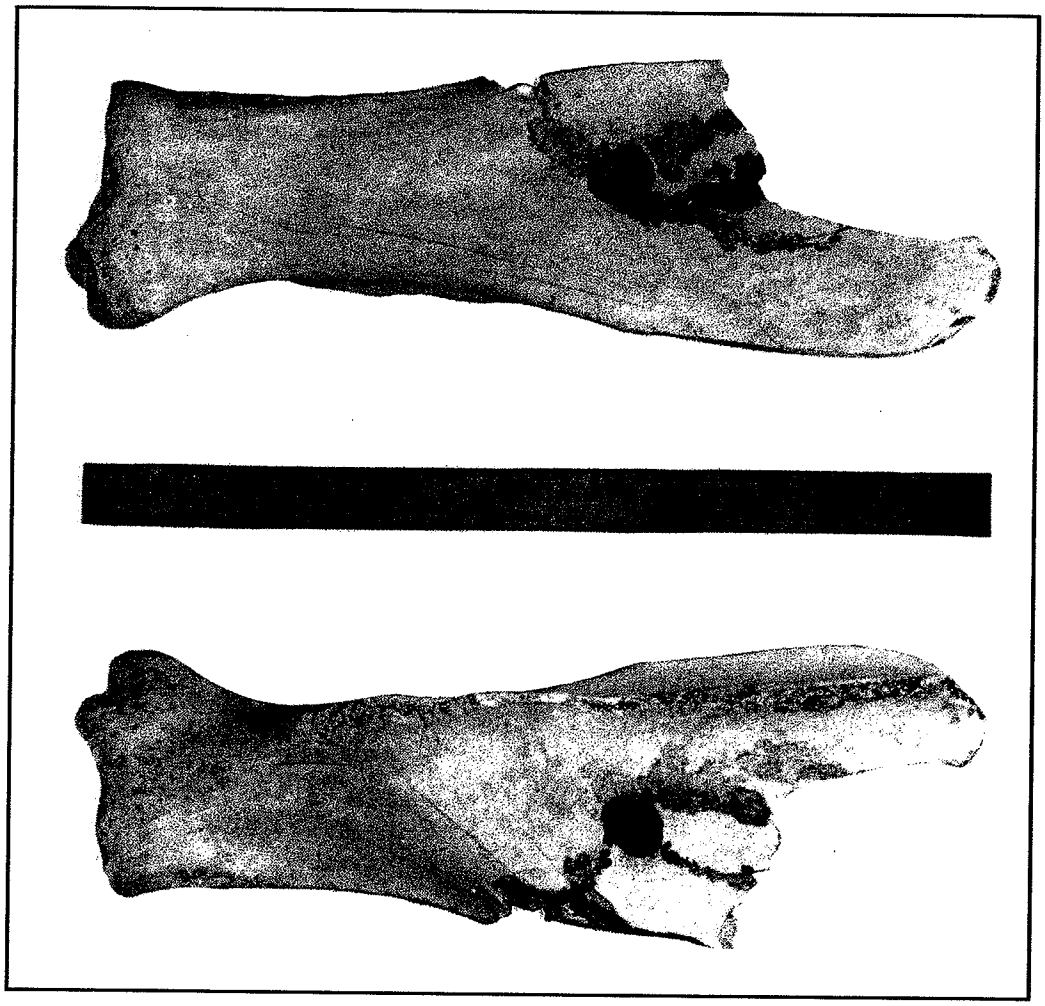


Figure 16: One of the bison scapula hoes from EaLf-1 (Specimen 37832, N162 W43, Level 13, from Roberts 1991:5)

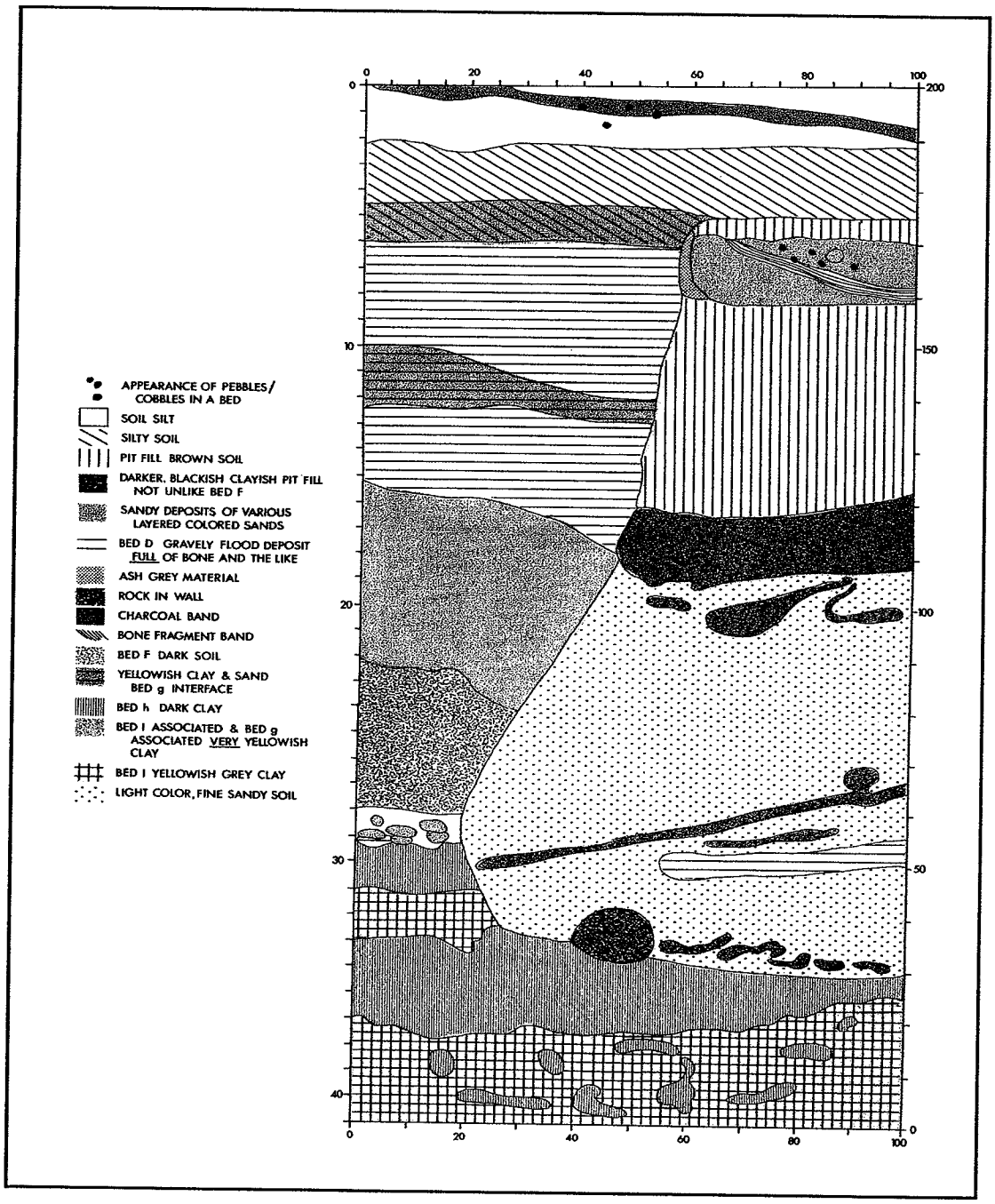


Figure 17: Large bell shaped pit (Feature 7, South Wall) (based on a drawing by C. Trottier)

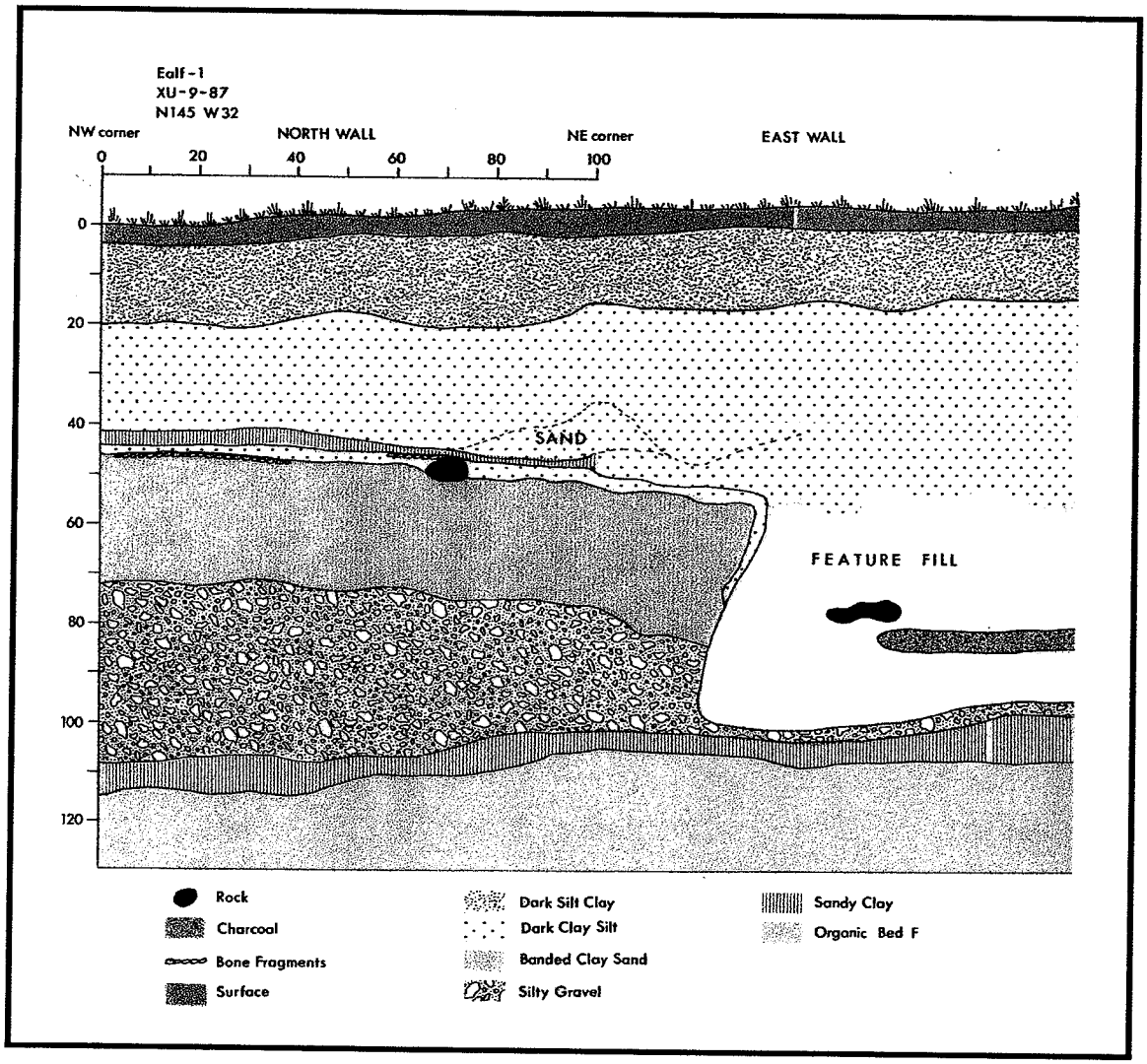


Figure 18: Profile of a small bell shaped pit (based on a drawing by C. Trotier)

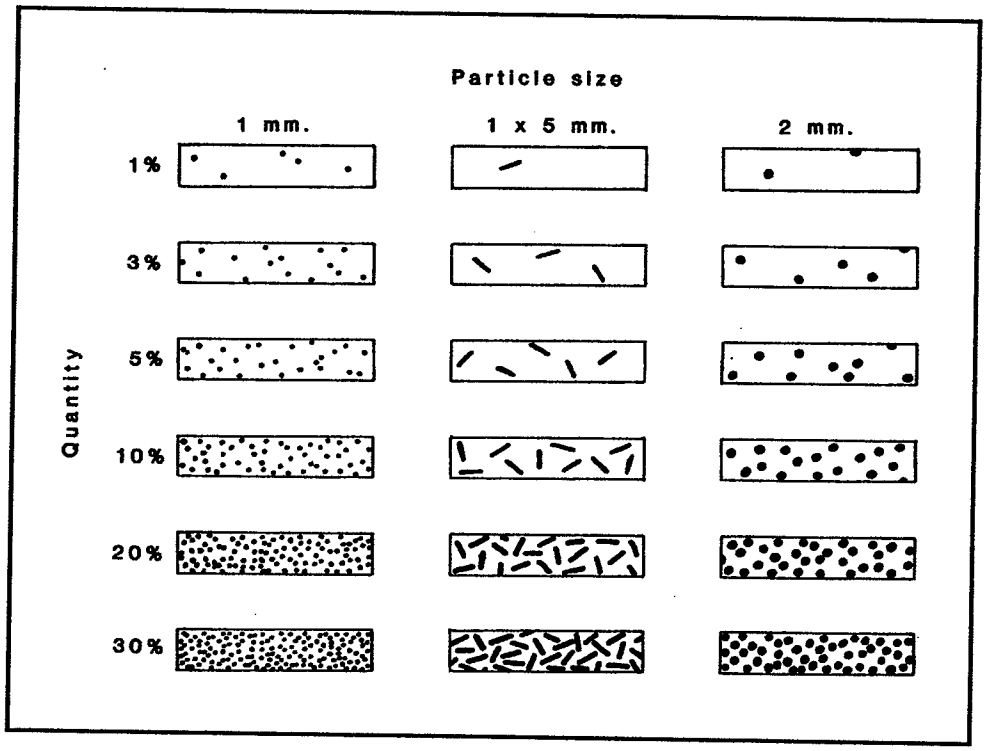


Figure 19: Temper density and particle size (from Rice 1987:349)

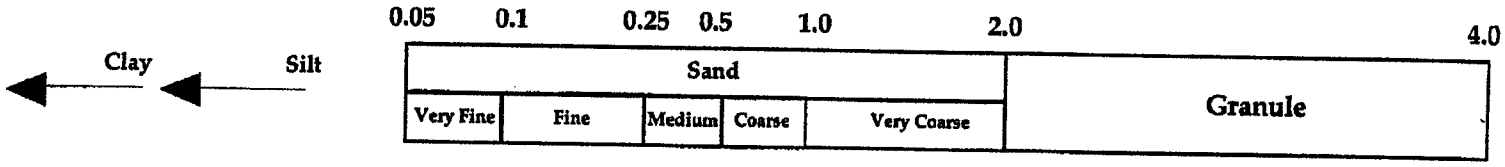


Figure 20: Modified version of the Wenworth Scale of Particle Sizes (based on Rice 1987:38)

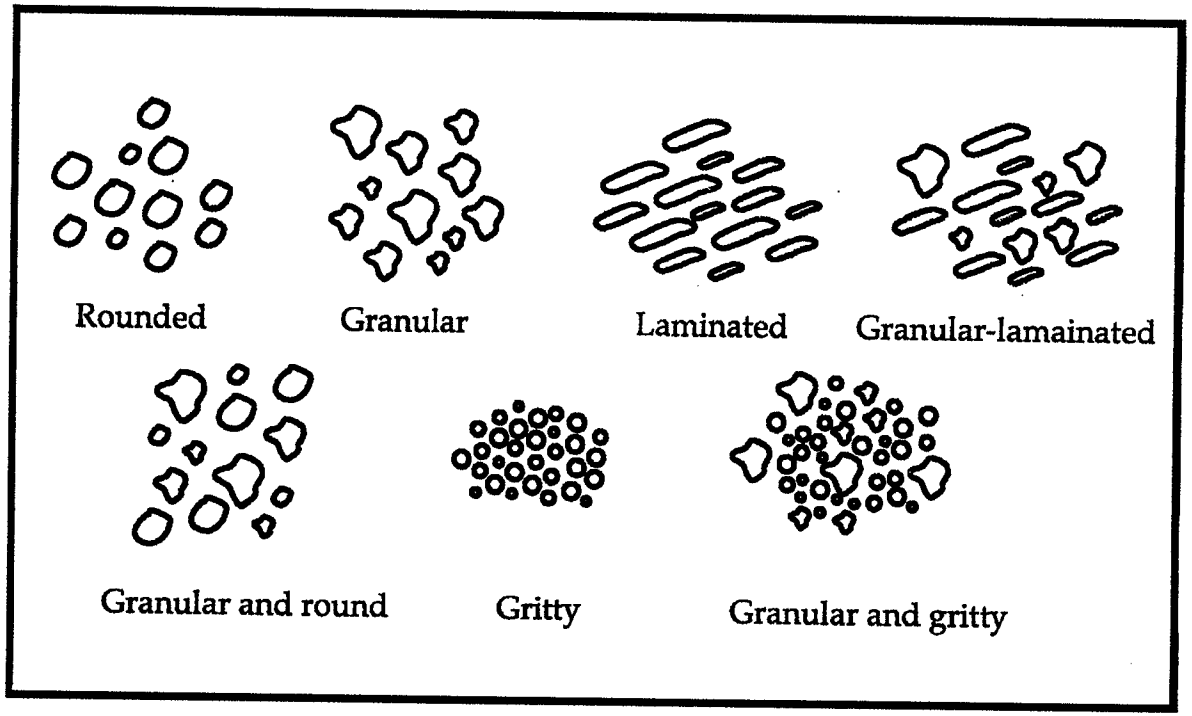


Figure 21: Temper shape

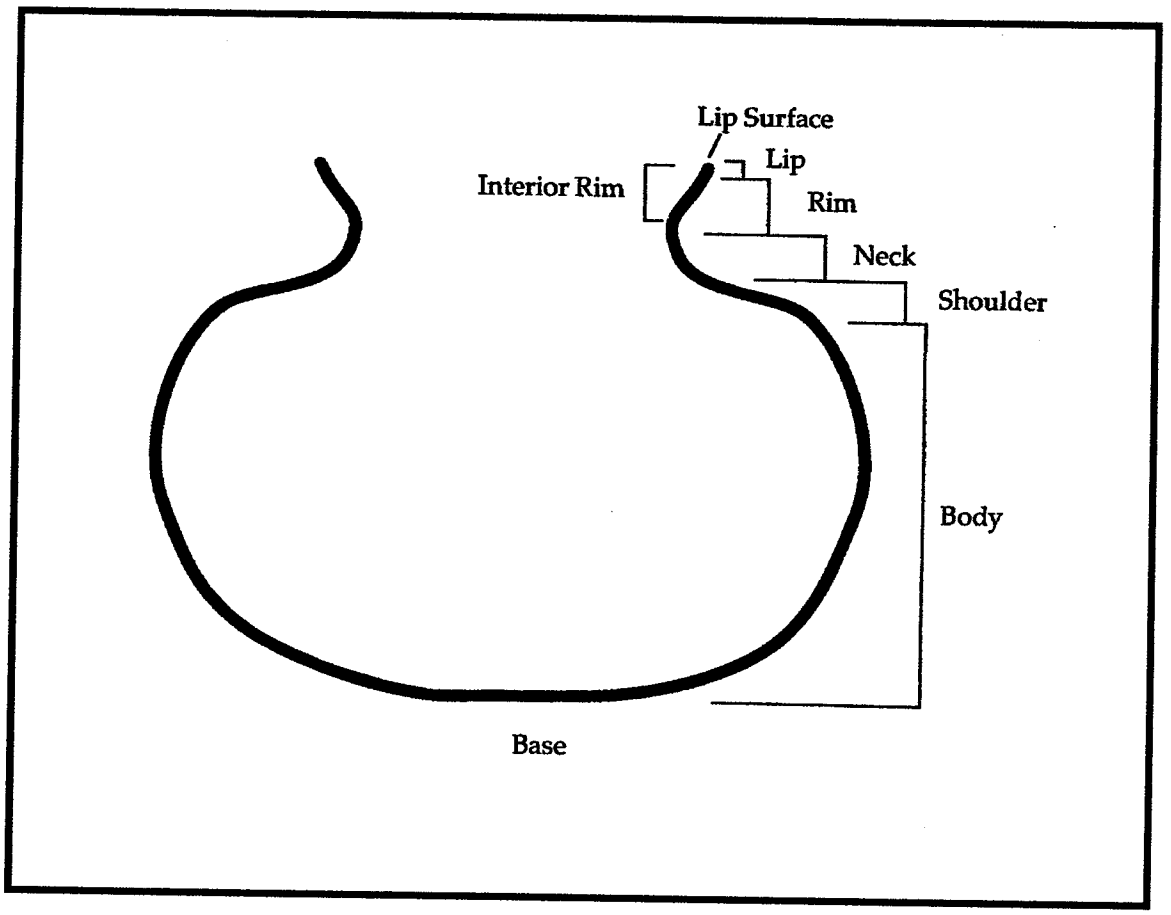


Figure 22: Stylized profile of a precontact ceramic vessel showing major landmarks

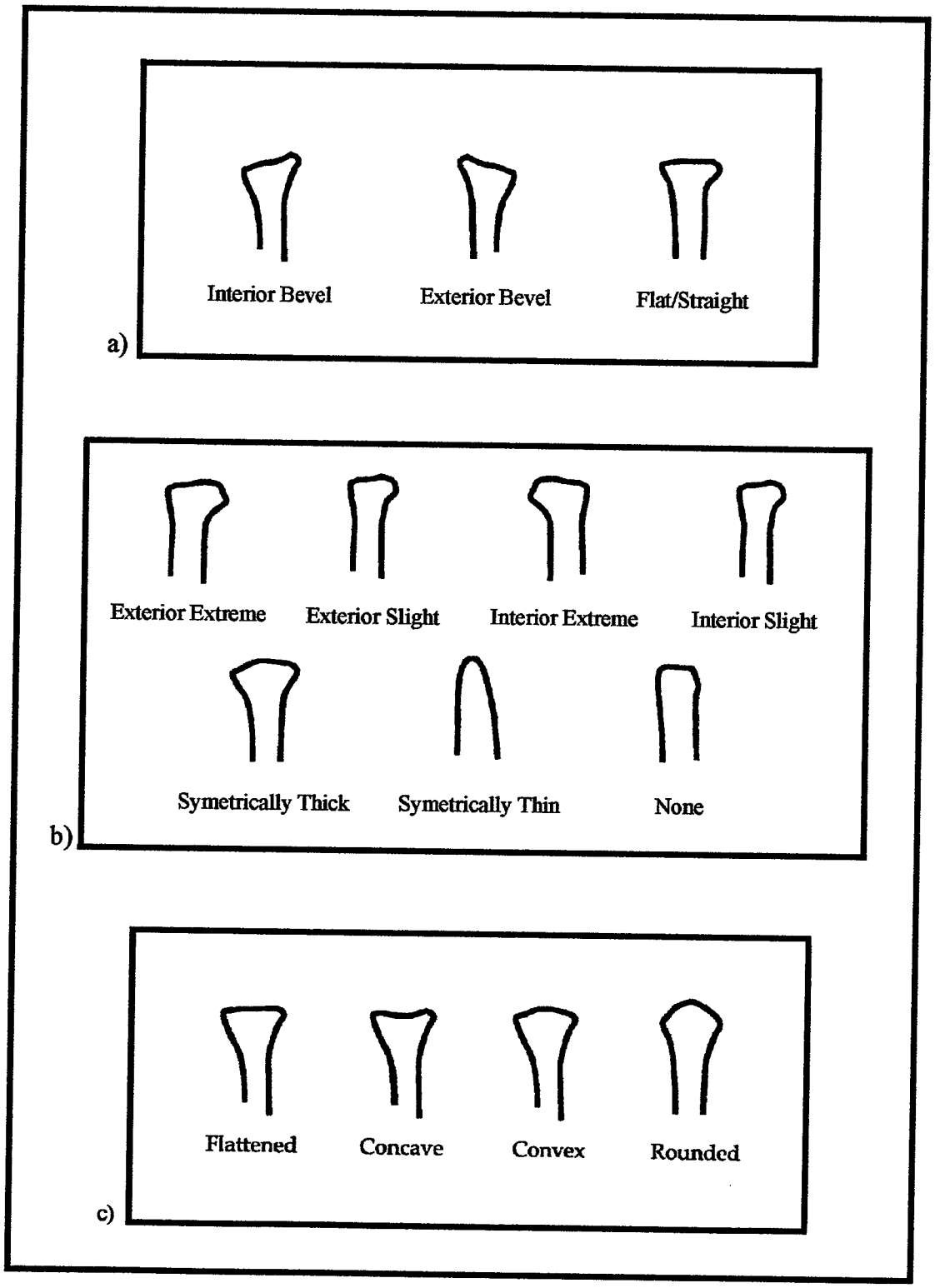
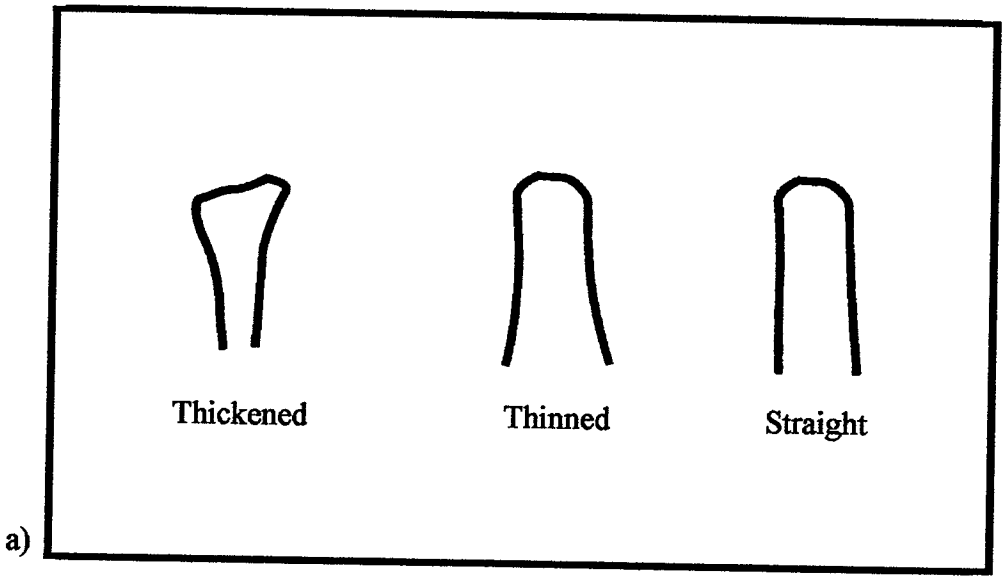
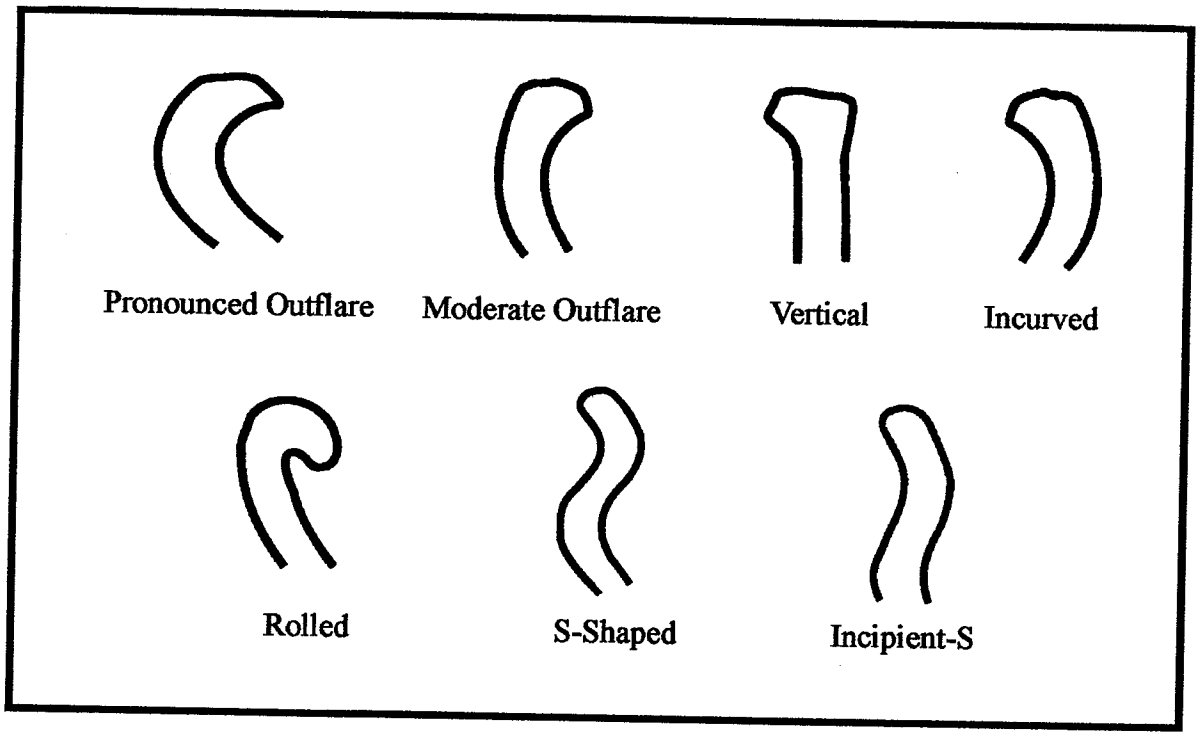


Figure 23: Lip morphology (interior to left) a) orientation; b) eversion; c) surface



a)



b)

Figure 24: Stylized rim profiles (vessel interior to left) found on precontact ceramic vessels showing decorative zones a) rim shape; b) rim orientation

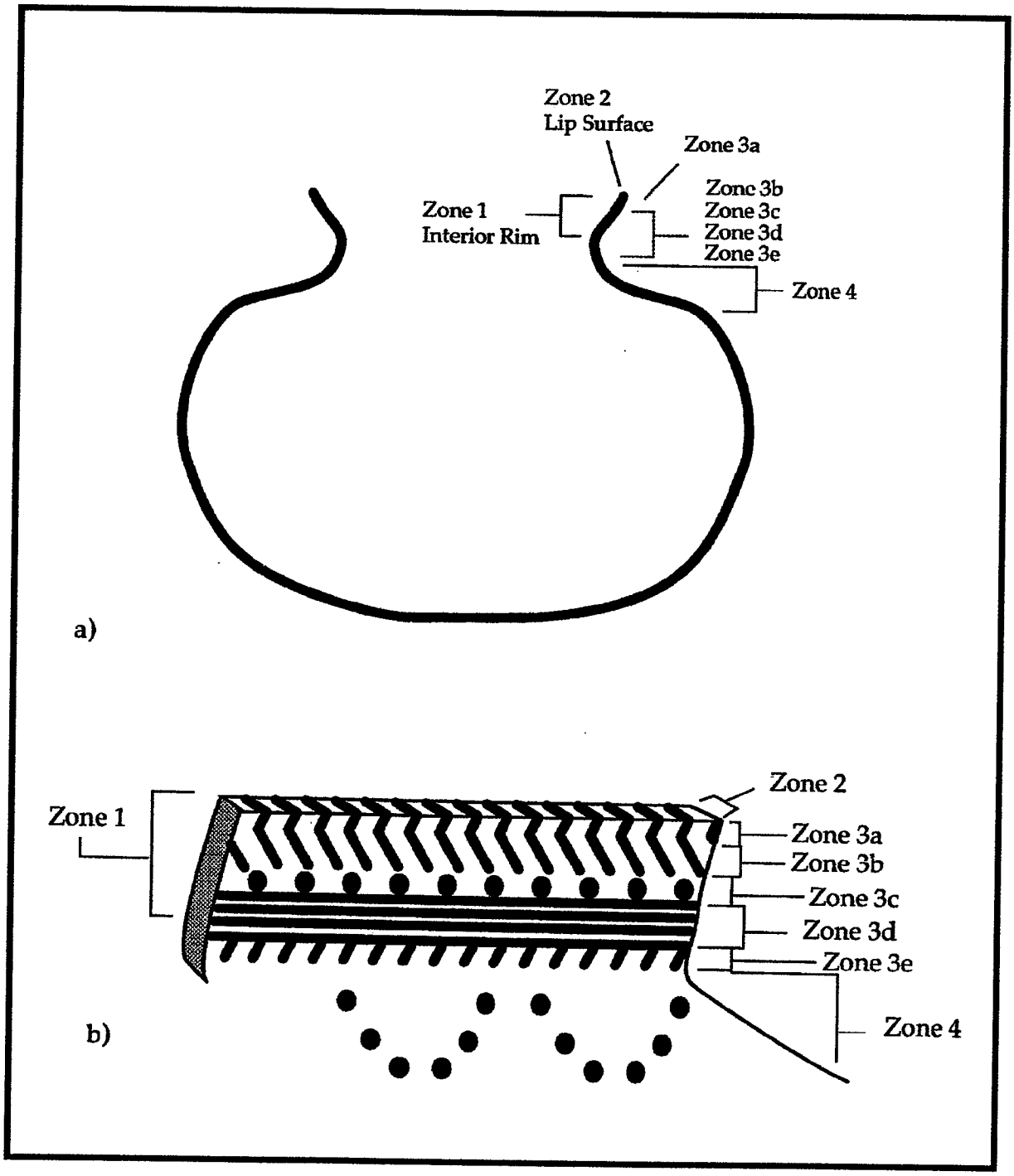


Figure 25: Stylized profile of a precontact ceramic vessel showing a) general vessel profile; b) decorative zones on vessel

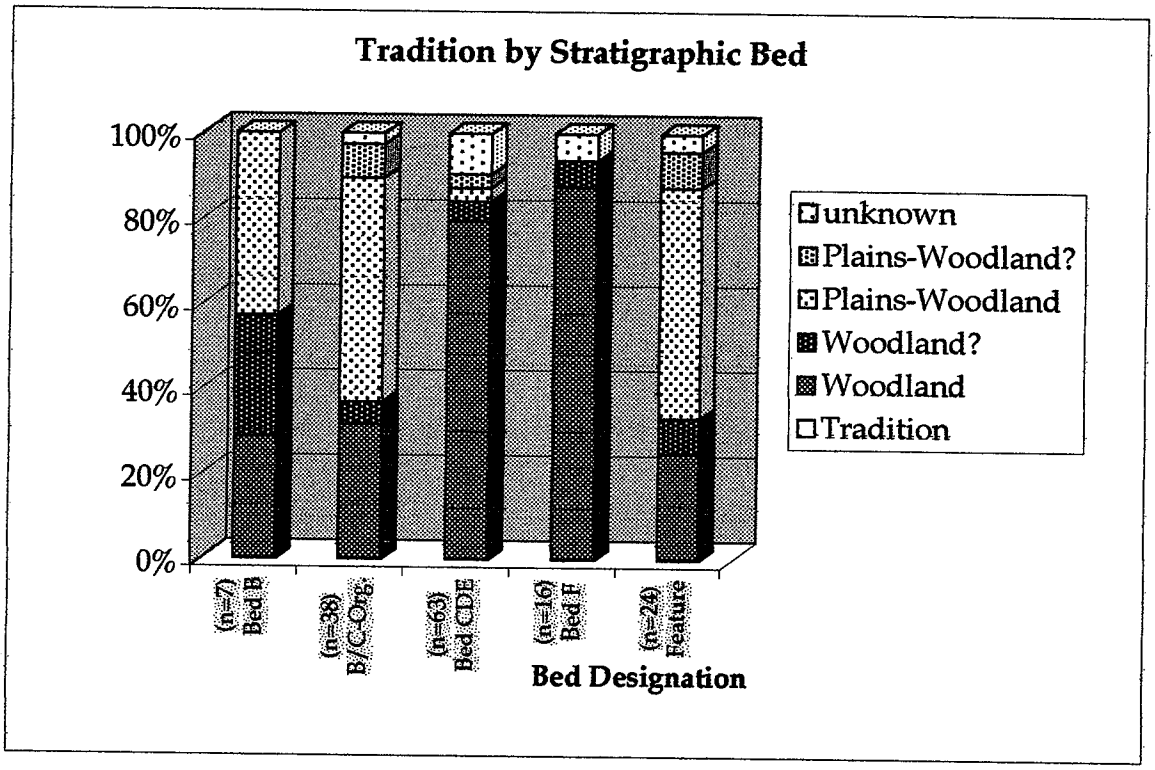


Figure 26: Ceramic tradition by stratigraphic bed

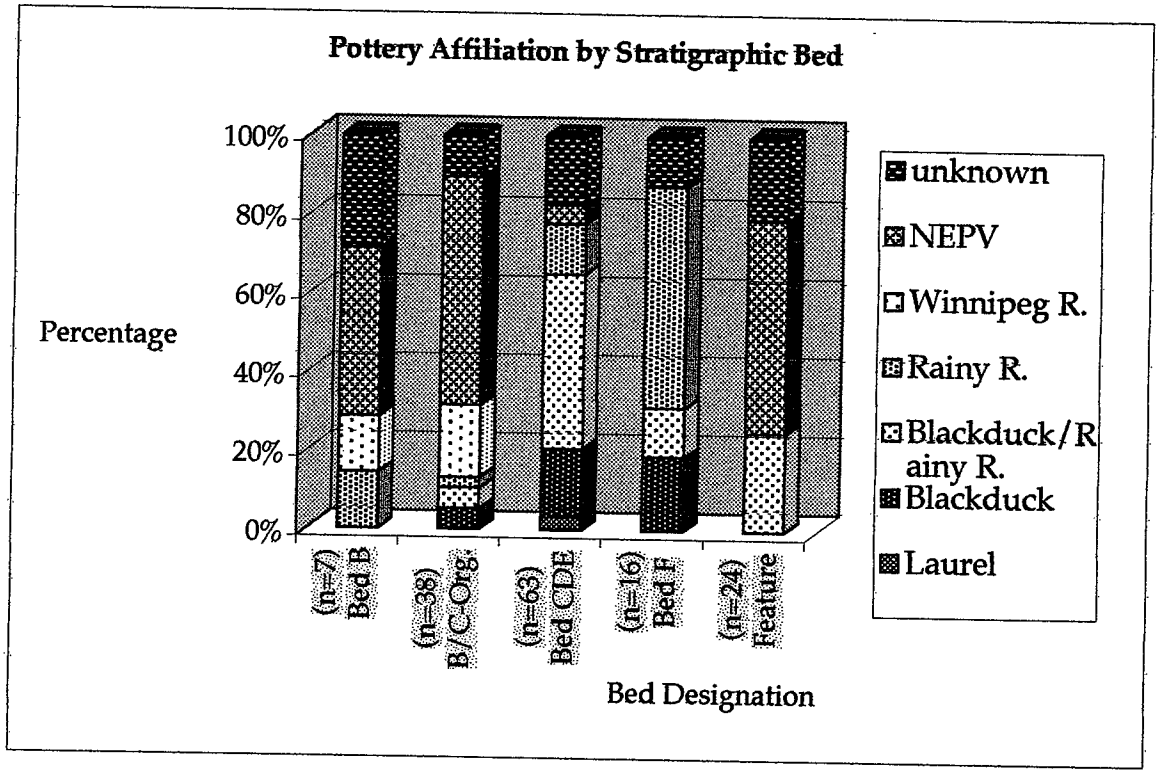


Figure 27: Pottery affiliation by stratigraphic bed

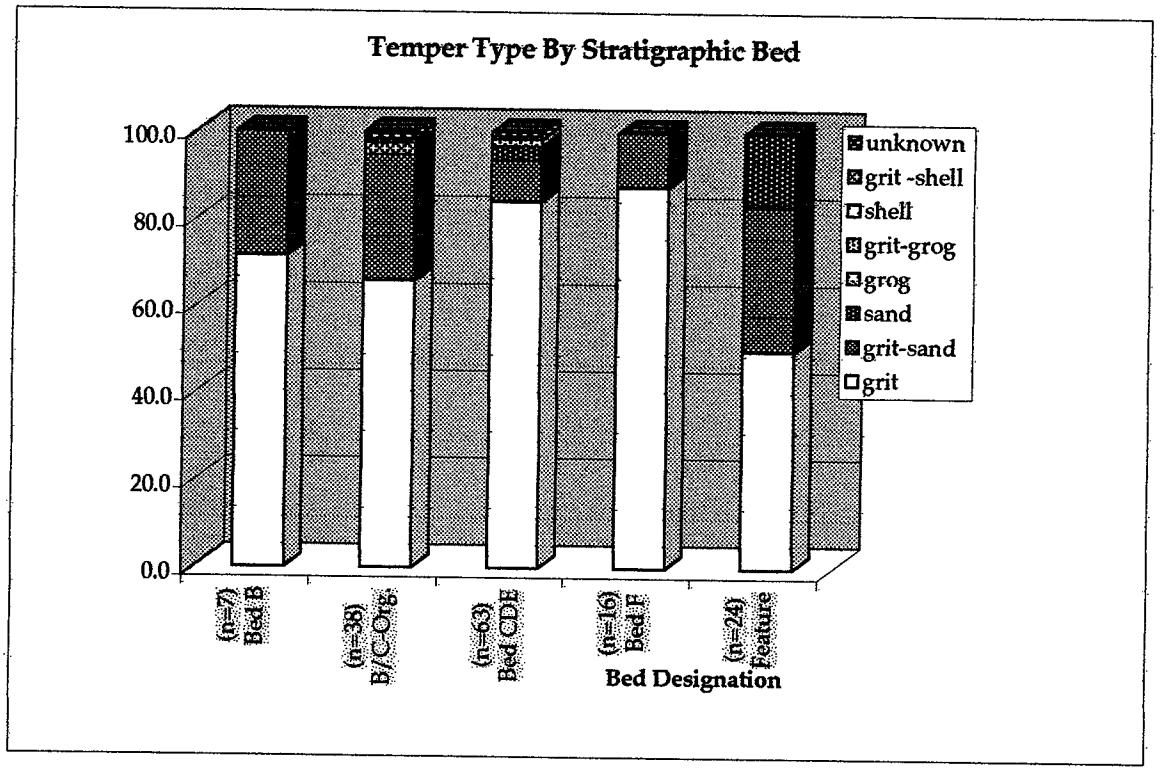


Figure 28: Temper type by stratigraphic bed

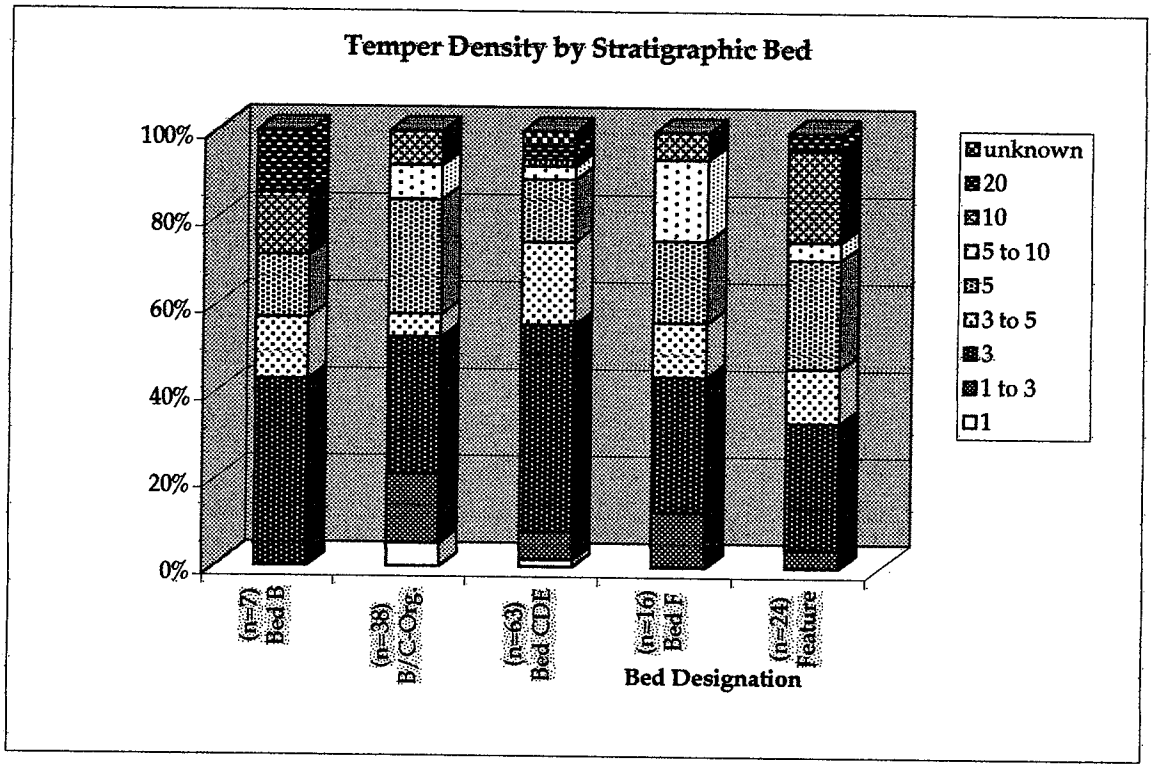


Figure 29: Temper density by stratigraphic bed

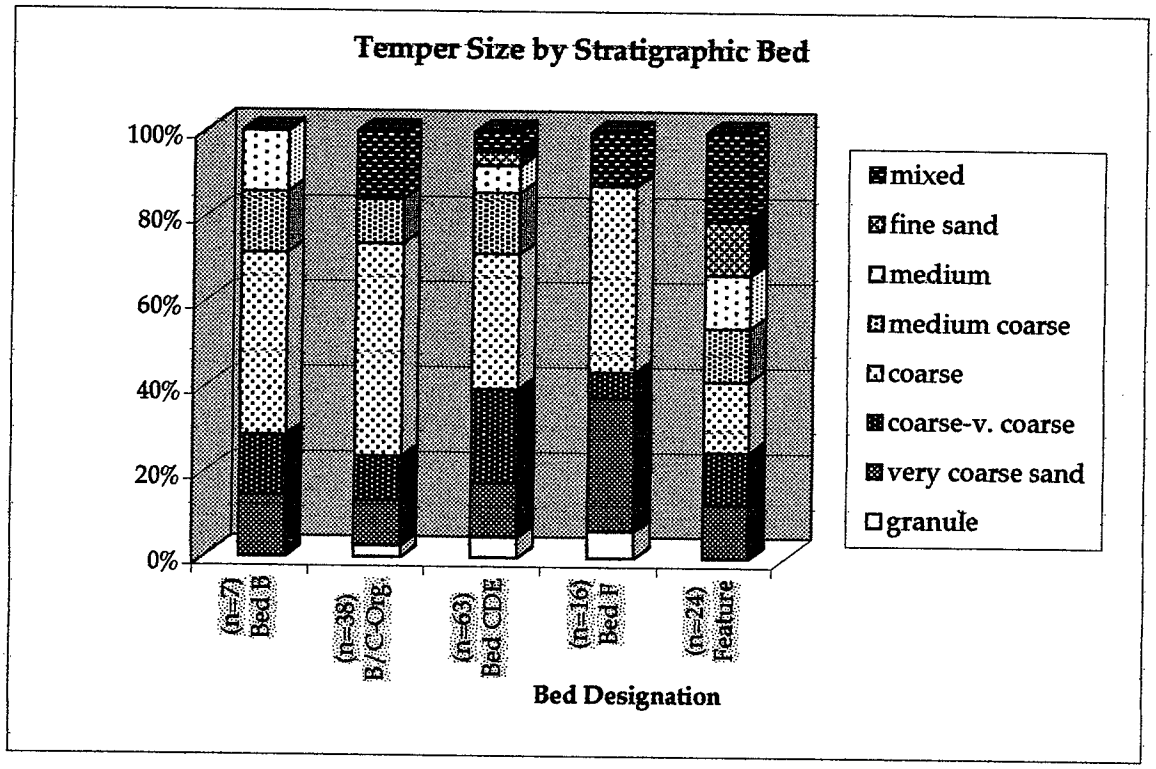


Figure 30: Temper size by stratigraphic bed

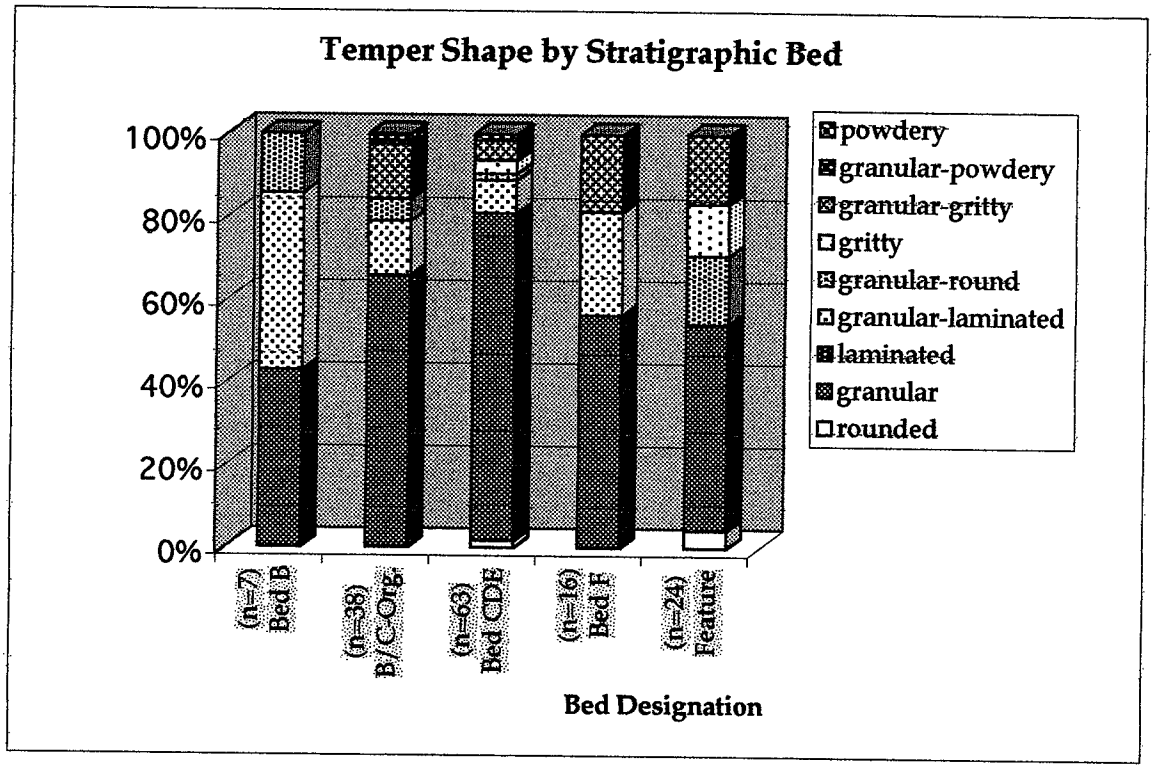


Figure 31:Temper shape by stratigraphic bed

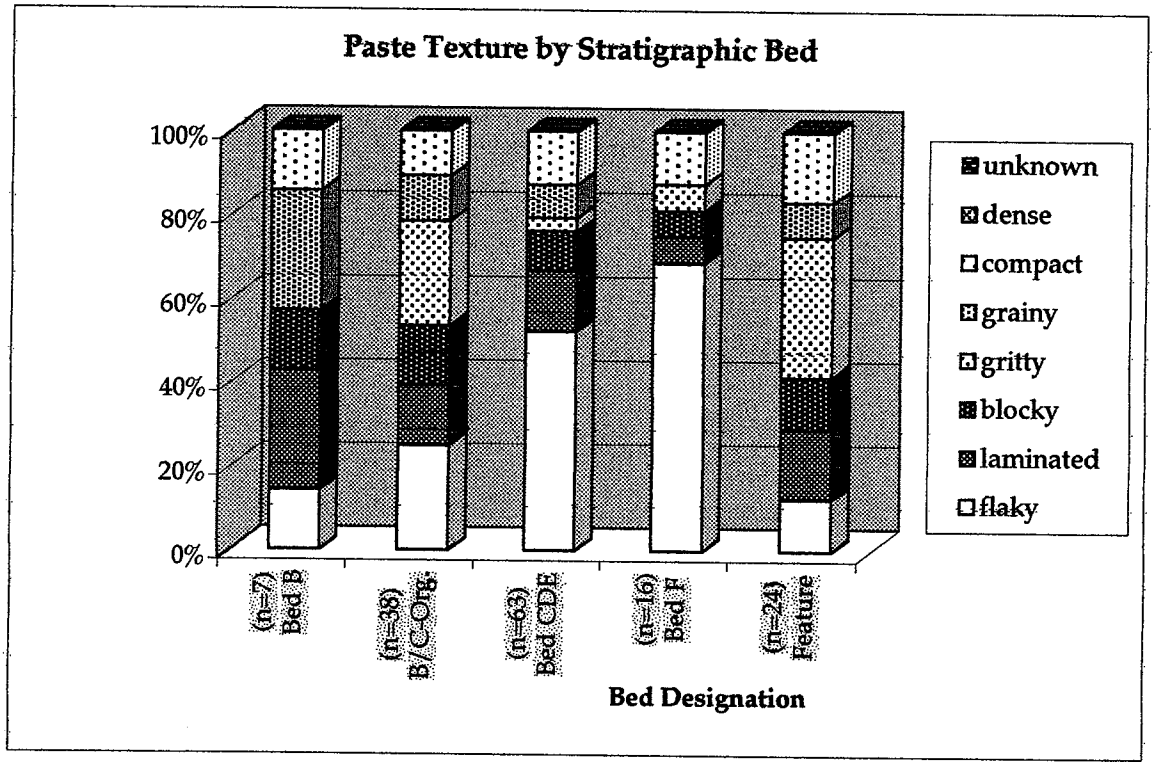
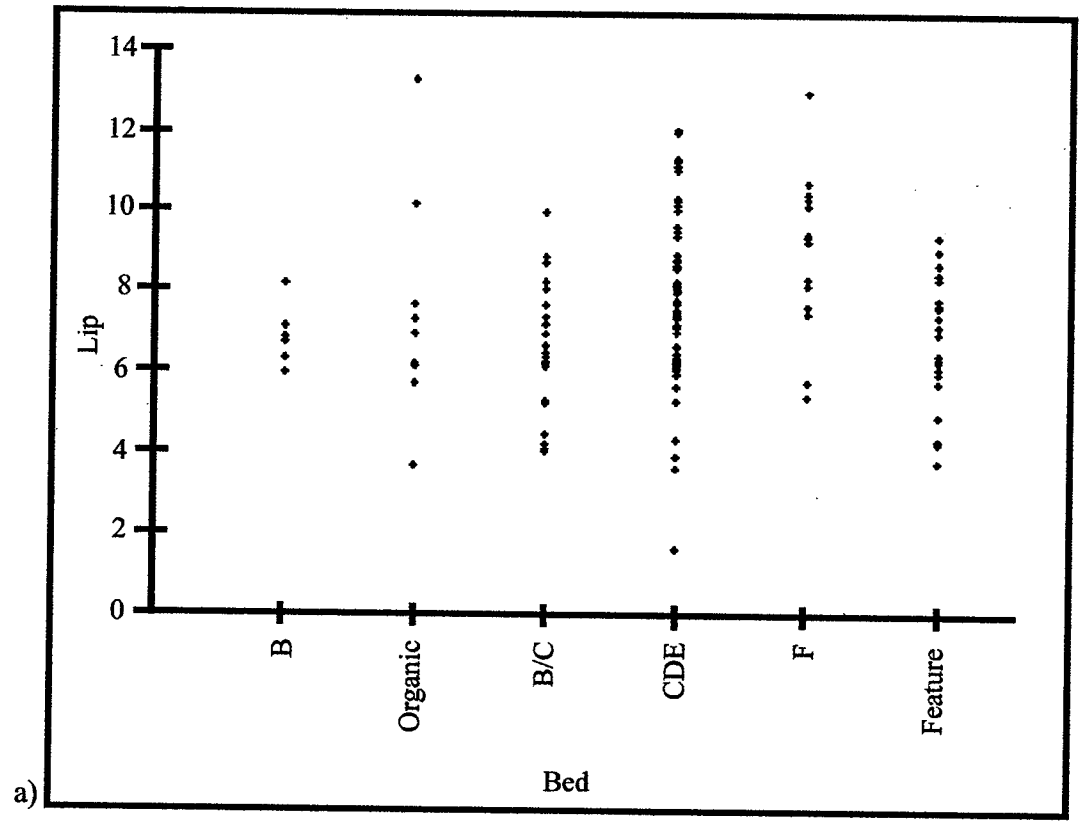


Figure 32: Paste texture by stratigraphic bed



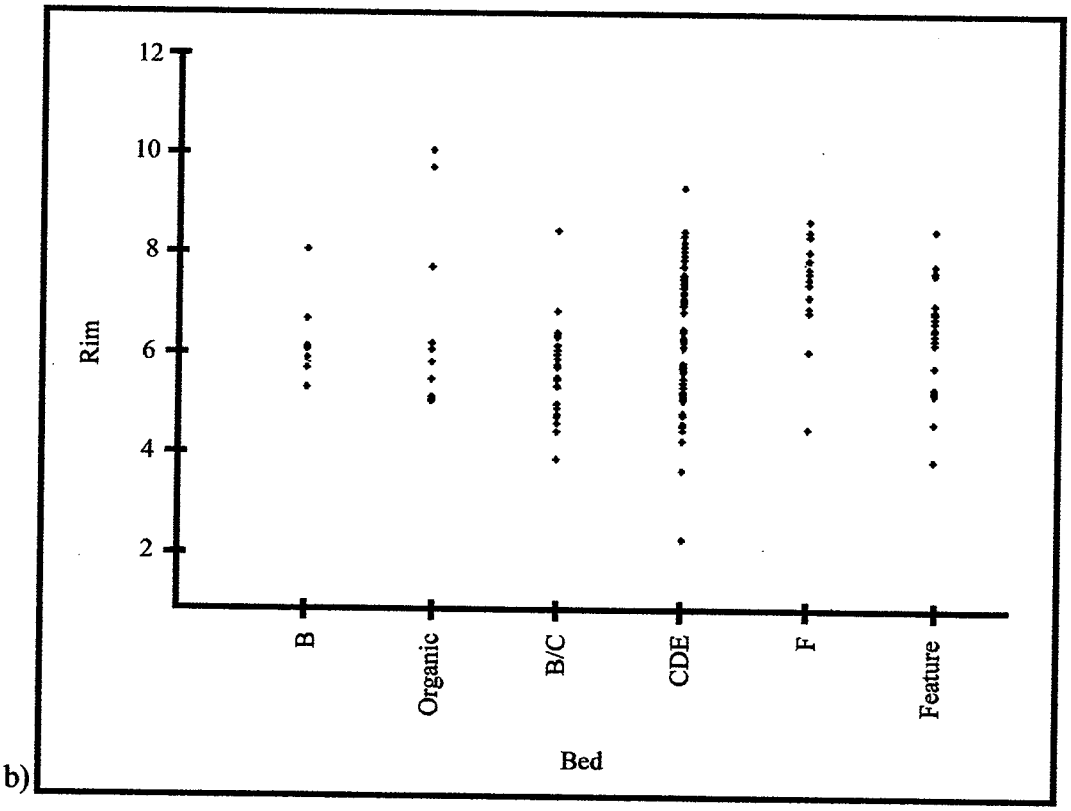


Figure 33: a) Lip Thickness; b) Rim Thickness

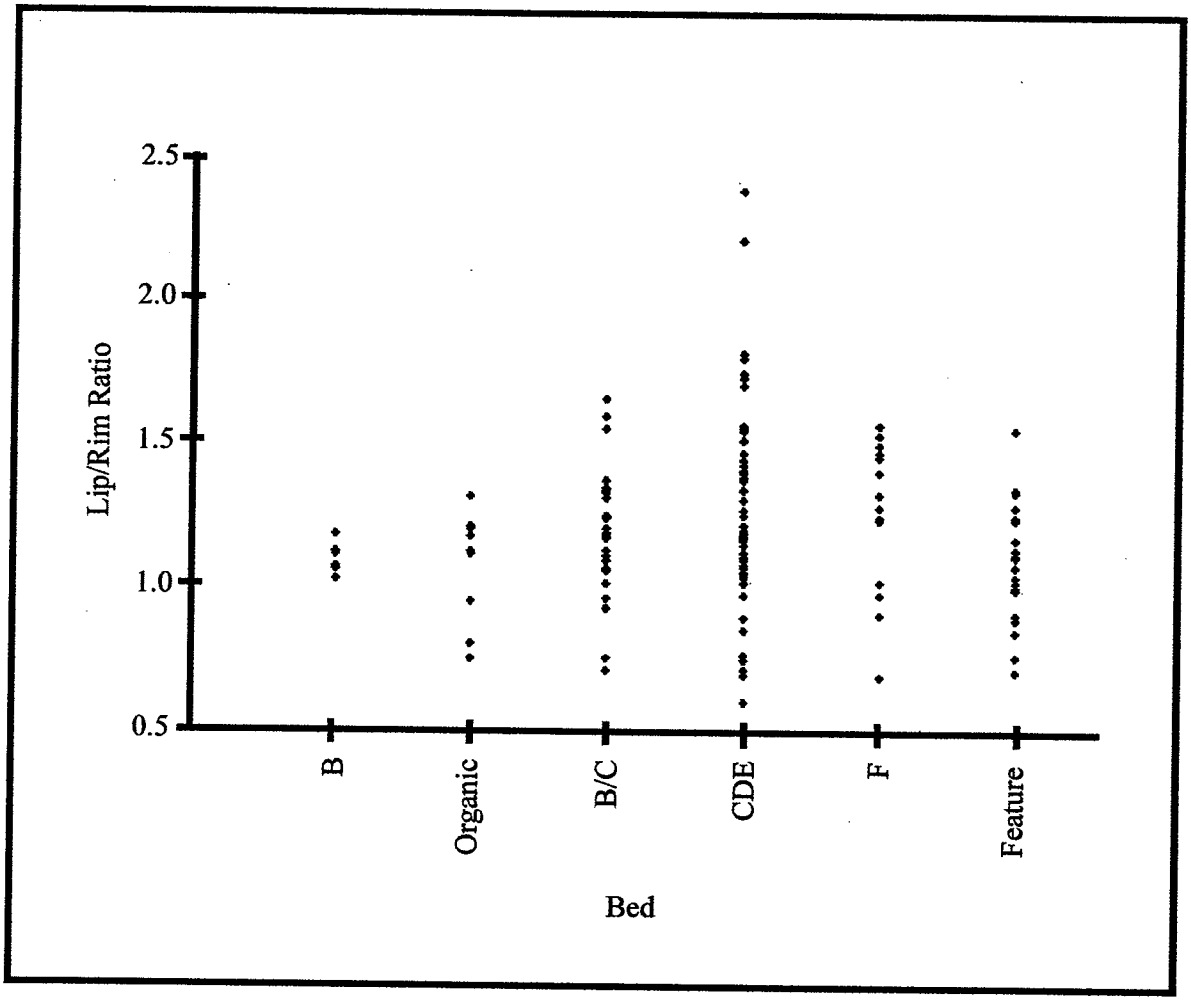


Figure 34: Lip and rim thickness ratio by stratigraphic bed

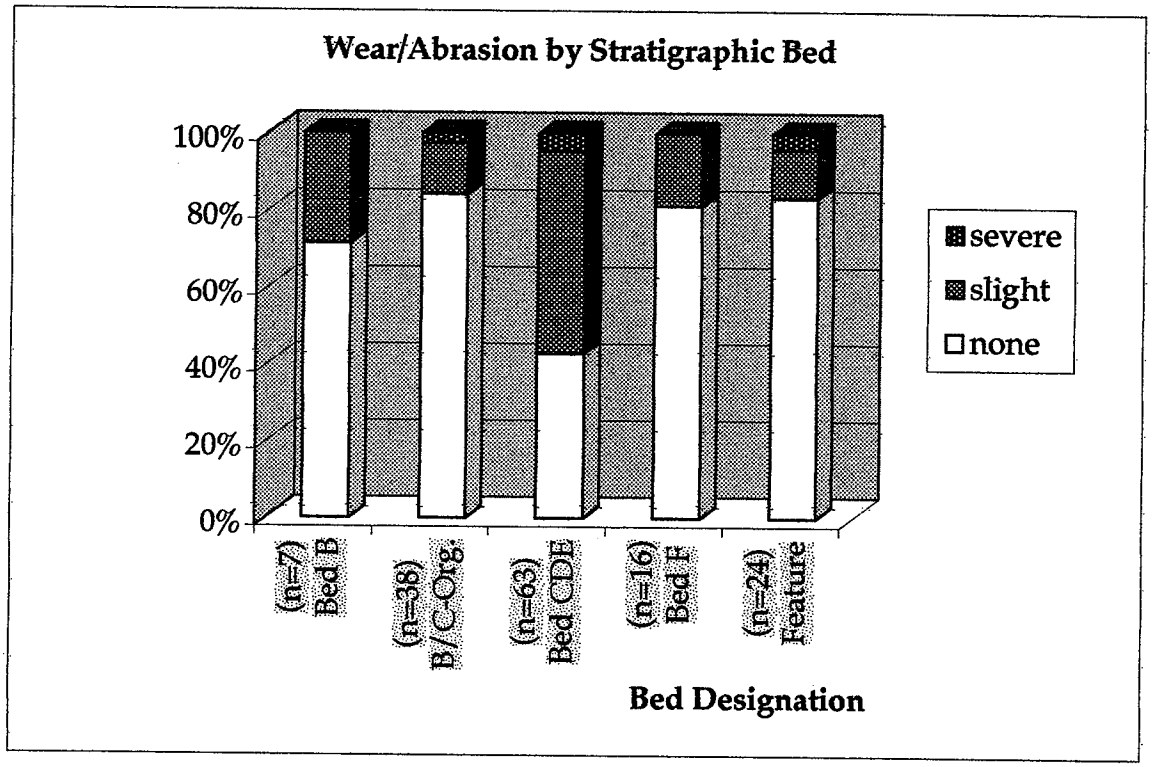


Figure 35: Wear/Abrasion by stratigraphic bed

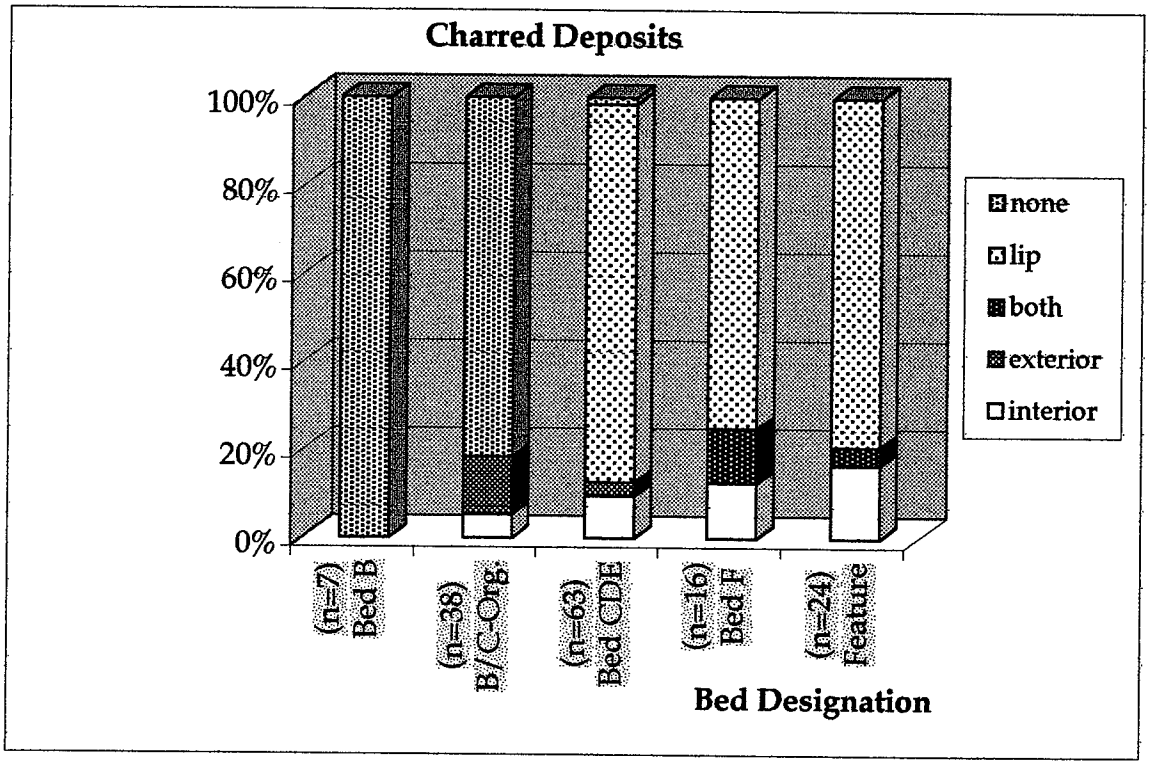


Figure 36: Charred deposits by stratigraphic bed

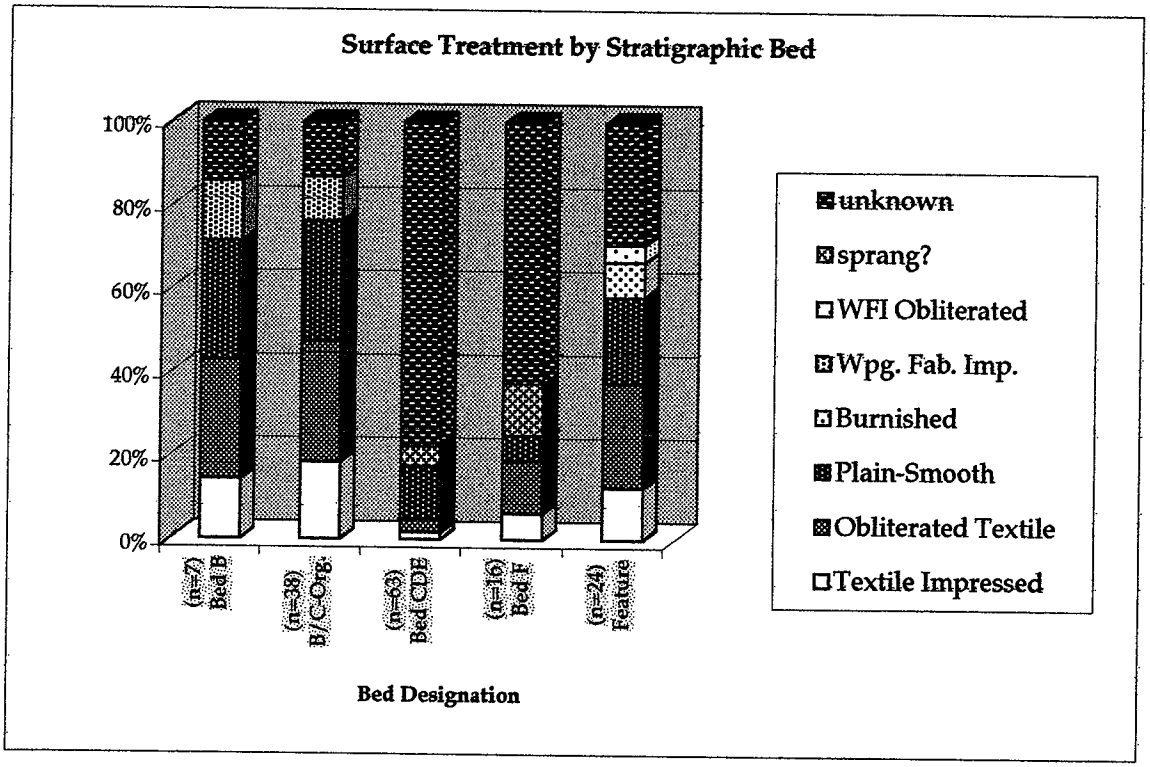


Figure 37: Surface treatment by stratigraphic bed

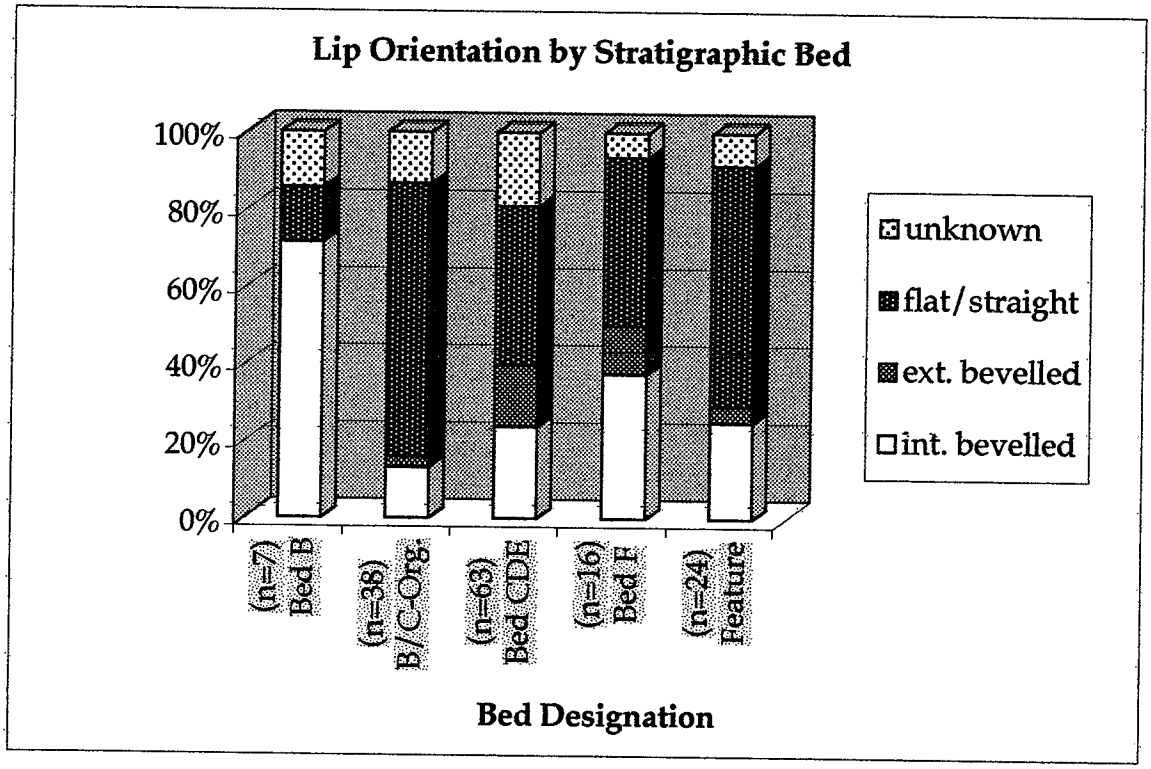


Figure 38: Lip orientation by stratigraphic bed

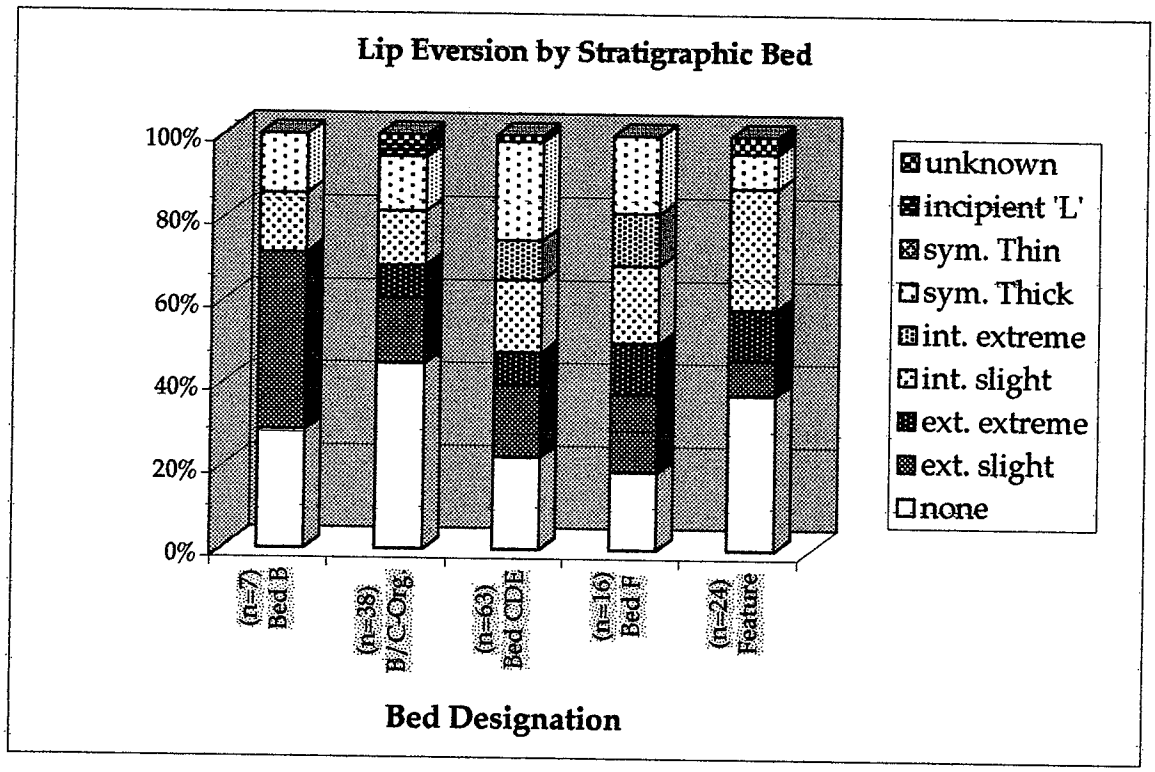


Figure 39: Lip eversion by stratigraphic bed

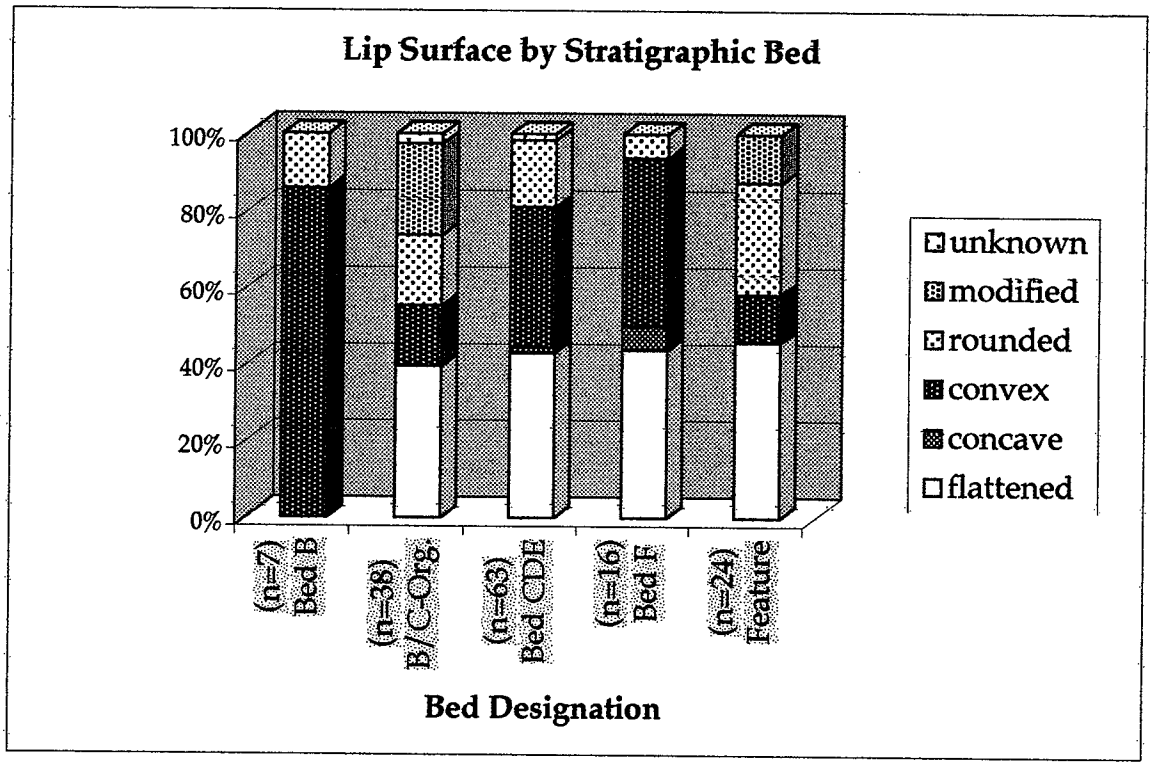


Figure 40: Lip surface by stratigraphic bed

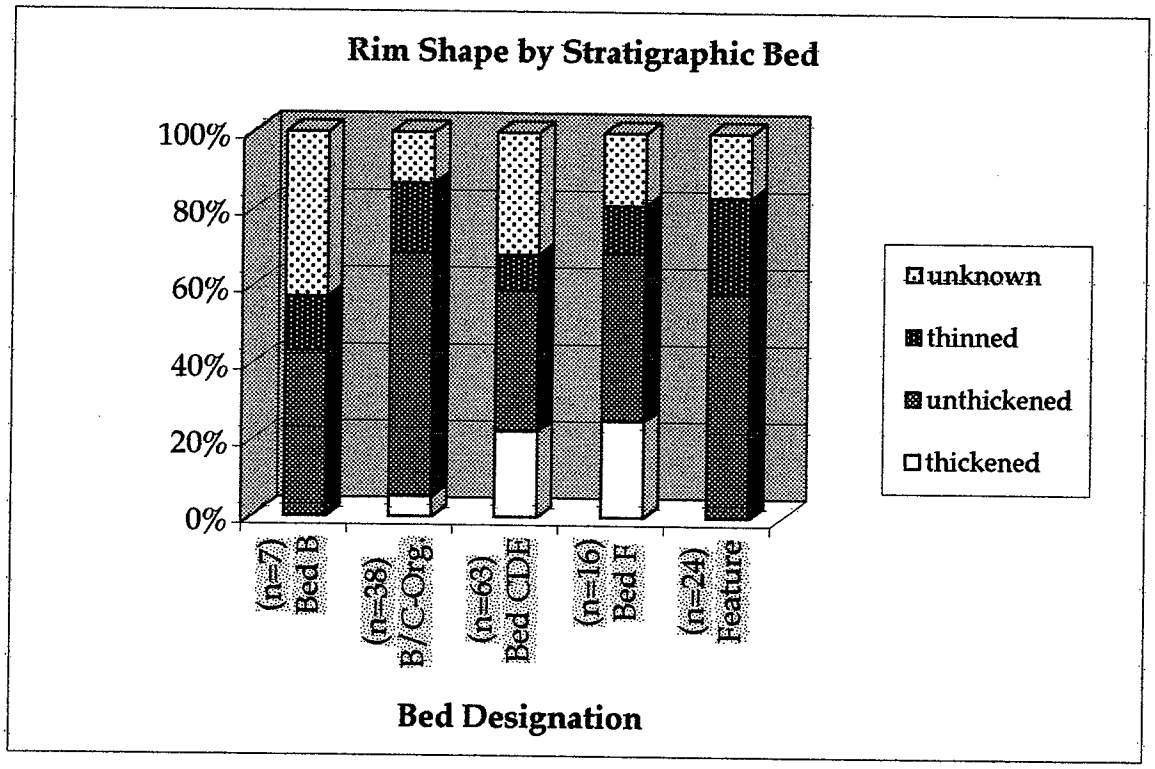


Figure 41: Rim shape by stratigraphic bed

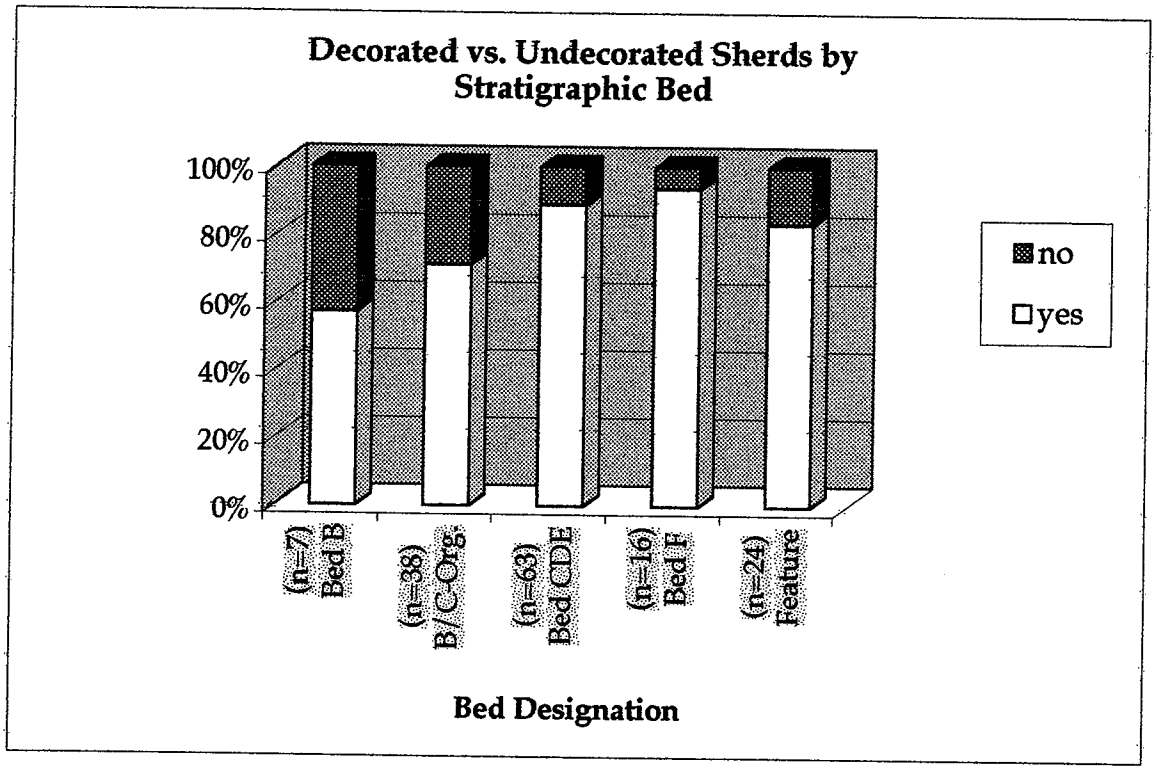


Figure 42: Decorated and undecorated sherds by stratigraphic bed

Cultural-Historical Overview of Northeastern Plains and Adjacent Areas

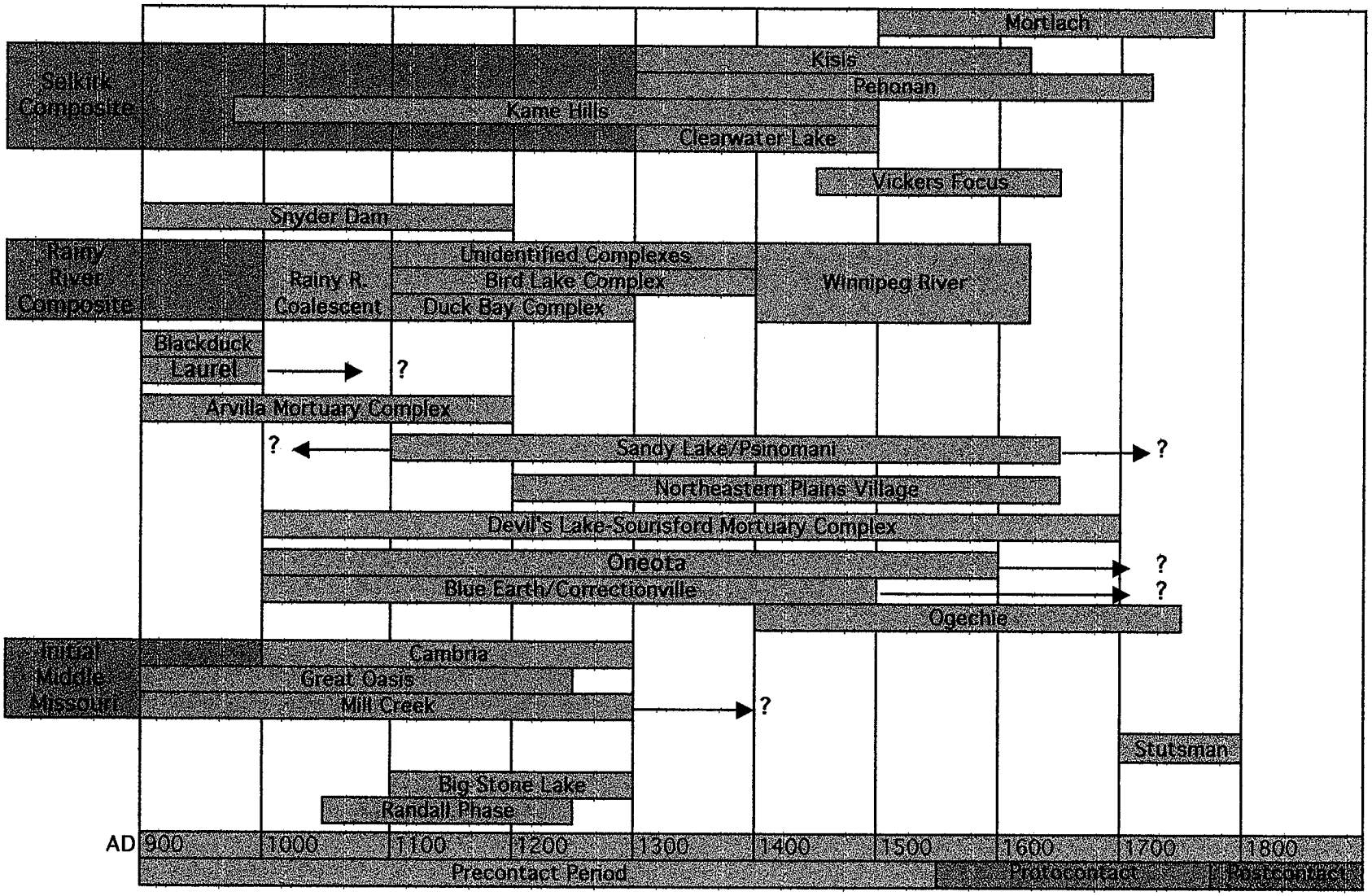


Figure 44: Selected archaeological cultures of the Northeastern Plains for the later Precontact Period

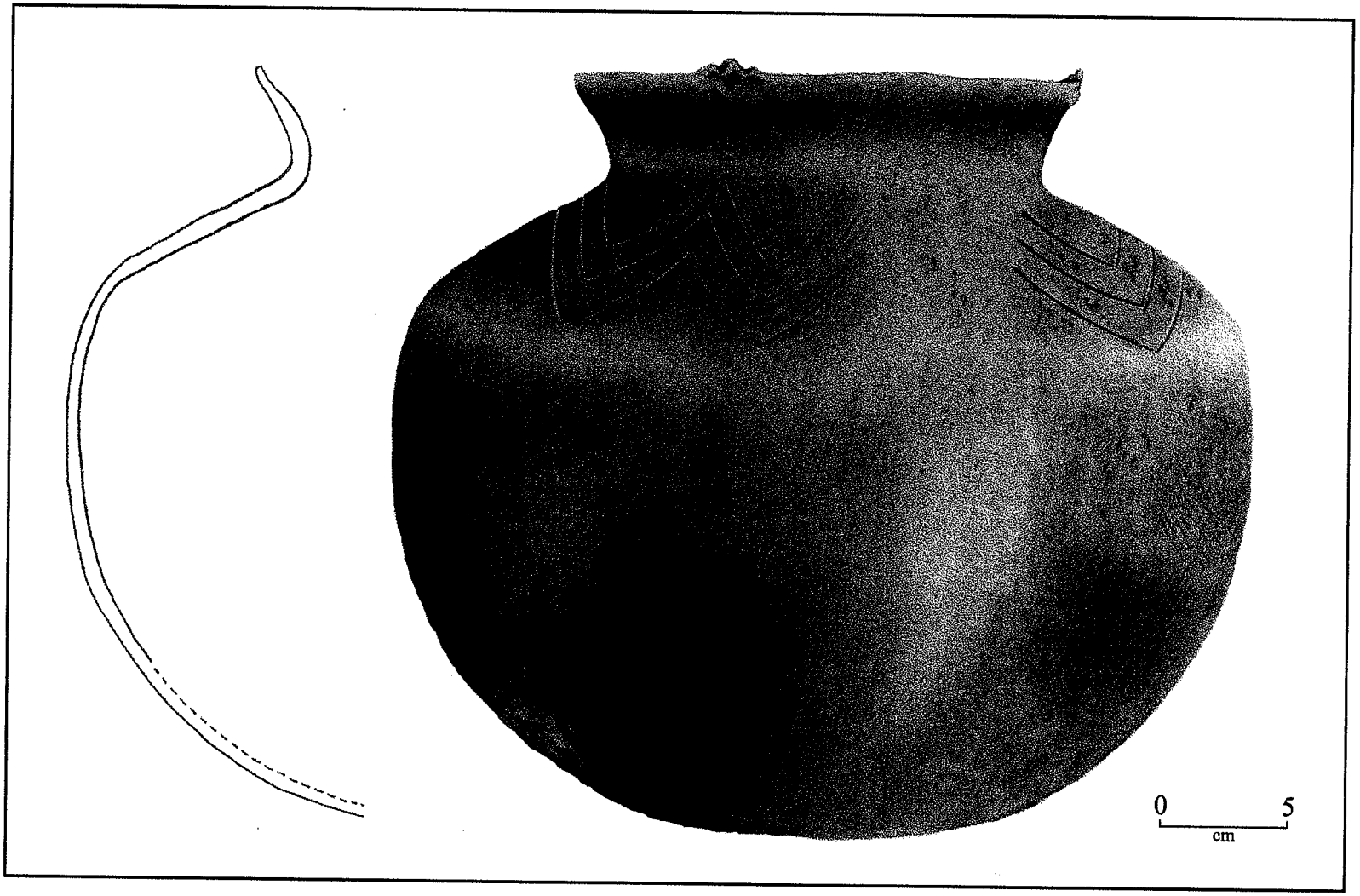


Figure 44: Lockport ceramic vessel (artist's reconstruction, drawing by C. Flynn)

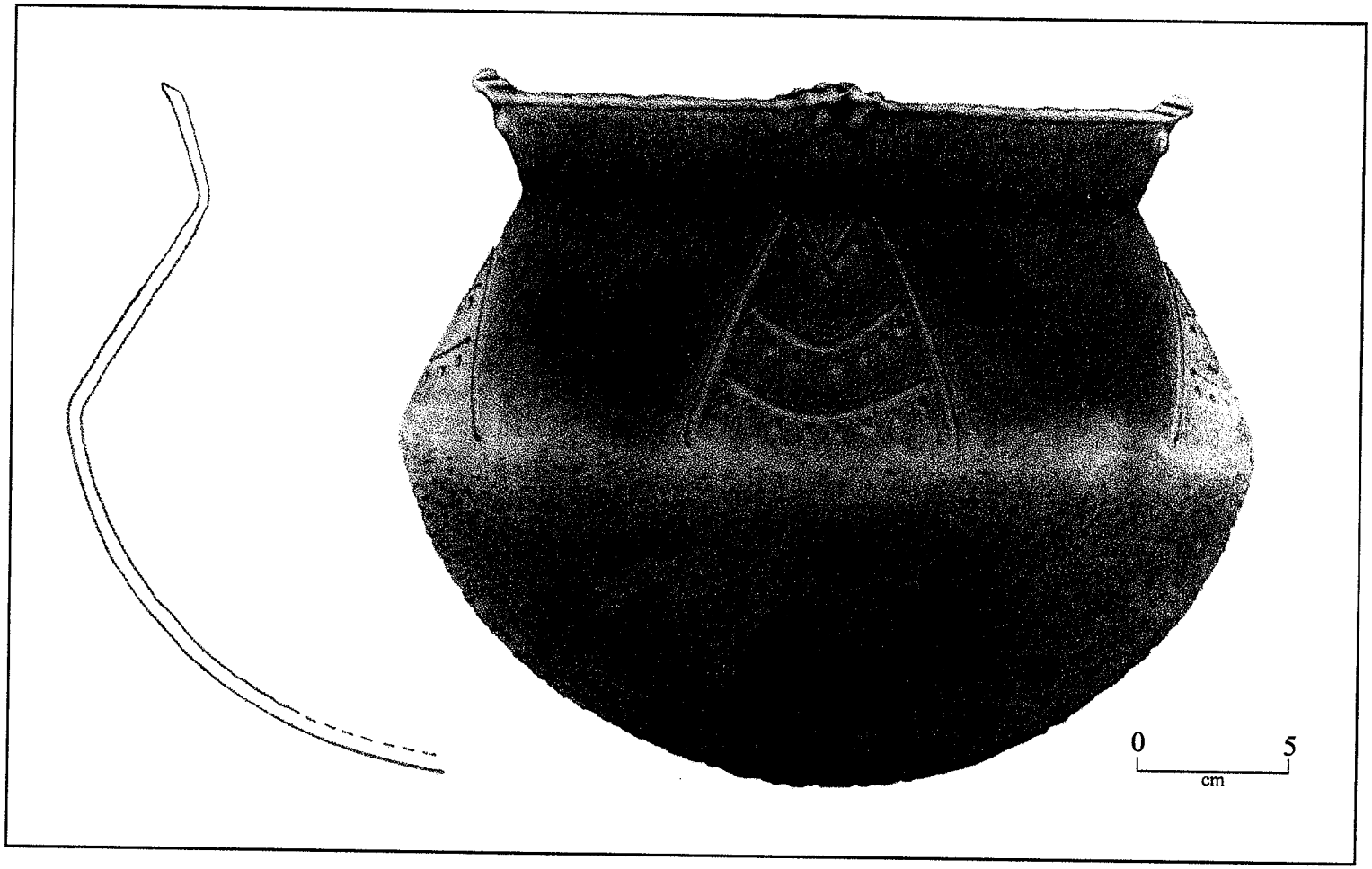


Figure 45: Lockport ceramic vessel (artist's reconstruction, drawing by C. Flynn)

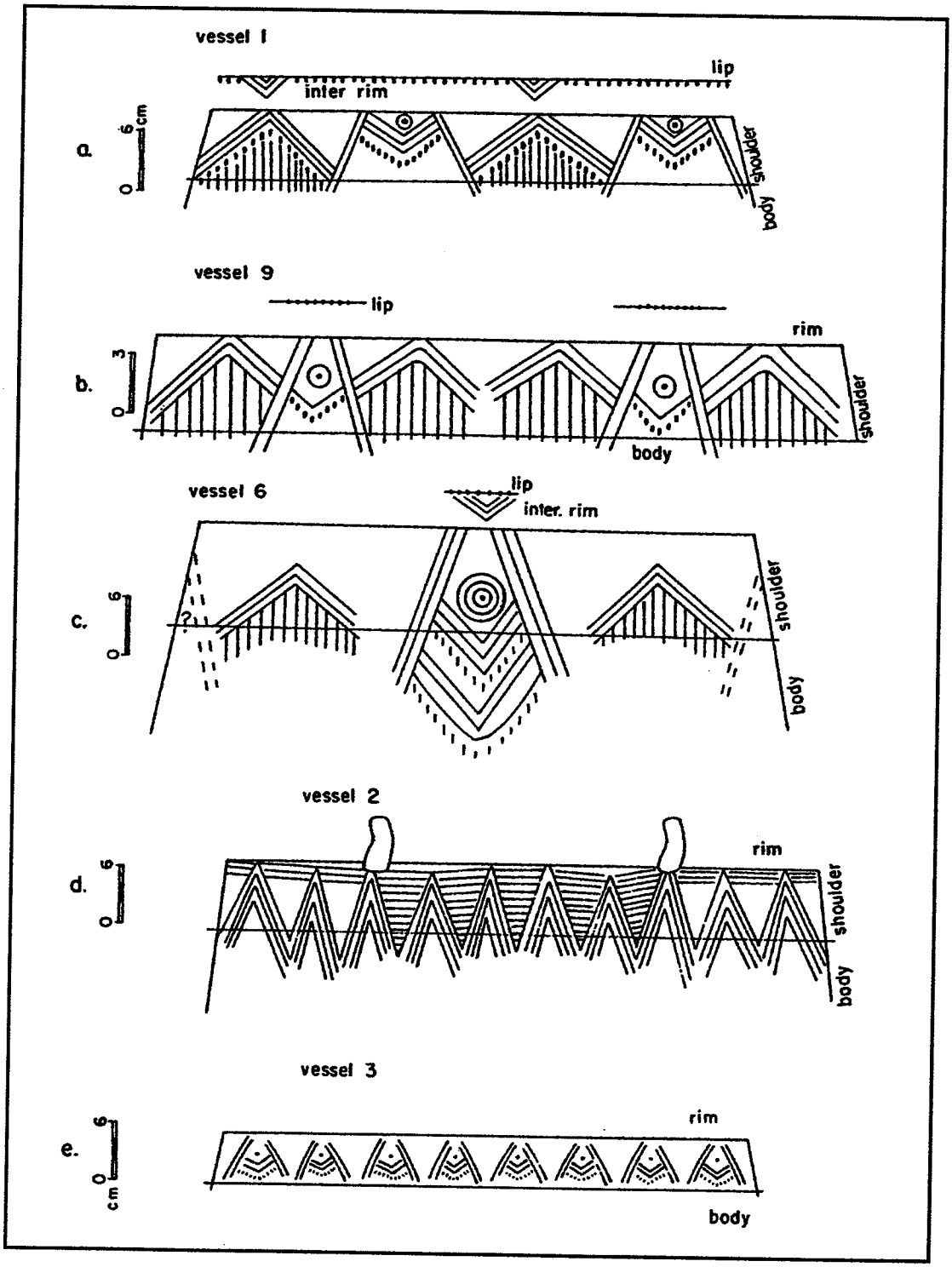


Figure 46: Decorative motifs (from Benn 1980:244)

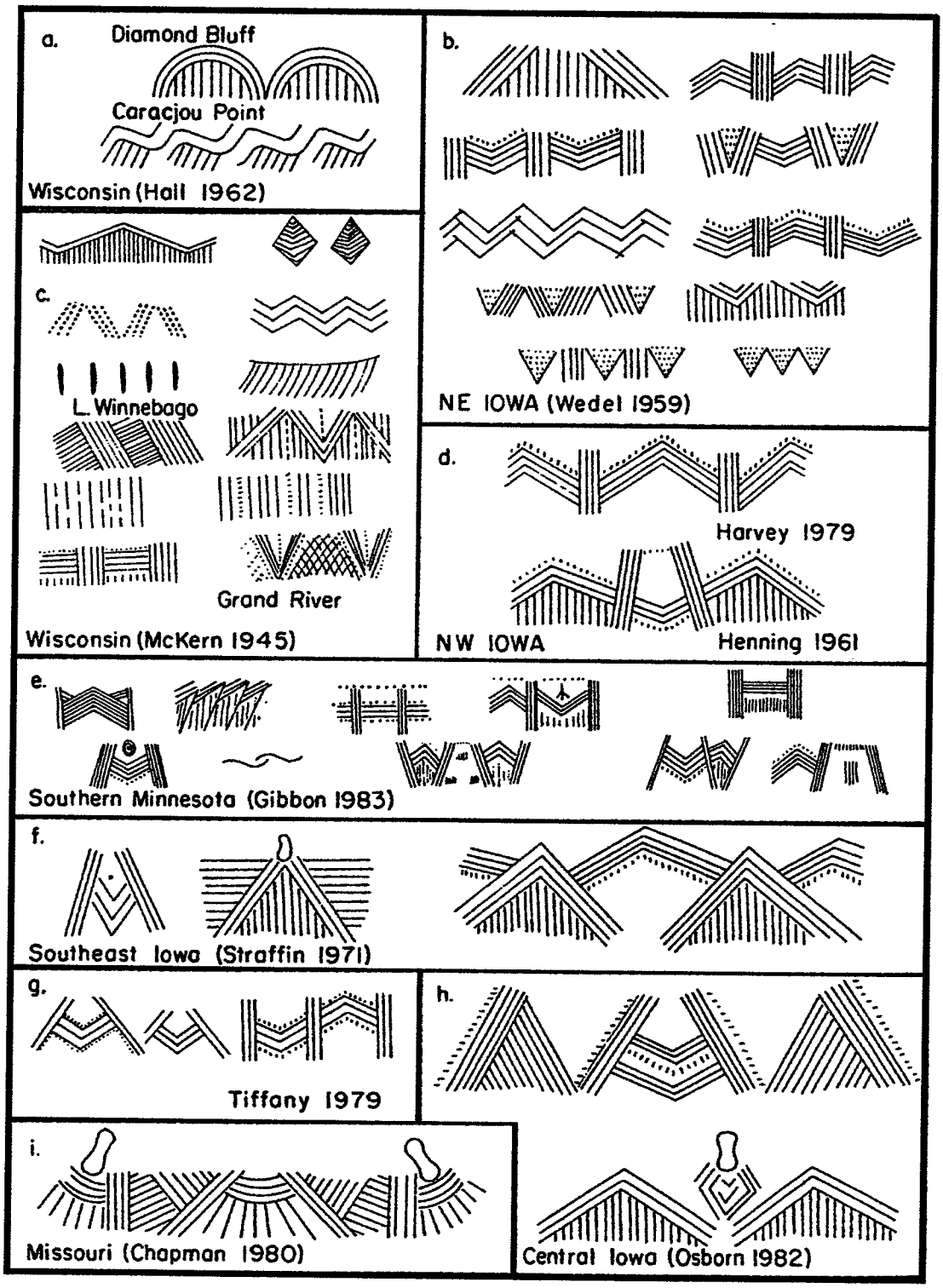


Figure 47: Decorative motifs (from Benn 1989:246)

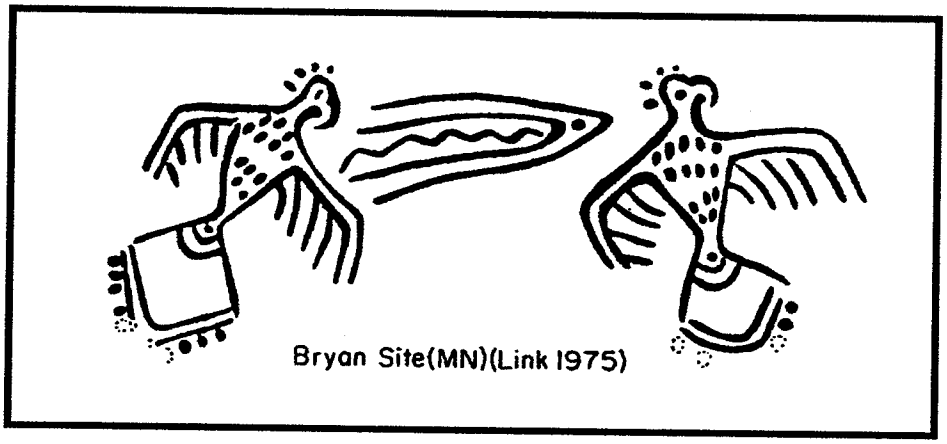


Figure 48: Decorative motif (from Benn 1989:247)

Appendix II

Tables

	Count	Percentage
Bed B	7	4.7
Bed B/C	38	25.7
Bed CDE	63	42.6
Bed F	16	10.8
Feature	24	16.2
totals	148	100.0

Table 1: Sample breakdown by stratigraphic bed

MacNeish's Stratigraphic Zones and Cultural Foci

Stratum	Description	Level	Focus
Zone A	A humus layer containing cultural refuse from the Selkirk Focus, includindg scapula hoes, bell-shaped storage pits, and shell tempered ceramics.	1 and 2	Late Selkirk
Zone B	A layer of sand, interspersed with layers of "refuse". Included in this zone was a layer of banded sands and silt which were supposed to represent as many as 28 flood events	3 and 4	Selkirk
Zone C	A layer of "dark refuse".	5 and top of 6	Manitoba
Zone D	A layer of sterile sand	6	----
Zone E	A zone composed primariy of "dark refuse" but with clay, sand, and charcoal as well. At the bottom of zone E were patches of clean sand.	lower 6 and upper 7	Nutimik
Zone --	A thin horizontal zone between E and F which included cultural material from both	8	
Zone F	A zone of brown-gray clay	9 and 10	Anderson
Zone G	A zone of gray clay, grading to a dense yellow clay with patches of burned floor.	11	
Zone H	A zone of tightly knit yellow clay with burned floors in it.	12	Larter
Zone I	A sterile, tightly-knit yellow clay with large, rounded boulders in it.	13	

Table 2: MacNeish's stratigraphic sequence (adapted from MacNeish 1958)

(precise depths of levels and base of excavation unknown, mostly excavated in arbitrary six inch levels. Base of excavation probably 6-7 feet).

Buchner's Stratigraphic Beds and Cultural Phases

Stratum	Description	Approximate Level	Phase
Bed A	Sandy clay-loam	1 and 2	Modern
Bed B	Clay loam	3 to 8	Selkirk
Bed C	Sandy loam	9 to 12	Blackduck-Horticutural
Bed D	Dark clay loam	13 to 15	
Bed E	Sandy loam	16 to 20	Blackduck
Bed F	Clay loam	21 to 29	Laurel
Bed G	Silty loam	30 to 32	Mixed
Bed H	Silty clay	33 to 37	Larter/Pelican Lake
Bed I	Clay	38 to 40	Glacial Lake Agassiz clays

Table 3: Buchner's stratigraphic sequence (adapted from Buchner 1988)

(levels were excavated in arbitrary five centimeter levels. Base of excavation approximately two meters.

Hems/Flynn Stratigraphic Beds and Cultural Occupations

Stratum	Description	Approximate Level	Occupation
Bed A	Sod, evidence of the 1950 flood, access road, silty clay, and plough zone	1 to 4	Modern to Late Homestead
Bed B	Brown to black silty soil	5 to 8	Early Homestead to "Selkik"
Bed B/C	Fish scale, cultural remains, charcoal fragments, faunal remains in a silty sand, capping many horticultural occupation features (eg: bell-shaped pits)	9 and 10	Unnamed Horticultural
Bed C	Finely bedded sand and silty clay	11 and 12	Blackduck/Rainy River
Bed D	Mixed silt, clay, sand, and gravel	13 to 15	
Bed E	Fine white sterile sand	16 to 20	none
Bed F	Dark, silty clay loam	21 to 29	Classic Blackduck to Late Laurel
Bed G	A zone of gray clay, grading to a dense yellow clay with patches of burned floor.	30 to 35	Laurel
Bed H	A zone of tightly knit yellow clay with burned floors in it.	36 to 40	Unnamed Pre-Laurel
Bed I	Olive gray clay grading to yellow gray clay	41 to 44	Larter/Pelican Lake
Bed I 1	oOlive gray clay below first charcoal horizon	45 to 47	Unnamed Pre-Larter (no diagnostics)
Bed I 2	Olive gray clay below second charcoal horizon	47 to 50	

Table 4: Hems/Flynn stratigraphic sequence

(Excavated was done in combined 5 cm. arbitrary and natural stratigraphic levels. Base of excavation between 2 and 3 meters)

Correlation of the Three Major Stratigraphic Interpretations Used at the Lockport Site, EaLf-1

MacNeish				Buchner				Hems/Flynn			
Zone	Level	Depth (inches)	Cultural Affiliation	Bed	Level	Depth (cm's)	Cultural Affiliation	Bed	Level	Depth (cm's)	Cultural Affiliation
A	1 to 2	0 to 12	Late Selkirk	A	1 to 2	0 to 10	Modern	A	1 to 4	0 to 20	Modern to Late Homestead
B	3 to 4	12 to 24	Selkirk	B	3 to 8	10 to 40	Selkirk	B	5 to 8	20 to 40	Early Homestead to Selkirk
C	5 to 6	24 to 36	Manitoba	C	9 to 12	40 to 60	Blackduck/ Horticultural	B/C	9 to 10	40 to 50	Horticultural
D	6	36 to 42	----	D	13 to 15	60 to 75	Blackduck/ Horticultural	C	11 to 12	40 to 60	Blackduck/Rainy River
E	6 to 7	36 to 48	Nutimik	E	16 to 20	75 to 100	sterile	D	13 to 15	60 to 75	Blackduck/Rainy River
F	9 to 10	54 to 66	Anderson	F	21 to 29	100 to 145	Laurel	E	16 to 20	75 to 100	Sterile
G	11	66 to 72	Larter	G	30 to 32	145 to 160	mixed	F	21 to 29	100 to 145	Classic Blackduck
H	12	72 to 78	Larter	H	33 to 37	160 to 185	Larter/ Pelican Lake	G	30 to 32	145 to 160	Laurel to Late Laurel
I	13	78 to 84	Glacial Clays	I	38 to 40	185 to 200	Glacial Clays	H	33 to 37	160 to 185	Pre-Laurel to Early Laurel
sub-I	below 13	below 6 ft.	Glacial Clays	sub-I	below 40	below 2 m.	Glacial Clays	I	38 to 40	185 to 200	Larter/Pelican Lake
								sub-I	below 40	below 2 m.	Larter/Pelican Lake to unnamed pre-ceramic

Table 5: MacNeish, Buchner, and Hems/Flynn Stratigraphic Interpretations

Conventional C14 Dates (1984-1986)

	Bed	Lab Number	Age (years BP)	Standard Deviation	Calendar years	Weight (grams)	Material	Date within one SD
a	B	S-2852	315	235	1635 AD	12.3	Charcoal	1400-1870 AD
b	B/C	S-2850	470	270	1480 AD	8.0	Charcoal	1201-1750 AD
c	D	GX-10866	620	105	1330 AD	40.0	Charcoal	1225-1435 AD
d	C-E	S-2849	635	90	1315 AD	24.5	Charcoal	1225-1405 AD
e	E/F	S-2851	1005	280	945 AD	17.0	Charcoal	665-1225 AD
f	E/F	S-2853	1095	250	855 AD	95.0	Charcoal	605-1105 AD
g	E/F	S-2848	1185	255	765 AD	22.2	Charcoal	510-1020 AD
h	E/F	S-2854	1185	255	765 AD	9.1	Charcoal	510-1021AD
I	F	GX-10865	1410	290	540 AD	155.0	Collagen	250-830 AD
j	G/H	GX-10864	2315	85	365 BC	785.0	Collagen	280-450 BC
k	H	GX-10863	2515	140	565 BC	216.0	Collagen	425-705 BC
l	H/I	S-2847	3300	295	1350 BC	111.9	Charcoal	1055-1645 BC

Notes: Buchner's dates were obtained largely on small clusters of charcoal resulting in wide standard deviations, which may or may not date the occupation itself.
All dates are uncorrected.
B/C = Horticultural occupation as defined by Hems and Flynn 1987
All AMS dates are obtained from hoes and corn from the horticultural occupation

AMS Dates (1987-1988)

	Bed	Lab Number	Age (years BP)	Standard Deviation	Calendar years	Weight (grams)	Material	Date within one SD
a	Hort. Layer	RIDDL1272	595	80	1355	unknown	scapula hoe	1245-1435 AD
b	Hort. Layer	RIDDL1273	705	75	1245	unknown	scapula hoe	1170-1320 AD
c	Hort. Layer	RIDDL1274	520	100	1430	unknown	scapula hoe	1330-1530 AD
d	Hort. Layer	RIDDL1275	940	120	rejected by lab	unknown	charred food	n/a
e	Hort. Layer	RIDDL1330	525	85	1425	split sample	charred corn kernel	1340-1510 AD
f	Hort. Layer	RIDDL1331	510	80	1440	split sample	sonication test	1360-1520 AD
g		split sample average			1436			1356-1516 AD
h	Hort. Layer	RIDDL 1332	765	85	contamination test	unknown	100 microgm OH extract	n/a (gives date of contaminant)
	average of dates a,b,c, and g			83	1367			1284-1450

Table 6: EaLf-1 Radiocarbon dates

	Bed B (n=7)	B/C-Org. (n=38)	Bed CDE (n=63)	Bed F (n=16)	Feature (n=24)
Tradition	Percentage	Percentage	Percentage	Percentage	Percentage
Woodland	28.6	31.6	79.4	87.5	25.0
Woodland?	28.6	5.3	4.8	6.3	8.3
Plains-Woodland	42.9	52.6	3.2	0.0	54.2
Plains-Woodland?	0.0	7.9	3.2	0.0	8.3
unknown	0.0	2.6	9.5	6.3	4.2
total	100.0	100.0	100.0	100.0	100.0
Ware Type	Bed B (n=7)	B/C-Org. (n=38)	Bed CDE (n=63)	Bed F (n=16)	Feature (n=24)
Laurel	0	0.0	3.2	0.0	0.0
Blackduck	0	5.3	17.5	18.8	0.0
Blackduck/Rainy R.	0	5.3	44.4	12.5	25.0
Rainy R.	14.3	2.6	12.7	56.3	0.0
Winnipeg R.	14.3	18.4	0.0	0.0	0.0
NEPV	42.9	57.9	4.8	0.0	54.2
unknown	28.6	10.5	17.5	12.5	20.8
total	100.0	100.0	100.0	100.0	100.0
Temper Type	Bed B (n=7)	B/C-Org. (n=38)	Bed CDE (n=63)	Bed F (n=16)	Feature (n=24)
grit	71.4	65.8	84.1	87.5	50.0
grit-sand	28.6	28.9	9.5	12.5	33.3
sand	0.0	0.0	3.2	0.0	16.7
grog	0.0	0.0	0.0	0.0	0.0
grit-grog	0.0	0.0	1.6	0.0	0.0
shell	0.0	0.0	0.0	0.0	0.0
grit -shell	0.0	2.6	0.0	0.0	0.0
unknown	0.0	2.6	1.6	0.0	0.0
total	100.0	100.0	100.0	100.0	100.0
Temper Density	Bed B (n=7)	B/C-Org. (n=38)	Bed CDE (n=63)	Bed F (n=16)	Feature (n=24)
1	0.0	5.3	1.6	0.0	0.0
1 to 3	0.0	15.8	6.3	12.5	4.2
3	42.9	31.6	47.6	31.3	29.2
3 to 5	14.3	5.3	19.0	12.5	12.5
5	14.3	26.3	14.3	18.8	25.0
5 to 10	0.0	7.9	3.2	18.8	4.2
10	14.3	7.9	1.6	6.3	20.8
20	14.3	0.0	3.2	0.0	4.2
unknown	0.0	0.0	3.2	0.0	0.0
total	100.0	100.0	100.0	100.0	100.0
Charred Deposits	Bed B (n=7)	B/C-Org. (n=38)	Bed CDE (n=63)	Bed F (n=16)	Feature (n=24)
interior	0.0	5.3	9.5	12.5	16.7
exterior	0.0	13.2	3.2	0.0	0.0
both	0.0	0.0	0.0	12.5	4.2
lip	0.0	0.0	85.7	75.0	79.2
none	100.0	81.6	1.6	0.0	0.0
total	100.0	100.0	100.0	100.0	

Table 6: Data analysis categoried by stratigraphic bed

Surface Treatment	Bed B (n=7)	B/C-Org. (n=38)	Bed CDE (n=63)	Bed F (n=16)	Feature (n=24)
Textile Impressed	14.3	18.4	1.6	6.3	12.5
Obliterated Textile	28.6	28.9	3.2	12.5	25.0
Plain-Smooth	28.6	28.9	12.7	6.3	20.8
Burnished	0.0	0.0	0.0	0.0	8.3
Wpg. Fab. Imp.	14.3	10.5	0.0	0.0	0.0
WFI Obliterated	0.0	0.0	0.0	0.0	4.2
sprang?	0.0	0.0	4.8	12.5	0.0
unknown	14.3	13.2	77.8	62.5	29.2
total	100.0	100.0	100.0	100.0	100.0
Temper Size	**Bed B (n=7)**	**B/C-Org. (n=38)**	**Bed CDE (n=63)**	**Bed F (n=16)**	**Feature (n=24)**
granule	0.0	2.6	4.8	6.3	0.0
very coarse sand	14.3	10.5	12.7	31.3	12.5
coarse-v. coarse	14.3	10.5	22.2	6.3	12.5
coarse	42.9	50.0	31.7	43.8	16.7
medium coarse	14.3	10.5	14.3	0.0	12.5
medium	14.3	0.0	6.3	0.0	12.5
fine sand	0.0	0.0	3.2	0.0	12.5
mixed	0.0	15.8	4.8	12.5	20.8
total	100.0	100.0	100.0	100.0	100.0
Temper Shape	**Bed B (n=7)**	**B/C-Org. (n=38)**	**Bed CDE (n=63)**	**Bed F (n=16)**	**Feature (n=24)**
rounded	0.0	0.0	1.6	0.0	4.2
granular	42.9	65.8	79.4	56.3	50.0
laminated	0.0	0.0	0.0	0.0	0.0
granular-laminated	42.9	13.2	7.9	25.0	0.0
granular-round	14.3	5.3	1.6	0.0	16.7
gritty	0.0	0.0	3.2	0.0	12.5
granular-gritty	0.0	13.2	4.8	18.8	16.7
granular-powdery	0.0	2.6	0.0	0.0	0.0
powdery	0.0	0.0	1.6	0.0	0.0
total	100.0	100.0	100.0	100.0	100.0
Paste Texture	**Bed B (n=7)**	**B/C-Org. (n=38)**	**Bed CDE (n=63)**	**Bed F (n=16)**	**Feature (n=24)**
flaky	14.3	25.0	52.4	68.8	12.5
laminated	28.6	14.3	14.3	6.3	16.7
blocky	14.3	14.3	9.5	6.3	12.5
gritty	0.0	25.0	3.2	6.3	33.3
grainy	28.6	10.7	7.9	0.0	8.3
compact	14.3	10.7	12.7	12.5	16.7
dense	0.0	0.0	0.0	0.0	0.0
unknown	0.0	0.0	0.0	0.0	0.0
total	100.0	100.0	100.0	100.0	100.0
Wear/ Abrasion	**Bed B (n=7)**	**B/C-Org. (n=38)**	**Bed CDE (n=63)**	**Bed F (n=16)**	**Feature (n=24)**
none	71.4	84.2	42.9	81.3	83.3
slight	28.6	13.2	52.4	18.8	12.5
severe	0	2.6	4.8	0.0	4.2
total	100.0	100.0	100.0	100.0	100.0

Table 6: Data analysis categoried by stratigraphic bed

Lip Orientation	Bed B (n=7)	B/C-Org. (n=38)	Bed CDE (n=63)	Bed F (n=16)	Feature (n=24)
int. bevelled	71.4	13.2	23.8	37.5	25.0
ext. bevelled	0.0	2.6	15.9	12.5	4.2
flat/straight	14.3	71.1	41.3	43.8	62.5
unknown	14.3	13.2	19.0	6.3	8.3
total	100.0	100.0	100.0	100.0	100.0
Lip Eversion	**Bed B (n=7)**	**B/C-Org. (n=38)**	**Bed CDE (n=63)**	**Bed F (n=16)**	**Feature (n=24)**
none	28.6	44.7	22.2	18.8	37.5
ext. slight	42.9	15.8	17.5	18.8	8.3
ext. extreme	0.0	7.9	7.9	12.5	12.5
int. slight	14.3	13.2	17.5	18.8	29.2
int. extreme	0.0	0.0	9.5	12.5	0.0
sym. Thick	14.3	13.2	23.8	18.8	8.3
sym. Thin	0.0	0.0	0.0	0.0	0.0
incipient 'L'	0.0	2.6	0.0	0.0	0.0
unknown	0.0	2.6	1.6	0.0	4.2
total	100.0	100.0	100.0	100.0	100.0
Lip Surface	**Bed B (n=7)**	**B/C-Org. (n=38)**	**Bed CDE (n=63)**	**Bed F (n=16)**	**Feature (n=24)**
flattened	0.0	39.5	42.9	43.8	45.8
concave	0.0	0.0	1.6	6.3	0.0
convex	85.7	15.8	36.5	43.8	12.5
rounded	14.3	18.4	17.5	6.3	29.2
modified	0.0	23.7	0.0	0.0	12.5
unknown	0.0	2.6	1.6	0.0	0.0
total	100.0	100.0	100.0	100.0	100.0
Rim Shape	**Bed B (n=7)**	**B/C-Org. (n=38)**	**Bed CDE (n=63)**	**Bed F (n=16)**	**Feature (n=24)**
thickened	0.0	5.3	22.2	25.0	0.0
unthickened	42.9	63.2	36.5	43.8	58.3
thinned	14.3	18.4	9.5	12.5	25.0
unknown	42.9	13.2	31.7	18.8	16.7
total	100.0	100.0	100.0	100.0	100.0
Rim Shape	**Bed B (n=7)**	**B/C-Org. (n=38)**	**Bed CDE (n=63)**	**Bed F (n=16)**	**Feature (n=24)**
moderate outflare	14.3	15.8	19.0	31.3	25.0
pronounced outfla	14.3	5.3	6.3	12.5	0.0
incurved	0.0	0.0	3.2	0.0	4.2
incipient-s	0.0	5.3	0.0	6.3	16.7
s-shaped	0.0	0.0	0.0	0.0	4.2
vertical	0.0	18.4	1.6	0.0	4.2
rolled	0.0	0.0	4.8	0.0	0.0
unknown	71.4	55.3	65.1	50.0	45.8
total	100.0	100.0	100.0	100.0	100.0
Decorated?	**Bed B (n=7)**	**B/C-Org. (n=38)**	**Bed CDE (n=63)**	**Bed F (n=16)**	**Feature (n=24)**
yes	57.1	71.1	88.9	93.8	83.3
no	42.9	28.9	11.1	6.3	16.7
total	100.0	100.0	100.0	100.0	100.0

Table 6: Data analysis categoried by stratigraphic bed

Possible Push Factors	Possible Pull Factors
raiding	group safety
warfare	increased distance from endemic hostility
shortage of suitable habitation sites in safe areas	good habitation site
shortage of arable land	well-drained sandy soil
drought	cheap, direct migration route
coercive, agressive Oneota	abundance of required natural resources*
southern part of Red River corridor possibly caught between east-west	ability to continue using existing technological system
south is heavily occupied = obstacles on the way	lower relative population density

*riverine, prairie (w. side of river), woodland (e. side of river) wetland (Netley Marsh) plus local raw materials including workable clay, cherts, wood, permanent water course

Table 8: Push-pull factors influencing decision to migrate to Lockport

Source	Dates	Proxy Data	Location	Visible Effect	Archaeological Correlate
Hall 1988	150-950 AD	humic soil formation, rodent, mollusk, pollen	Osage Plains, Oklahoma	warm moist interval	increased site visibility
Gregg 1985	600-1050 AD	pollen, sedimentological	central and northern Plains	warm, moist interval	population growth, expansion of agriculture
Cronin, 1999	900-1100AD	sea surface temperatures	northern hemisphere	1 degree C. elevation	none cited
Grove and Swistur 1994	900 - 1200 AD	forest advances and glacial retreat	Canadian Rockies	warm summers	none cited
Hall 1988	950 - 1100 AD	humic soil formation, rodent, mollusk, pollen	Osage Plains, Oklahoma	warm, dry interval	apparent occupational gaps possibly caused by erosion
Gregg 1985	1050-1250 AD	pollen, sedimentological	central and northern Plains	drought	abandonment of some areas, development of fortified villages, increased inter-group conflict
Hughes and Diaz 19954	1090-1450 AD	tree rings	Sierra Nevada	warm summers	none cited
Jirikowic and Damon 1994	1100-1250 AD	isotopic and historical records show Medieval Solar Maximum	global	possible factor in MWP	none cited
Hughes and Diaz 1994	1110-1350 AD	tree rings	Polar Urals	warm summers	none cited
Larson and Michaelson, 1990	1120-1150 AD	tree rings, stream flow volumes, historic records	southern Great Basin	severe drought	widespread abandonment
Gregg 1990	1200's AD	aeolian sediments	North Dakota	severe drought	abondonment of uplands
Hughes and Diaz 1994	1200's AD	glacial retreat	Northern Europe	warm, dry summers	none cited
Raab and Larson 1997	1209-1350 AD	tree rings, lake stands	Sierra Nevada	"epic" drought	Site abandonment, high rates of disease, increasing levels of inter-group violence
Creel, Scott, and Collins 1990	1300's	fluvial sedimentology	southern Plains	moist interval following drought	impacts on large game resources – 900-1300 AD: few bison, 1300-1650 many bison
Lamb 1982	mid 1300's	historic records, tree rings, storm data, glacial re-advance	Northern Europe	cold wet interval	farms abandoned, increased disease, crop failure, Norse settlements fail, ergot outbreaks, flooding

Table 9: Selected sources and evidence for MWP/LIA climate change

Appendix III

Explanation of ceramic analysis categories

Appendix III
Analysis categories

GENERAL SITE INFORMATION

These data were recorded for data management purposed only.
This area also allowed for a brief condition report, a small sketch, and photo record data if required. Sketches were made of all sherds.

SUMMARY PROVENIENCE DATA

"Year", "Bed". "Origin of Feature" were used as data management tools. With the exception of "Bed", these were not included in the analysis.

"Type", "Affiliation", and "Tradition" are explained in Chapter 7: Methods and Techniques and Chapter 8: Data Description and Analysis

PHYSICAL CHARACTERISTICS

A) FABRIC

1) TEMPER/INCLUSIONS

TYPE was identified according to the following categories (limestone is presumed to be a natural inclusion):

a) grit (crushed granite, including fragments of quartz, feldspar, mica etc.;
b) grit and sand
c) sand (like grit but greater numbers of smaller, more rounded particles)
d) grog (crushed pottery)
e) grit and grog
f) shell (crushed mollusk shell)
g) grit and shell
h) grit and limestone
i) limestone
j) sand and limestone

DENSITY was defined according to categories established in Rice (1987). These were initially designated in the numbered categories, 1%, 3%, 5%, 10% and 20%; however, it was necessary to use intermediate categories to accommodate the variability visible in individual sherds. It is important to note that these "percentages" are based on a diagrammatic representation rather than on weight ratios of clay to temper. It may be that the physical measurement of clay and temper would yield quite different percentages. The categories were important in order to allow consistency of measurement but may not accurately reflect temper to clay ratios in a strict numerical sense.

a) 1%
b) 1% -3%
c) 3%
d) 3%-5%
d) 5%
e) 5%-10%
f) 10%
g) 20%
h) unknown (particles too small or too dense for an accurate point count)

SIZE is also based on Rice (1987:38) in an adapted version of the classic Wentworth scale. Intermediate categories were used to accommodate particle sizes that did not fall neatly into a single range.

a) granule 2 - 4 mm
b) very coarse sand 1 - 2 mm
c) coarse- very coarse sand
d) coarse sand .5 - 1 mm
e) medium - coarse sand
f) medium sand .25 - .5 mm
g) fine sand .1 - .25
h) mixed (as in with grit and sand together)

Temper shape describes the shape of the visible particles in the sherd without respect to size. However, the shape also ends up describing the type of temper

as different inclusions have different characteristic shapes. For instance, granular shape is characteristic of grit temper, while gritty shape is characteristic of sand.

SHAPE was based on the physical appearance of the temper particles as described below.

1) rounded
2) granular (angular or faceted)
3) laminated (like mica)
4) gritty (like sand)
5) powdery (like limestone or disintegrated shell)

2) PASTE

TEXTURE describes the look of the fired clay along the broken edge of the sherd according to categories established below.

a) Flaky (loose and unstructured like pie crust
b) laminated (structured layers)
c) blocky (like a developed clay-loam horizon in a dry wall profile)
d) gritty (as with a sand temper)
e) grainy (denser, more finely textured than gritty;
f) compact (few visible layers or spaces;
g) dense (appearing hard and highly fired.

HARDNESS -- discarded as an analytical category

B) <u>METRIC DATA</u>

1) SHERD THICKNESS was measured in millimeters with sliding calipers.
LIP thickness was measured at the lip-rim junction
RIM thickness
SHOULDER thickness was measured at the shoulder inflection. Mostly this portion of the vessel was not present.
BODY thickness was measured below the shoulder inflection. This portion of the

the vessel was rarely present
UNKNOWN was applied where there was not enough sherd to measure, or where there was significant spalling.

2) SHERD WEIGHT -- discarded as an analytical category

3) WATER WORN was a subjective assessment of the degree of abrasion visible on the sherd. The sherd was then assigned to one of three categories a) severely; b) slightly; c) not at all

4) CHARRED DEPOSITS was used to assess the presence or absence of charred remains on the various surfaces of the rim sherd.

MANUFACTURE

A) FORMING -- discarded as an analytic category
B) FINISHING
1) SURFACE TREATMENT was designed to assess the surface treatment on the exterior of the vessel. However, since surface treatment is mainly visible below the rim, the majority of rims had to be designated "unknown"

VESSEL CHARACTERISTICS

A) MORPHOLOGY

1) LIP
ORIENTATION
Lip orientation was described according to the following categories.
a) interiorly bevelled
b) exteriorly bevelled
c) flat/straight

EVERSION
Lip eversion was described according to the following categories.
a) none

b) exterior slight
c) exterior extreme
d) interior slight
e) interior extreme
f) symmetrically thickened

SURFACE
Lip surface was described according to the following categories.
a) flattened
b) concave
c) convex
d) rounded

2) RIM
SHAPE
Rim shape was described according to the following categories.
a) thickened
b) thinned
c) unthickened

ORIENTATION
Rim orientation was described according to the following categories.
a) pronounced outflare
b) moderate outflare
c) vertical
d) incurved
e) rolled
f) S-shaped
g) incipient 'S'

RIM/BODY ANGLE
The measurement of rim/body angle is described in Chapter 7: Methods and Techniques and Chapter 8: Data Description and Analysis

MOUTH FLARE ANGLE

The measurement of mouth flare angle is described in Chapter 7: Methods and Techniques and Chapter 8: Data Description and Analysis

3) BODY

ESTIMATED VESSEL CIRCUMFERENCE

The measurement of the estimated vessel circumference at orifice is described in Chapter 7: Methods and Techniques and Chapter 8: Data Description and Analysis

B) DECORATION

1) PLASTIC TECHNIQUES

DECORATED

This category was used to differentiate between decorated and undecorated vessels. However, undecorated rims are not always indicative of undecorated vessels, especially on Northeastern Plains vessels where decoration is highly zoned and may include large portions of undecorated surface.

APPENDAGES

This category was used to indicate the presence or absence of lip tabs, handles, effigies or other attachments. Lip decorative techniques may include "Tabs" which are small nodes of clay pulled up from the otherwise flat lip surface. "Notches" which are pressed into the lip surface with a variety of tools and may be shallow or quite deep. And "Castellations" which can be either larger tabs or very deep notches that stand up from the surface of the lip. These may be applied separately or pinched off the vessel while the paste is still wet. These occur on the lip of a vessel and may very in size.

TYPE

a) incipient tab: An incipient tab describes a very small lip tab, pulled up from the surface of the lip. It resembles more a bump on the lip surface than an actual tab.

b) tab: A lip tab is larger than an incipient tab, generally .5 cm or greater. They frequently occur in fours, to divide the vessel into quarters but may be found in greater multiples as well.

c) handle: A handle is an applied loop or strap that generally articulates at the lip or rim. These are not usually present on Late Woodland vessels in this area.They are more common on Oneota vessels.

d) castellation: A castellation resembles a lip tab but is squared off to resemble the top of a castle wall. These may occur regularly around the surface of the vessel frequently appearing as extra deep cord-wrapped object impressions.

e) effigy: This category describes the presence of small animal-like appliques on the rim, neck, or shoulder of the vessel.

f) broken: Broken handles, effigies, lip tabs etc. will leave an area of roughness behind. The nature of the attachment will not be known, but it is possible to tell that something was present during the use-life of the vessel.

g) none: Self-explanatory.

LOCATION

The location of the appendage was assessed according to decorative zones outlined below under #4 Arrangement.

SIZE

Where appendages were present they were measured in two dimensions, length and width, in millimeters.

STAMPS

These were described first as present or absent.

TECHNIQUE

The type of tool used to make the stamp was assessed using a piece of soft plasticene to make an impression of the stamp. This frequently allowed the tool to be identified, especially in the case of cord-wrapped tool edge, where the marks of the cordage on the edge of the tool could be easily seen. Other tools were described as angular tool edge, angular tool end, rounded tool edge,

rounded tool end, other, and unknown.

LOCATION of the stamps was assessed according to the decorative zones described below

SHAPE of the stamps was described according to the following categories:
a) round -- round (obviously)
b) ovoid -- like round but more oval, longer than it is wide.
c) rectilinear -- a skinny rectangle with or without rounded edges.
d) rectangular -- rectangular
e) square -- square
f) other -- described on analysis sheet where required.

METRICS
Where present, stamps were measured in three dimensions, length, width, and depth in millimeters.

4) ARRANGEMENT:
Location:
The placement of decorations on the surface of the vessel was described according to a series of zones.
a) Zone 1 is the interior rim;
b) Zone 2 is the surface of the lip;
c) Zone 3 is the area immediately below the lip. After this, all zones are defined by their location relative to Zone 3;
d) Zone 3a is immediately below 3;
e) Zone 3b is immediately below 3a etc.

Motif:
This describes the arrangement of the decorative elements. Rows of punctates, oblique or horizontal cord-wrapped object impressing, trailed line decorations in linear or curvilinear shapes etc. may all be found on the lip, rim, neck, and shoulder of a vessel.

Technique:
This is used to describe the decorative element itself.

a) "Cord-wrapped object impressed" (usually abbreviated as "cwoi") is understood to mean some sort of tool such as thin bone, stick or twig wrapped with cordage frequently arranged in horizontal rows or lines of parallel obliques encircling the lip, rim, or neck, or all of those together.

b) A "punctate" is a hole in the outside of the sherd made by pressing a rounded object into the surface of wet clay.

c) A "boss" is the reverse of a punctate and leaves a small bump on the surface. Bosses and punctates may occur on either the interior or exterior surface.

d) A "stamp" is generally a small impression on the surface of the vessel which is wider than it is deep. A stamp may occur in a variety of shapes and sizes.

e) Decoration is described as "trailed" when it occurs in straight or curvilinear lines that are wider than they are deep. Trailed decoration is applied to wet paste possibly with with a small, smooth spatulate tool.

f) Incised lines, on the other hand, are deeper and narrower and are applied to drier, perhaps leather hard paste with a pointier tool.

5) NON-PLASTIC TECHNIQUES

a) slip: Slip is a suspension of fine clay particles in water with or without a colourant/oxide that is applied to the surface of a vessel when it is leather hard. This slip will add durable colour to the surface of the vessel, generally in tones of red, black, white, or yellow. No vessels with applied slip decoration were present in the collection from EaLf- 1

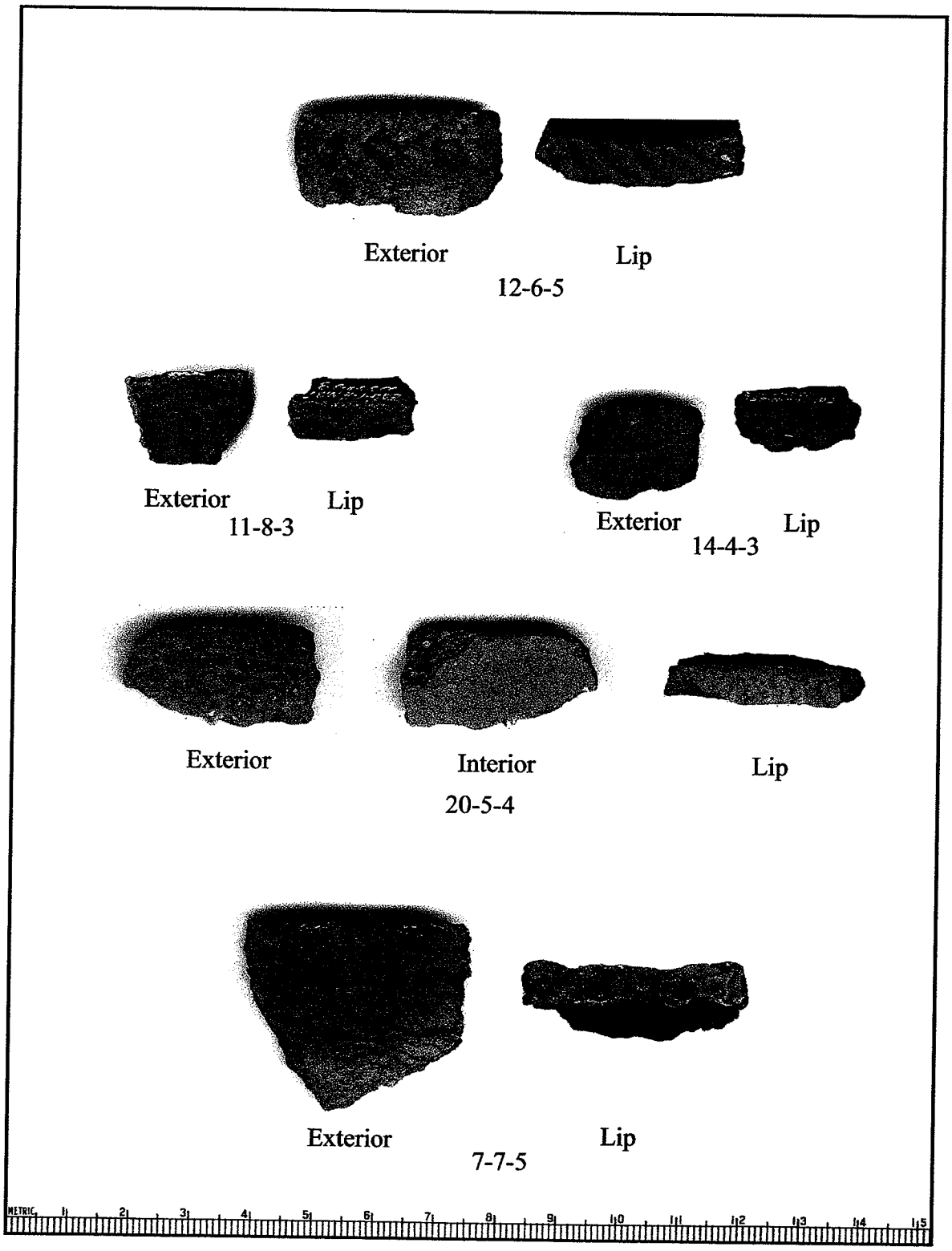
b) wash: A wash is a suspension of colourant or oxide (usually iron) in water. This is applied to the surface of the vessel before or after firing and will leave a residue on the surface. Ochre (red iron oxide) is sometimes found on the exterior surfaces of vessels from this area.

c) present but unknown: This was a contingency category that, in the end, was not required.

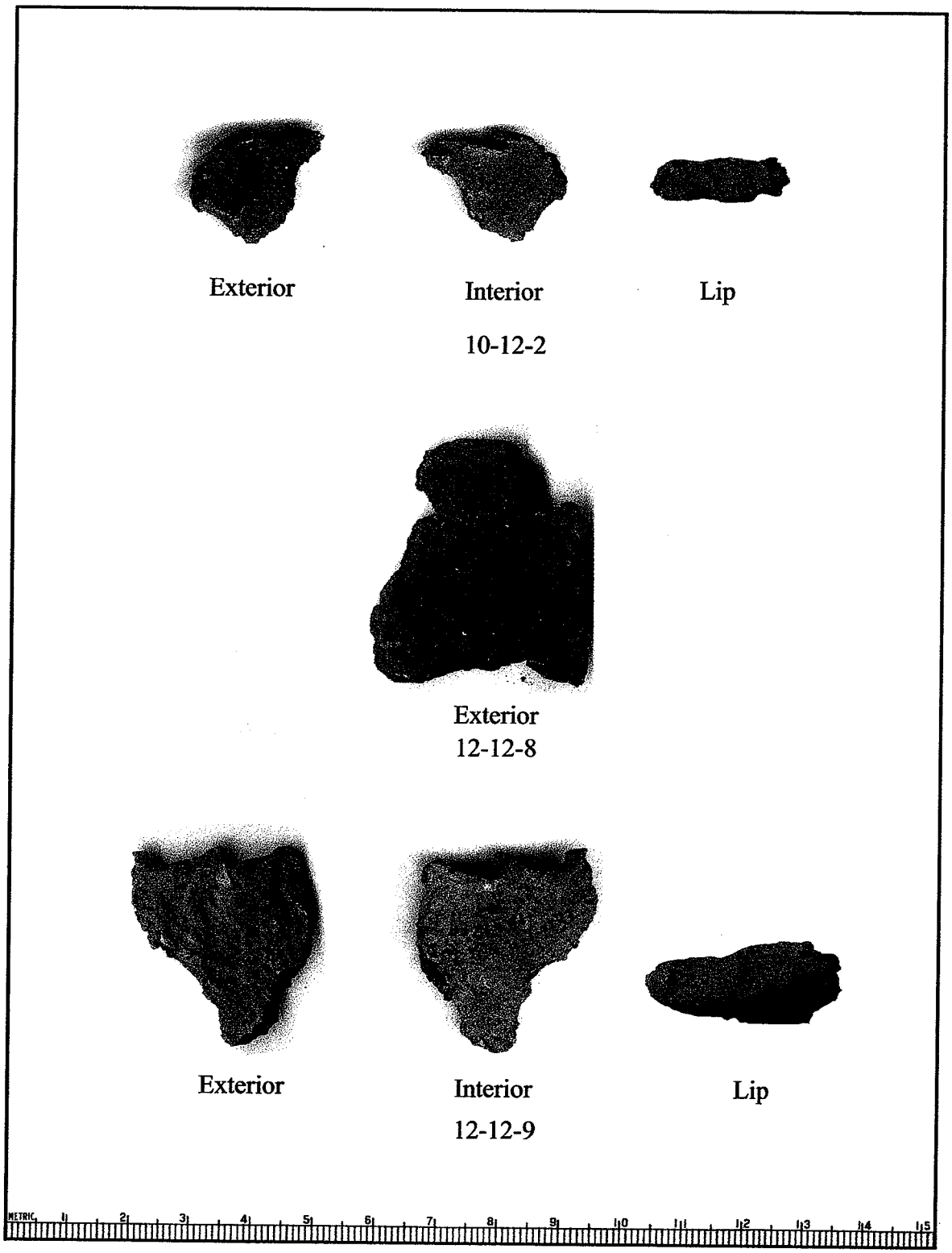
d) none.

Appendix IV

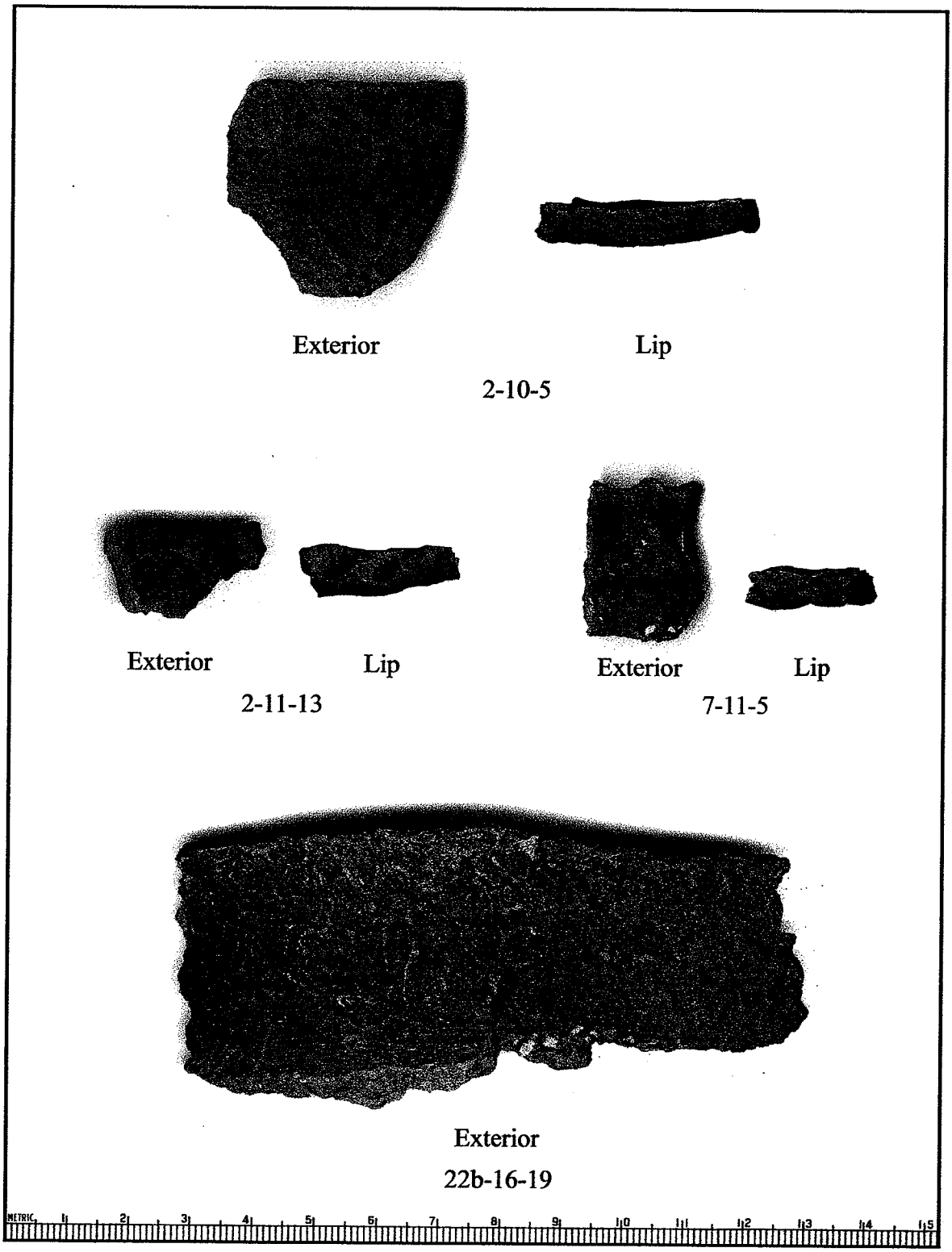
Rim sherd photographs


Exterior
Lip
12-6-5
Exterior
Lip
11-8-3
Exterior
Lip
14-4-3
Exterior
Interior
Lip
20-5-4
Exterior
Lip
7-7-5
METRIC

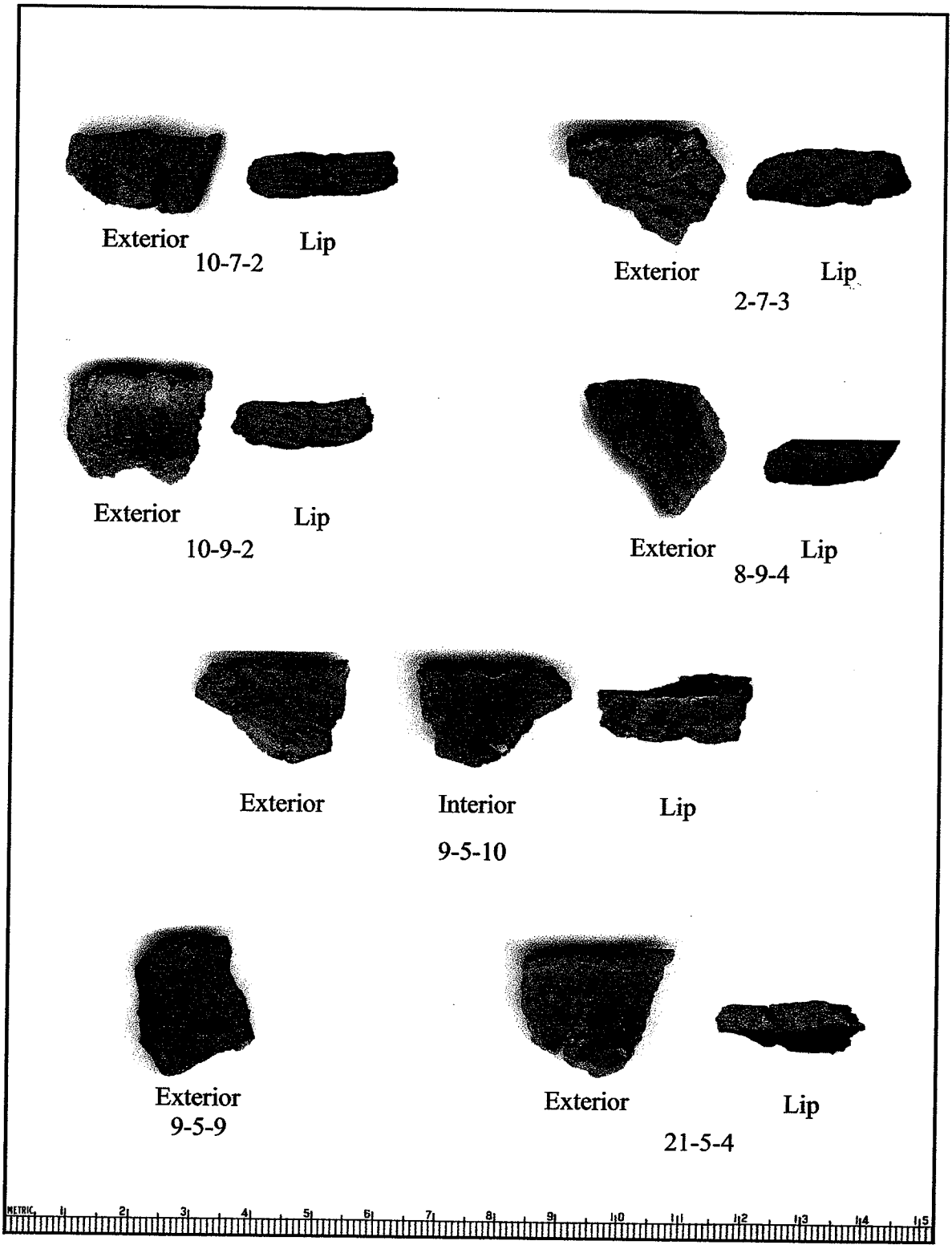
Bed B



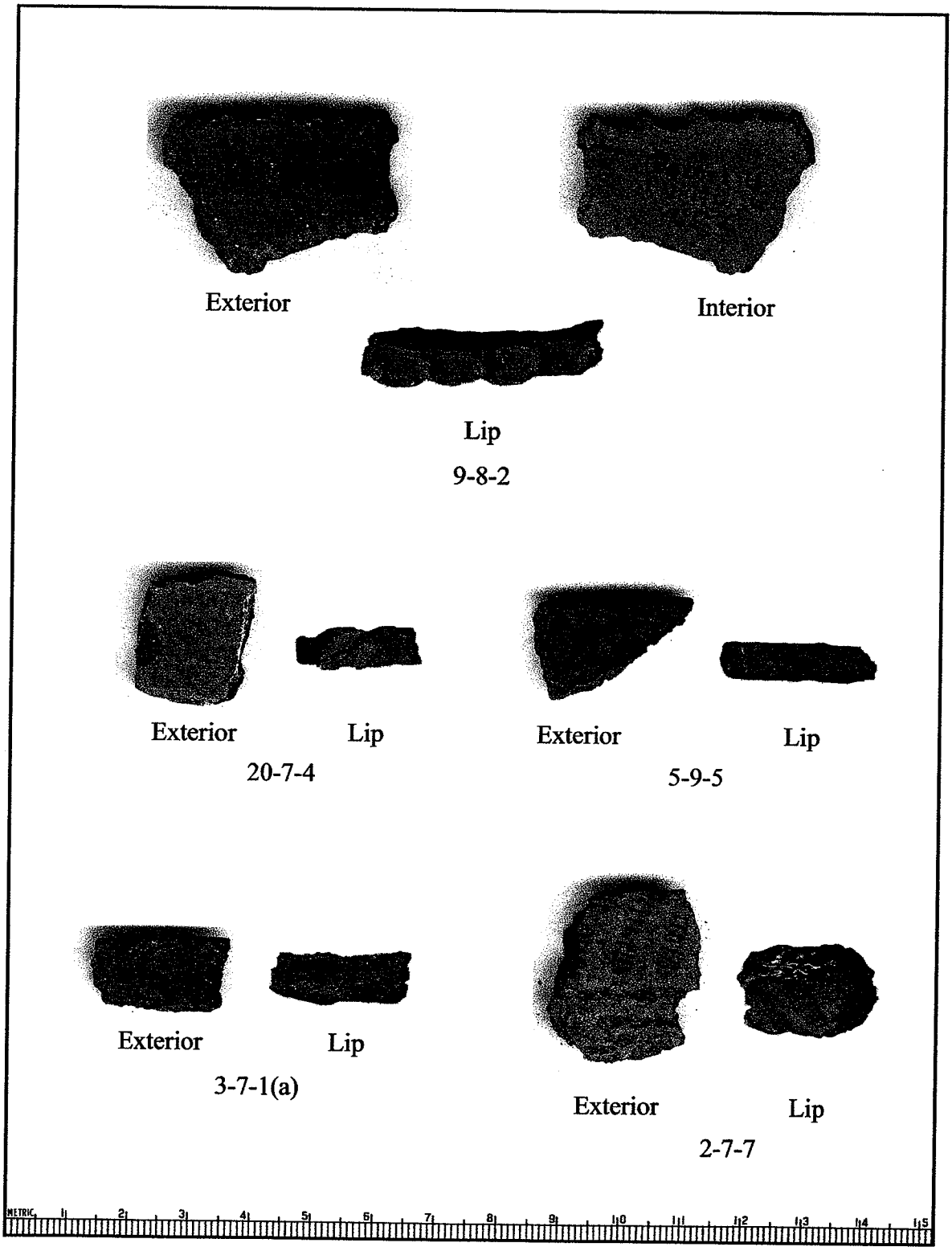
Organic Layer



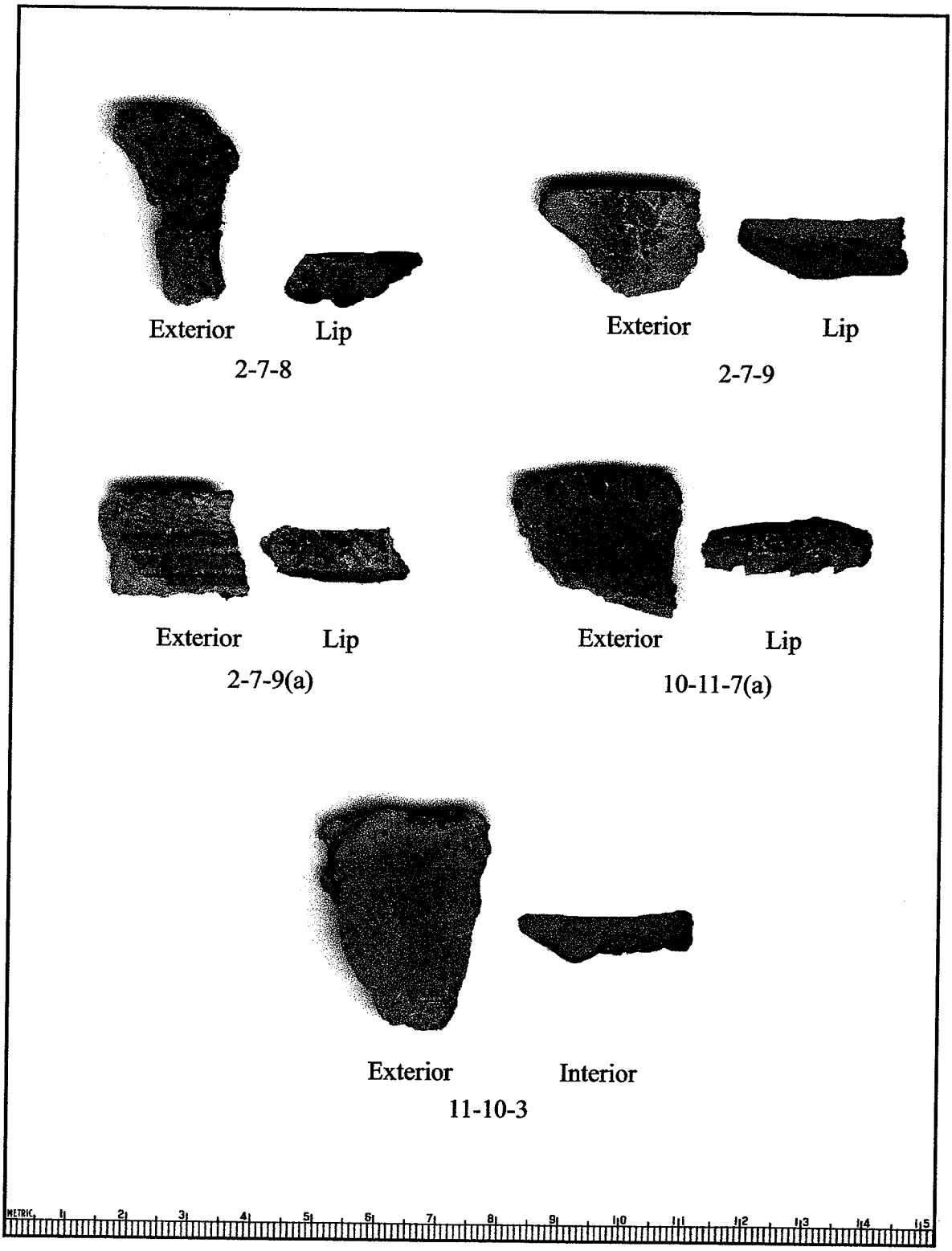
Organic Layer


Exterior
Lip
10-7-2
Exterior
Lip
2-7-3
Exterior
Lip
10-9-2
Exterior
Lip
8-9-4
Exterior
Interior
Lip
9-5-10
Exterior
9-5-9
Exterior
Lip
21-5-4
METRIC

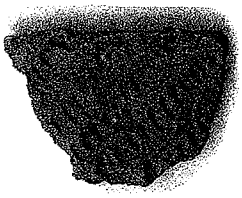
Bed B/C


Exterior
Interior
Lip
9-8-2
Exterior
Lip
20-7-4
Exterior
Lip
5-9-5
Exterior
Lip
3-7-1(a)
Exterior
Lip
2-7-7
METRIC

Bed B/C


Exterior
Lip
2-7-8
Exterior
Lip
2-7-9
Exterior
Lip
2-7-9(a)
Exterior
Lip
10-11-7(a)
Exterior
Interior
11-10-3
METRIC

Bed B/C

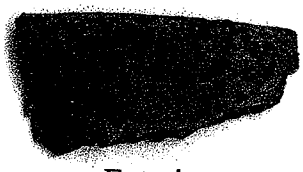


Exterior

Interior

Lip

11-W-9

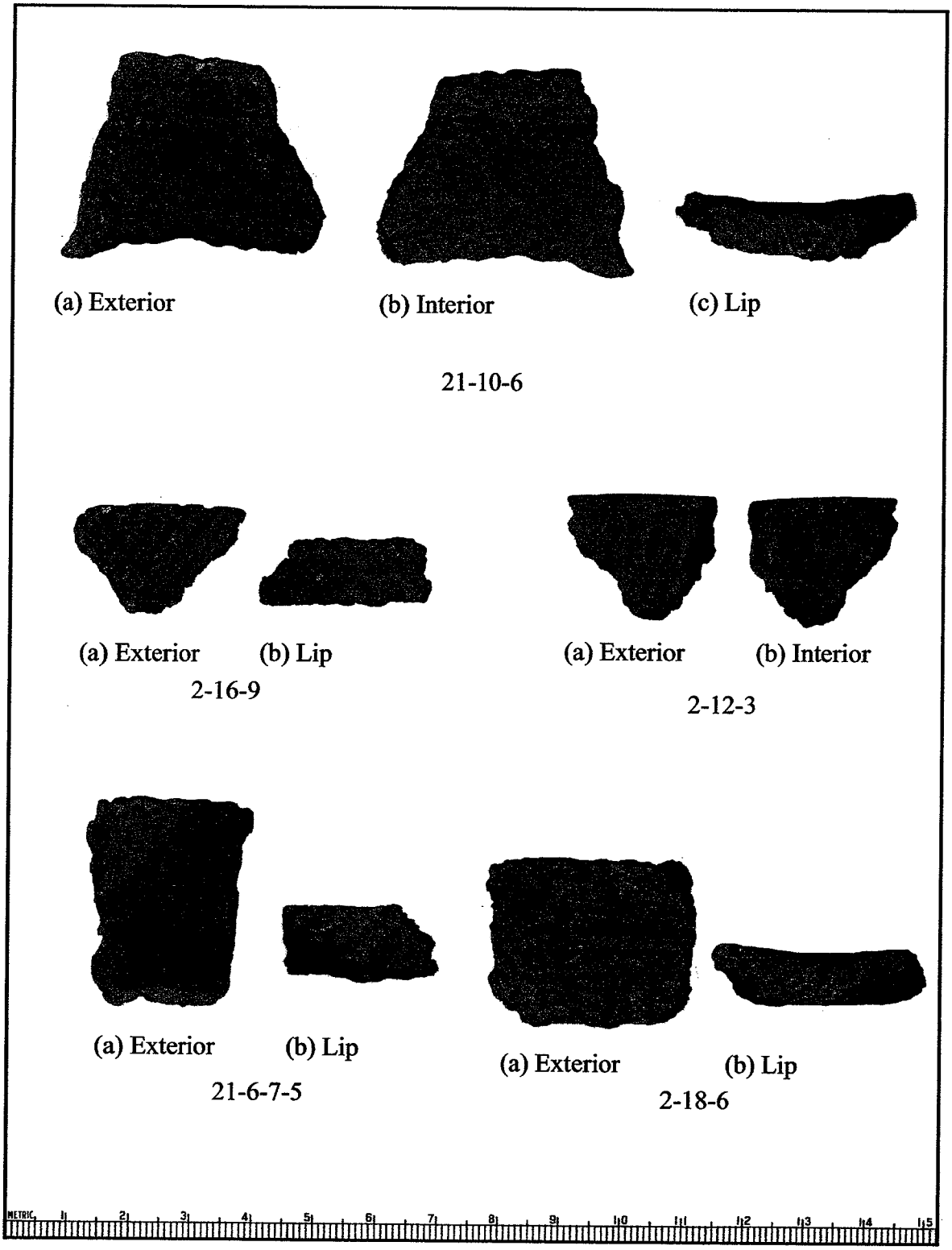


Exterior

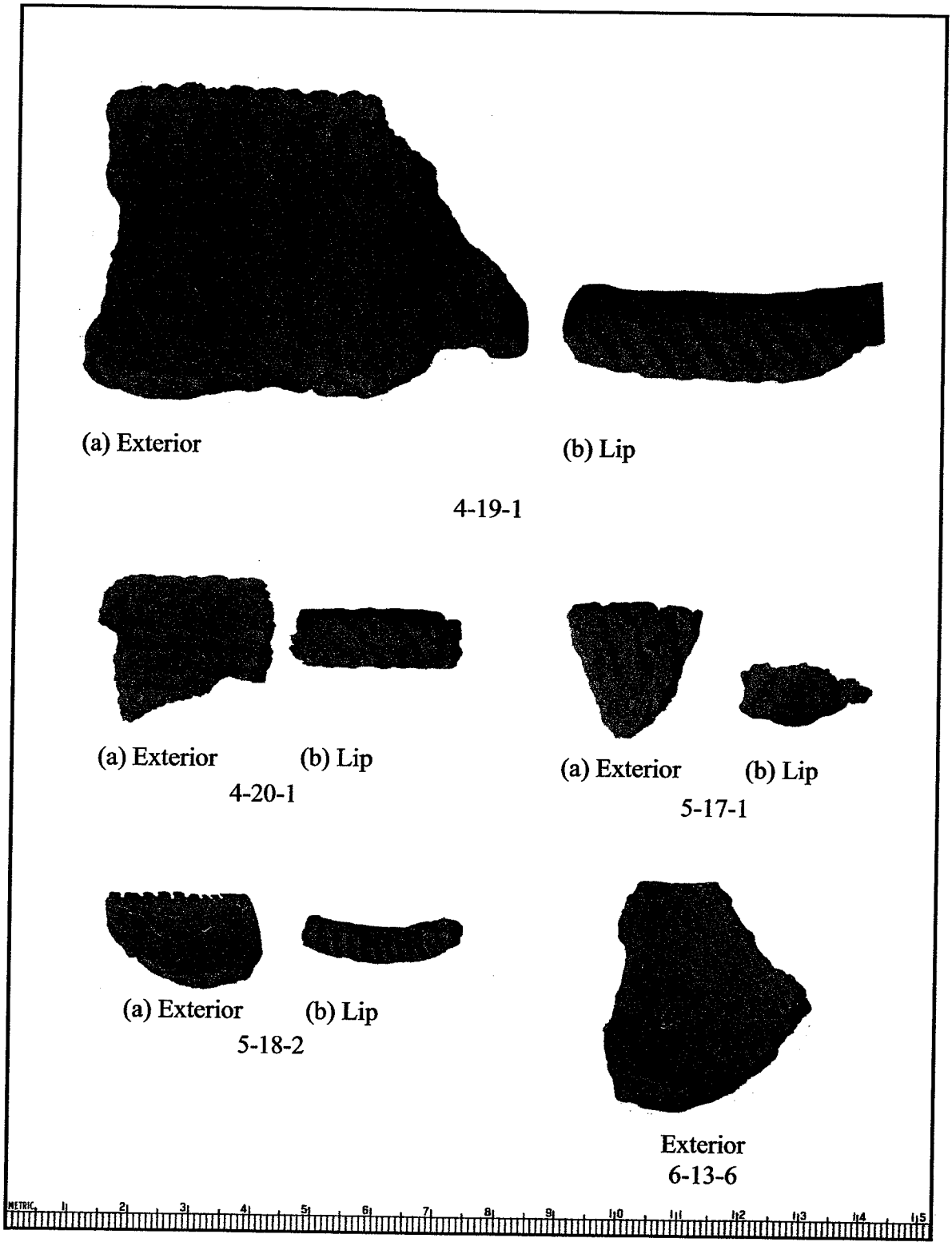
Lip

11-8-7

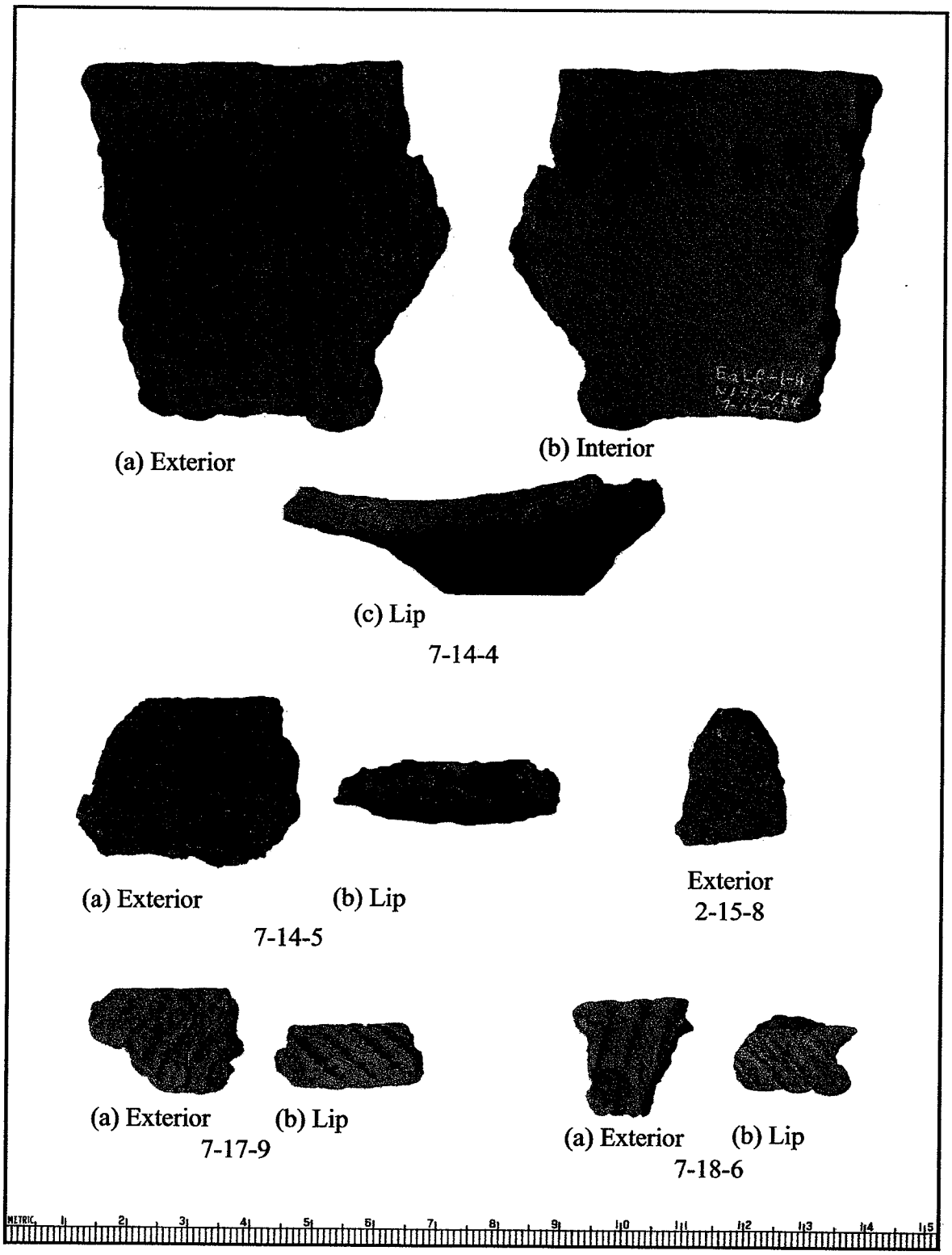
Bed B/C


(a) Exterior
(b) Interior
(c) Lip
21-10-6
(a) Exterior
(b) Lip
2-16-9
(a) Exterior
(b) Interior
2-12-3
(a) Exterior
(b) Lip
21-6-7-5
(a) Exterior
(b) Lip
2-18-6
METRIC

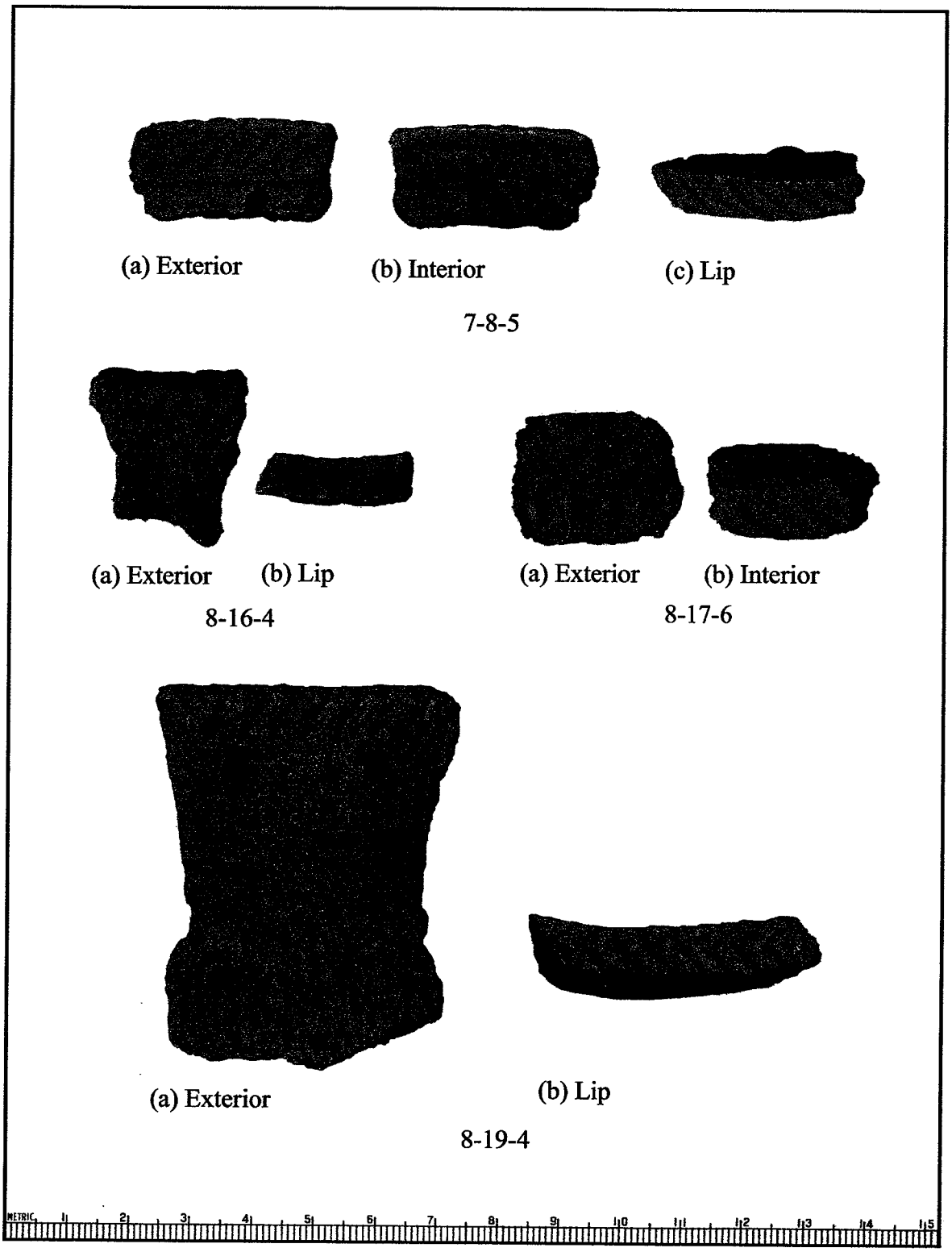
Bed CDE


(a) Exterior
(b) Lip
4-19-1
(a) Exterior
(b) Lip
4-20-1
(a) Exterior
(b) Lip
5-17-1
(a) Exterior
(b) Lip
5-18-2
Exterior
6-13-6
METRIC

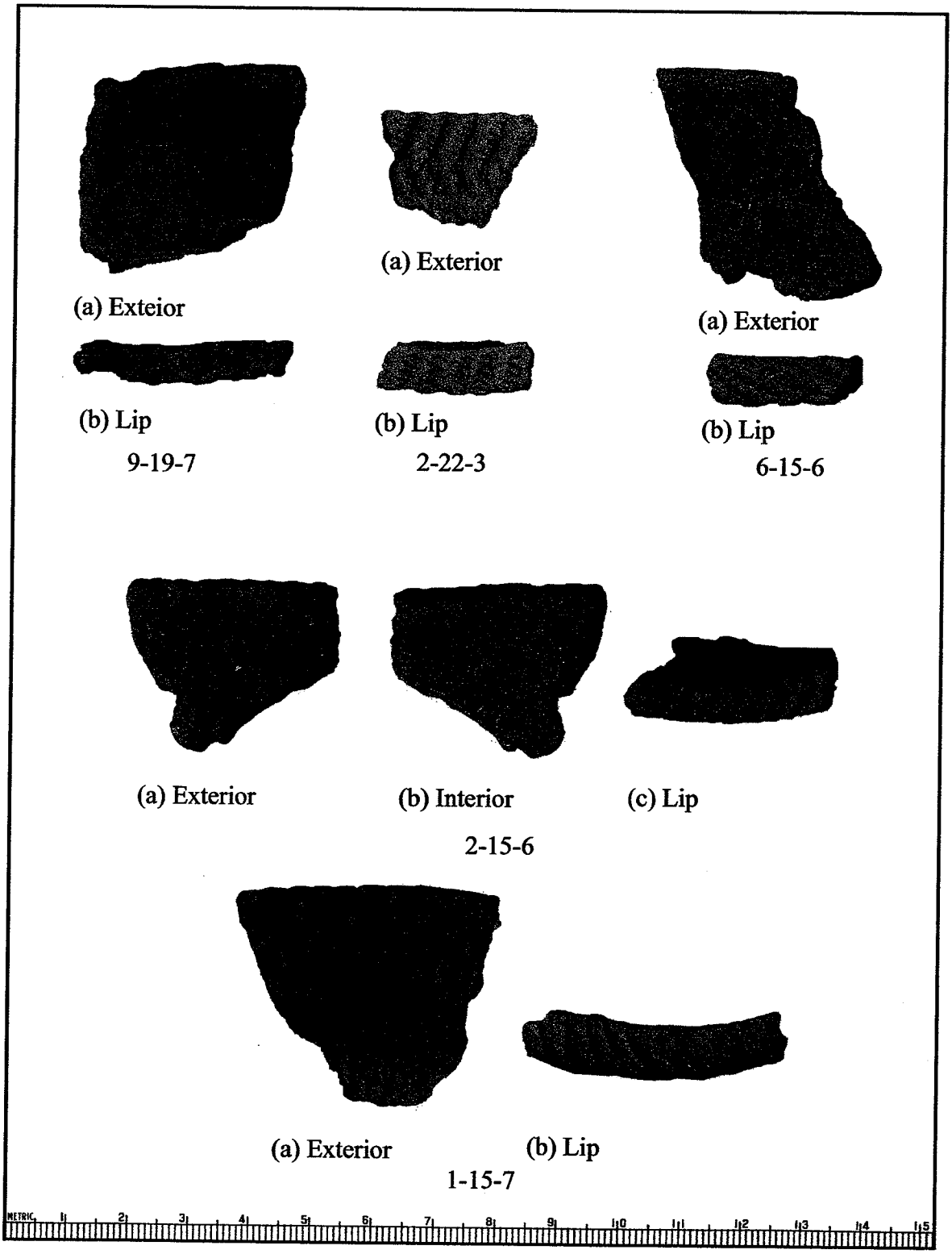
Bed CDE


(a) Exterior
(b) Interior
(c) Lip
7-14-4
(a) Exterior
(b) Lip
7-14-5
Exterior
2-15-8
(a) Exterior
(b) Lip
7-17-9
(a) Exterior
(b) Lip
7-18-6
METRIC

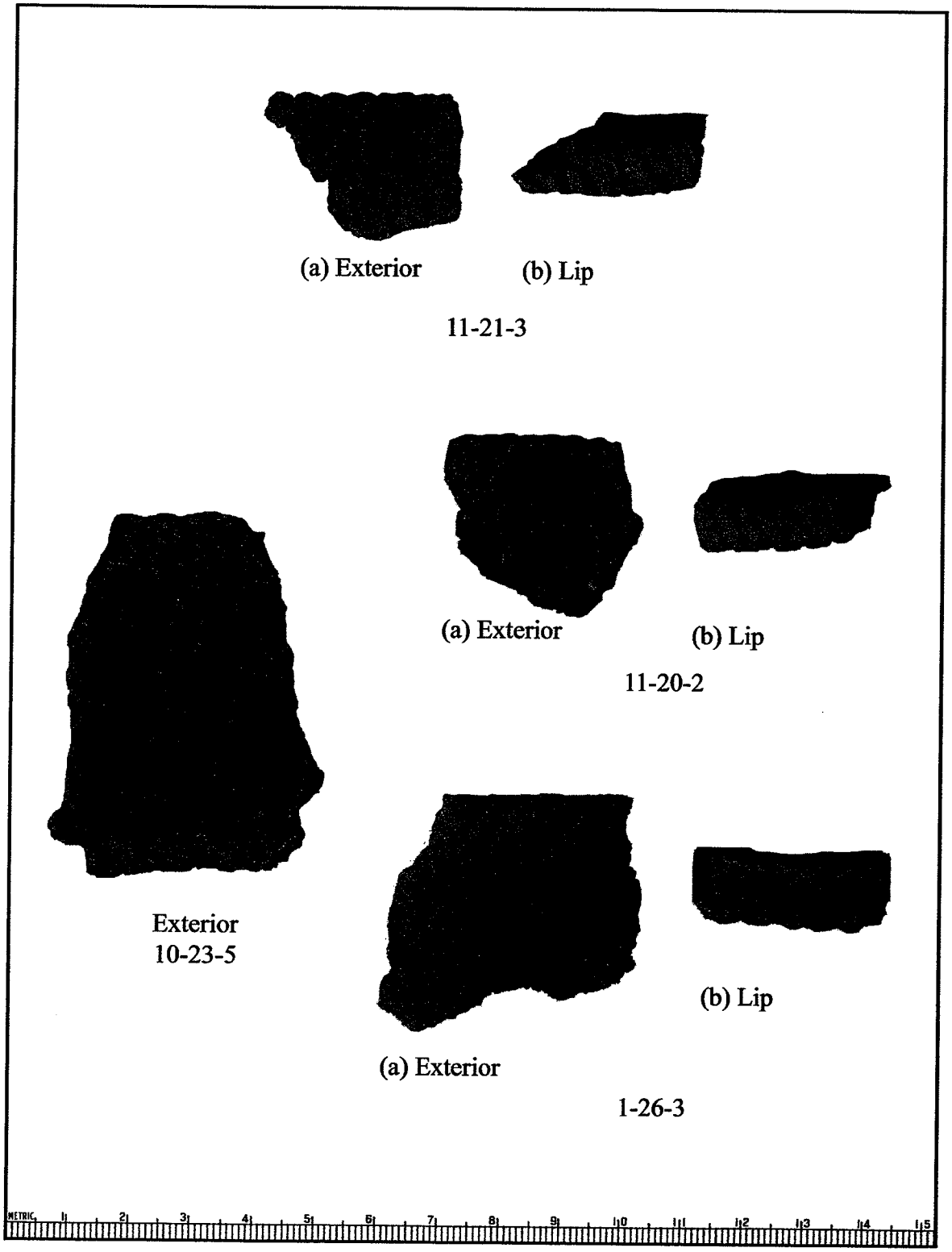
Bed CDE


(a) Exterior
(b) Interior
(c) Lip
7-8-5
(a) Exterior
(b) Lip
8-16-4
(a) Exterior
(b) Interior
8-17-6
(a) Exterior
(b) Lip
8-19-4
METRIC

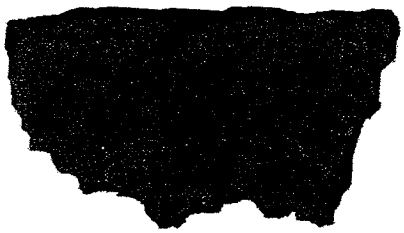
Bed CDE


(a) Exteior
(a) Exterior
(a) Exterior
(b) Lip
9-19-7
(b) Lip
2-22-3
(b) Lip
6-15-6
(a) Exterior
(b) Interior
(c) Lip
2-15-6
(a) Exterior
(b) Lip
1-15-7
METRIC

Bed CDE


(a) Exterior
(b) Lip
11-21-3
(a) Exterior
(b) Lip
11-20-2
Exterior
10-23-5
(b) Lip
(a) Exterior
1-26-3
METRIC

Bed F



Exterior
21-23-4

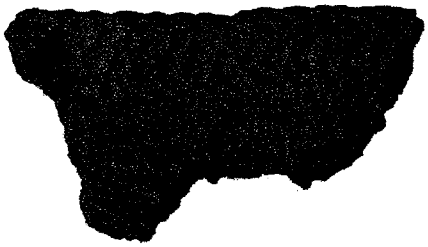
Exterior
1-26-5

(a) Exterior

(b) Lip

15-22-1

Exterior
6-23-2

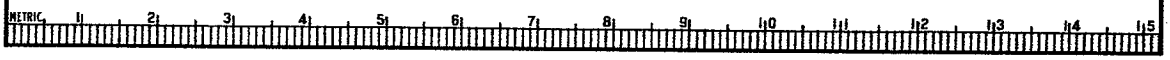


(a) Exterior

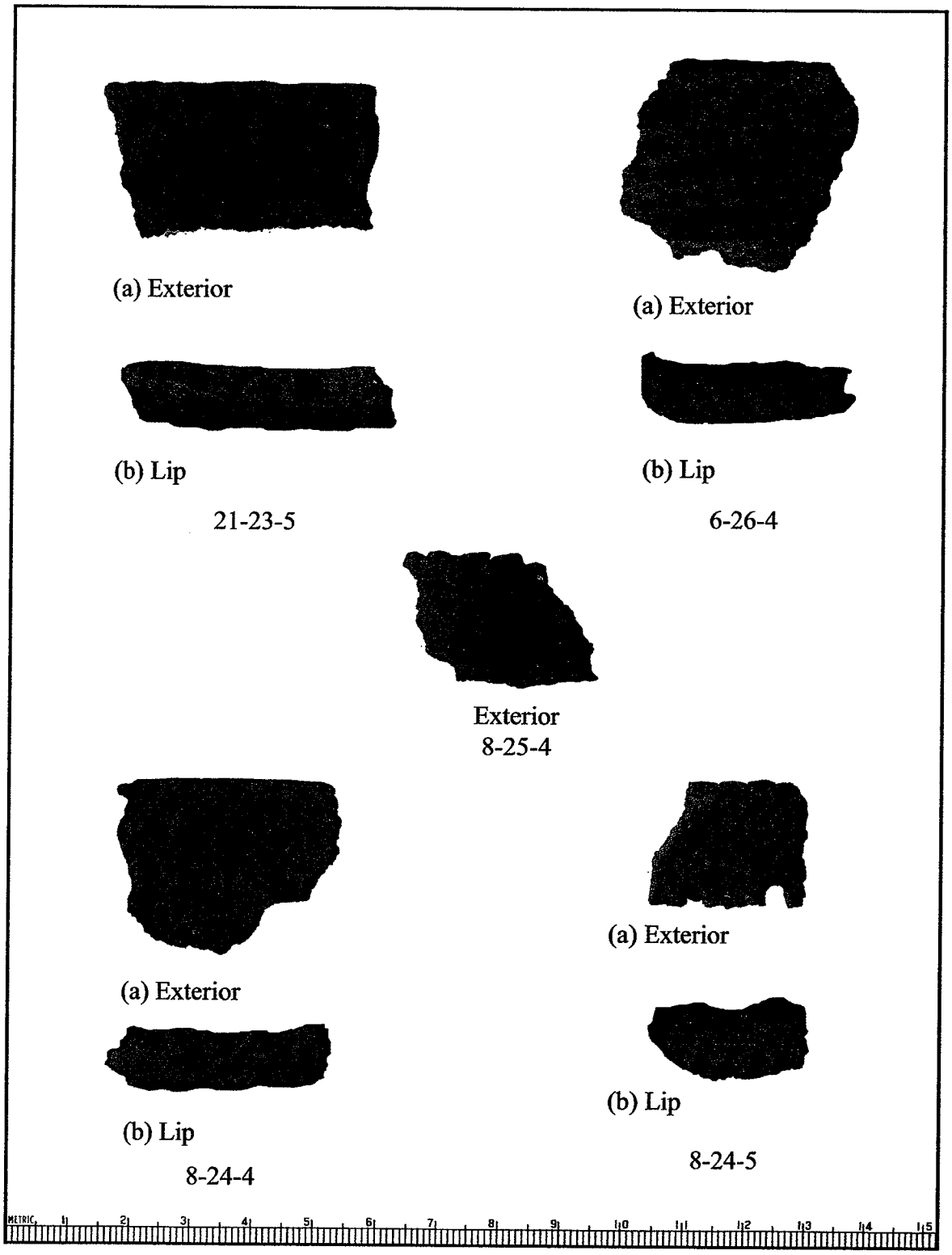
(b) Interior

(c) Lip

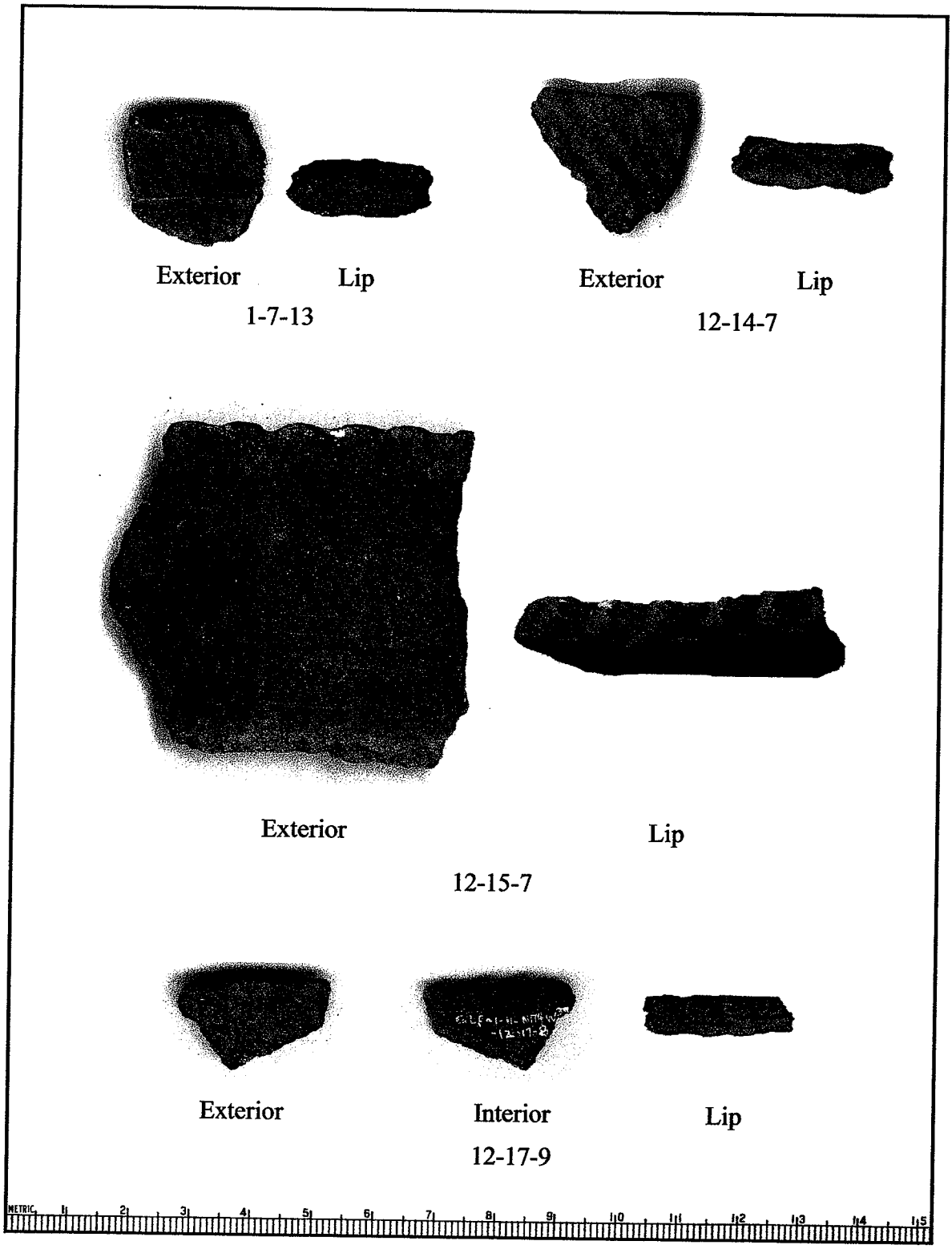
15-23-1



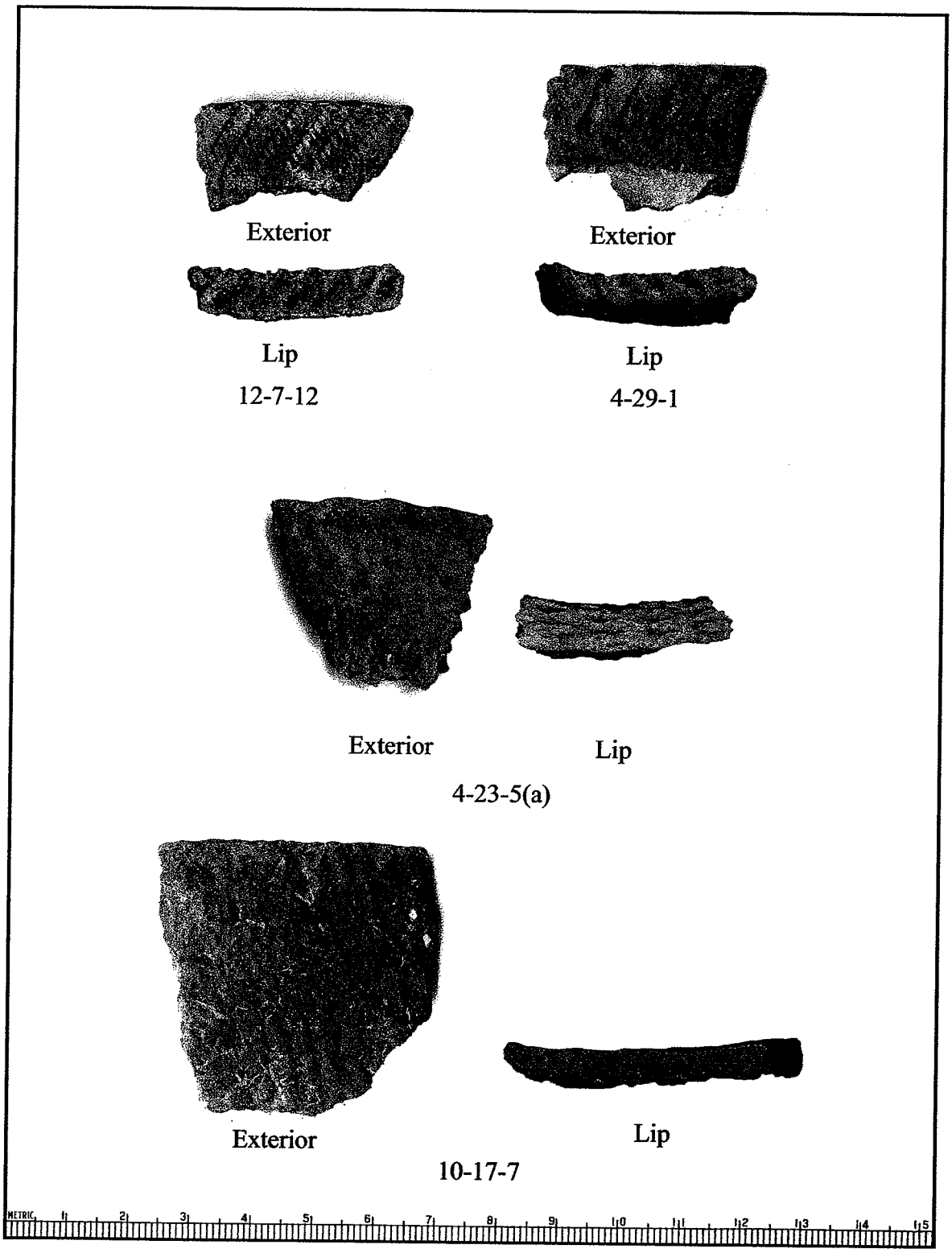
Bed F


(a) Exterior
(b) Lip
21-23-5
(a) Exterior
(b) Lip
6-26-4
Exterior
8-25-4
(a) Exterior
(b) Lip
8-24-4
(a) Exterior
(b) Lip
8-24-5
METRIC

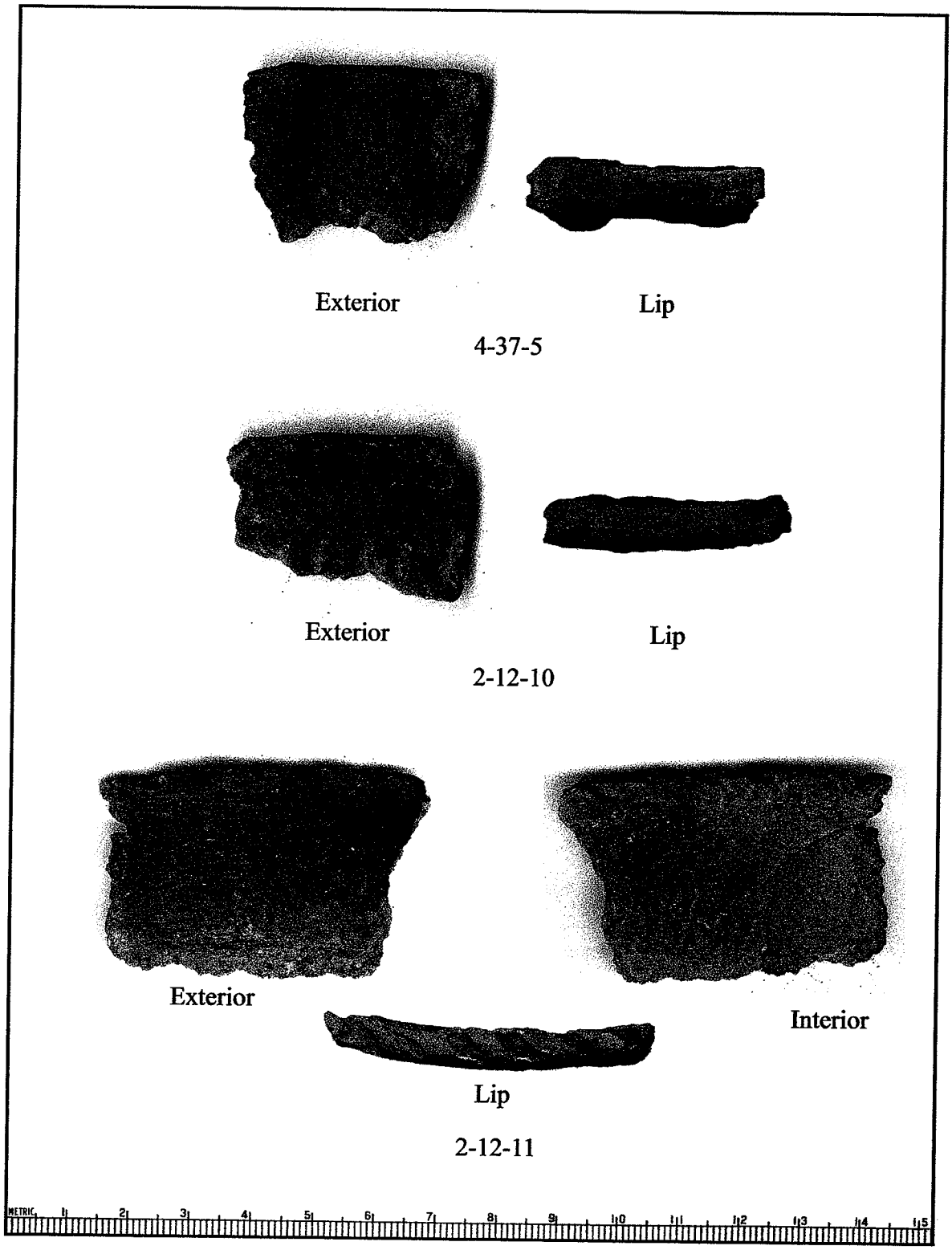
Bed F


Exterior
Lip
1-7-13
Exterior
Lip
12-14-7
Exterior
Lip
12-15-7
Exterior
Interior
Lip
12-17-9
METRIC

Feature


Exterior
Exterior
Lip
Lip
12-7-12
4-29-1
Exterior
Lip
4-23-5(a)
Exterior
Lip
10-17-7
METRIC

Feature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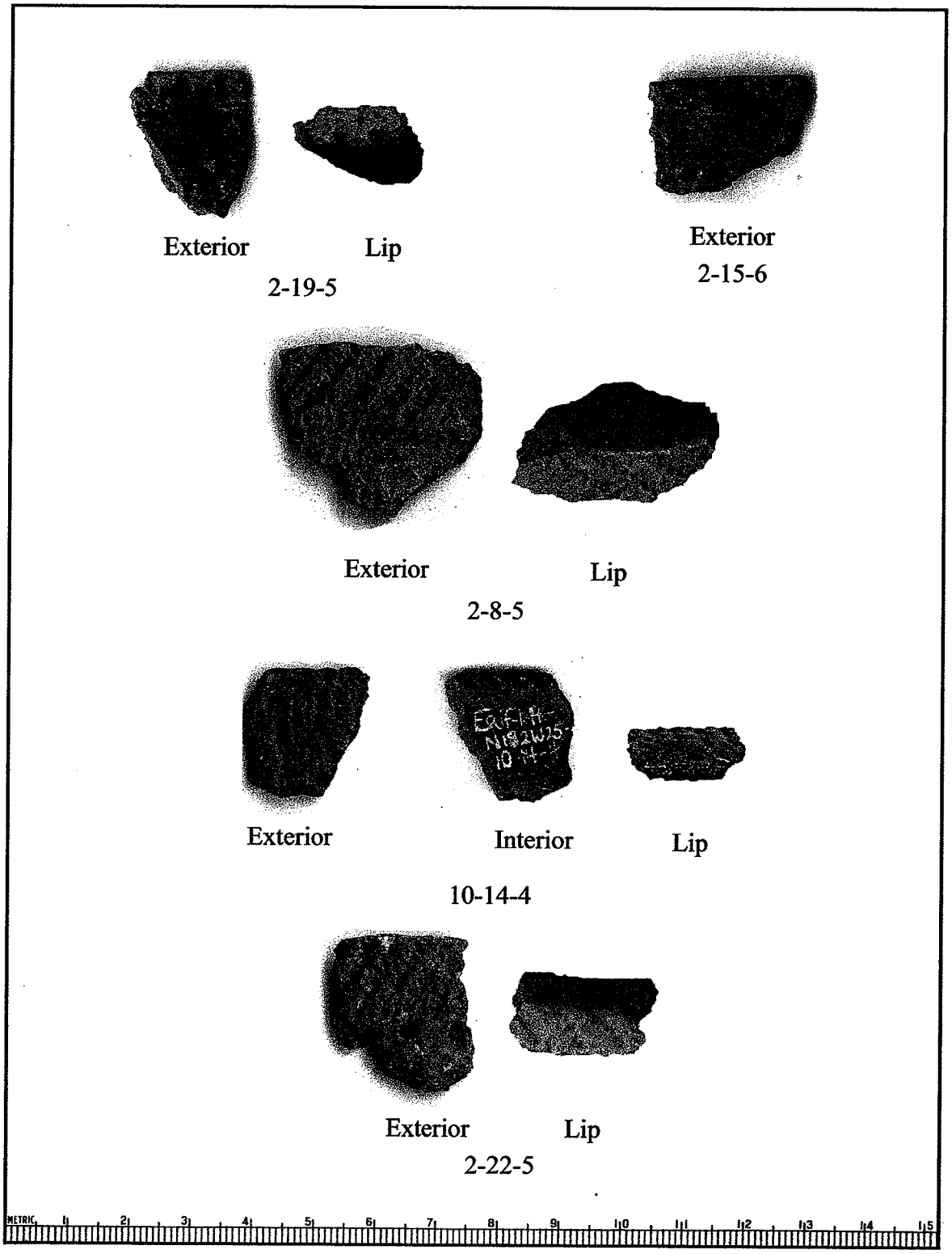
Exterior
Interior
Lip
2-12-11
METRIC

Feature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Exterior
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Exterior
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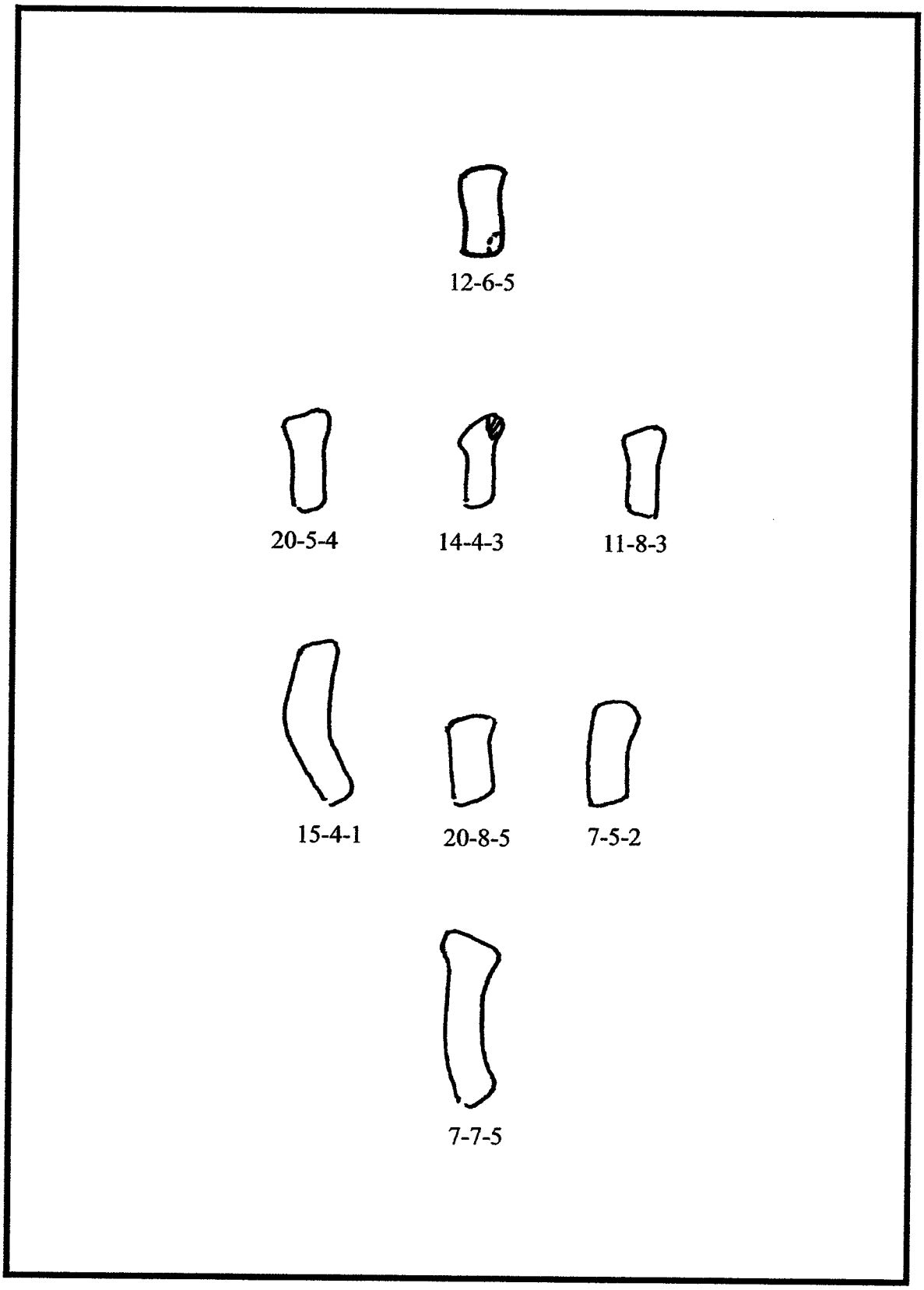
Lip
2-22-5
METRIC

Feature

Appendix V

Rim profiles



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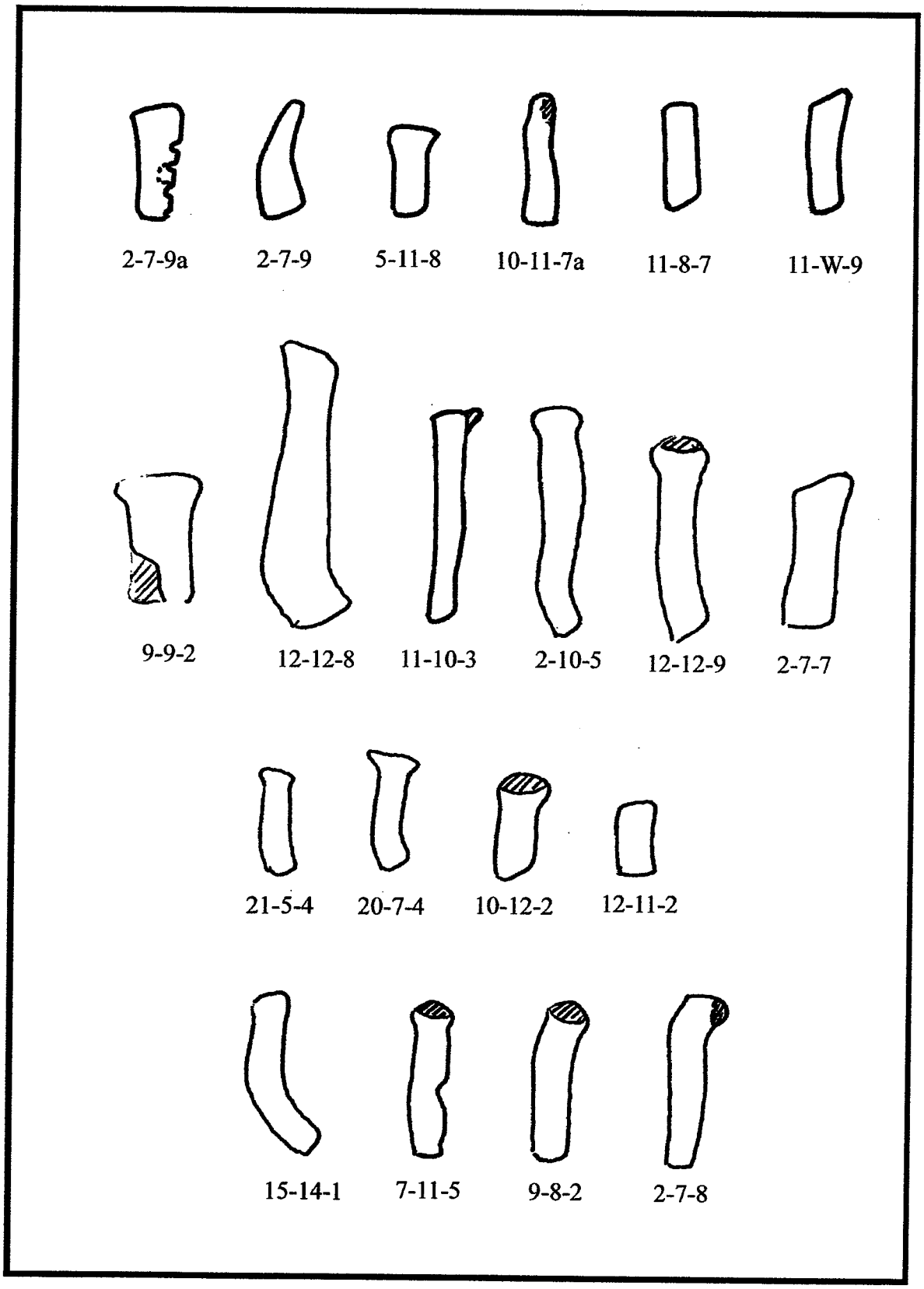
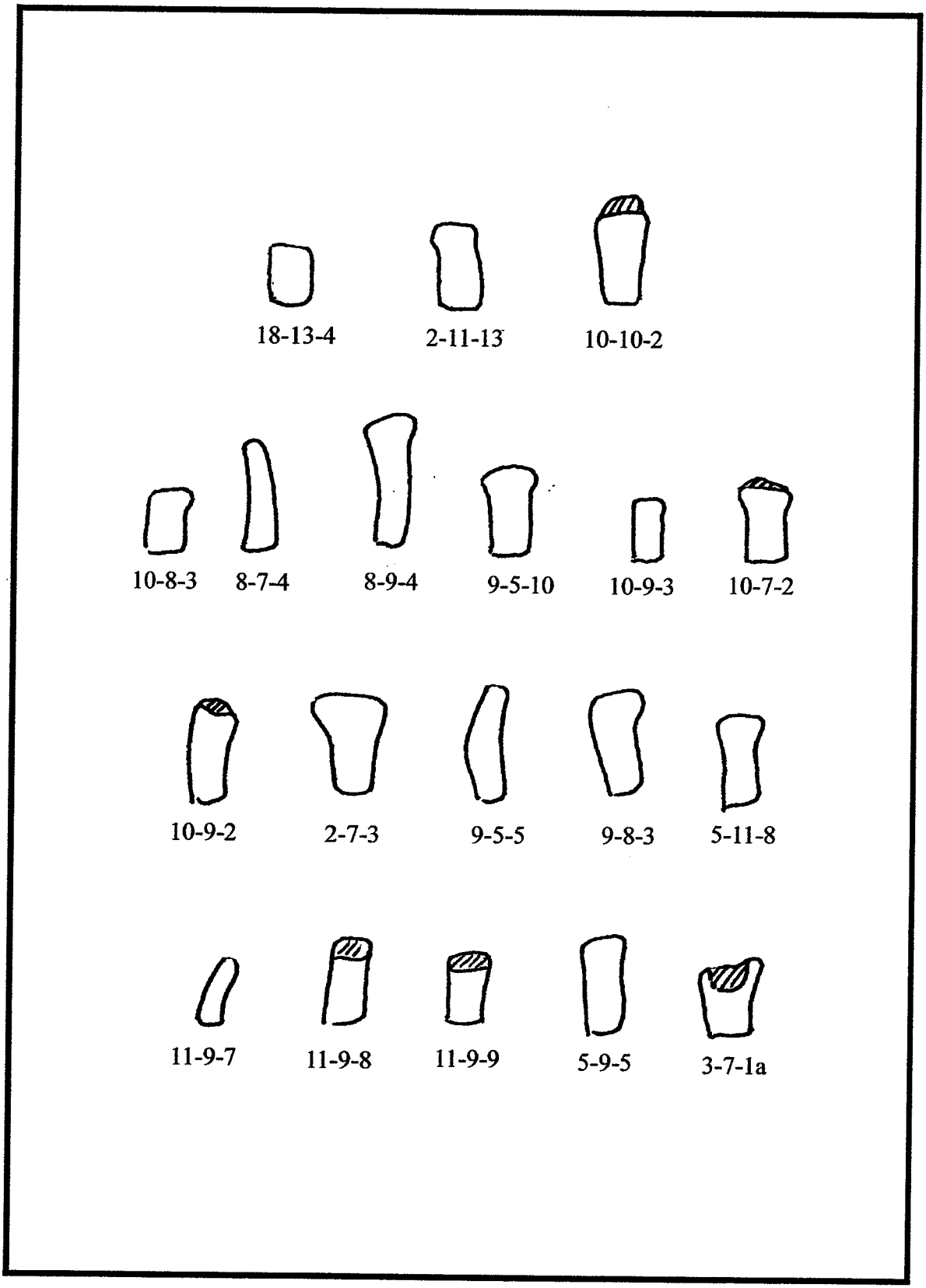


B/C and Organic Layer (interior to left)



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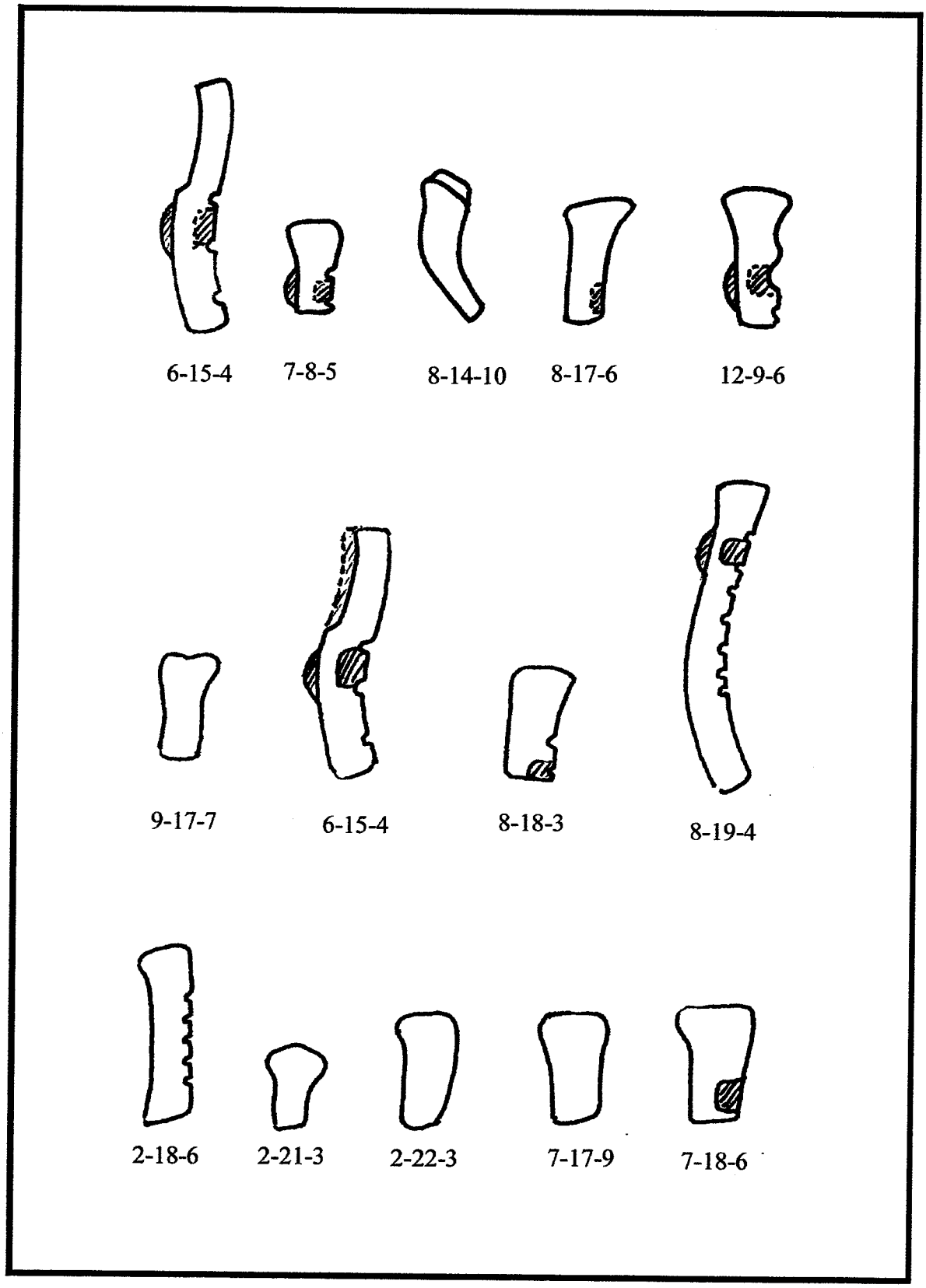

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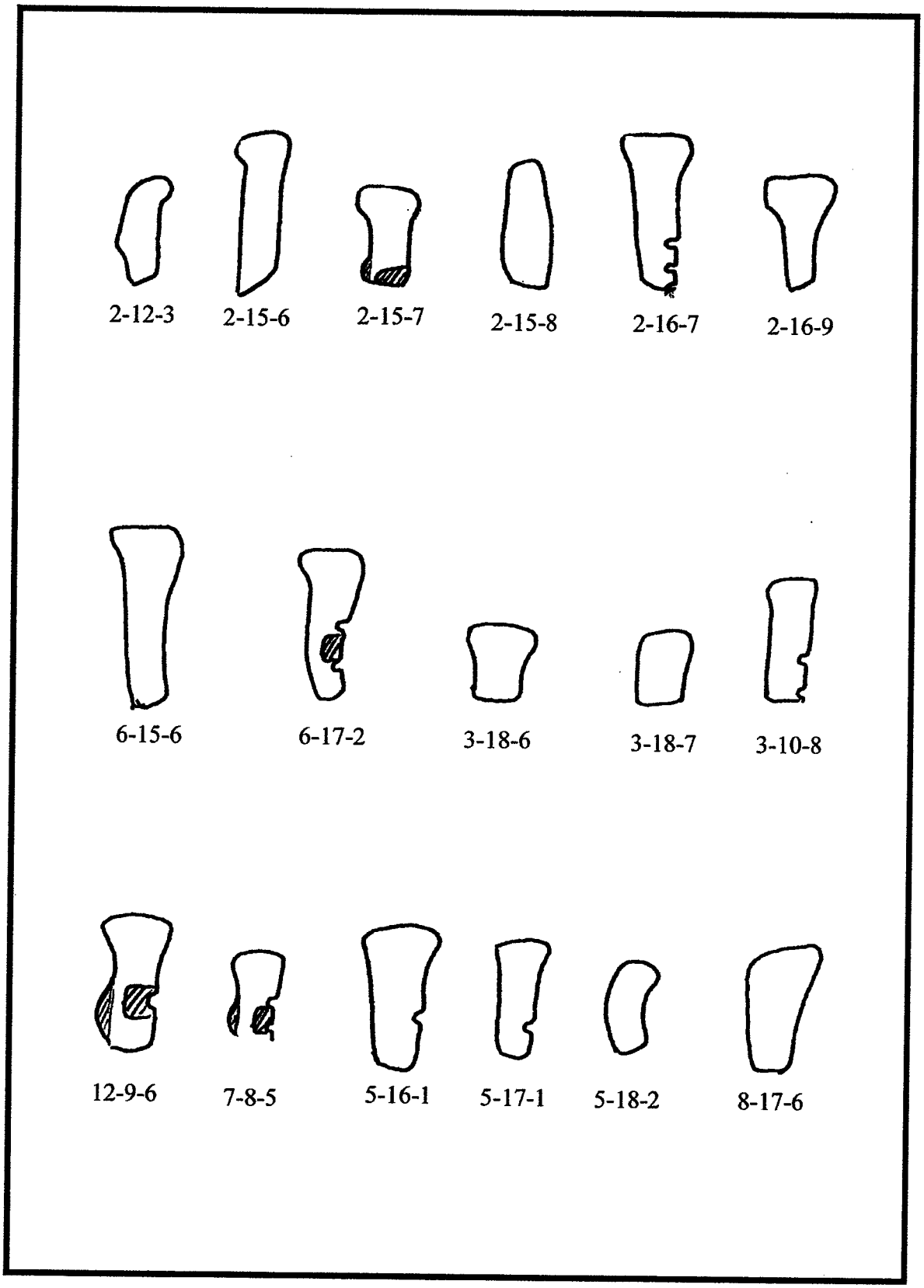

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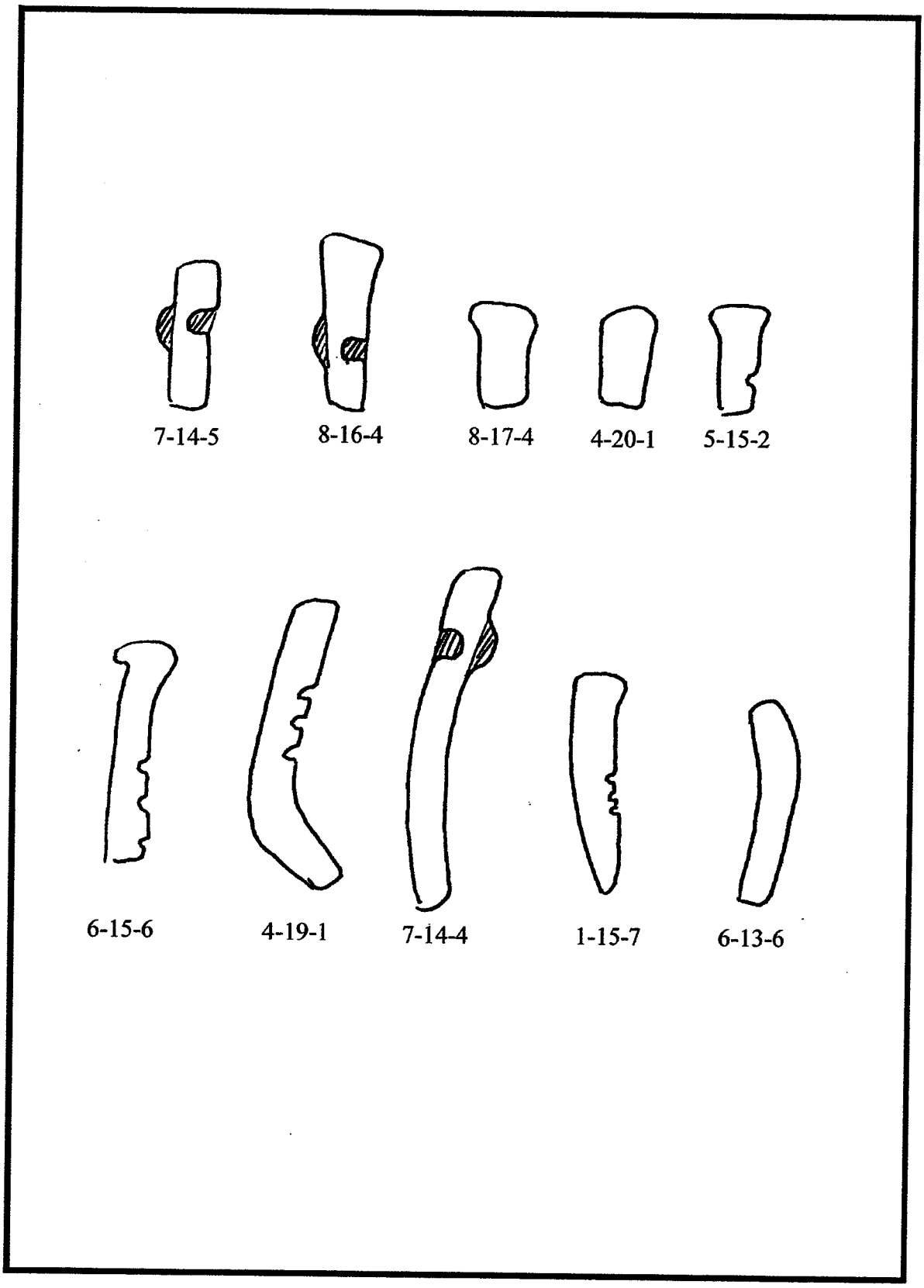

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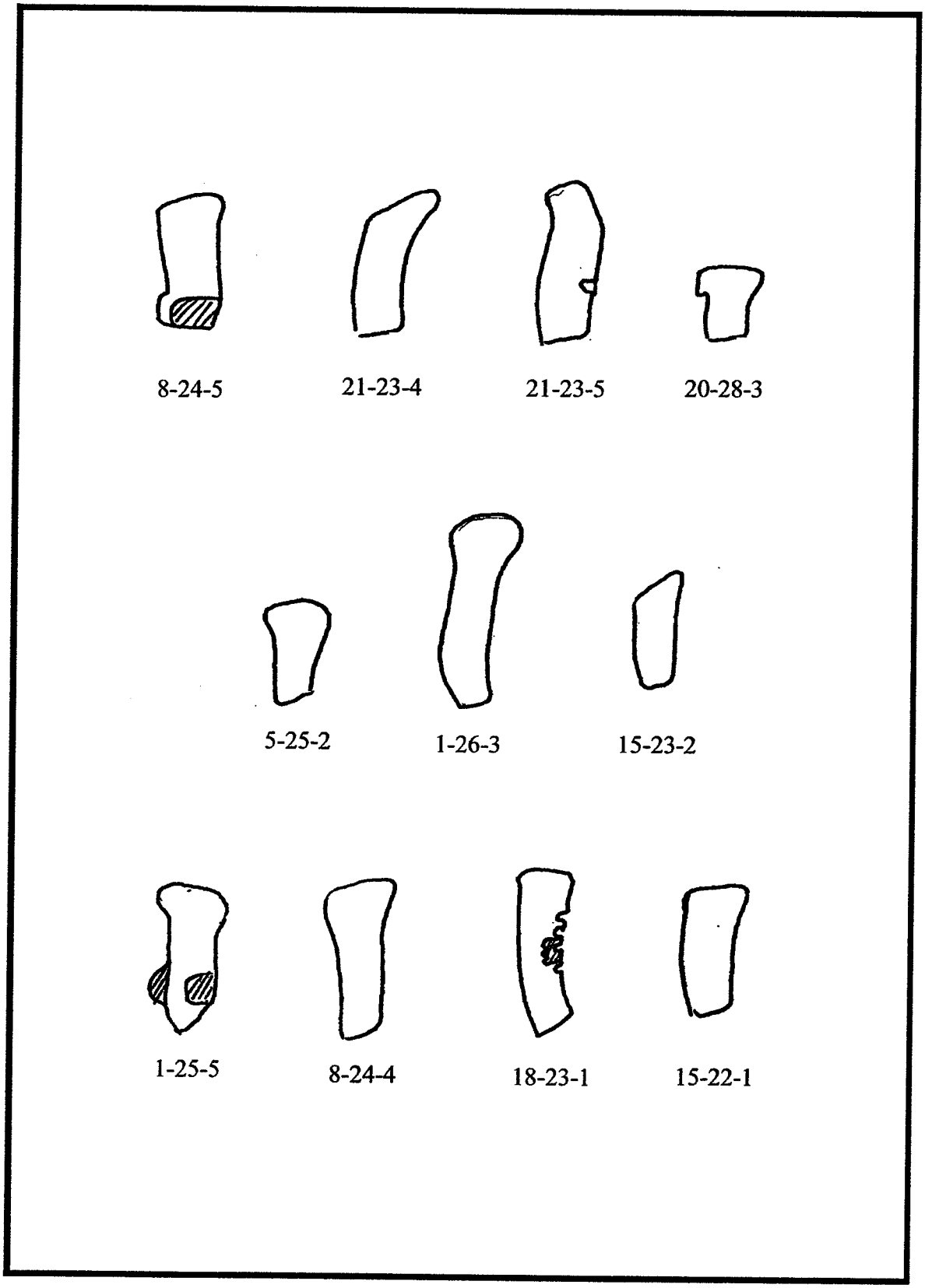

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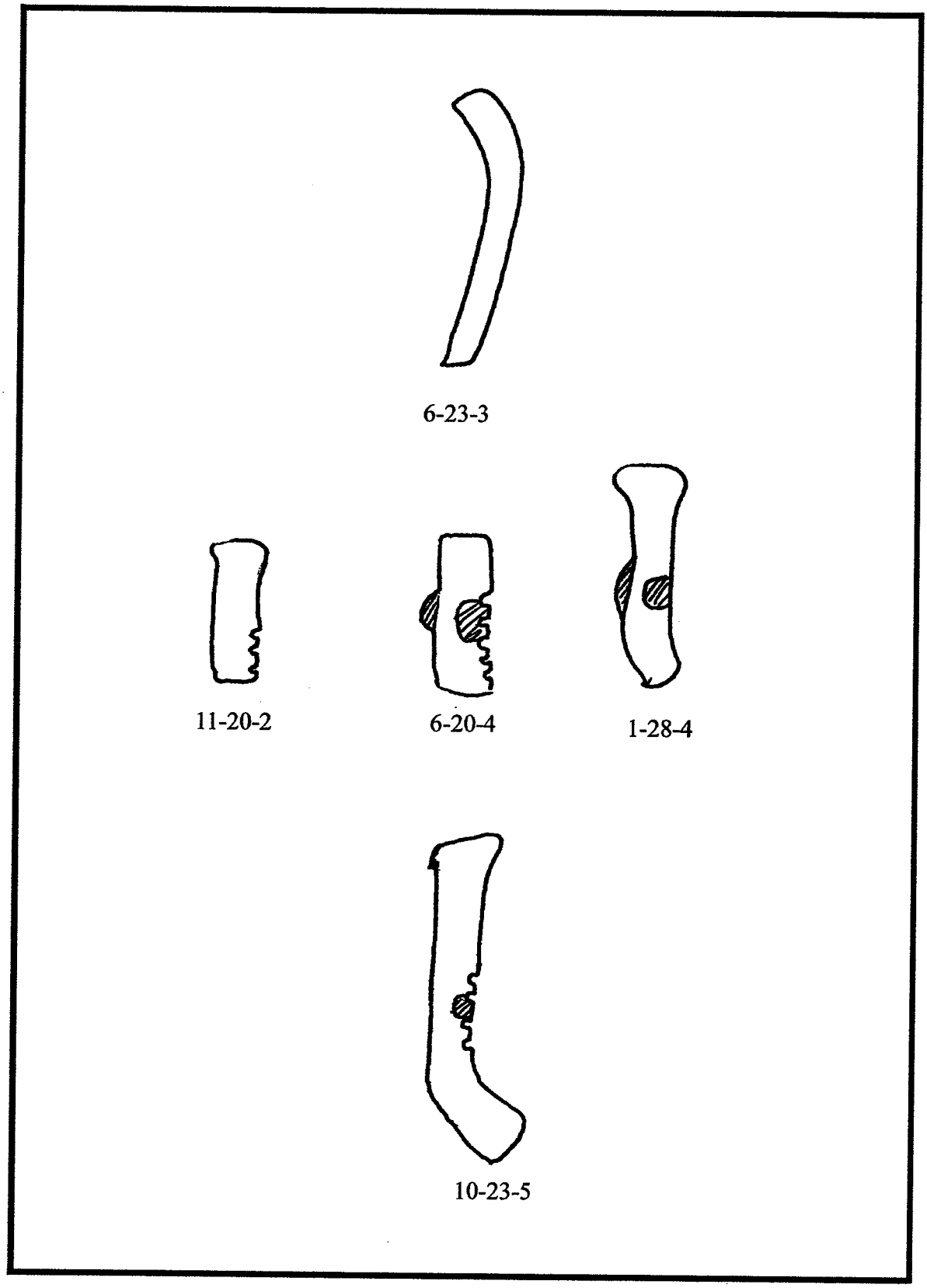

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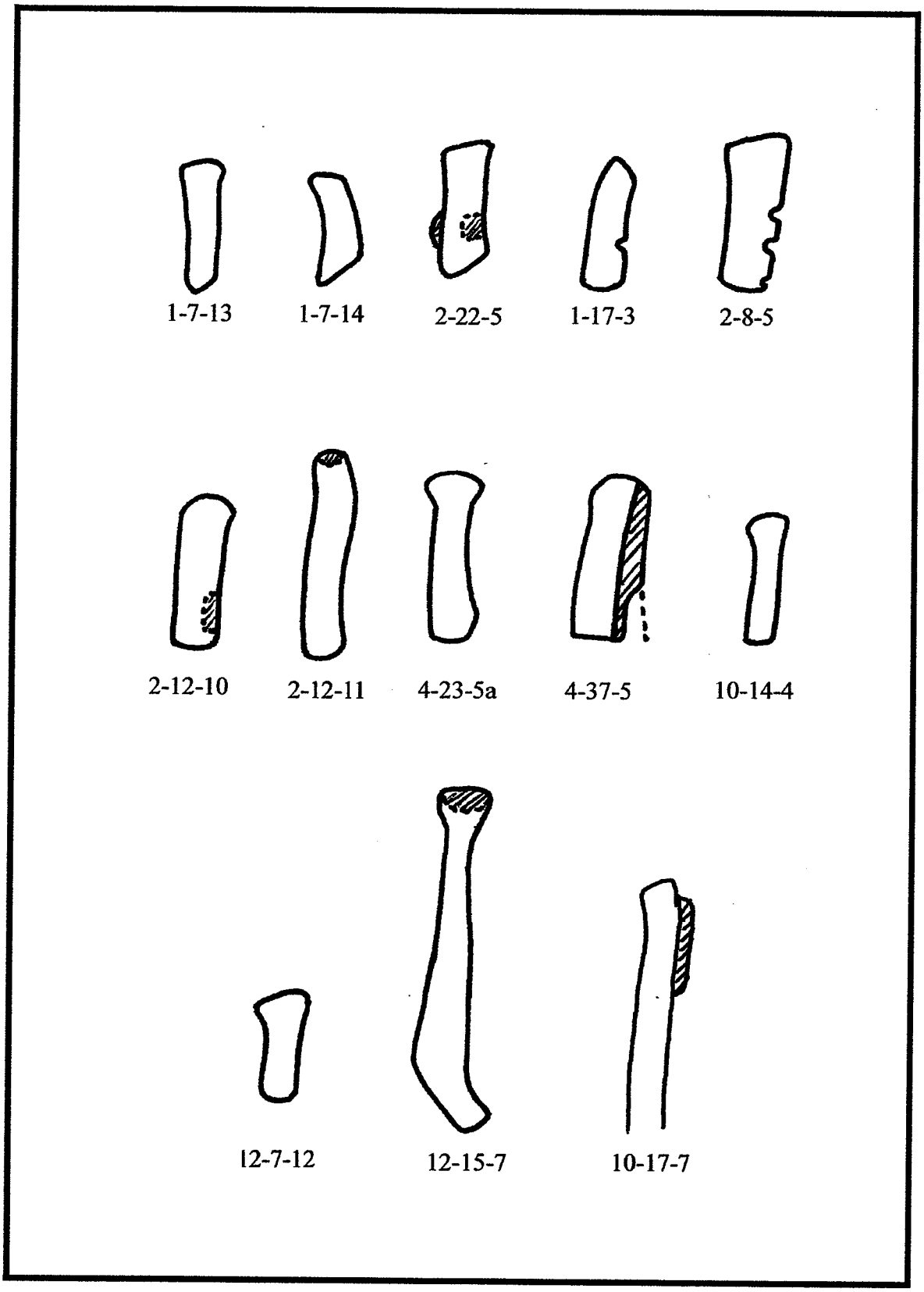

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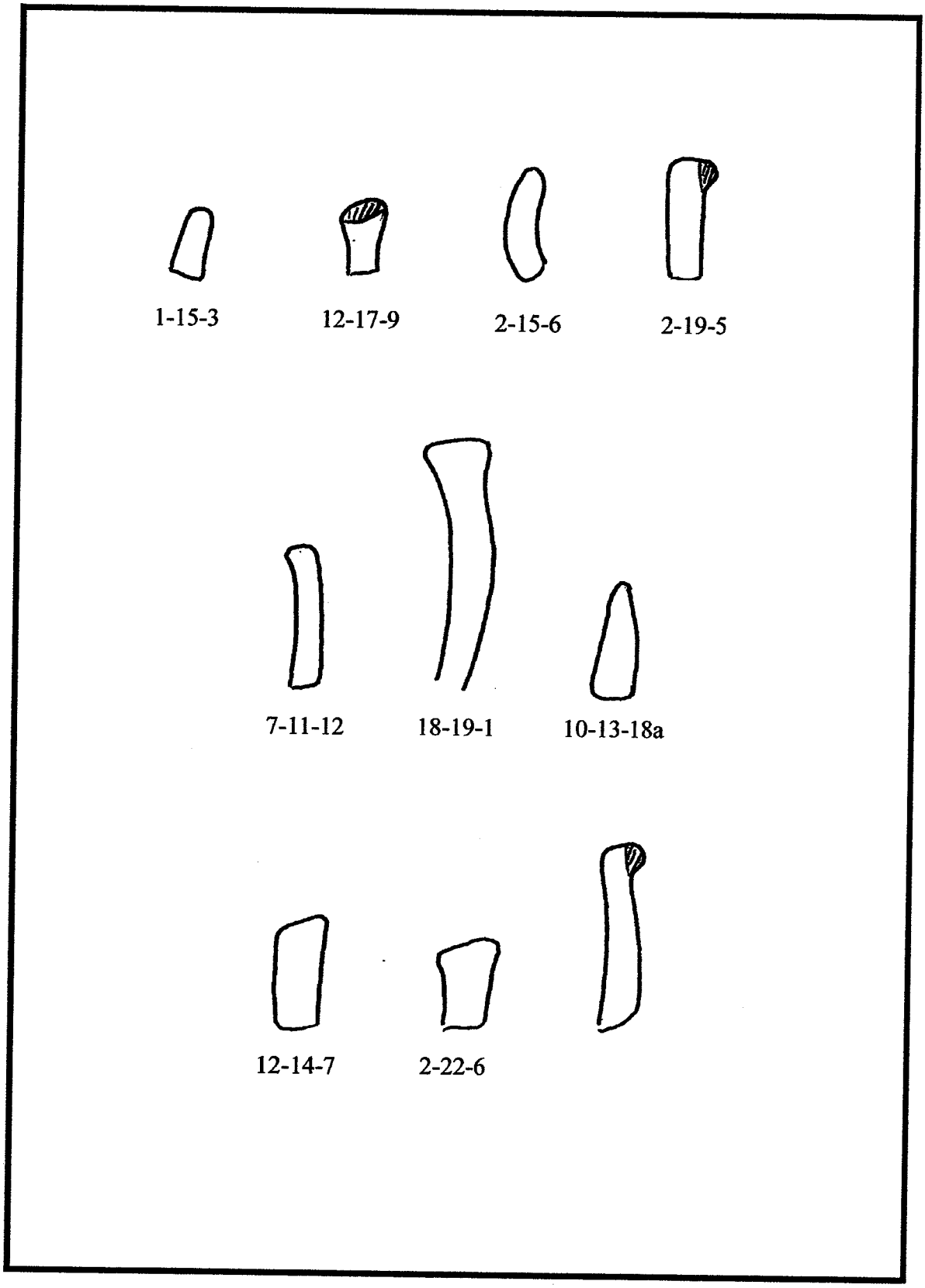

Feature (interior to left)

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