THE UNIVERSITY OF MANITOBA

LIBRARY

AUTHOR ... McLEOD, Kenneth David .....

TITLE ... A STUDY OF METIS ETHNICITY IN THE RED RIVER .....

..... SETTLEMENT: QUANTIFICATION AND PATTERN RECOGNITION .....

..... IN RED RIVER ARCHAEOLOGY .....

THESIS ... M.A., 1985 .....

I, the undersigned, agree to refrain from producing, or reproducing, the above-named work, or any part thereof, in any material form, without the written consent of the author:

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

A STUDY OF METIS ETHNICITY IN THE RED RIVER SETTLEMENT: QUANTIFICATION AND PATTERN RECOGNITION IN RED RIVER ARCHAEOLOGY

BY

KENNETH DAVID McLEOD

Submitted to the Faculty of Graduate Studies

The University of Manitoba

In Partial Fulfillment of the Requirements for the

Degree of Master of Arts

Department of Anthropology

Faculty of Arts

University of Manitoba

Winnipeg, Manitoba

September, 1985

THE UNIVERSITY OF MANITOBA

FACULTY OF GRADUATE STUDIES

The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies for acceptance, a Master's thesis entitled: A Study of Metis Ethnicity in the Red River Settlement: Quantification and Pattern Recognition in Red River Archaeology

submitted by Kenneth David McLeod

in partial fulfilment of the requirements for the degree of Master of Arts

G. Monks
Advisor

C.T. Shay

External Examiner

Date September 26, 1985

Oral Examination Requirement is:

Satisfactory XX Not Required __

[Unless otherwise specified by the major Department, thesis students must pass an oral examination on the subject of the thesis and matters relating thereto.]

A STUDY OF METIS ETHNICITY IN THE RED RIVER SETTLEMENT: QUANTIFICATION AND PATTERN RECOGNITION IN RED RIVER ARCHAEOLOGY

BY

KENNETH DAVID McLEOD

A thesis submitted to the Faculty of Graduate Studies of the University of Manitoba in partial fulfillment of the requirements of the degree of

MASTER OF ARTS

THESIS ABSTRACT

The following thesis has two study objectives. The first is to determine whether Red River Metis cultural remains are distinguishable from the remains of other cultural groups. This objective is undertaken using the quantification and pattern recognition method of Stanley South. This method has been widely adopted in most current historic archaeology studies and therefore the second objective of this thesis is to evaluate the quantification method. The research hypothesis is that the Metis artifact pattern is distinctive from all other patterns.

The Metis data base consisted of three sites; the Garden, Riel House and Delorme House sites, which represent the only excavated Metis sites in the Red River Settlement. In addition, the site inhabitants at each site were from the upper social stratum of the Metis cultural group, the Farmer-Merchants. The cultural material used from these sites collectively date from the 1840s to the 1880s. The Metis data was compared with South's Carolina and Frontier sites as well as western Canadian Hivernant sites and the two assemblages from Upper Fort Garry.

Rank order correlation tests, using the ranked artifact group and class data from each Metis site, were conducted to determine the degree of association between the Metis sites. Since most tests showed a positive correlation, it was concluded that the Metis data was sufficiently associated to formulate a Metis pattern. This pattern was abstracted and called the

Metis Farmer-Merchant Pattern.

Rank order correlations between ranked Metis and comparative artifact groups and classes were conducted to determine the degree of association. A positive correlation was calculated in all test except those involving the Frontier data. This suggested that the Metis data was not as distinctive as hypothesized. However, comparisons between the Metis and comparative patterns showed some differentiation between the data.

Several explanations were advanced to account for the lack of supportive evidence. It was suggested that South's method may not be as useful to delineate cultural differentiation as South has postulated. The domestic nature of the assemblages was also a possible explanation for similarity. Possible factors for the similarity between Metis and Upper Fort Garry assemblages were adoption of certain cultural traditions by the Metis, a dependence on British goods, or similar environmental conditions faced by both groups.

Table of Contents

ACKNOWLEDGEMENTS

I will be forever indebted to several very important people for without their patience, guidance and assistance this thesis would never have reached completion. One person in particular contributed a paramount effort in the way of time, energy and encouragement, my wife Kathy. She listened patiently to every cockamamy theory and hypothesis I could think of. She also edited and typed portions of the numerous thesis drafts. Words are not enough to express my gratitude but will have to suffice given current budget constraints. As a token of my gratitude I am dedicating this thesis manuscript to her.

I also owe a debt of gratitude to my parents who helped me throughout my long academic career and were a driving force behind the completion of my degree.

Other individuals who contributed directly to this final product were the members of my thesis committee: Doctors Monks, Shay and Sprague. These gentlemen offered invaluable criticism and editorial suggestions. I am especially grateful to Dr. Monks who took me by the hand and guided, or rather pulled, me through the land of academia and on to thesis completion.

Also a word of thanks to Chris Kotecki and Bruce Donaldson who patiently read portions of the text and offered many helpful suggestions.

My deepest thanks to all of you.

INTRODUCTION

Objectives of Thesis

The history of the Red River Settlement has been discussed from a variety of viewpoints. This includes Alexander Ross, J.J. Hargrave and Donald Gunn, who lived in the settlement during the years of its formation and authors such as C.N. Bell and George Bryce who interviewed some of the original Selkirk settlers to obtain a first-hand account of the events, it also includes researchers using census data and other archival material to interpret the historical events (c.f. Sprague 1983).

Archaeological research within the area of the Red River Settlement has been neglected and to date consists of three Metis sites excavated (Forsman 1977, McLeod 1982 and McLeod et al. 1983), a portion of Upper Fort Garry (Monks 1983), several operations at Lower Fort Garry (Priess 1969, Chism 1972, Foland and Priess 1972, Dewhirst 1974, Priess 1978, Priess and Sears 1979), a few sites only marginally tested such as the Barber House (Ross n.d.), the Dalebozic site (Ferguson 1978) and the Klann Site (Badertscher 1984) and a number of surface assemblages collected in the Parishes of St. Andrew, St. Clement and St. Peter (McLeod 1985). These sites represent a range of periods, of cultural groups and functional activities, but they are all related by the fact that each site represents part of the population that developed in the Red River area.

The objective of this thesis is to study one Red River group, the Metis, to determine if their material culture remains are sufficiently distinctive to isolate them from the remains of other cultural groups. The Metis sites used in this research collectively date from c.1845 to 1880. The hypothesis tested in this research is that the Metis artifact pattern is distinctive from all other patterns. The artifact patterns are abstracted using South's quantification method (South 1977). Therefore, a second thesis objective is to evaluate South's method.

This research distinguishes between the "mixed bloods" of French origin and those of English. The term Metis refers to the French, Roman Catholic sector while Countryborn refers to the English Protestant group (Foster 1973).

The first chapter discusses the theoretical and methodological approach and includes a rationale for the study, a brief discussion of the current status of historic site archaeology, an examination of other colonial archaeological studies and the potential of the Red River Settlement for archaeological study. The chapter concludes with an outline of the method used in the research and critical evaluation of that method.

The second chapter summarizes the historical background of the Metis and the Red River Settlement. This historical background is discussed in two sections, the first deals with events from c.1700 to 1821 and the second from 1821 to 1880.

These sections cover the formation and establishment of the Metis within the Red River area as well as the formation of the Red River Settlement.

Chapter III deals with the historical background of the three Metis sites used in the research. Each site is discussed in terms of its geographical setting within the settlement, its specific historical background and archaeological investigations at the site.

Chapter IV examines the archaeological data obtained from the three Metis sites. The site assemblages are examined using quantification and rank order correlation. The rank order correlations should show the associations between the Metis assemblages. This is integral to the thesis hypothesis of Metis distinctiveness in that it must first be established that the Metis assemblages are similar. The Metis artifact pattern is then formulated and presented as the Metis Farmer-Merchant pattern. The pattern consists of the ranges of the eight artifact groups used to classify the data: Kitchen, Architectural, Furniture, Arms, Clothing, Personal, Pipes and Activities. The concept of the artifact pattern is that the artifact group values from other Farmer-Merchant sites will fit within these ranges.

Chapter V compares non-Metis and/or non-Red River sites with the Metis data to test the hypothesis of Metis distinctiveness using sites from the eastern United States, western Canada and the Red River area.

The final chapter summarizes the major points and conludes with a consideration of the status of historical archaeology within the Red River Settlement.

CHAPTER I

THEORETICAL AND METHODOLOGICAL CONSIDERATIONS

Introduction

This chapter is divided into three sections: the first deals with theory in historical archaeology and develops a framework for the research that follows, the second section discusses previous ethnic studies and the results of these studies, and the final section examines the methods used to study the problem of Metis ethnicity. Specifically, this section is an evaluation of Stanley South's artifact pattern abstraction through quantification.

Theory in Historical Archaeology

The major understanding throughout this study is that historical archaeology is anthropology. Historical archaeology is concerned with more than sites that are linked with written documents; it is the study of cultures through their artifacts and documents. The artifactual assemblage in this sense consists of the material retrieved through excavation as well as historic records.

The preoccupation of many historical archaeology reports with material cultural and historical detail frequently led to a neglect of cultural systems and how they changed through time.

The particularistic and historical approach has led some scholars to consider historic archaeology as a branch of history (Walker 1967, Noel-Hume 1969). Based on the archaeological reports of that time they were probably correct in their assessment. The research objectives during the period that historic archaeology began to develop were usually related to either historic or architectural reconstruction while interpretations of cultural processes, if they existed at all, were incidental.

Excavations in Canada took place at three types of historic sites: fur trade, military and domestic. Occassionally a specialized activity area has been included at one or more of these sites but, in general, research has concentrated within the context of this triad. South (1977) summarized the different theoretical approaches to historic site excavation and identified three approaches: the particularist, the problem-oriented and the hypothetico-deductive. These theoretical approaches were also discussed by Hamilton (1978). South's "hypothetico-deductive" approach is considered to be necessary in any historic archaeological analysis to make the research scientific and theoretical. Combining the problem-oriented and processual approaches is of the greatest benefit as this brings a scientific rigour to historical archaeology. Most of the studies generated thus far have been of the first two research types, the particularist and to a

lesser degree the problem-oriented. Adams (1981:35) has suggested that Canadian archaeologists were compelled to conduct particularist research as the studies were initiated by government agencies interested in structural details and artifacts for display. Pyszczk and Praeger (1982:287-288) make a similar assessment with respect to the state of historical archaeology in North America. They suggest new directions that incorporate a particularist approach to enhance local and regional histories, as well as the processual approach to provide for archaeological method and theory.

The introduction of this chapter stated that the South method of quantification was utilized to examine the Metis data. South's method is based on a hypothetico-deductive method or the deductive-nomological method of logic (Renfrew 1983:10). This theoretical framework begins when observed facts are used to produce a generalization. This generalization is evaluated through tests involving hypotheses and predictions whereby the tests use further observations and data (South 1977:15). At the time that South was formulating his methodological and theoretical framework in historic archaeology, the deductive-nomological model was considered by many as the "new" reasoning in archaeology.

Recent archaeological theorists have suggested that the deductive-nomological model is not appropriate for archaeology since the model requires one universal law per explanation

(Smith 1983:73). Although South's method is used in this Metis research, no formilization of universal laws will be attempted. The only generalization based on induction is that the range of percent frequencies of the Metis artifact group is representative of Metis sites in general. The hypothesis of Metis distinctiveness is tested through comparisons with other Red River and non-Red River assemblages.

If the Metis pattern is shown to be distinctive, then causal factors must be examined to explain how ethnic diversity can be reflected in material culture. The causal factors are identified through historic background. If diversity cannot be ascertained, then other factors must be introduced to explain why similarity was reflected in material culture.

Ethnicity Studies in Historic Archaeology

Studies of ethnicity in historic archaeology have increased significantly in the past decade. McGuire (1982) has divided these studies into three categories: (1) assimilation studies where changes in ethnic boundary markers have been demonstrated, (2) ethnic pride studies which show the contribution of an ethnic group to history, and (3) ethnic criteria that establish standards for identifying specified ethnic groups.

These studies have involved various cultural manifestations and have shown some degree of categorical distinction between ethnic group assemblages. Otto (1977) found

a definite dichotomy between the ceramics of plantation slaves, overseers and the planter family at the Cannon's Point Plantation. Other studies (Deetz 1977, Baker 1978, Ferguson 1980) have illustrated differences between ceramic assemblages, food remains and even patterns of housing construction when contrasting Afro-American and Anglo-American examples. Carrillo (1977) distinguished contrasting refuse disposal patterns at British and German sites in the Piedmont area of South Carolina. Variation in food remains and ceramics have also been observed when Chinese assemblages of the west coast in the United States have been examined with other ethnic assemblages (Olsen 1978, Greenwood 1980 and Langewalter 1980). The studies mentioned above did not use pattern abstraction to isolate ethnic differentiation.

Faunal remains, housing construction, refuse disposal patterns and ceramic types have all been used as markers of ethnic diversity although none of these could be used for the Red River Metis research. Faunal remains could not be used because the only comparative sites with complete faunal analysis were the Hivernant sites. Housing construction could not be used either since architectural studies of the period under discussion are currently unable to discern different constructional techniques on the basis of architectural assemblages. Refuse disposal patterns were not considered as the assemblages from all comparative sites except Garden Site

and the Frontier sites were midden material from structural features. Ceramic types could not be used as only the Upper Fort Garry ceramic assemblage was sufficiently analyzed to permit comparisons. Therefore, rather than attempting to identify alternate ethnic markers an alternate method was used. This method has been used in at least one ethnic study, Deagan's (1983) study of St. Augustine.

Deagan calculated minor differences between Hispanic assemblages excavated in St. Augustine using South's pattern recognition. For example, differences could be ascertained between criollo, people of Spanish decent, and Mestizo, people of Spanish-Indian decent, in three artifact groups; Furniture, Clothing and Personal (Deagan 1983:242). However, Deagan also used a Student's t test to compare the two ethnic assemblages and showed that there was no significant difference between them. She therefore focussed on specific artifact classes, ceramics and glassware, to illustrate differences between the criollo and Mestizo assemblages. Differentiation at the group level could be calculated between Deagan's Hispanic pattern and South's Carolina pattern using a Chi-square test. Differences were also evident by a larger Hispanic Kitchen group and lower percentages in the Hispanic Architectural and Pipes groups (Deagan 1983:244-245).

The St. Augustine study was parallel to the Red River research because: (1) both were composed of a collection or

aggregate of differing ethnic groups, (2) the European segment of the colony was usually of a higher economic and social status, (3) a completely new ethnic group was formed through the union of the European colonizers and the local indigenous population, and (4) the different ethnic groups settled in specific areas of the colony.

Method of Abstracting the Metis Farmer-Merchant Pattern

The Metis data was placed in the artifact class and group classification of Stanley South used by him to form the Carolina pattern (South 1977:88-102). The artifact classes are designated on the basis of form and function. These classes are in turn grouped into eight functional groups (Table 1).

Some artifact classes were altered to account for the later date of the Metis material. This involved an expansion of the number of artifact types within particular classes. All concave glass that was analyzed or inferred from site monographs as being neither liquor, case, tumbler, medicine or window glass was classified or glassware. This included decorated serving ware, condiment vessels, sealers and kerosene lamp chimneys. Tin can fragments were placed in Kitchenware as were sealer lids. A Shoe class was added to the Clothing group and bale seals were removed. It was anticipated that only the Upper Fort Garry assemblages would contain any concentration of bale seals. Artifacts placed in the Personal items class

Table 1. Artifact groups and classes (modified from South 1977).

Kitchen group	Personal group
Ceramics	Coins
Liquor bottle glass	Keys
Case bottle glass	Personal items
Tumbler glass	
Medicine bottle glass	Pipes group
Glassware	
Tableware	Tobacco pipes
Kitchenware	
	Activities group
Architectural group	
	Construction tools
Window glass	Farm tools
Nails	Toys
Construction hardware	Fishing gear
Door parts	Prehistoric
	Storage items
Furniture group	Botanical
	Stable and barn
Furniture hardware	Miscellaneous hardware
	Other
Arms group	
Musket balls, shot, gunflints, gun parts and shell casings	
Clothing group	
Buckles	
Thimbles	
Buttons	
Scissors	
Pins	
Fasteners	
Shoe parts	
Beads	

included jewelry, mirror fragments, slate pencils and watch parts. In the Activities group, South's Sub-stemmed pipe class was deleted and the Colono-Indian Pottery class was altered to

the Prehistoric class. The Miscellaneous Hardware class contained nuts, bolts, washers, wire, chain and metal scraps.

South's method was selected because (1) it has become a widely used research method in historic archaeology, (2) the South method was readily adaptable to the small sample size which was characteristic of the Metis data, (3) previous use of this method by this researcher (McLeod 1982, McLeod 1984), and (4) one of the Metis sites, Delorme House, had already been placed in this format. Another classification format was considered (Sprague 1981) but was rejected due to the number of additional classes and groups that would cause too great a division of the small Metis sample size.

The basic assumption of South's method is that regularity exists in the archaeological record and this can be elicited through the quantification of site materials. Most of the critcisms of South's method have been levelled not at the method itself but at its application by other researchers (Stevenson 1983). Very few direct critiques of the method have been forwarded and even the review of South's book Method and Theory in Historical Archaeology (Chance 1977:126-128) did not offer much in the way of criticism. The following evaluation of the South method is a summary of Benson's (1978) and Warfal's (1982) critiques as these researchers have used the method under discussion.

One of the first criticisms is that when South formulated the Carolina Pattern he utilized the entire assemblage from the excavated sites which:

> has the effect of stripping the material remains of their specific temporal and spatial relationships.(Warfal 1982:141).

The Carolina sites were occupied or used as middens from the 1720s to the 1830s. One site ranged from 1728 to 1830 and its entire assemblage was used in the pattern. South does not present stratigraphic correlations with any of the deposits to indicate any artifactual change, especially quantifiable, over time. It is unlikely that cultural practices remained static and therefore artifactual variation over time would be expected. This was not considered by South. A trade embargo with Britain during and after the War of Independence could theoretically reduce the quantity of goods available to the Carolina colonists. An increase of industrial centres along the eastern United States coast after 1783 may have an effect in certain artifact classes, depending on the type of industry, thereby inflating particular artifact group percentages.

A problem related to the above is that the class-group classification does not represent categories into which materials from later sites can be placed. In other words, duplication of the method is difficult when dealing with more recent assemblages. The Metis data was classified by altering the classification system.

Duplication of the method is also hampered by the fact that although South adjusted his empirical pattern frequencies in order to allow for artifact group variations due to specilaized activities, he did not reveal instances when adjustment should be employed. As will be pointed out in a following chapter, this dilemma was also faced when the Metis group frequencies were first presented.

Warfal's overall conclusion was that the relationships between the artifact groups drawn by South are:

> as much a product of his classificatory scheme and data manipulation as they are characteristics inherent to the archaeological record of the 18th century British-American colonial cultural system . (1982:164).

Benson's criticism was primarily not of the method but of South's interpretations of the two patterns he had abstracted, the Carolina and Frontier patterns. Benson suggested that what South had in part accomplished was a simple measure of domesticity (1978:64). The dichotomy between the two patterns merely indicates the presence of women and a longer period of human occupation at the Carolina sites. Benson provided a second interpretation of the two patterns whereby the Carolina Pattern indicates an access to redistributional markets. That is, the Carolina Pattern range is reflective of a greater access to viable markets while the Frontier Pattern represents less access. Indeed, Forsman and Gallo (1979:175) concluded on the

basis of Kendall's rank correlation test, that the Frontier and Carolina patterns are indistinguishable because their difference lies only in the different proportions of Kitchen and Architectural groups.

Possibly the greatest drawback to South's method is that it is not easily duplicated. Use of the form-function method first of all implies known function for every artifact. This is nearly impossible given the large degree of breakage most artifacts are subjected to before and after deposition. The difficulty in duplicating the South method has possibly led to some of the problems inherent in the studies of other researchers. Forsman and Gallo, in their abstraction of the Early Fur Trade Pattern, had difficulties when using research monographs that did not attribute function to all recovered artifacts. Unidentifiable metal, for example, was deleted and not included in their pattern. The problem of utilizing unidentifiable artifacts was also encountered when classifying material from the Metis sites. This will be addressed in the chapters that deal with comparative studies.

With the theoretical and methodological framework established, attention will now be focused on the general historical background of the Metis and the Red River area.

CHAPTER II

HISTORICAL BACKGROUND

Introduction

This chapter is divided into two parts. The first section deals with the early history of the Metis until the beginning of the Selkirk Settlement, and the second section discusses the rise and progress of the Metis and the Red River Settlement after 1821. The early history of the Metis provides a synthesis in light of the fact that no early sites have been exavated.

Early History of the Metis (ca.1700-1821)

A date of 1700 is used not to indicate the year of the first Metis but rather as an initial date for French penetration westward past the Great Lakes. In 1713, France agreed to return the posts it had seized from the English along the Hudson's Bay coast thus giving the English control of that area (Morton 1957:21). As a result, France was forced to search for the "Western Sea" through the interior of North America. This continued exploration in conjunction with the depletion of fur-bearing animals in the Great Lakes area as well as the desire to intercept the trade of the Hudson's Bay Company caused the French to push westward. This interest in early and subsequent French ingression into the northwest is of great importance because it was from the union of French traders and native women that the Metis emerged.

There are several views as to why the Metis group developed west of Lake Superior and no where else. This is possibly one of the most striking features of Metis history and essential to the understanding of how, in the 1800s, they perceived themselves as the rightful owners of the northwest. There are several factors that account for this lack of group emergence in eastern Canada. Possibly the greatest deterrent to the establishment of an eastern Metis group was the assimilation practice of the Roman Catholic church and the government of New France (Lussier 1978:16). In western Canada, beyond the control of church and state, a definite group emerged and by the 1840s was a society composed of food gatherers, agriculturists, entrepeneurs and politicians (Gosman 1977:1).

There are generally two groups of "mixed bloods" recognized in the west, those of French paternal ancestory and those of English (Foster 1976:72). The former were known as Metis while the latter have been designated as the English Countryborn. It has been acknowledged that the union of European trader and native woman was more than sexual desire (Van Kirk 1980:4). This union benefitted both the trader and the woman's kin as it provided furs to the former and a sense of security and prestige to the latter (Van Kirk 1980:29). During French expansion into the country west of Lake Superior there were frequent marriages between French and Ojibwa, usually in the Native tradition (Van Kirk 1980:28).

Foster, in his study of the English Countryborn, suggests that the female offspring of the above marriages had valuable socio-economic roles in the trading post system while males had difficulty in getting established (Foster 1976:79). Gradually the Indian wife was replaced by the Countryborn wife and this produced complex intermarriage patterns among the fur trade families (Van Kirk 1980:5). The male, in addition to having difficulty getting established in the post, would also have difficulty fitting in with his mother's family unit as his only claim to the resource basis was maternal and contrary to the patrilineal system of the Ojibwa family hunting territories (Foster 1976:79). The Metis male therefore had to follow the trade movement westward seeking employment in the lower eschelons of the fur trade system as they had no means for advancement.

Sealy and Lussier (1975) take a more optimistic view of how the Metis came to be established as a distinct group in the west. The offspring of the French-Indian union could either use their father's connections and pursue a fur trade career or utilize their Native background and adopt an Indian lifestyle.

Both explanations deal with a time period after initial French ingression and likely during the first years of the independent traders and the North West Company's activities in the west. Early journals dating to La Verendrye's expeditions (Burpee 1927), make no mention of "mixed blood" individuals. It was not until after 1763 and the fall of New France, when

independent traders and the North West Company came into the area, did the Metis group become a more dominant force. With the Montreal-based traders entering the northwest the importance of trading networks through marital ties could be seen as creating an even greater number of intermarriages.

From the period of La Verendrye's first entry west of the Lake of the Woods around 1734 until the beginning of the Seven Years War in 1756, the furthest west the French had pushed was to the forks of the Saskatchewan River (Morton 1957:34). In 1756 there were seven posts in operation with forts La Reine and St. Charles the closest posts to the forks area (Magry 1878:82-83). By 1760, most of the establishments had closed as the manpower was needed to defend New France. Eight years later the areas west of the Lake of the Woods were re-opened by the independent traders from Montreal. Many of these traders were of the old French regime but British traders such as Forrest Oakes were also establishing wintering posts on the Red River (Morton 1937:90). It was after this time that the number of Metis offspring increased and became further involved with the fur trade. As the traders pushed into hitherto untrapped fur regions, the Montreal-based trade stretched over thousands of miles. The necessity of transporting goods and furs across the western interior provided two major occupations for the Metis, that of working as tripmen in the canoe brigrades and as provisioners (Kotecki 1983:52-53). In addition, the Metis role as

provisioners may have greatly increased after the 1780s as a result of the decimating effects of small pox on the Indian population (Sealy and Lussier 1975:8).

By the end of the eighteenth century and the early nineteenth century there were likely small groups of Metis families living in and around the posts. It has been estimated that the Metis were already semi-settled by 1800 and had cleared plots of land for crops and animals in the vicinity of the Red/Assiniboine junction (Tremauden 1982:10). Other histrographers suggest that prior to 1825 there were three types of lifestyles pursued by the Metis: (1) those who secured permanent employment with the fur trading company, (2) those who lived on small farms and had gardens and/or small plots of grain, some livestock and devoted portions of the summer to hunting buffalo or doing commerical freighting with Red River carts and, (3) those who hunted and trapped for a living (Sealy 1978:6-7). This was certainly the case by 1825 but was not likely to have been much earlier than 1821. When John Mcdonnell came up the Red River in 1793, he made no mention of any such establishments at the forks (Masson 1890:268). Alexander Henry the Younger made no remarks of any farming in any of his trips up and down the Red between the Pembina post and Lake Winnipeg (Coues 1965).

After the North West and Hudson's Bay companies moved inland one of the most important commodities was an ample supply of provisions. Trade with the Mandan for corn had been established

by 1785 and by 1796 there were gardens at Brandon House and by 1805 in Pembina (Moodie and Kaye 1969:526). It may be these gardens to which Tremauden and Lussier and Sealey refer, but these appear to be more oriented to the fur trade posts rather than small settlements of Metis. It also appears that the trade post locations such as Pembina, were areas where retired North West employees settled, especially after 1805 (Coues 1965:269).

It would appear that prior to the arrival of the Selkirk Settlers in 1812, the Metis were scattered throughout the west near the fur trading posts.

Sealey and Lussier suggest the conflict between the Scottish settlers and Metis was the stimulus that made the scattered Metis a cohesive group (Sealey and Lussier 1975:30). This conflict was a struggle against the settlers as well as the Hudson's Bay Company. It has been suggested that a strategy used by the Hudson's Bay Company to defeat the North West Company, with whom the Metis were allied, was to place the Selkirk Settlement near the latter's main provisioning posts (Sprague 1983:13). Other suggested motives for the establishment of the colony include inducing retired Hudson's Bay Company employees to settle at the Forks as a desire by Lord Selkirk to "civilize" and "evangelize" the Native population (Ross 1957:17-19). Another suggestion is that Selkirk created the colony to relieve the economic hardships of the Scottish highland crofters and Irish cotters who had been forced off their native lands due to the practice of enclosure (Clarke 1966:28).

Initially it would appear that there was no aggresive struggle between Metis and the first settlers. In the first few winters of the colony's existence the Metis fed the settlers from the produce of hunts that originated out of Pembina. In as much as the North West Company agitated the Metis against the colony by assuring them they were the rightful owners of Rupert's Land (Morton 1957:51), the Hudson's Bay Company through such proclamations as the Pemmican Proclammation of 1814 contributed to the aggressiveness of the Metis. This ultimately culminated in the events at Seven Oaks in June of 1816.

After the retaking of the colony by Lord Selkirk and the de Meuron soldiers in the winter of 1817 there appeared to be a cessation of open hostilities that had marked the previous years. Although there was some fear of Metis reprisal, as exemplified by Miles Mcdonnell closing the trade post at Netley Creek in February of 1817 for fear of an attack, it appears that the Metis came to regard the colony as a place of settlement for themselves and a market for the produce of the hunt (Morton 1957:56). It has in fact been illustrated (Sprenger 1972) that the produce of the hunt was the main stay of the colony provisions during the first years of reestablishment of the settlement. It was likely during this time that the orgainzed hunts began to develop. Usually the hunters were organized at Pembina (Sprenger 1972:30) but this changed after 1823 when a large number moved from that location to the White Horse Plains (Morton 1957:62).

Thus tar the sequence of events has progressed up to 1821, the year that the two rival companies merged. As a result of this merger and the subsequent release of surplus manpower the population of the Red River settlement began to increase. It was at this time that the settlement became ruled by the Hudson's Bay Company and characterized by the role of each of the various population sectors in the fur trade.

The Metis in the Red River Settlement (1821-1870)

It has been estimated that 15 percent of the retired fur trade employees settled in the Red River colony after the 1821 amalgamation and that these individuals farmsteaded in specific geographical areas within the settlement (Sprague 1983:15). The Scottish, Orkneymen, English, Irish and Countryborn settled north of the Red-Assiniboine junction and the French and Metis south of it. Therefore, if the Red River Settlement is considered as an established mosaic of distinctive groups settled along the Red and Assiniboine rivers, this occurred after 1823 when most of the retiring employees moved into the colony (Clarke 1966:32). By 1826, the ethnic colonization of the Red River was complete and contained the characteristics it maintained in later years (Morton 1957:65-66). An examination of these characteristics is critical to this thesis because it considers the settlement as an aggregate of distinctive ethnic groups operating within the overall settlement. It was probably during the 1820-1840 period that the Metis developed the characteristics that separated them

from the Red River population in general and specifically from the Countryborn. Up to the time of amalgamation there was likely little differentiation between the two groups other than that the loyalties of the Metis were generaly oriented toward the North West Company while the Countryborn were allied with the Hudson's Bay Company. Between 1820 and 1840 however, these two groups gradually became differentiated as a result of at least four factors: religious, demographic, social and economic.

Religion was perhaps the greatest factor that served to divide the Countryborn from the Metis. The former were primarily Protestant while the latter were Roman Catholic. There were other implications from the dual religious background. Marriage would generally be restricted to individuals from the same faith and therefore, both the Countryborn and Metis can be seen as being biologically self-perpetuating populations. Religion thus serves as an ethnic group marker (Barth 1969:10-11).

Religion may have divided the entire settlement to some degree because there were several different religions represented in the Red River populace. Only two of these, the Anglicans and Catholics, had religious leaders. The first Catholic missionaries in the area were the Abbes Provencher and Dumoulin who arrived in the Settlement in 1818 (Tremauden 1982:71). The first Protestant missionary was the Reverend John West who arrived in the colony in 1820 (Morton 1957:71). West and his successor the Reverend D.T. Jones, found a good deal of success in augmenting their congregations with numbers of Orkneymen and their Countryborn families (Ross 1957:129).

The Metis appear to have accepted christianity quite readily and it has been stated that they were devout Catholics even before the arrival of the missionaries (Tremauden 1982:16). Although the Catholic missionaries sought to make their Metis parishoners more sedentary, their success was only marginal and some priests such as Dumoulin and Belcourt followed the Metis into the plains (Morton 1957:70). The establishment of the church and school seemed to draw the Metis into the settlement during the winter and in this way they began to establish small, semi-permanent river lot farms.

Demographic factors became important after the 1821 amalgamation, when many of the retired employees established themselves and their families in the settlement. The retiring employees either seemed to favour one specific area of the small colony or the Hudson's Bay Company tried to control the ethnic diversities in the settlement by placing specific groups in certain areas. After the 1820s, the location of the various mission churches also contributed to the demographic pattern.

Gradually there occurred what has been termed as "ethnic transfer" (Clarke 1966:26). This refers to a shift in enumerating the offspring of European-Indian marriages from the ethnic affiliation of the father to "Rupertslanders" in successive census. A Rupertslander could be either Countryborn or Metis. As a result of this ethnic transfer large numbers of Rupertslanders were enumerated after the 1830s when the second

generation matured. These offspring usually settled on their father's river lot and through time a geographical separation developed between Metis and Countryborn. The male offspring either settled in close proximity to their father's lot or moved to lands in the next available parish. This maintained the geographic separation between Metis and Countryborn.

The third factor that separated the Metis from the Countryborn was social discrimination inherent in the policies of the Hudson's Bay Company after 1821 (Sprague 1983:18). Although many Metis were incorporated into the company labour force from 1830 to 1850, they seldom rose above the rank of tripmen. When the Hudson's Bay Company began selecting apprentice postmasters in the 1840s and 1850s they selected primarily the Countryborn (Sprague 1983:20).

It would appear that during the 1830s marriage patterns altered among the higher status Hudson's Bay Company officials (Van Kirk 1980:189-191). Officials went to England, married English brides and the couple returned to the settlement. This produced a certain amount of racism shown by the European wives toward Native, Countryborn and Metis females. Van Kirk indicates that during the 1840s acculturated mixed blood women were reasserting themselves socially in the fur trade (Van Kirk 1980:203). Perhaps the key word is "acculturated" as this indicates that conscious attempts were made by the mixed blood individuals to assimilate into the British society. Van Kirk

does not indicate whether these were predominantly Countryborn or Metis, in all likelihood it would be those individuals of British background. If so, this would further serve to divide the Countryborn from the Metis as these processes of British assimilation would likely include agricultural sedentism, the Protestant faith and some degree of education.

Economic factors conclude the discussion of the 1821-1870 history of the Metis. The economic roles of the Metis were different from other groups in the settlement. They were not only tripmen as they also provisioned the Company through the semi-annual bison hunts. These were more organized after 1821 and the number of participants numbered five hundred by 1835 (Sprague 1983:18). Perhaps the most important aspect of the hunt was that it was not until 1835 that enough pemmican was produced to satisfy the needs of the Hudson's Bay Company and the settlement (Sprague 1983:17-18).

Limited economic opportunity, caused by a failure of the colony to expand, changed economic factors after the 1840s. Both the Metis and Countryborn were effected differently by the lack of economic opportunity. Pannekoek has illustrated that the individuals involved were the "second Red River generation" of primarily Countryborn males who were unable to gain a livelihood on the overcrowded river lots of their fathers or find suitable employment within the Hudson's Bay Company (Pannekoek 1976:86-87). Those that continued to farm faced the problem of a

lack of market for what they produced as the Hudson's Bay Company needed only six to eight bushels of wheat from each farmer per year (Gosman 1977:7). The few established Metis farmers faced a similar restricted market.

Bison hunters also had a lack of market because the amount of pemmican required by the Company remained static while the number of hunters gradually increased.

As a result of the crisis the Countryborn and Metis began seeking alternative means of livelihood. Many turned to the plains to partake in illegal fur trading, to hunt or to freight goods to St. Paul (Pannekoek 1976:86). Pannekoek summarized the settlement prior to 1849 as being in a state of confusion where farm, state and church which had hitherto been points of reference were stigmatized and new points of reference were necessary (Pannekoek 1976:89). The free trade movement was one of the attempts that relieved the crisis situation and altered one of the reference points - political control by the Hudson's Bay Company. This alteration was the breaking of the Company monopoly which ultimately led to the transfer of the area to the Canadian government in 1869.

Agitation for free trade was gradually increased throughout the 1840s by such individuals as James Sinclair, Andrew McDermot and the Reverend Belcourt (Gosman 1977:7). Gosman suggested that the increase in the number of carts owned by individuals during the period of 1843 to 1849 indicated the increased involvement in free trade (Gosman 1977:16).

After the Sayer trial in 1849 Metis society was to change slightly. With the various occupational roles and some degree of success now available, there developed some differentiation among the Metis based on social and economic status. This was essentially a hierarchical system composed of the Farmer-Merchant, Tripmen and Hunter groups (Gosman 1976:4). After 1849, the divergence between the first and last two groups gradually increased for it was the Farmer-Merchant that most benefitted from the Sayer affair, especially during the mid-1850s when a few were appointed to the Council of Assiniboia (Gosman 1977:22). This, however, represents only a small segment of Metis society because most continued on the semi-annual bison hunts and returned to the settlement in fall and winter to take up residence on the available river lots.

This brings the discussion to the 1860s and the dispersal of the Metis. This was possibly the result of the gradual termination of Hudson's Bay Company rule, the expansion of the American farming frontier within a short distance of the settlement, a renewed interest of eastern Canada in the west and the gradual westward migration and decline in numbers of the bison (Morton 1957:94-96). The last organized hunt was in 1868 (Kotecki 1983:53) and with it was removed one of the most distinguishing characteristics of Metis society. The 1860s were also characterized by other events: (1) the gradual flow of eastern settlers from Ontario into the settlement, (2) a severe

drought during the years 1862 to 1868 with 1868 also marked by a poor bison hunt, and (3) negotiations for transfer of the northwest from the Hudson's Bay Company to Canada.

It was this last event as well as an accumulation of grievances from the events above that brought about the Red River resistence. This resistence has been treated in other works and will not be discussed here. The major result of the resistance was not only the formation of the province of Manitoba but the dispersal of a large segment of Metis.

The Metis were required to produce legal claim to their river lots either through the Hudson's Bay Company land registry book or by making agricultural improvements on the lots. These improvements were recorded by Dominion Land surveyors during the early 1870s (Sprague 1983:28). Failure to provide ownership status allowed the Dominion government to expropriate the land and discharge it as they saw fit. Many Metis could not produce documented ownership and lost their land. As a result many left the settlement for the western territory.

In summary, Metis distinctiveness was a result of religion, demography, social organization and economic situation. Religion and demography are inter-related in that Metis primarily settled in the Catholic parish of St. Boniface then during the 1850s began to settle in St. Norbert. This created a southward expansion of Metis land holdings. The Protestant Countryborn and Orkneymen were moving northward into the developing parishes of

St. Andrew, St. Clement and St. Peter. Social organization and economic orientation are related because due to discriminatory policies of the Hudson's Bay Company the Metis were limited in the type of job positions they could hold. This limited economic potential led to involvement in farming, bison hunting and cart freighting by many individuals.

The discussion conlcudes with a summary of: (1) Metis ethnic characteristics, (2) a study of the economic adaptation of Red River groups, and (3) archaeological implications of the historical events.

Sprenger (1972) considered the Metis to be a definite ethnic group with identifiable boundaries. These boundaries were self-ascription, Indian-European ancestory, French language, Roman Catholicism, ecological and economic adaptation through bison hunting and distinct territories, such as the parishes of Saint Boniface and Saint Norbert, where they predominantly resided (Sprenger 1972:20-23). The combination of these traits is the most important point because they serve to distinguish Metis from other groups. For example, the Countryborn/Metis differentiation can be further highlighted through the use of boundary markers. The Countryborn were also of Indian-European ancestory and settled in distinct territories, however, they possessed none of the other criteria such as French language or Roman Catholicism.

Ecological and economic adaptation are useful to differentiate the Metis from other Red River ethnic groups. An examination of this difference with respect to agricultural activities, location in the settlement and age composition, was conducted through the use of census data by Clarke (1966). Clarke's study showed a definite relationship between ethnic group and agricultural participation. During the period of 1832 to 1838, the Metis had the lowest number of cultivated acres in comparison to any other group. The Countryborn had only a slightly higher ratio. The group with the highest ratio were the Scottish and Orkney settlers. The period 1838 to 1849 witnessed an increase in the number of acres cultivated per one hundred Metis. Clarke suggested that this increase was not the result of increased agricultural activity but an extension in the number of acres cultivated by a few enterprising families (Clarke 1966:87). Thus, the period of 1838 to 1849 demonstrates the emergence of the Farmer-Merchant class. By 1850 the larger increase in cultivated acreage per 100 Metis was in the parish of Saint Boniface (Clarke 1966:94). This suggests that the Farmer-Merchant class developed in that parish and may be a result of the influences by either the Catholic missionaries or the French Canadian settlers. It may have also been a result of this area being one of the first to be settled and gradually additional land was cleared and cultivated.

Archaeological Implications of Historical Events

Prior to the discussion of the sites used in the abstraction of the Metis pattern it is necessary to consider archaeological implications of the above summarized historic events and social factors. First, temporal variation would be expected between Metis assemblages. It is unfortunate that there are no pre-1840 Metis assemblages that could be compared with the post-1840 assemblages used in this study. Since the mid-1800s demarcates the period when Metis internal differentiation developed it would be beneficial to compare early assemblages with late. Also, pre-1825 assemblages would be of value because these would give insights into early Metis material culture.

Economic orientation is possibly the factor with the greatest effect on Metis material culture because this was used to distinguish the three Metis sub-groups. Economic orientation also separates the Metis from the remainder of the ethnic groups at Red River. When only Metis sites are considered, assemblages from Farmer-Merchant sites should show a large degree of differentiation from bison hunter sites. In addition, most of the former should be located in St. Boniface and St. Norbert while the latter would be concentrated in the White Horse Plains.

Evidence of agricultural related artifacts would likely be confined to sites in St. Boniface and St. Norbert that post-date 1850. It is probable that these sites would have a larger Activities group frequency due to the Farm Tools, Storage Items,

Botanical and Stable and Barn classes, than sites on the White Horse Plains. Increased agricultural practices might also lead to an increase in the number of farm buildings and in the degree of refinement to the domestic residence. This in turn should result in a large Architectural group frequency.

Sites where the major economic emphasis was on seasonal hunting, and therefore abandoned for period of time, would have a decreased emphasis on sophistication of shelter construction and therefore a decreased Architectural percentage. However, there would likely be an increased Arms group frequency at these sites over that of agricultural sites.

Finally, nineteenth century agriculturalism in the Red River Settlement and bison hunting on the plains would probably not have afforded site inhabitants luxury goods. As a result, the Personal group total at most sites would probably be lower than most other artifact groups.

Summary

The historical, geographical and anthropological studies illustrate the nature of Metis society from its development in the Red River area to its dispersal after 1870. These events establish a background for the 1845 to 1870 period the time of the Metis assemblages discussed in the next chapter. During this time, Metis culture developed to make the Metis a distinct unit within the Red River settlement. They have been portrayed to be ethnically and economically distinct and divided into three

groups: Farmer-Merchant, Tripmen and Hunters. It was shown that the Farmer-Merchant group first developed in the Saint Boniface area during the period of 1838 to 1849.

The following chapter outlines the historical and archaeological background of the three Metis sites used to establish the Metis pattern.

CHAPTER III

THE METIS FARMER-MERCHANT SITES: HISTORICAL BACKGROUND

Introduction

The sites discussed in this chapter represent the extent of Metis sites excavated in the Winnipeg area. The discussion will introduce each site, its historic background, the rationale for investigation, excavation techniques and conclusions drawn by the original researchers. The chapter concludes with a summary of the site inhabitants as well as their social and economic status.

Site Data Base

Riel House

Introduction

Riel House is located in the Parish of St. Vital on Lot 51 as designated by the land survey of 1874 (McPhillips 1874). The site was excavated in 1976 by Parks Canada to recover data regarding the cultural history of the Riel family (Forsman 1977:viii). The artifactual material was later reviewed (Lunn et al. 1980) in light of historic data obtained following excavations (Payment 1980).

Historical background

Riel House site can be divided into three main occupations based on the three families that resided on the lot from 1835 to the twentieth century. The first documented owner was Pierre Parenteau from eastern Canada who resided on the lot with his Metis wife Josephte Laurin and five children (Forsman 1977:6). Although Parenteau was not Metis, his children could be considered as such based on the link through their mother. In 1849, Parenteau sold to Francois Gendron who was born in Rupertsland in 1795 and married to a Metis, Angelique Lussier (Sprague and Frye 1983). Gendron may have also been Metis considering that the first Euro-Canadian woman was not in the area until after 1811. Therefore if he were born west of Lake Superior, the geographic designation Sprague and Frye equate with Rupertsland, then Gendron's mother was in all probability either Native or Metis and Gendron therefore would be Metis. During the Gendron occupation the lot contained a house, stable and barn. Eight acres were recorded to be under cultivation (Forsman 1977:6). By 1864, the property had been sold to Julie Riel the widow of Jean-Louis Riel and mother of Louis Riel (Forsman 1977:6). Jean-Louis was a Metis and born in 1816. Julie Riel was born in Lower Canada in 1822. In 1864 the Riel family consisted of eight children with the two oldest, Louis and Sarah, receiving education in eastern Canada (Forsman 1977:7). The Riel family lived at the site into the 1900s.

Archaeological Investigations

Site excavations consisted of a variety of tested locales (Figure 1) with only two areas, Structures 1 and 2, considered in this thesis. Samples from the other areas examined were either too small (area totals were less than 100 artifacts) or too recent (post-1900). Both Structures 1 and 2 contained cellars and the artifacts from these form the assemblages used. Structure 1 and 2 remains are hereafter referred to as Riel 1 and Riel 2.

Riel 1 was located partially beneath a still-standing structure (Figure 2). Half of the cellar had been destroyed by the construction of a concrete foundation under this present structure. Cellar fill consisted of mottled brown soil interspersed with distinct bands of organic material and covered with a black soil. Forsman initially interpreted this cellar as being filled during the Parenteau occupation (Forsman 1977:18-19). Subsequent interpretations suggest that filling of the cellar began not earlier than 1848 and had concluded by the 1880s (Lunn et al. 1980:14). For purposes of this research a mean date of 1860 and bracketing dates of 1842 to 1892 have been calculated (Table 2) using the method outlined by South (1977).

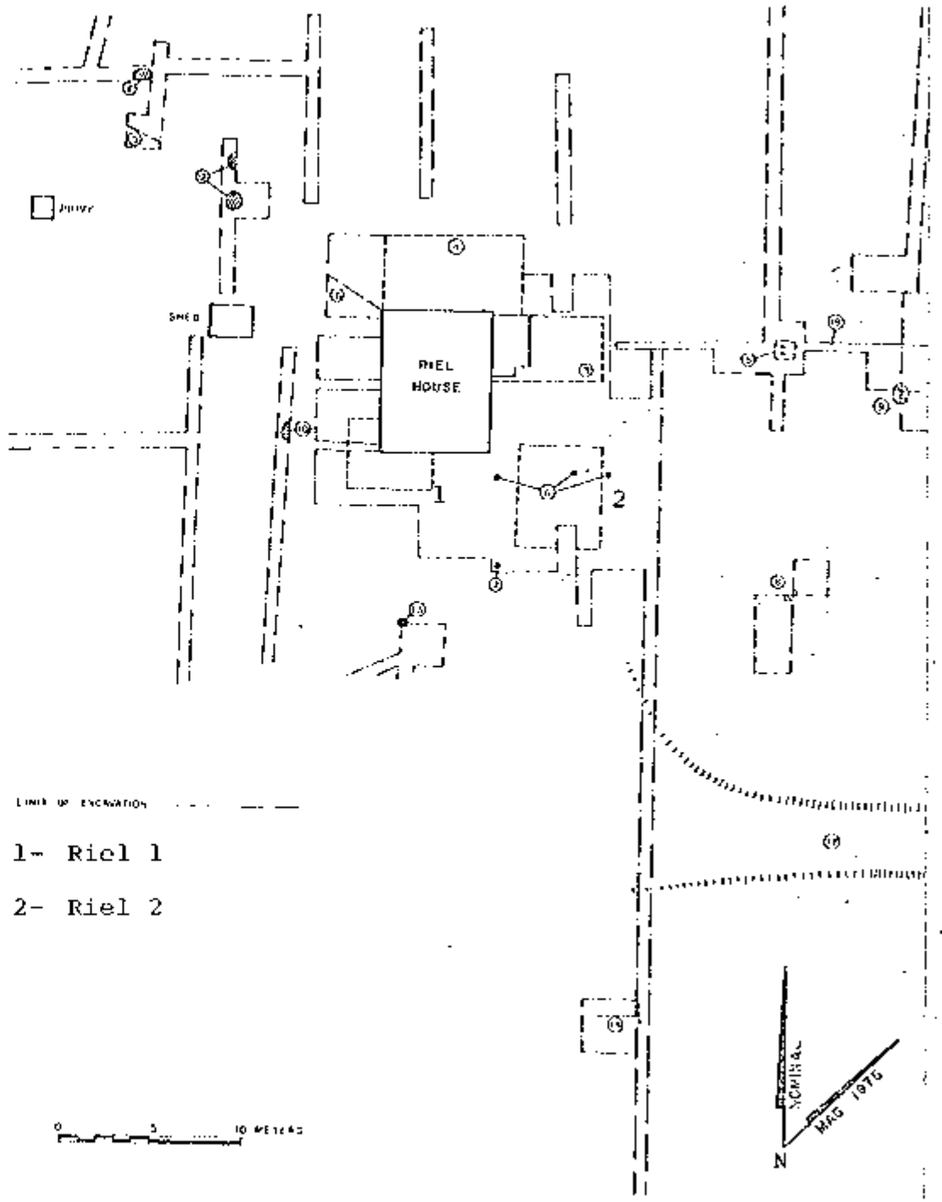

Figure 1. Riel House Excavations (from Forsman 1977:10).

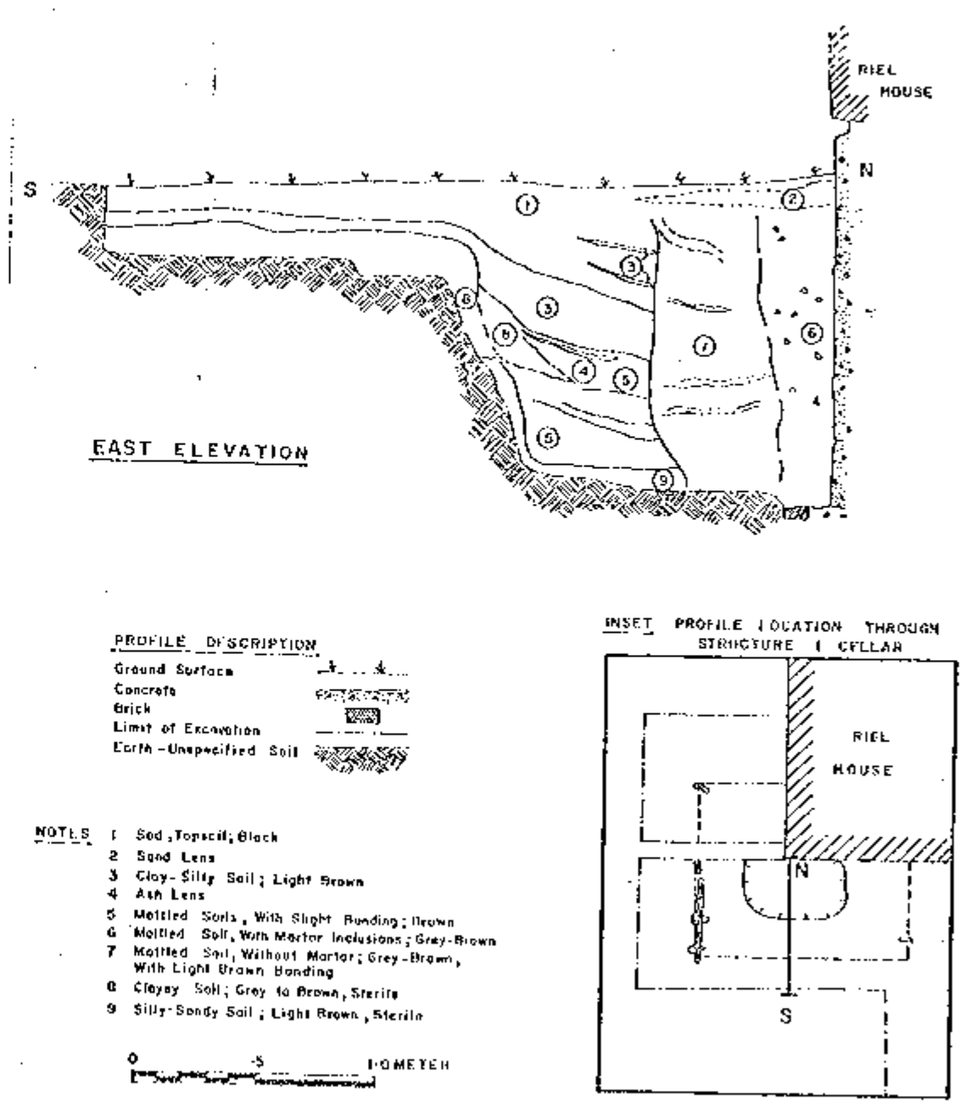

Figure 2. Riel 1 Stratigraphy (from Forsman 1977:13).

Table 2. Riel 1 Mean Ceramic Date and Bracketing Date.

Name	Date	Median	Count	Product
Alhambra	1848-1892	1870	13	24310.0
British Flowers	1835-1892	1863.5	2	3727.0
B 772	1847-1892	1869.5	10	18695.0
Continental Views	1844-1892	1868	12	22416.0
Macaw	1835-1892	1863.5	7	13044.5
Watteau	1835-1892	1863.5	7	13044.5
Wellington	1835-1892	1863.5	3	5590.5
Floral	1835-1892	1863.5	1	1863.5
Italian	1835-1892	1863.5	2	3727.0
Flower Vase	1835-1892	1863.5	1	1863.5
		TOTAL	58	108281.5

$$\text{Mean date} = \frac{108281.5}{58} = 1866.9$$

Correction factor = 235.5 + 0.87 (1866.9) = 1859.7
(South 1977:202)

Riel 1 Bracketing Date

Name	Initial	Count	Product	Terminal	Product
Alhambra	1848	13	24024	1892	24596
British Flowers	1835	2	3670	1892	3784
B 772	1847	10	18470	1892	18920
Continental Views	1844	12	22128	1892	22704
Macaw	1835	7	12845	1892	13244
Watteau	1835	7	12845	1892	13244
Wellington	1835	3	5505	1892	5676
Floral	1835	1	1835	1892	1892
Italian	1835	2	3670	1892	3784
Flower vase	1835	1	1835	1892	1892
	TOTAL	58	106827		109733

$$\text{Initial date} = \frac{106827}{58} = 1841.8 \qquad \text{Terminal date} = \frac{109733}{58} = 1891.9$$

As a result of the cellar materials having been disturbed after deposition and only half of the feature excavated the number of artifacts recovered was extremely low. The assemblage was also characterized by a large Ceramics class. The ceramics were further characterized by being comprised of small sherds with no reconstructable vessels and it has been suggested that the material was originally deposited outside of the cellar area (Lunn et al. 1980:15). This inference was based on small ceramic sherd size, lack of cross mends and several scorched ceramic and glass fragments. Only a small portion of the assemblage was scorched and no matrix appeared to have ash content. Small sherd size and lack of cross mends was also characteristic of the ceramic assemblage from Riel 2, Delorme House and Garden Site.

The second cellar feature, Riel 2, was situated about four metres southeast of the extant structure (Figure 3). Cellar fill consisted of multiple layers of mottled brown soil, organic material and light brown clay-silt. Backfilling of the feature likely began during the 1860s and had ceased by the 1880s (Lunn et al. 1980:25). Similarly to Riel 1 a mean ceramic date and bracketing date were calculated for Riel 2 (Table 3).

The cellar fill has been interpreted as being primary de facto refuse,but it also contained materials from elsewhere on the site (Lunn et al. 1980:20).

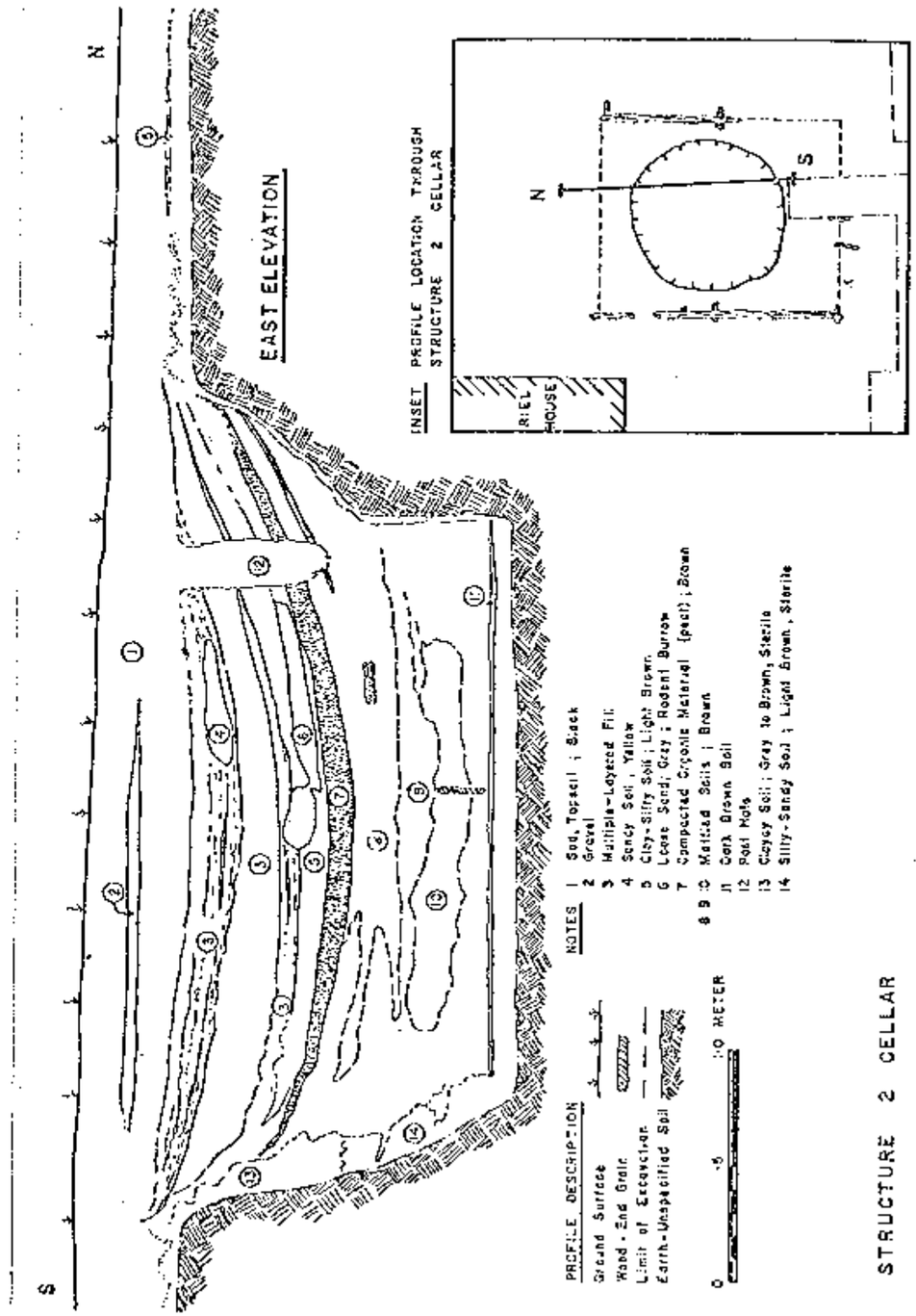

Figure 3. Riel 2 Stratigraphy (from Forsman 1977:23).

Table 3. Riel 2 Mean Ceramic date and Bracketing Date.

Name	Date	Median	Count	Product
Continental Views	1844-1892	1868.0	25	46700.0
B 700	1837-1892	1864.5	3	5593.5
Ivy	1845-1892	1868.5	7	13079.5
Shamrock	1861-1892	1876.5	9	16888.5
J.& G. Meakin	1851-1891	1871.0	6	11226.5
E.C. Gallinor	1862-1891	1876.5	5	9382.5
British Flowers	1835-1892	1863.5	5	9317.5
Broseley	1835-1892	1863.5	5	9317.5
Flower Vase	1835-1892	1863.5	4	7454.5
Rural Scenes	1850-1892	1871.0	8	14968.0
Wellington	1835-1892	1863.5	2	3727.0
Alhambra	1848-1892	1870.0	1	1870.0
Bosphorus	1854-1891	1872.5	1	1872.5
B 772	1847-1892	1869.5	2	3739.0
Camilla	1835-1892	1863.5	4	7454.0
Floral	1835-1892	1863.5	1	1863.5
Ionian	1848-1892	1870.0	2	3740.0
Watteau	1835-1892	1863.5	1	1863.5
		TOTAL	91	170056.5

Mean date = $\frac{170056.5}{91}$ = 1868.8

Correction factor = 235.5 + 0.87(1868.8)= 1861.3

Riel 2 Bracketing Date

Continental Views	1844	25	46100	1892	47300
B 700	1837	3	5511	1892	5676
Ivy	1845	7	12915	1892	13244
Shamrock	1861	9	16749	1892	17028
J.& G. Meakin	1851	6	11106	1891	11346
E.C. Gallinor	1862	5	9310	1891	9455
British Flowers	1835	5	9175	1892	9460
Broseley	1835	5	9175	1892	9460
Flower Vase	1835	4	7340	1892	7568
Rural Scenes	1850	8	14800	1892	15136
Wellington	1835	2	3670	1892	3784
Alhambra	1848	1	1848	1892	1892
Bosphorus	1854	1	1854	1891	1891
B 772	1847	2	3694	1892	3784
Camilla	1835	4	7340	1892	7568
Floral	1835	1	1835	1892	1892
Ionian	1848	2	3696	1892	3784
Watteau	1835	1	1835	1892	1892
	TOTAL	91	167953		172160

Initial date = $\frac{167953}{91}$ = 1841.8 Terminal date= $\frac{172160}{91}$ = 1891.9

Garden Site

Introduction

The Garden Site, Dklg-16, is located in the Parish of St. Norbert on Lot 81 under the 1874 survey (McPhillips 1874).

The site was excavated in 1979 through a grant obtained by the Manitoba Historic Resources Branch from the Federal government (Ebell 1983:ix).

Historic Background

The site was initially owned by Etienne Gilbert but the Garden Site materials are likely those of Pierre Beauchamp who purchased the land in 1845 (Kotecki and Brown 1983:91). Pierre Beauchamp had previously owned Lot 119 in the Parish of St. Boniface (Sprague and Frye 1983). Beauchamp had six children, four were born after 1845. His wife died in 1862 and in 1863 he married Scholastique Versaille. Pierre Beauchamp died in 1865 (Kotecki and Brown 1983:95). In 1868, Pierre's son Abraham sold a portion of the lot to Michelle Roi whereupon Roi sold this portion to the Reverend Ritchot in 1870. Scholastique Versaille also owned a portion of the lot but sold it to the Reverend in 1872 (Kotecki and Brown 1983:98).

During Pierre Beauchamp's occupation there were no more than three standing structures. These were located in virtually a straight line oriented north to south parallel to the Sale River. Between 1845 and 1865, Beauchamp had from three to eight acres under cultivation, five to six carts and ten to twenty

livestock animals. In comparison with other Metis settlers, these were slightly higher than the average number of assets (Kotecki and Brown 1983:93).

Archaeological investigations

The Garden Site was intensively surface collected, shovel tested and excavated in areas of concentrated artifact recovery (McLeod 1983:111-112). Three features were identified and the artifacts of these, plus the material obtained from the surface and the shovel tests, were used to form the Garden Site assemblage. The three features have been interpreted as refuse middens with two features dating to the 1841 to 1870 period while the third dates c.1840 to the late 1880s. Each feature contained a combination of yellow clays, mottled brown clay, silt and organic materials with the upper portion of each feature disturbed as a result of ploughing (Figures 4 to 6).

Delorme House Site

Introduction

The Delorme House Site is located in the Parish of St. Norbert on Lot 21 (McPhillips 1874). The site was excavated in 1981 by the Manitoba Department of Cultural Affairs and Historic Resources as part of the Historic Resources Branch ongoing field research.

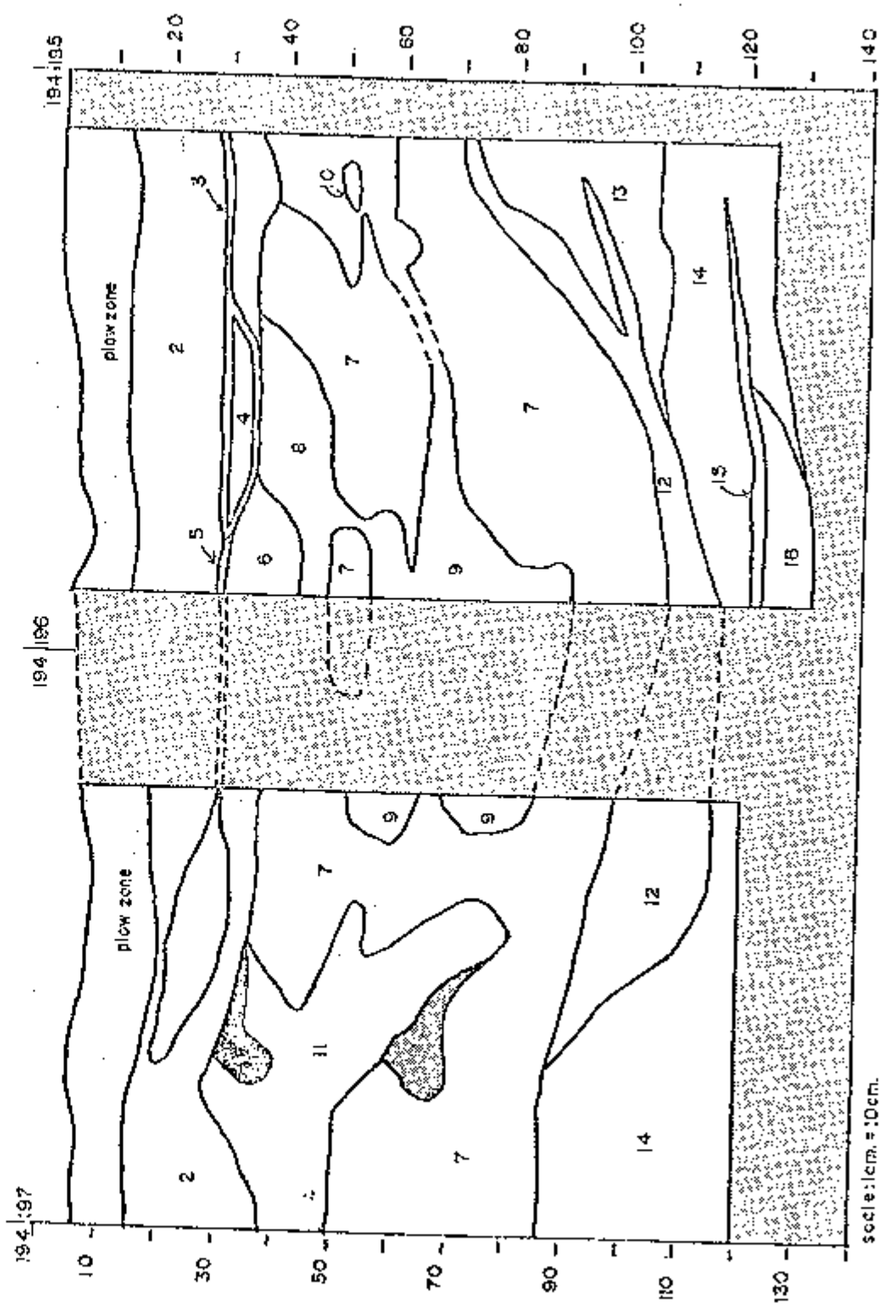

Figure 4. Garden Site Feature 1 (from McLeod 1983:115).

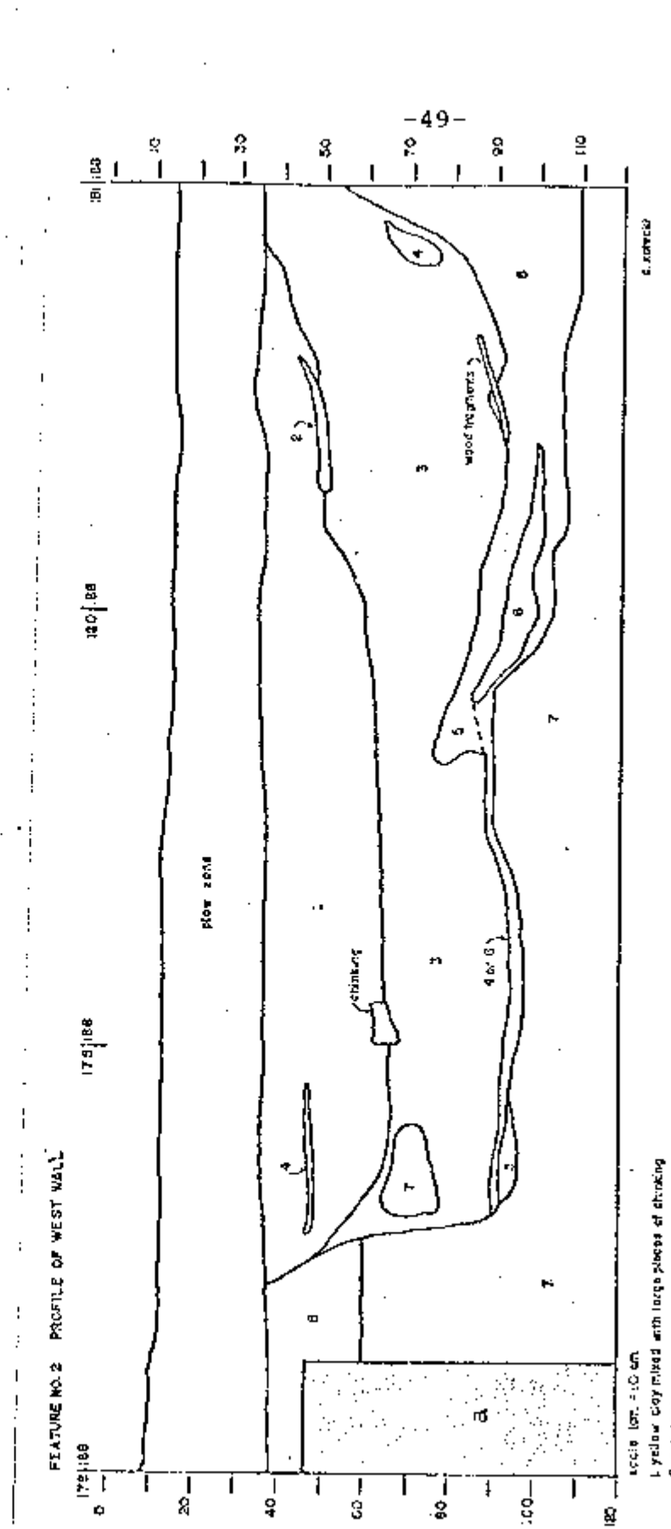

Figure 5. Garden Site Feature 2
(From McLeod 1983:128).

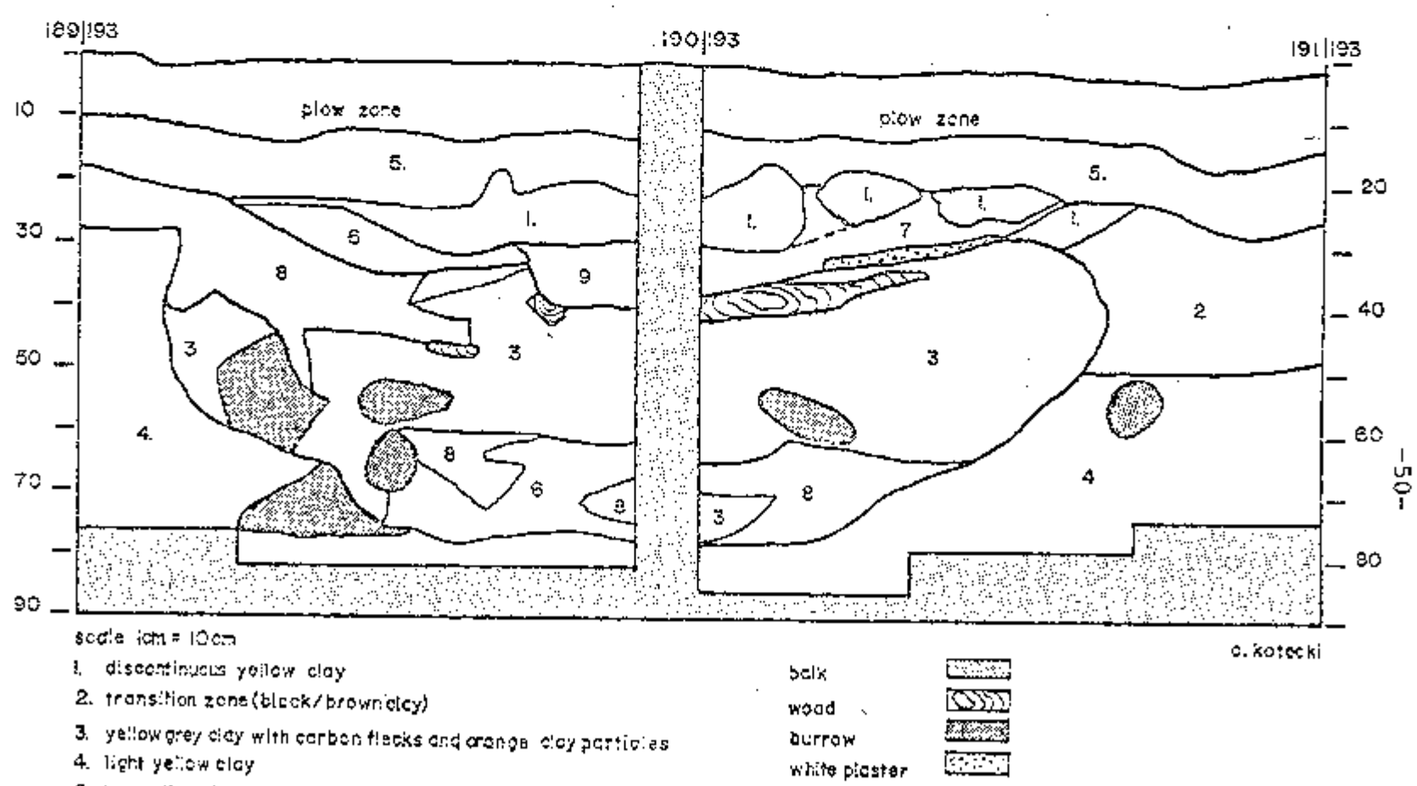

Figure 6. Garden Site Feature 3 (from McLeod 1983:123).

Historic Background

The site was purchased by Pierre Delorme before 1864 (McLeod 1982:5). Pierre Delorme was Metis, born in the Red River Settlement in 1832 and married Adelaide Beauchemin in 1854 (McLeod 1982:7). During the Delorme occupation one house and as many as four outbuildings stood on the site prior to 1874. These were oriented north-south with the widest portion of the structures faced toward the river. In 1881, the Delormes moved to the east bank of the Red River, almost directly opposite the original homestead. The original site was then utilized by two brothers, the Pattersons, who had immigrated from Scotland in 1879 (McLeod 1982:6). In 1892 the Courchaine family purchased the site and owned the land until the 1960s (McLeod 1982:6-8).

Archaeological Investigations

The Delorme House assemblage consists of artifacts obtained from a cellar located in close proximity to the pre-1881 house. Only those artifacts recovered in the designated cellar stratum (Figure 7) were used for calculation of the Delorme House assemblage. This stratum consisted of one major soil type, that of a yellow-black clay mixed with organic remains such as seeds, nut shells, wood and charcoal (McLeod 1982:26-28). The Delorme House cellar fill differed from the Riel House cellars in that actual cellar walls were located in

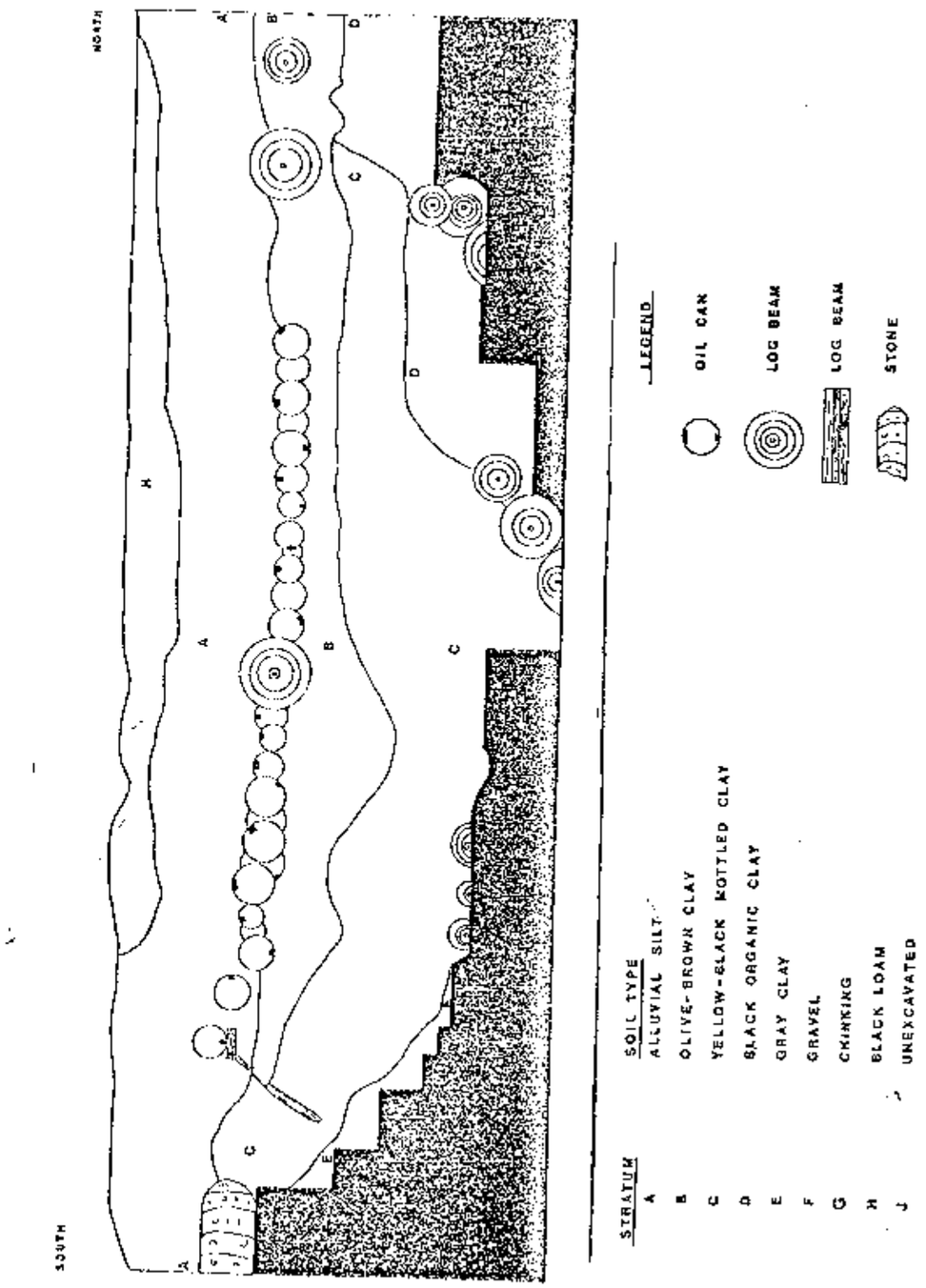

Figure 7. Delorme House Cellar Stratigraphy (from McLeod 1982:25).

situ at the former. The cellar fill accumulated between 1854 and the 1880s. It is likely that the artifacts were deposited directly into the cellar area and were not part of the fill collected from other areas. This is based on the vertical distribution of dateable artifacts such as an 1854 coin found near the base of the cellar and an 1870 dime found 25 cm above that (McLeod 1982:96). The Delorme House ceramic assemblage was however, similar to that of the Riel House cellars because there were few cross mends or complete vessels. The corrected mean ceramic date for the Delorme House cellar has been calculated to 1862 and the ceramic bracketing date from 1860 to 1880 (McLeod 1982:113).

Ethnicity and Social Status

Sprenger has outlined the parameters for Metis membership on the basis of a monothetic set of criteria: French-Indian ancestory, Roman Catholic religion, French language and a traditional dress that readily identified them (Sprenger 1972:17). Census records were the main data source for social and economic position of individuals and families refered to in this thesis. Pierre Parenteau was likely not Metis, however his wife is listed as being of the Catholic faith and French Metis (Sprague and Frye 1983). The Parenteau family could be considered Metis on the basis of the parameters established by Sprenger. However, the possibility that either of the Riel House assemblages being remnants of the Parenteau occupation is slight

for the bulk of the material dated the Francois Gendron occupation. Gendron is listed in the census records as being born west of the Great Lakes but was, in all probability a Metis, as was his wife. The Riel family was Metis through the paternal side of the family as Louis Riel Sr. was Metis. Pierre Beauchamp is listed in the census as Metis and from his will it is also evident that he was Roman Catholic (Kotecki and Brown 1983:95). Pierre Delorme was also Metis and of the Catholic faith. Therefore, when specific individuals and families are considered, the two most easily identifiable criteria were the French-Indian ancestory and the Roman Catholic faith.

Each of the site inhabitants, with the exception of Pierre Delorme, gained ownership of their river lot through cash purchase. There is insufficient documented evidence with Pierre Delorme although it has been documented that he purchased a second lot north of his farmstead in 1864. Therefore these individuals represent a higher status of Metis who were capable of purchasing their specific lot. The lack of other comparative Metis Farmer-Merchant assemblages makes it difficult at this time to strengthen the archaeological assumption that these individuals were of a higher relative social standing. The fact that they purchased their land, that Delorme was a politician, that Louis and Sara Riel were educated elsewhere, and that all families were sedentary agriculturalists all support this assumption.

Pierre Beauchamp was originally from the Parish of St. Boniface and if he was not of fairly high social standing when he arrived in St. Norbert it has been shown that through the years 1845 to 1865 his assets gradually increased to above that of other Metis of the same relative age (Kotecki and Brown 1983:93). Therefore, it is likely that the artifactual material deposited at these three Metis sites are related to individuals who enjoyed a relatively successful farming economy. In this sense they belong to the group of Metis that Gosman has designated as the Farmer-Merchant class.

Implications of Site Formation

Other factors to consider in light of of the historical data and the sites used in this thesis are site formation processes. It is necessary to consider what might be expected at Metis sites especially when subsequent sections of this research deal with why certain artifact group frequencies are highly variable between sites.

All assemblages used in this research are from domestic sites. Domesticity implies daily activities by a household or family. Subsistence related materials, most of which are included in the Kitchen group, would likely be expected to form a large portion of each site assemblage. In addition, material that is easily fragmented, such as ceramics and glass containers would be expected to form the bulk of the Kitchen group.

Most residences and farm buildings were probably constructed in the Red River frame style and therefore one would expect varying amounts of architectural items. The Architectural group frequency would largely be dependent on the degree of interior and/or exterior finishing. Sites where buildings were frequently repaired or replaced might also have a larger Architectural group percentage than sites were reparation or replacemnet activities were limited.

Diversified subsistence strategies that combined hunting with farming might be reflected in site assemblages by a higher Arms group than sites where farming was the sole economy. Family size might also effect the Arms group frequency because a family composed primarily of males might own a larger number of weapons than a smaller sized family or one composed of females.

Family size might also have other correlates in the archaeological record in terms of a large or diverse number of artifacts. Length of occupation would also affect the size and diversity of the assemblages. The Garden site was occupied for about 25 years, the Riel House features were used over a 30-year period while the Delorme House cellar was filled over a 20-year period.

Different temporal periods might also determine the size and content of site assemblages. Clothing style variation might cause a varying number of Clothing group artifacts to be deposited. A wider range of household goods might have been

available after the 1850s, when the American market at St. Paul was tapped via cart freighting. In addition, this might have allowed for an increased number of cheaper goods to be purchased then was possible when only the Hudson's Bay market was available.

It is difficult to predict what ethnic markers would be evident in the archaeological assemblages. The pattern recognition approach of this thesis infers that the various relative artifact group percentages are the correlates of ethnicity.

Summary

The three sites used in the study of the Red River Metis were introduced in terms of geographical location within the settlement, historic background of the site, extent of building construction during major occupations and the extent of of archaeological investigations and conclusions at the specific sites.

The site occupants are considered to have been Metis on the basis of French-Indian ancestory and Roman Catholicism and this was obtained from census data. It has been hypothesized that these Metis individuals were of the Farmer-Merchant group, based on relative comparisons using census data. The following chapter compares the artifactual assemblages recovered at each site and formulates the Farmer-Merchant Pattern.

CHAPTER IV

COMPARISON OF FOUR METIS ASSEMBLAGES: THE FARMER-MERCHANT ARTIFACT PATTERN

Introduction

This chapter compares the Metis assemblages and combines them into a Metis pattern. Rank order correlation was conducted using each Metis site and artifact group and class counts to determine the degree of similarity within Metis data. The data were further analyzed to abstract the Metis Farmer-Merchant Pattern.

Data Classification

The data for both the rank order correlations and pattern frequencies were placed within the artifact group and class format of South (1977:95-96).

The Delorme House has been analyzed and presented in the South format but both the Riel House and Garden Site materials required reexamination.

Original site monographs were utilized to obtain artifact class and group totals (McLeod 1982, Forsman 1977). One of the problems encountered when using the site monographs was that some of the artifact descriptions did not include function and

therefore artifacts could not be accurately placed within an artifact class. These non-diagnostic artifacts were either glass or metal and it is assumed that, due to their fragmentary nature, function could not be ascertained by the researchers. When the Delorme House material was analyzed the unidentifiable glass was placed within the Glassware class as a specific type (McLeod 1982:56). Metal fragments were placed either in the Kitchenware class as tin can fragments or in Miscellaneous Hardware as miscellaneous metal based on size and/or material type. In most instances, the data from the other Metis sites were treated in a similar manner to the Delorme House materials. At Riel 2, for example, 31 bottle fragments and 38 unidentifiable glass fragments were recovered. The function of the vessels was not specified and they were placed within the Kitchen group in the Glassware class. Quantification of unidentifiable metal presented a problem. These could not be placed in any one specific group given the degree of functional variability of metal artifacts found at historic sites. The unidentified metal from the Garden and Riel House sites could not be examined as was the case for the Delorme House and as a result the unidentifiable metal totals were deleted from those site assemblages.

Once each site assemblage was quantified the procedure for further data manipulation was initiated. Table 4 and 5 illustrate the class and group frequencies from each site.

Table 4. Raw Data Artifact Class Counts for Metis Sites.

Artifact class	Garden	Riel 1	Riel 2	Delorme
Kitchen group				
Ceramics	223	136	186	60
Liquor bottle	11	0	9	6
Case bottle	0	0	0	5
Tumbler	0	1	0	5
Medicine bottle	32	1	7	8
Glassware	57	6	171	89
Tableware	3	2	14	5
Kitchenware	120	8	120	39
Architectural group				
Window glass	116	8	53	125
Nails	237	27	244	694
Construction hardware	20	3	9	31
Door parts	0	0	1	2
Furniture group				
Furniture hardware	1	0	4	10
Arms group				
Arms	19	0	1	3
Clothing group				
Buckles	0	0	1	3
Thimbles	0	1	0	0
Buttons	53	6	23	39
Scissors	0	0	1	0
Pins	16	1	1	10
Fasteners	2	0	0	0
Shoes	5	0	49	11
Beads	546	2	4	18
Personal group				
Coins	1	0	0	3
Keys	1	0	0	0
Personal items	5	0	8	17
Pipes group				
Pipes	27	16	4	5
Activities group				
Construction tools	3	0	6	1
Farm tools	0	0	3	0
Toys	0	0	4	24
Fishing gear	0	0	0	2
Prehistoric	0	0	0	2
Storage items	14	1	9	6
Botanical	0	0	2	56
Stable and barn	4	0	9	11
Miscellaneous hardware	34	3	8	63
Other	0	0	0	1
TOTAL	1550	222	951	1354

Table 5. Raw Data Artifact Group Frequencies for Metis Sites.

Artifact group	Garden		Riel 1		Riel 2		Delorme	
	Count	%	Count	%	Count	%	Count	%
Kitchen	446	28.8	154	69.4	507	53.3	217	16.0
Architectural	373	24.1	38	17.1	307	32.3	852	62.9
Furniture	1	0.1	0	0.0	4	0.4	10	0.7
Arms	19	1.2	0	0.0	1	0.1	3	0.2
Clothing	622	40.1	10	4.5	79	8.3	81	6.0
Personal	7	0.5	0	0.0	8	0.8	20	1.6
Pipes	27	1.7	16	7.2	4	0.4	5	0.4
Activities	55	3.5	4	1.8	41	4.4	166	12.2
TOTAL	1550	100.0	222	100.0	951	100.0	1354	100.0

Rank Order Correlation Tests

Introduction

A rank correlation test is a nonparametric procedure for measuring the relationship between two variables or samples (Mendenhall and Ott 1972:192). The variables considered in this study are the artifact groups and classes from each of the Metis sites. Rank order correlation allows for a statistical test of association between the ranks of variables being considered. The null hypothesis in this case would be that there is no association between the artifact groups or classes and sites.

The alternative hypothesis is that there is an association between these variables. Since the alternate hypothesis does not state how the ranks are associated, i.e. specifies direction, the test is two-tailed.

Rank order correlation was selected to compare Metis assemblages as this provided a simple means of determining association. Other statistical tests have been used in conjunction with South's artifact groups. Two have been mentioned in this text: Forsman and Gallo's use of Kendall's tau, also a rank order test, and Deagan's use of Student's "t" distribution. Speaman's rank order was preferred over these methods largely due to a less tedious process for calculation of the coefficient, especially when the artifact classes were examined.

One of the problems of utilizing this statistical method is that it usually requires a fairly large number of variables (Mendenhall and Ott 1972:193). While a comparison at the class level provided for 36 variables, the group level consisted of only eight categories, a statistically low number of comparative variables. However, it represents the highest number of artifact groups that can be compared.

Figure 8 shows the formula utilized to calculate rank order correlation. The advantage of a rank correlation test is that large artifact class or group values do not effect the outcome of the test as much as it would in a comparison based on absolute or relative frequencies.

Data Manipulation

Artifact group and site correlation

Ranking consisted of giving a value of "one" to the group with the highest total and "two" to the second highest group and so forth. In the event of a tie, a mean ranked value was calculated. The correlation coefficient (r_s) ranges from +1.0, a perfect positive correlation, to -1.0, a perfect negative correlation. Therefore, when the artifact group rankings of each site are tested the value of r_s becomes important when observing the degree of association between each Metis artifact group.

$$r_s = 1 - \frac{6 \sum d^2}{N(N^2-1)}$$

Where r_s = correlation coeeficient
N = number of ranks
d = difference between ranks

Figure 8. Formula for Calculation of Rank Correlation Test.

Table 6 shows the ranked values of the artifact group counts. All rank order calculations are illustrated in Appendix A-1 while Table 7 below shows a summary of the r_s and the critical values. Due to a sample size of less than 30, a table of critical values (Levin 1977:277) was used to evaluate the significance of the test statistic. If the test statistic was larger than the critical value at the chosen probability level then the null hypothesis was rejected in favour of the alternate

hypothesis. The .05 probability level was chosen for all statistical tests because the possibility of having 5 chances out of 100 for sampling error is commonly considered appropriate for the examination of assemblages collected in the manner of those discussed here.

The null hypothesis was rejected in four of the six tests. In the Garden-Delorme and Riel 1-Delorme tests the coefficient value did not exceed the critical value. Temporal differences may account for this lack of correlation.

Table 6. Metis Ranked Artifact Groups.

Artifact group	Garden	Riel 1	Riel 2	Delorme
	Rank	Rank	Rank	Rank
Kitchen	2	1	1	2
Architectural	3	2	2	1
Furniture	8	7	6.5	6
Arms	6	7	8	8
Clothing	1	4	3	4
Personal	7	7	5	5
Pipes	5	3	6.5	7
Activities	4	5	4	3

Based on the r_s value, the strongest artifact group correlation existed between Riel 2 and Delorme House, and Garden Site and Riel 1. It is interesting to note that in terms of temporal comparisons, Riel 2 and Delorme House are the latest sites (post-1860) while Garden Site and Riel 1 are the earliest. A coefficient of agreement, the mean of the r_s values, was calculated for the six tests. The coefficient of agreement is a method of summarizing the degree of association between the sets of rankings (Mueller et al. 1970:274).

Table 7. Summary of Metis Artifact Group Rank Order Tests.

Comparison	r_s value	Critical value (p=.05)	Decision
Garden-Riel 1	+0.785	0.738	reject null
Garden-Riel 2	+0.780	0.738	reject null
Garden-Delorme	+0.643	0.738	accept null
Riel 1-Riel 2	+0.768	0.738	reject null
Riel 1-Delorme	+0.667	0.738	accept null
Riel 2-Delorme	+0.946	0.738	reject null
Coefficient of agreement +0.765			

Artifact Class and Site Correlation

Correlations between artifact classes and sites allowed for a larger number of variables to be compared than the group and site correlations, therefore a greater degree of reliability in terms of hypothesis acceptance or rejection would be produced. With the larger sample size the significance of the r_s value can be tested by the formula illustrated in Figure 9. The value derived from this formula is distributed as a Student's "t" with degrees of freedom equal to n-2 (Siegel 1956:212). The value of the calculated t was compared with a table of critical values (Levin 1977:273).

The rankings for each artifact class at Metis sites are illustrated in Table 8. The calculations for the data are illustrated in Appendix A-2 and summarized in Table 9. The Riel 2-Delorme test produced the largest correlation coefficient while the lowest value was from the Riel 1-Delorme House test.

The null hypothesis of no association was rejected for each paired site comparison at the p=.05 level of significance. No correction factor was used for the tied ranks as they only caused a slight inflation of the r value (Siegel 1956:210).

$$t = r_s \sqrt{\frac{N-2}{1-(r_s)^2}}$$

Where:

t = student's "t"
r_s = correlation coefficient
N = number of ranked observations

Figure 9. Formula for Calculation of Student's t.
Table 8. Metis Ranked Artifact Classes.

Artifact class	Garden	Riel 1	Riel 2	Delorme
	Rank	Rank	Rank	Rank
Ceramics	3.0	1.0	2.0	5.0
Liquor bottle	15.0	26.5	10.5	17.5
Case bottle	30.5	26.5	32.0	20.5
Tumbler	30.5	14.0	32.0	20.5
Medicine bottle	9.0	14.0	15.0	16.0
Glassware	6.0	6.5	3.0	3.0
Tableware	19.5	10.5	8.0	20.5
Kitchenware	4.0	4.5	4.0	7.5
Window glass	5.0	4.5	5.0	2.0
Nails	2.0	2.0	1.0	1.0
Construction hardware	11.0	8.5	10.5	9.0
Door parts	30.5	26.5	25.0	27.0
Furniture hardware	23.0	26.5	18.5	15.0
Arms	12.0	26.5	25.0	24.0
Buckles	30.5	26.5	25.0	24.0
Thimbles	30.5	14.0	32.0	33.5
Buttons	7.0	6.5	7.0	7.5
Scissors	30.5	26.5	25.0	33.5
Pins	13.0	14.0	25.0	33.5
Fasteners	21.0	26.5	32.0	33.5
Shoes	16.5	26.5	6.0	13.5
Beads	1.0	10.5	18.5	11.0
Coins	23.0	26.5	32.0	24.0
Keys	23.0	26.5	32.0	33.5
Personal items	16.5	26.5	13.5	12.0
Pipes	10.0	3.0	18.5	20.5
Construction tools	19.5	26.5	16.0	29.5
Farm tools	30.5	26.5	21.0	33.5
Toys	30.5	26.5	18.5	10.0
Fishing gear	30.5	26.5	32.0	27.0
Prehistoric	30.5	26.5	32.0	27.0
Storage items	14.0	14.0	10.5	17.5
Botanical	30.5	26.5	22.0	6.0
Stable and barn	18.0	26.5	10.5	13.5
Miscellaneous hardware	8.0	8.5	13.5	4.0
Other	30.5	26.5	32.0	29.5

Table 9. Summary of Metis Artifact Class Rank Order Tests.

Comparison	r_s value	t value	Critical value (p=.05)	Decision
Garden-Riel 1	+0.782	7.316	2.034	reject null
Garden-Riel 2	+0.764	6.904	2.034	reject null
Garden-Delorme	+0.651	5.000	2.034	reject null
Riel 1-Riel 2	+0.646	4.935	2.034	reject null
Riel 1-Delorme	+0.612	4.512	2.034	reject null
Riel 2-Delorme	+0.778	7.221	2.034	reject null
Coefficient of agreement	+0.705			

Rank order tests using sites and classes produced correlation coefficients in the same range as those calculated from site and artifact group tests. It would therefore appear that the Metis data show some correlation with variable size as small as eight and a more consistent correlation with the number of variables at thirty-six.

Summary

Rank order correlations showed that Metis sites were associated based on ranked artifact group and classes. Tests using ranked class data exhibited the largest amount of association. Table 10 shows the range of correlation coefficients and coefficient of agreement values for the artifact group and class data sets.

It has now been shown that the sites used in this research have a degree of similarity based not only on historical background but also with respect to material assemblages as shown on Table 9. It is now possible to further examine the data to determine the possibility of abstracting the Metis Farmer-Merchant pattern.

Table 10. Range of Metis Correlation Coefficient.

	Coefficient Range	Coefficient of Agreement
	+0.643-+0.946	
Artifact group	+0.643-+0.946	+0.765
Artifact class	+0.612-+0.782	+0.705
	+0.612-+0.782	
	+0.612-+0.782	

Calculation of the Metis Farmer-Merchant Pattern

Introduction

The data illustrated in Table 5 can be combined to formulate an artifact pattern based on the percent frequency range of each artifact group because of the similarities between the ranked Metis asemblages. Only those artifact groups with low frequencies showed any patterning based on similar percent values. The degree of percent variation among other artifact groups was the result of one specific artifact class within the site assemblage having a somewhat higher count than any other class. At Garden site the Beads class had a considerably higher

count than any other class, at Riel House 1 it was the Ceramics class, and at both Riel 2 and Delorme House it was the Nails class. It was assumed that these higher counts represented specialized activities particular to each specific site. If the anomalies were adjusted it would be possible to abstract a more generalized pattern.

Before the adjustment technique is outlined it is necessary to rationalize why this procedure should be employed. Chapter II included a brief discussion on the archaeological implication of historial and social factors. It is possible that some of the anomalies exhibited by the Metis data relate to these implications. The Delorme House Nail class may reflect extensive repairs to the house or outbuildings. Delorme's status and wealth may have either necessitated or allowed continual maintenance on farm buildings. In this case adjustment of the Nail assemblage is justifiable.

The Bead class anomaly at the Garden site is less straightforward. This site dated a little earlier than the other Metis sites and therefore the bead assemblage might be a function of temporal differentiation. The nature of the Beads class is also a consideration in terms of relative over-representation. Any beadwork design could contain a varying number of beads to complete the motif and the 546 Garden site beads likely represent only a small portion of any design(s). Evidence of beadwork has been recorded at each Metis site, but if some unique process led

a comparatively large sample to be deposited at the Garden site, then that sample may be adjusted.

The Riel 1 ceramics were also adjusted to account for what might be a sampling bias due to the post-1950 disturbance of the feature.

In the instance of three of the sites used to create South's Carolina Pattern, Brunswick S25, Fort Moultrie A and Fort Moultrie B, South adjusted for an unusually large amount of shot and tailoring artifacts at the first site and prehistoric pottery at the other two (South 1977:103). The shot count and pottery were removed from each site total and the Clothing group was adjusted to account for 3% of the Brunswick S25 total. Three percent was the mean value calculated from the remaining four sites used in formulating the Carolina Pattern. South's method of adjustment by deletion of the anomalous totals has been one of the major criticisms of his method. South does not define an anomaly nor establish criteria to recognize anomalous counts. In the Metis research, anomalies were inferred when a specific site contained one particular artifact class which caused its artifact group to be overrepresented when compared with the other assemblages. If no concentration of the artifact class was found at the other sites then an anomaly was inferred either as a result of a specialized activity or due to sampling variation.

A method for adjustment had to be devised for the Metis

sites. It was unrealistic to use a group mean to calculate a group total such as South did for the Carolina Clothing group because any particular mean changed depending upon which artifact group was initially adjusted. For example, the Clothing group at Garden site and the Architectural group at Delorme House both required adjustment. If the Clothing group was adjusted first then the frequency mean for the Architectural group was considerably higher and vice versa. This was based on the fact that adjustment resulted in a decrease in the site total for both Delorme House and Garden site. With a decrease in site total there was an increase in the percent frequency of the unadjusted groups. Thus the dilemma was which artifact group to adjust first. It was concluded that two groups in two separate sites could not be adjusted through use of the means of the remaining sites.

The objective of adjusting the profiles was to reduce the large artifact counts that were site specific such as beads at Garden site, nails at Delorme House and ceramics at Riel 1. It was determined that a standardized procedure must be applied to all four assemblages. Initially it was decided to calculate a minimum number of objects and use that number as the class count. This technique had inherent problems and it became evident that it would be inapplicable. For example, to adjust the bead count at Garden site required an estimation of the number of bead strands, however, beads could be procured in a variety of ways:

by masses, pounds, bunches or dozens (Spector 1976:19). The nails at Delorme House were likely purchased by the pound as indicated by advertisements in the Nor'Wester (Kotecki 1983:77). This, however presented problems of using a unit of weight to obtain a quantified artifact count. Thus, adjustment of the empirical profiles using minimum number of vessels was impractical.

The technique used to adjust the data was that of calculating a mean artifact class ratio for those classes which required adjustment. The process involved an examination of how the artifact classes which required adjustment at one site related to the assemblage totals of the other sites. First, a working total for each site was determined by removal of the Ceramics, Nails and Beads from the total artifact count for each site. The working total is used as a divisor with the ceramics, nails or bead count from each site to create a ratio for each variable. This procedure for the three variables is shown in Table 11. The adjusted ceramic count at Riel 1 was produced by multiplying the three-site mean ceramic ratio by the Riel 1 working total. This process was repeated using the Garden Site working total multiplied by the mean bead ratio and the Delorme House working total multiplied by the mean nail ratio.

Table 11. Calculation of Metis Ceramics, Nail and Bead Ratio.

Site	Total	-	Variables[a]	=	Working total
Garden	1550	-	1006	=	544
Riel 1	220	-	165	=	57
Riel 2	951	-	434	=	517
Delorme	1354	-	772	=	582

a: Variables= Ceramics + Nails + Beads

Site	Ceramic	÷	Working Total	=	Ceramic Ratio
Garden	225		544		0.412
Riel 2	186		517		0.360
Delorme	60		582		0.103
				Mean =	0.292

Site	Nails	÷	Working Total	=	Nails Ratio
Garden	237		544		0.436
Riel 1	27		57		0.474
Riel 2	244		517		0.472
				Mean =	0.461

Site	Beads	÷	Working Total	=	Beads Ratio
Riel 1	2		57		0.035
Riel 2	4		517		0.008
Delorme	18		582		0.031
				Mean =	0.250

Table 11. Continued

Site	Mean Ceramic Ratio	x Working Total	= Adjusted Count
Riel 1	0.292	57	17

Site	Mean Nails Ratio	x Working Total	= Adjusted Count
Delorme	0.461	582	268

Site	Mean Bead Ratio	x Working Total	= Adjusted Count
Garden	0.025	544	14

Site	Working Total	+ Ceramics	+ Nails	+ Beads	= Total
Garden	544	223	237	14	1018
Riel 1	57	17	27	2	103
Riel 2	517	186	244	4	951
Delorme	582	60	268	18	928

The adjusted group frequencies are illustrated below (Table 12) and the group ranges are presented as the Metis Farmer-Merchant Pattern (Table 13).

Adjustment of Garden Site Beads class created a marked decrease in the Clothing group percentage and as expected, a significant rise in other artifact groups especially the Kitchen and Architectural groups (Table 12). The frequencies of the remaining five Garden Site groups displayed only a slight increase.

Adjustment of Riel House 1 ceramics resulted in a decrease of the Kitchen group to a value similar to other Metis Kitchen values. The ceramics adjustment also caused a much larger Architectural group frequency. The Pipes group experienced an increase and the adjusted value was considerably larger than other Metis Pipes group frequencies.

Table 12. Adjusted Metis Group Frequencies.

Artifact group	Garden		Riel 1		Riel 2		Delorme	
	Count	%	Count	%	Count	%	Count	%
Kitchen	446	43.8	35a	34.0	507	53.3	217	23.4
Architectural	373	36.6	38	36.9	307	32.4	426a	45.9
Furniture	1	0.1	0	0.0	4	0.4	10	1.1
Arms	19	1.9	0	0.0	1	0.1	3	0.3
Clothing	90a	8.8	10	9.7	79	8.3	81	8.7
Personal	7	0.7	0	0.0	8	0.8	20	2.2
Pipes	27	2.6	16	15.5	4	0.4	5	0.5
Activities	55	5.4	4	3.9	41	4.3	166	17.9
TOTAL	1018	100.0	103	100.0	951	100.0	928	100.0

a - adjusted totals

Table 13. Metis Farmer-Merchant Artifact Pattern.

Artifact group	Pattern range (%)	Mean (%)	Standard Deviation (%)
Kitchen	23.3-53.2	38.6	11.2
Architectural	32.4-45.9	37.9	4.9
Furniture	0.0- 1.1	0.4	0.4
Arms	0.0- 1.9	0.6	0.8
Clothing	8.3- 9.7	8.9	0.5
Personal	0.0- 2.2	0.9	0 8
Pipes	0.4-15.5	4.8	6.3
Activities	3.9-17.9	7.8	5.7

When the Nails class of the Delorme House assemblage was adjusted, the Architectural group underwent a large decrease and the Kitchen group a major increase. However, the resultant frequencies still displayed slightly larger and lower frequencies respectively when compared with the same groups at the other Metis sites.

To further illustrate how adjustment of the data created a more homogenous data set, rank order correlations were conducted using artifact groups and sites plus classes and sites (Appendix A-3 and A-4). The results are summarized in Table 14 and 15.

Table 14. Summary of Metis Adjusted Artifact Group Rank Order Tests.

Comparison	r_s value	Critical value (p=.05)	Decision
Garden-Riel 1	+0.880	0.738	reject null
Garden-Riel 2	+0.851	0.738	reject null
Garden-Delorme	+0.761	0.738	reject null
Riel 1-Riel2	+0.744	0.738	reject null
Riel 1-Delorme	+0.690	0.738	accept null
Riel 2-Delorme	+0.946	0.738	reject null
Coefficient of agreement +0.812			

As would be expected, artifact group coefficients increased in each test as well as the coefficient of agreement over that of the unadjusted group data. The null hypothesis of no association was rejected in all cases at p=.05 except for the Riel 1-Delorme test. Artifact class coefficients also increased over corresponding tests where the unadjusted data was used. The coeffiecient of agreement was also slightly larger. Therefore, adjustment of the data affected all correlation coefficients by increasing the value closer to a perfect positive correlation value of +1.0.

Table 15. Summary of Metis Adjusted Artifact Class Rank Order Tests.

Comparison	r_s value	t value	Critical value (p=.05)	decision
Garden-Riel 1	+0.788	7.463	2.034	reject null
Garden-Riel 2	+0.790	7.513	2.034	reject null
Garden-Delorme	+0.699	5.699	2.034	reject null
Riel 1-Riel 2	+0.647	4.948	2.034	reject null
Riel 1-Delorme	+0.649	4.974	2.034	reject null
Riel 2-Delorme	+0.770	7.037	2.034	reject null
Measure of Agreement	+0.724			

Pattern Discussion

The Metis Farmer-Merchant Pattern exhibited some degree of variability as indicated by the range and standard deviation of the Kitchen, Pipes and Activities groups (Table 13). The Kitchen group exhibited the largest degree of variability as evidenced by the standard deviation of 11.2%. The percent frequency of most of the artifact groups was relatively low, except for the Riel 2 Kitchen group.

The major characteristic of the Metis Farmer-Merchant Pattern is the relatively low percentage of most artifact groups except for the Kitchen, Architectural and Clothing groups.

Within the Kitchen group ceramics accounted for the largest class of artifacts at the earlier sites, Garden and Riel 1. Riel 2 and Delorme House had lower frequencies of ceramics and a larger percentage of glassware.

Nails were the most frequent class of Architectural artifacts recovered at all Metis sites. Many nails may be expected as the structures at the sites were likely built in Red River frame construction, and in some instances such as the Delorme House, had exterior siding on the dwelling. The presence of exterior siding was also suggested by the nail lengths at the Garden site (McLeod and Kotecki 1983:358). The few items of construction hardware and door parts may suggest that few were used. This observation coincides with the description of a typical Metis dwelling with usually no more than three rooms (Harvard 1880:323).

Buttons, shoe parts, beads and pins were the four major classes of Clothing group artifacts recovered at the four sites. The high percentage of these clothing artifacts may be a function of clothing style, degree of preservation, climatic location or other variables.

Summary

A pattern was produced using quantified assemblages of three Metis sites. This pattern was most evident after the

empirical profiles of the three assemblages were adjusted using a modification of South's (1977) procedure. After adjustment only the Kitchen group retained a large standard deviation.

The distinguishing characteristic of the Metis Farmer-Merchant Pattern is the similar mean frequency of the Kitchen and Architectural groups. Comparisons of the Metis Farmer-Merchant Pattern and other abstracted patterns will be discussed in the following chapter.

CHAPTER V

METIS COMPARISONS WITH OTHER SITES: THE CAROLINA, FRONTIER, HIVERNANT AND UPPER FORT GARRY SITES

Introduction

The first step in testing the hypothesis of Metis distinctiveness was to adjust the Metis data to form an artifact pattern. The second step is to use similar statistical procedures to compare non-Metis or non-Red River assemblages with Metis data. It the hypothesis of Metis distinctiveness is valid, there should be little or no association between the Metis and other comparative sites.

Four site groups are compared with the Metis data: the Carolina, Frontier, Hivernant and preliminary Upper Fort Garry assemblages. The colonial American sites are contrasted with the Metis data as: (1) South's method was developed to study these sites and correlations may therefore be a function of similar classification method, (2) correlation might also be a function of similar site formation processes, such as the domestic nature of the Carolina sites and, (3) the American sites offer a general comparative data base because they are temporally and geographically removed from the Metis data.

This chapter is divided into four sections. The first describes the comparative data with respect to geographic location, nature of site investigations and assemblage totals. The second section consists of rank order correlations between the comparative data and the Metis data. This is followed by a comparison of each pattern, or in the case of Upper Fort Garry the group frequencies, with the Metis Farmer-Merchant Pattern. The final section summarizes all tests and observations.

Sites Used for Comparisons with the Metis Assemblages

Carolina Sites

The five assemblages used for the Carolina pattern ranged in date from ca.1732 to ca.1830 and were located along the east coast of North and South Carolina. They include: the Public House-Tailor Shop (S-25) and Nath Moore's Front (S-10) at Brunswick Town, North Carolina; two midden deposits, one American and one British, at Fort Moultrie, South Carolina; and the Cambridge Cellar deposit (C-96) at Ninety-Six, South Carolina. The following brief descriptions of each assemblage are from South (1977:92).

The S-25 assemblage was from a six-room house foundation excavated in 1960. The house was possibly used as a public house or inn prior to 1732 and as a tailor shop after 1732. The structure was burned in 1776. S-10 was a two-room foundation from a residence that was burned in 1776 and then used as a refuse dump until 1830. The ruin was excavated in 1958. The American deposit at Fort Moultrie (Fort Moultrie A) was deposited primarily between 1775 and 1780 and as late as 1794. The British midden (Fort Moultrie B) was deposited between 1780 and 1782. These were also excavated in 1973. The C-96 assemblage was contained within a small cellar used as a midden area between 1800 and 1820.

Frontier Sites

Three sites were used to calculate the Frontier pattern: Spaulding's Lower Store, Putnam County, Florida; Fort Ligonier, Pennsylvania; and Fort Prince George, South Carolina (South 1977: 143). Spaulding's Store was a British trading post dated 1763 to the present. Fort Ligonier was a British post that dated 1758 to 1766. Fort Prince George was a British fort and trading post that dated c.1734 to c.1776.

Although the Carolina and Frontier sites are considerably earlier and distant from Red River, all three areas operated within the British colonial system. However, the seaboard location of the American sites may have allowed for a larger

availability of British goods in the Carolinas than was possible at the Red River Settlement. As a result of these factors it was possible that the greatest degree of similarity exists between the Metis and Frontier sites.

Hivernant Sites

Hivernants were groups of Metis and English Countryborn who wintered on the western plains (Elliott 1971:60). Their numbers gradually increased after 1870 as a result of the post-1870 dispersal summarized in Chapter II. The Hivernant culture is distinguishable from that of the Red River Metis as the former were characterized by an almost entirely nomadic way of life (Elliott 1971:61). They followed a seasonal round whereby bison were hunted on the plains during the spring and summer and wintering villages were occupied during the fall and winter. Bison and other game were hunted from the environment surrounding the villages. The Hivernants periodically built new villages and returned to the same village about every other year (Bonnichsen et al. 1973). Usually the villages consisted of a cluster of log cabins located close to wood, water, horse pasture and bison wintering areas.

A total of four Hivernant cabins have been excavated; three in the Cypress Hills (Elliott 1971 and Bonnichsen et al. 1973) and one in south central Alberta (Doll and Kidd 1976).

The Cypress Hills village contained an estimated nineteen cabins of which three, A, B and E, were excavated. Each cabin was occupied intermittently from c.1840 to 1882. At each cabin, the floor as well as interior and/or exterior cache pits were excavated. The entire assemblage from each cabin, rather than feature-related subassemblages, were discussed by the researchers. Therefore, the totals that are summarized below are the total artifacts found in and around each cabin.

The Buffalo Lake Cabin site from south central Alberta consisted of a fireplace feature, a large refuse pit and a smaller pit. The sum total of all three features plus non-related artifacts formed the Buffalo Lake assemblage.

Hivernant data base

The three monograph reports varied in the presentation of data and several problems were encountered when placing the data into the South format. Neither Elliot nor Bonnichsen et al. distinguished between liquor bottle, medicine bottle or glassware glass. The procedure followed was the same as with glass fragments from the Red River Metis sites. Green glass was designated as liquor glass, blue or green-tinged as medicine bottle and clear glass as glassware (Table 16).

Table 16. Raw Data Artifact Class Counts for Hivernant Sites.

Artifact class	Cabin A	Cabin B	Cabin E	Buffalo Lake
Kitchen group				
Ceramics	277	139	124	107
Liquor bottle	27	30	38	14
Case bottle	0	0	0	0
Tumbler	0	0	0	0
Medicine bottle	19	37	35	19
Glassware	73	7	22	14
Tableware	4	6	0	1
Kitchenware	225	81	16	12
Architectural group				
Window glass	0	0	0	0
Nails	107	56	26	60
Construction hardware	1	8	0	0
Door parts	0	0	2	0
Furniture group				
Furniture hardware	0	0	4	1
Arms group				
Arms	44	14	12	54
Clothing group				
Buckles	1	1	2	1
Thimbles	2	0	0	0
Buttons	34	13	16	33
Scissors	0	0	0	0
Pins	1	0	0	2
Fasteners	3	0	0	0
Shoes	2	3	0	0
Beads	2684	220	27	3259
Personal group				
Coins	0	1	0	1
Keys	0	0	0	0
Personal items	3	8	5	4
Pipes group				
Pipes	5	16	1	0
Activities group				
Construction tools	1	4	1	1
Farm tools	0	0	0	0
Toys	12	7	3	0
Fishing gear	0	0	0	0
Prehistoric	11	43	115	37
Storage items	9	7	2	0
Botanical	0	9	0	0
Stable and barn	9	4	2	7
Miscellaneous hardware	15	5	7	2
Other	0	3	2	0
TOTAL	3559	716	462	3629

The Kitchen, Clothing and Activities groups were highly variable between sites (Table 17). The Clothing group ranged from 9.7 to 90.8% due to large bead counts recovered at Cabin A in the Cypress Hills and at Buffalo Lake. The Kitchen group variability was a result of the diverse number of Kitchenware artifacts found at each site. The smallest sample sizes were recovered at Cabin E in the Cypress Hills and

Table 17. Raw Data Artifact Group Frequencies for Hivernant Sites.

Artifact group	Cabin A		Cabin B		Cabin E		Buffalo Lake	
	Count	%	Count	%	Count	%	Count	%
Kitchen	625	17.6	300	41.9	235	50.8	167	15.9
Architectural	108	3.0	64	8.9	28	6.1	60	1.6
Furniture	0	0.0	0	0.0	4	0.9	1	0.1
Arms	44	1.3	14	2.0	12	2.6	54	1.5
Clothing	2727	76.6	240	33.5	45	9.7	3295	90.8
Personal	3	0.1	9	1.3	5	1.1	5	0.1
Pipes	5	0.1	16	2.2	1	0.2	0	0.0
Activities	47	1.3	73	10.2	132	28.6	47	1.3
TOTAL	3559	100.0	716	100.0	462	100.0	3629	100.0

Buffalo Lake. In both cases this was not a smaller sample per se but an absence of a definite quantifiable number. Elliott (1971:229-230) mentioned concentrations of lead foil and also rectangular metal box fragments having been recovered in Cabin E. Doll and Kidd quantify fifty-one iron fragments in a "Miscellaneous" category but do not mention their possible function.

Rank order correlations (Appendix B-1 and B-2) show a high degree of association (Table 18). A coefficient of agreement of +0.837 was calculated for the artifact group tests while a value of +0.815 was obtained from the artifact class tests. In all instances the r_s value was large enough to reject the null hypothesis of no association at a .05 level of confidence. The Hivernant sites are sufficiently associated to be grouped as a Hivernant Pattern. Some minor adjustments however were applied to the raw data.

Hivernant data adjustment

The Hivernant group frequencies were affected by variations in the Kitchenware and Beads classes. The four Hivernant sites were adjusted using an average ratio of the Kitchenware and Beads classes (Table 19). The adjustment of the Kitchenware and Beads classes brought the sites into close approximation (Table 20).

Based on the high rank correlations displayed by the unadjusted Hivernant data in conjunction with the low

Table 18. Summary of Hivernant Group and Class Rank Order Tests.

Artifact Groups

Comparison	r_s value	Critical value (p=.05)	Decision
A-B	+0.928	0.738	Reject null
A-E	+0.809	0.738	Reject null
A-Buffalo	+0.905	0.738	Reject null
B-E	+0.833	0.738	Reject null
B-Buffalo	+0.738	0.738	Reject null
E-Buffalo	+0.809	0.738	Reject null
Coefficient of agreement	+0.837		

Artifact Classes

Comparison	r_s value	t value	Critical value (p=.05)	Decision
A-B	+0.877	10.642	2.034	Reject null
A-E	+0.793	7.590	2.034	Reject null
A-Buffalo	+0.782	7.316	2.034	Reject null
B-E	+0.814	8.171	2.034	Reject null
B-Buffalo	+0.802	7.829	2.034	Reject null
E-Buffalo	+0.827	8.577	2.034	Reject null
Coefficient of agreement	+0.815			

Table 19. Calculation of Hivernant Kitchenware and Bead Ratio.

Site	Total −	Variables[a]	=	Working total
Cabin A	3559	(225 + 2684)		650
Cabin B	716	(81 + 220)		415
Cabin E	462	(16 + 27)		419
Buffalo Lake	3629	(12 + 3259)		358

a: Variables = (Kitchenware + Beads)

	Kitchenware	÷ Working total	=	Kitchenware ratio
Cabin A	225	650		0.346
Cabin B	81	415		0.195
Cabin E	16	419		0.038
Buffalo Lake	12	358		0.033
		Mean	=	0.154

	Bead	÷ Working total	=	Bead ratio
Cabin A	2864	650		4.129
Cabin B	220	415		0.5330
Cabin E	27	419		0.064
Buffalo Lake	3529	358		9.103
		Mean	=	3.457

	Kitchenware ratio	x Working total	=	Adjusted count
Cabin A	0.154	650		100
Cabin B	0.154	415		63
Cabin E	0.154	419		64
Buffalo Lake	0.154	358		55

	Bead ratio	x Working total	=	Adjusted count
Cabin A	3.457	650		2247
Cabin B	3.457	415		1434
Cabin E	3.457	419		1448
Buffalo Lake	3.457	358		1237

Table 19. Continued.

	Working total	+ Kitchenware	+ Beads	= Site total
Cabin A	650	100	2247	2997
Cabin B	415	63	1434	1912
Cabin E	419	64	1448	1931
Buffalo Lake	358	55	1237	1650

Table 20. Adjusted Hivernant Group Frequencies.

Artifact group	Cabin A		Cabin B		Cabin E		Buffalo Lake	
	Count	%	Count	%	Count	%	Count	%
Kitchen	500	16.7	282	14.7	283	14.7	210	12.7
Architectural	108	3.6	64	3.4	28	1.4	60	3.6
Furniture	0	0.0	0	0.0	4	0.2	1	0.1
Arms	44	1.5	14	0.7	12	0.6	54	3.3
Clothing	2290	76.4	1454	76.1	1466	75.9	1273	77.2
Personal	3	0.1	9	0.5	5	0.3	5	0.3
Pipes	5	0.2	16	0.8	1	0.1	0	0.0
Activities	47	1.5	73	3.8	132	6.8	47	2.8
TOTAL	2997	100.0	1912	100.0	1931	100.0	1650	100.0

standard deviations of the separate artifact group frequencies it is argued that the Hivernant assemblages show a definite pattern. The Hivernant Pattern is shown in Table 21.

Table 21. Bivernant Artifact Pattern.

Artifact group	Range %	Mean %	Standard Deviation %
Kitchen	12.7-16.7	14.7	1.4
Architectural	1.4- 3.6	3.0	0.9
Furniture	0.0- 0.2	0.1	0.1
Arms	0.6- 3.3	1.5	1.1
Clothing	75.9-77.2	76.4	0.5
Personal	0.1- 0.5	0.3	0.1
Pipes	0.0- 0.8	0.3	0.3
Activities	1.5- 6.8	3.7	1.9

Upper Fort Garry Assemblages

Excavations were conducted in the southwest corner of Upper Fort Garry during the summer months of 1981, 1982 and 1983. The data from the first two field seasons were used for comparisons with the Metis material and therefore it must be stressed that all Upper Fort Garry data is of a preliminary analytical nature. The assemblages utilized from the Upper Fort Garry excavations were recovered within two structures that have been identified as cribbing for two privy-refuse pits (Monks 1983:11). The first structure has been identified as having been constructed for the 6th Regimnent of Foot (Royal Warwickshire Regiment) which was

headquartered at the Upper Fort from the fall of 1846 until early summer of 1848 (Monks 1983:23). The second privy-refuse pit dates to c.1880 (Monks:pers. comm.).

The 1981 and 1982 data were coded following the Parks Canada system with modifications for Upper Fort Garry, and further examination was necessary to place the data into the South classes and groups. This involved modification of the seven categories into which the data had originally been divided (Glass, Ceramics, Nails, Fasteners, Other Metal, Arms and Ammunition, and Miscellaneous) into the eight categories contained in the South format. A direct conversion was possible for such categories as Ceramics, Nails and Arms, however some degree of difficulty was experienced with the Glass, Miscellaneous and Other Metal categories. The problem with the glass was the listing of scores of unidentifiable bottle glass recovered. The Upper Fort Garry glass was originally examined by Dr. Monks by the use of a duo-functional designation plus colour. An example ot duo-function is a glass fragment classified as being: (1) bottle glass and (2) liquor glass. Therefore, those that created the greatest manipulative problems were the unidentitiable glass, unidentifiable bottle and unidentifiable flat glass tragments. These three groups accounted for over 38% of the entire glass assemblage found within both structures. The method for dividing the unidentifisable glass assemblages was the

same as that used when dealing with the Metis and Hivernant sites. This allowed for a standardized treatment of the unidentifiable glass in each comparative site data base. Green and brown glass were placed in the Liquor bottle class; green-tinted, turquoise, blue and all non-window flat glass was designated as Medicine bottle glass; and clear, red, light olive and dark purple fragments were placed in the Glassware class.

The Miscellaneous and Other Metal categories also contained items that could not be identified, such as unidentified rock and mineral samples or unidentifiable metal, and these counts were deleted from the assemblage.

As of the spring of 1983, the numerous leather fragments of ankle boots and mocassins recovered in the structures had not been recorded due to removal for preservation. Therefore, the Shoes class and the Clothing group is somewhat underrepresented in the Upper Fort Garry assemblages. A quantity of organic remains were also not coded and therefore the Botanical class and the Activities group freguency may be larger by a few thousand (Shay pers. comm.) than that portrayed below (Tables 22 and 23).

Table 22. Upper Fort Garry Artifact Class Counts (Preliminary 1981 and 1982 data).

Artifact class	Structure 1	Structure 2
Kitchen group		
Ceramics	410	158
Liquor bottle	83	83
Case bottle	0	3
Tumbler	27	11
Medicine bottle	98	124
Glassware	116	664
Tableware	7	1
Kitchenware	14	0
Architectural group		
Window glass	857	656
Nails	446	467
Construction hardware	24	1
Door parts	0	0
Furniture group		
Furniture hardware	0	0
Arms group		
Arms	20	5
Clothing group		
Buckles	0	0
Thimbles	0	0
Buttons	57	11
Scissors	0	0
Pins	22	0
Fasteners	1	0
Shoes	2	0
Beads	23	950
Personal group		
Coins	1	0
Keys	0	0
Personal items	10	31
Pipes group		
Pipes	228	19
Activities group		
Construction tools	0	1
Farm tools	0	0
Toys	2	0
Fishing gear	0	0
Prehistoric	0	0
Storage items	19	4
Botanical	4	2
Stable and barn	1	0
Miscellaneous hardware	43	6
Other	1	0
TOTAL	2516	3197

Table 23. Upper Fort Garry Artifact Group Frequencies.

Artifact group	Structure 1		Structure 2	
	Count	%	Count	%
Kitchen	755	30.0	1044	32.6
Architectural	1327	52.7	1124	35.2
Furniture	0	0.0	0	0.0
Arms	20	0.8	5	0.1
Clothing	105	4.2	961	30.1
Personal	11	0.4	31	1.0
Pipes	228	9.1	19	0.6
Activities	70	2.8	13	0.4
TOTAL	2516	100.0	3197	100.0

Rank Order Correlations

Ranked Artifact Group Counts

Rank order correlation tests between the Metis and comparative data were conducted similarily to those in Chapter IV. However, rather than testing each Metis site with each comparative site, the adjusted ranked group totals were used (Table 24). Total counts were used to reduce the number of tied ranks. In all cases the null hypothesis was that there was no association between the Metis and comparative ranked data. All tests were two-tailed as the alternative hypotheses, that there were associations, were non-directional. The calculations are illustrated in Appendix B-3 and are summarized in Table 25.

In all Metis tests the null hypotheses were rejected, except for the Frontier-Metis test, at the p=.05 level of significance. In two instances, the Metis-Carolina and Metis-UFG1 tests, the resulting coefficients were larger than the coefficient of agreement calculated in Chapter IV for the adjusted Metis groups.

Table 24. Ranked Comparative Artifact Groups.

	Carolina		Frontier		Metis	
	Count	Rank	Count	Rank	Count	Rank
Kitchen	47521	1	13034	2	1205	1
Architectural	20596	2	23586	1	1144	2
Furniture	208	6	101	8	15	8
Arms	165	8	2518	4	23	7
Clothing	2416	4	954	6	260	4
Personal	207	7	118	7	35	6
Pipes	5225	3	3605	3	52	5
Activities	1272	5	2020	5	266	3

	Hivernant		UFG 1		UFG 2	
Kitchen	1275	2.0	755	2	1044	2
Architectural	260	4.0	1327	1	1124	1
Furniture	5	8.0	0	8	0	8
Arms	124	5.0	20	6	5	7
Clothing	6483	1.0	105	4	961	3
Personal	22	6.5	11	7	31	4
Pipes	22	6.5	228	3	19	5
Activities	299	3.0	70	5	13	6

These results do not support the research hypothesis of Metis distinctiveness. This suggests that the South method of using group frequencies may not be as useful to delineate cultural differences as South has postulated. He used only subjective comparisons to show the differences between the Carolina and Frontier patterns. Forsman and Gallo (1978) illustrated that there was no statistical difference between South's patterns using Kendall's tau, another rank correlation test. The null hypothesis of no association was accepted when the Carolina and Frontier sites were tested using Spearman's rank correlation. Therefore, when South's group classification is used in

Table 25. Summary of Comparative Artifact Group Rank Order Tests.

	Metis	Carolina	Frontier	Hivernant	UFG 1	UFG 2
Metis	-------	+0.833 R	+0.714 A	+0.756 R	+0.857 R	+0.809 R
Carolina	+0.833 R	-------	+0.690	+0.482 A	+0.880 R	+0.738 R
Frontier	+0.714 A	+0.690 A	-------	+0.386 A	+0.904 R	+0.619 A
Hivernant	+0.756 R	+0.482 A	+0.386 A	-------	+0.577 A	+0.589 A
UFG 1	+0.857 R	+0.880 R	+0.904 R	+0.577 A	------	+0.809 R
UFG 2	+0.809 R	+0.738 R	+0.619 A	+0.589 A	+0.809 R	-------

A- Accept null hypothesis at p=.05.

R- Reject null hypothesis at p=.05.

Critical Value = +0.738

conjunction with at least two statistical tests, different conclusions can be drawn; Spearman tests agreed with South's postulate while Kendall's tau showed no difference.

A second explanation for the association between the Metis, Carolina, Hivernant and Upper Fort Garry assemblages is that all assemblages were deposited in response to domestic related activities. Benson (1978) has already suggested that the Carolina pattern was a simple measure of domesticity.

A third possibility is that the data does not lend itself to rank order correlation. The use of eight variables may not be adequate for the type of inquiry pursued and this may explain the failure to separate Metis from non-Metis patterns. As a consequence, correlations at the class level were conducted.

Ranked Artifact Class Counts

Rather than testing each Metis site with each comparative site the adjusted total values from each comparative sites were utilized. In Chapter IV, it was shown that there were high rank correlations among the Metis sites when the adjusted artifact classes were compared. The same characteristic was observed when the Hivernant artifact classes were correlated between sites. Therefore, it is probable that coefficient values for the following rank order tests using class counts will be somewhat lower than the values obtained when the group totals were used. However, are these values reduced sufficiently to reduce the degree of association between the data?

Some degree of difficulty was encountered when rank ordering the artifact classes of the Carolina sites. When South computed the Carolina Pattern, he adjusted for the large number of straight pins recovered at the Brunswick (S-25) site by using the mean Clothing group percentage of the four remaining Carolina sites. However, South did not adjust the eight Clothing group classes of the S-25 site to equal 3% of the assemblage when totalled. It was therefore difficult to rank order the adjusted artifact classes of the Brunswick S-25 site. The four remaining Carolina sites were used to obtain a mean value for each of the eight artifact classes in the Clothing group and each mean was multiplied by five, the number of Carolina sites, to obtain a total count for each class.

Table 27 illustrates the ranked Metis and comparative site correlation coefficients. All calculations are shown in Appendix B-4 and the results are summarized in Table 28. As predicted, most correlation coefficients were lower than those of the group comparisons. Exceptions to this were the coefficients for the Carolina-Frontier and the Frontier-Hivernant tests. In the case of the former test, there was a large increase over that of the group correlation.

In all cases the null hypothesis of no association was rejected at p=.05. The correlation coefficients can be compared with regard to strength of association (Levin 1977:197). Only those correlations involving the Metis data will be examined.

The largest coefficient value was for the Metis-UFG1 test while the lowest was for the Metis-Frontier test. If +0.50 is considered a moderate positive correlation and +0.95 a strong positive correlation (Levin 1977:197) then the strength of the associations increase as one moves from the Frontier data to that of Upper Fort Garry Therefore, the results show that the strongest association is between the Metis and UFG 1 data.

Table 27. Ranked Comparative Artifact Classes.

Artifact class	Metis		Carolina		Frontier	
	Count	Rank	Count	Rank	Count	Rank
Ceramics	486	2.0	33664	1.0	6730	2.0
Liquor bottle	26	18.0	11579	3.0	4034	3.0
Case bottle	5	25.0	1145	8.0	1035	7.0
Tumbler	6	24.0	1914	6.0	32	25.5
Medicine bottle	48	12.0	1774	7.0	579	10.0
Glassware	323	3.0	730	10.0	408	11.0
Tableware	24	19.5	298	15.0	98	20.0
Kitchenware	287	5.0	117	20.0	118	18.0
Window glass	302	4.0	4725	5.0	2131	6.0
Nails	787	1.0	19560	2.0	21116	1.0
Construction hardware	63	9.0	213	17.0	313	13.0
Door parts	3	28.5	51	24.0	26	19.0
Furniture hardware	15	22.0	226	16.0	101	20.0
Arms	23	21.0	188	18.0	2518	5.0
Buckles	4	26.5	101	21.0	56	22.0
Thimbles	1	34.5	12	31.5	6	32.0
Buttons	121	6.0	564	11.0	583	9.0
Scissors	1	34.5	17	30.0	10	30.0
Pins	28	16.5	916	9.0	239	14.0
Fasteners	2	34.5	8	34.0	3	33.0
Shoes	65	8.0	6	35.0	2	34.0
Beads	36	13.0	20	29.0	55	23.0
Coins	4	26.5	43	26.5	33	24.0
Keys	1	34.5	32	28.0	9	31.0
Personal items	30	14.5	136	19.0	76	21.0
Pipes	52	11.0	5599	4.0	3605	4.0
Construction tools	10	23.0	50	25.0	32	25.5
Farm tools	3	28.5	11	33.0	14	28.5
Toys	28	16.5	43	26.5	14	28.5
Fishing gear	2	31.0	12	31.5	1	35.0
Prehistoric	2	31.0	305	14.0	167	16.5
Storage	30	14.5	345	13.0	880	8.0
Botanical	58	10.0	55	23.0	0	36.0
Stable and barn	24	19.5	58	22.0	210	15.0
Miscellaneous hardware	108	7.0	443	12.0	167	16.5
Other	1	34.5	0	36.0	359	12.0

Table 27. Continued.

Artifact class	Hivernant		UPG 1		UPG 2	
	Count	Rank	Count	Rank	Count	Rank
Ceramics	647	1.0	410	3.0	158	5.0
Liquor bottle	109	9.0	83	7.0	83	7.0
Case bottle	0	33.0	0	31.0	3	15.0
Tumbler	0	33.0	27	10.0	11	10.5
Medicine bottle	110	8.0	98	6.0	124	6.0
Glassware	116	7.0	116	5.0	664	2.0
Tableware	11	17.0	7	18.0	1	18.0
Kitchenware	282	3.0	14	16.0	0	28.0
Window glass	0	33.0	857	1.0	656	3.0
Nails	249	4.0	446	2.0	467	4.0
Construction hardware	9	18.5	24	11.0	1	18.0
Doorparts	2	28.0	0	31.0	0	28.0
Furniture hardware	5	22.5	0	31.0	0	28.0
Arms	124	6.0	20	14.0	5	13.0
Buckles	5	22.5	0	21.0	0	28.0
Thimbles	2	28.0	0	21.0	0	28.0
Buttons	96	10.0	57	8.0	11	10.5
Scissors	0	33.0	0	21.0	0	28.0
Pins	3	25.5	22	13.0	0	28.0
Fasteners	3	25.5	1	23.5	0	28.0
Shoes	5	22.5	2	20.5	0	28.0
Beads	6366	1.0	23	12.0	950	1.0
Coins	2	28.0	1	23.5	0	28.0
Keys	0	33.0	0	31.0	0	28.0
Personal items	20	15.0	10	17.0	31	8.0
Pipes	22	13.0	228	4.0	19	9.0
Construction tools	7	20.0	0	31.0	1	18.0
Farm tools	0	33.0	0	31.0	0	28.0
Toys	22	13.0	2	20.5	0	28.0
Fishing gear	0	33.0	0	31.0	0	28.0
Prehistoric	206	5.0	0	31.0	0	28.0
Storage items	18	16.0	19	15.0	4	14.0
Botanical	9	18.5	4	19.0	2	16.0
Stable and barn	22	13.0	1	23.5	0	28.0
Miscellaneous hardware	29	11.0	43	9.0	6	12.0
Other	5	22.5	1	23.5	0	28.0

Table 28. Summary of Artifact Class Rank Order Coefficients and t values.

Rank Order Coefficients

	Metis	Carolina	Frontier	Hivernant	UFG 1	UFG 2
Metis	------	+0.594	+0.518	+0.616	+0.830	+0.690
Carolina	+0.594	------	+0.825	+0.394	+0.704	+0.702
Frontier	+0.518	+0.825	------	+0.522	+0.667	+0.634
Hivernant	+0.616	+0.394	+0.522	-------	+0.562	+0.519
UFG 1	+0.830	+0.704	+0.667	+0.562	------	+0.821
UFG 2	+0.690	+0.702	+0.634	+0.519	+0.821	------

t values

	Metis	Carolina	Frontier	Hivernant	UFG 1	UFG 2
Metis	-----	4.306	3.530	4.560	8.677	5.558
Carolina	4.306	-----	8.512	2.499	5.780	5.748
Frontier	3.530	8.512	-----	3.568	5.223	4.783
Hivernant	4.560	2.499	3.568	-----	3.958	3.538
UFG 1	8.677	5.780	5.223	3.958	-----	8.383
UFG 2	5.558	5.748	4.783	3.538	8.383	-----

Critical value for 34 degrees of freedom = 2.034 at p= .05.

All null hypothesis rejected

Due to the larger positive correlation values calculated between the Metis data and UFG 1, it was decided to calculate rank order coefficients for each Metis site in comparison with UFG 1, the structure closest in age to the Metis sites.

Table 29 illustrates the class frequencies and ranks correlated in Appendix B-5 and the coefficients are summarized in Table 30. The Garden site had the largest coefficient value of all Metis sites when compared with UFG 1 and Riel 2 had the lowest. There appears to be a relationship between the degree of correlation and temporal affiliation. The two earliest Metis sites, Garden Site and Riel 1, produced the largest coefficients when compared with the Upper Fort feature. Garden site dated 1840-1870, Riel 1 1848-1880 and UFG 1 dates after 1846. Riel 2 and Delorme, which date after 1860, produced slightly smaller correlation coefficients.

It was shown that when rank order correlation was used to contrast the artifact groups between comparative and Metis data the null hypothesis of no association was rejected in 4 of 5 tests. Similarily, the null hypothesis was rejected in all tests using ranked class data. However, some degree of differentiation could be observed when the mathematical differences between ranks were calculated (Appendix B-3 and B-4). This suggests that there may be some differentiation between artifact patterns when subjectively compared. The various patterns will be compared in the following section.

Table 29. Metis and UFG 1 Artifact Class Ranks.

Artifact class	Garden		Riel 1		Riel 2	
	Count	Rank	Count	Rank	Count	Rank
Ceramics	223	2.0	17	6.0	186	2.0
Liquor bottle	11	15.0	0	26.5	9	10.5
Case bottle	0	30.5	0	26.5	0	32.0
Tumbler	0	30.5	1	14.0	0	32.0
Medicine bottle	32	8.0	1	14.0	7	15.0
Glassware	57	5.0	6	6.5	171	3.0
Tableware	3	19.5	2	10.5	14	8.0
Kitchenware	120	3.0	8	4.5	120	4.0
Window glass	116	4.0	8	4.5	53	5.0
Nails	237	1.0	27	1.0	244	1.0
Construction hardware	20	10.0	3	8.5	9	10.5
Door parts	0	30.5	0	26.5	1	25.0
Furniture hardware	1	23.0	0	26.5	4	18.5
Arms	19	11.0	0	26.5	1	25.0
Buckles	0	30.5	0	24.5	1	25.0
Thimbles	0	30.5	1	14.0	0	32.0
Buttons	53	6.0	6	6.5	23	7.0
Scissors	0	30.5	0	26.5	1	25.0
Pins	16	12.0	1	14.0	1	25.0
Fasteners	2	21.0	0	26.5	0	32.0
Shoes	5	16.5	0	26.5	49	6.0
Beads	14	14.0	2	10.5	4	18.5
Coins	1	23.0	0	26.5	0	32.0
Keys	1	23.0	0	26.5	0	32.0
Personal items	5	16.5	0	26.5	8	13.5
Pipes	27	9.0	16	3.0	4	18.5
Construction tools	3	19.5	0	26.5	6	16.0
Farm tools	0	30.5	0	26.5	3	21.0
Toys	0	30.5	0	26.5	4	18.5
Fishing gear	0	30.5	0	26.5	0	32.0
Prehistoric	0	30.5	0	26.5	0	32.0
Storage items	14	13.0	1	14.0	9	10.5
Botanical	10	30.5	0	26.5	2	22.0
Stable and barn	4	18.0	0	26.5	9	10.5
Miscellaneous hardware	34	7.0	3	8.5	8	13.5
Other	0	30.5	0	26.5	0	32.0

Table 29. Continued.

Artifact class	Delorme		UFG 1	
	Count	Rank	Count	Rank
Ceramics	60	5.0	410	3.0
Liquor bottle	6	18.5	83	7.0
Case bottle	5	21.5	0	31.0
Tumbler	5	21.5	27	10.0
Medicine bottle	8	17.0	98	6.0
Glassware	89	3.0	116	5.0
Tableware	5	21.5	7	18.0
Kitchenware	39	7.0	14	16.0
Window glass	125	2.0	857	1.0
Nails	268	1.0	446	2.0
Construction hardware	31	9.0	24	11.0
Door parts	2	28.0	0	31.0
Furniture hardware	10	15.5	0	31.0
Arms	3	25.0	20	14.0
Buckles	3	25.0	0	31.0
Thimbles	0	34.0	0	31.0
Buttons	39	7.5	57	8.0
Scissors	0	34.0	0	31.0
Pins	10	15.5	22	13.0
Fasteners	0	34.0	1	23.5
Shoes	11	13.5	2	20.5
Beads	18	11.0	23	12.0
Coins	3	25.0	1	23.5
Keys	0	34.0	0	31.0
Personal items	17	12.0	10	17.0
Pipes	5	21.5	228	4.0
Construction tools	1	30.5	0	31.0
Farm tools	0	34.0	0	31.0
Toys	24	10.0	2	20.5
Fishing gear	2	28.0	0	31.0
Prehistoric	2	28.0	0	31.0
Storage items	6	18.5	19	15.0
Botanical	56	6.0	4	19.0
Stable and barn	11	13.5	1	23.5
Miscellaneous hardware	63	4.0	43	9.0
Other	1	30.5	1	23.5

Table 30. Summary of Metis-UFG 1 Artifact Class Rank Order Correlation Tests.

Comparison	r_s value	t value	Critical value p=.05	Decision
Garden-UFG 1	+0.830	8.677	2.034	Reject null
Riel 1-UFG 1	+0.796	7.668	2.034	Reject null
Riel 2-UFG 1	+0.663	5.164	2.034	Reject null
Delorme-UFG 1	+0.742	6.454	2.034	Reject null
Measure of agreement +0.758				

Artifact Pattern Comparisons

Table 26 illustrates artifact group percentages for the four abstracted patterns and the two Upper Fort Garry assemblages. The Carolina and Frontier patterns will be discussed simultaneously with the Metis Farmer-Merchant pattern while the Hivernant and Upper Fort Garry sites will be compared separately to serve as non-Red River and Red River examples.

Five artifact groups will be primarily discussed: the Kitchen, Architectural, Arms, Clothing and Pipes groups. These highlight the major differences and similarities between the Metis and comparative data. The discussion includes the nature of the difference or similarity and possible explanations why these occur.

Table 26. Comparative Artifact Patterns and Frequencies.

Artifact group	Metis		Carolina		Frontier	
	Range %	Mean %	Range %	Mean %	Range %	Mean %
Kitchen	23.3-53.2	38.6	51.8-69.2	63.1	22.7-34.5	27.6
Architectural	32.4-45.9	37.9	19.7-31.4	25.5	43.0-57.5	52.0
Furniture	0.0- 1.1	0.4	0.1- 0.6	0.2	0.1- 0.3	0.2
Arms	0.0- 1.9	0.6	0.1- 1.2	0.5	1.4- 8.4	5.4
Clothing	8.3- 9.7	8.9	0.6- 5.4	3.0	0.3- 3.8	1.5
Personal	0.0- 2.2	0.9	0.1- 0.5	0.2	0.1- 0.4	0.2
Pipes	0.4-15.5	4.8	1.8-13.9	5.8	1.9-14.0	9.1
Activities	3.9-17.9	7.8	0.9- 2.7	1.7	0.7- 6.4	3.7

	Hivernant		UFG 1	UFG 2
	Range %	Mean %	%	%
Kitchen	12.7-16.7	14.7	30.0	32.6
Architectural	1.4- 3.6	3.0	52.7	35.2
Furniture	0.0- 0.2	0.1	0.0	0.0
Arms	0.6- 3.3	1.5	0.8	0.1
Clothing	75.9-77.2	76.4	4.2	31.1
Personal	0.1- 0.5	0.3	0.4	1.0
Pipes	0.0- 0.8	0.3	9.1	0.6
Activities	1.5- 6.8	3.7	2.8	0.4

Carolina, Frontier and Metis Farmer-Merchant Comparisons

The Carolina and Frontier Patterns are characterized by inversely proportional frequencies of kitchen and architectural artifacts. The Kitchen group percentage was larger than the Architectural percentage in the Carolina pattern while the Architectural group percentage was larger than the Kitchen group percentage in the Frontier pattern. Those of the Metis Farmer-Merchant pattern were approximately equal. Both mean values lay between those of the Carolina and Frontier patterns. It is therefore possible that the Metis pattern indicates a frequency range for domestic sites in a frontier setting. If this were so then other sites in a similar setting, regardless of ethnic identity, should also have similar artifact group frequencies.

The progressively larger Architectural group from the Carolina to Metis and Metis to Frontier was largely a consequence of a gradual increase in the amount of nails recovered at each of the three site groups. South postulated that the increase in the frequency of nails at Frontier sites relative to domestic sites was a consequence of three phenomena: (1) more construction activity in a relatively small area, (2) a shorter occupation period where by-products of human activities accumulated in a smaller area, and (3) middens would not be allowed to accumulate around structures at a frontier-military site (South 1977:177).

It is possible that these postulates may also explain why the Metis Architectural group range extended beyond the Carolina range. The most plausible postulate is the first: a greater amount of construction activity had occurred in a relatively small area. The second postulate is not valid as occupation periods were quite long at all Metis sites. The third postulate is also invalid as it has been assumed that the cellar fills at the Metis sites were at least secondary midden deposits. Therefore, the first postulate appears to be the most logical. Construction activity at the sites is represented by building, repair and demolition with the latter two accounting for the largest number of architectural materials in the middens or cellar fill. The lower percentage of architectural materials recovered at the Metis sites relative to the Frontier sites may be a result of the longer occupations at the former group of sites and to a lesser extent, an increase in construction activity at the latter. The two military Frontier posts were not used for more than sixteen years and it is likely that when the forts were abandoned they were either demolished or left standing and gradually decayed. Thus there was a shorter occupation period and a greater amount of construction (and demolition) activity in a small area at the Frontier sites. This accounts for the larger frequency in the Architectural group.

The Arms group displayed a higher percentage than the Carolina mean and a lower value than that of the Frontier. The slightly greater Metis Arms group frequency over that of the Carolina sites was primarily the result of the large number of arms related artifacts found at the Garden site. Given the amount and variety of faunal remains of wild animals at this site the evidence for hunting is quite clear. The lower percentage of arms related artifacts at Metis sites as opposed to the Frontier sites may be a consequence of the military oriented nature of the American forts.

One artifact group of the Metis pattern, the Pipes group, displayed a lower mean frequency than that of the Carolina and Frontier patterns. Several possible explanations may account for the lower values at these latter sites. The first and perhaps most simplistic, is that certain inhabitants at particular Metis sites did not smoke. For example, a visitor at the Delorme House remarked that Pierre Delorme did, in fact, not smoke (Hamilton 1876:226). A second possible explanation lies in the nature of the smoking habit itself. Contrary to current smoking habits the long-stemmed clay pipes found at all Metis sites may not have been smoked while doing other activities. An individual would have had to deliberately set aside time for use of this artifact. Therefore a low frequency of pipe fragments may suggest that site occupants did not have extra "leisure time" to spend enjoying a pipe.

The fact that tobacco was readily available and less costly in the Carolinas might also have a bearing on the Pipes group frequency.

Metis Farmer-Merchant and Hivernant Comparisons

A comparison of the mean percent frequencies illustrates that two Hivernant artifact groups, Arms and Clothing, displayed larger frequencies than the corresponding Metis artifact groups. Only one Hivernant artifact group had a mean frequency similar to the Red River Metis sites and this was the Furniture group. Five artifact groups had mean frequencies lower than those of the Metis pattern: the Kitchen, Architectural, Personal, Pipes and Activities groups.

Several of the explanations forwarded to explain differences between the Metis, Carolina and Frontier patterns can now be reexamined in light of the Hivernant Pattern. It was suggested that the Red River sites represented domestic sites in a frontier setting and this accounted for Kitchen and Architectural group values to lie between the range of the domestic and frontier sites. The Hivernant sites contained significantly lower Kitchen and Architectural group frequencies. The nomadic nature of the Hivernants probably accounts for the decrease of kitchen related artifacts. The shorter occupation periods of the Hivernant sites are also possibly responsible for lower artifact frequencies in both the Kitchen and Architectural

groups. The lower number of architectural materials especially nails, at the Hivernant sites is may be a function of: (1) different constructional techniques, (2) a lack of accessible construction materials, and (3) infrequent periods of structural demolition.

A fairly large Clothing group frequency at the Red River sites was assumed to have been the result of a number of factors. The Hivernant adjusted Clothing group mean of 76.4% of the total was the result of large numbers of beads. A few variables must be considered before an explanation of why this group should be significantly larger than the Metis group values. The nature of the Beads class is one of these variables, as any beadwork design that incorporated the seed variety would have required a large number of specimens to complete the motif. Given the necessity for a large number to be procured, it is not surprising that a large bead assemblage would be recovered at a site where bead working was conducted. Also, the probability that winter, during which the cabins were occupied, was likely a time of increased indoor activities such as the completion of handicrafts, a large frequency of beads would be expected. Second, the nature of the features excavated at the Hivernant sites may have had an effect on the quantity of artifacts. Elliott (1971:23) and Bonnichsen et al. (1973:14) identified the subterranean features they recovered as cache pits while Doll and Kidd inferred that their

large feature was a refuse pit. It is possible that the cache-refuse pit dichotomy would affect the interpretation of the archaeological record in different manners. Material was placed in a cache pit for purposes of later retrieval and therefore any artifacts would be those either lost or forgotten. Refuse pits represent a type of artifact deposition based on a preconceived notion of discard by the site inhabitants. The artifacts in these features were no longer considered useful by the inhabitants and therefore discarded. Thus, a lost cache of beads or a repaired or discarded designs would result in a large bead assemblage.

Only the Garden site produced a relatively large bead count. The Metis were noted for their beadwork, so it is possible that a relatively large number of beads recovered at a site is diagnostic of a Metis occupation. A higher bead count at Hivernant sites may be due to an isolated setting where numerous non-Metis groups interacted with the Hivernants, the decorative beadwork served to readily distinguish the Hivernant from either the Native groups or Euro-Canadian traders. A corresponding lack of beadwork indicated by at least three Red River Metis assemblages may be the result of a lack of beaded designs by the site inhabitants in an attempt to conform to the British cultural traditions of the settlement by avoiding the more visual ethnic boundary markers or other factors.

The Pipes group frequency at Metis sites was observed to be slightly lower than that of the Frontier and Carolina pattern ranges. This was assumed to be the result of non-smokers at the site or a lack of leisure time for smoking. These latter assumptions do not gain further validity when tested using Hivernant sites because the percentage of pipes was considerably lower than that of the Red River Metis sites. The nature of the Hivernant pipe assemblage was quite different than that of the Metis assemblages. Whereas the latter sites contained primarily white clay and stoneware pipes, the Hivernant assemblages contained either buff or red clay detachable bowls (Bonnichsen et al. 1973) or handmade sandstone types (Elliott 1971). Therefore the differences in the pipe assemblages may be one of the distinguishing characteristics that highlight the difference between Metis and Hivernant assemblages. The detachable nature of the bowl from the stem for reuse indicated that the pipe would be discarded only when the bowl was broken. White clay pipes were usually discarded after breakage at either the stem or the bowl. The sandstone pipes also had less breakable pieces and this is likely the cause of a small Pipes group frequency at Hivernant sites.

The Arms group was greater at the Hivernant sites when compared with the Metis sites. Recall that the Arms percentage at the latter was greater than that of the Carolina sites. This

was assumed to be indicative of a large dependency on hunting. The further increase at the Hivernant sites further strengthens this assumption. The percentage at the Hivernant sites was, however, considerably less than the military oriented Frontier sites.

Metis Farmer-Merchant Pattern and Upper Fort Garry Comparisons

Generally, the values from UFG 2 approximated the predictive range of the Farmer-Merchant Pattern more than those of UFG 1. The UFG 1 Architectural group was slightly larger than that of the Metis range while the Clothing and Activities groups were smaller. The Clothing group frequency of UFG 2 was larger than the Metis Clothing range while the Activities percentage was smaller. The larger Architectural UFG 1 assemblage was a result of a large number of window glass fragments and nails scattered throughout the deposit. The proceses responsible for the formation of the Architectural assemblage at Upper Fort Garry are possibly similar to those discussed earlier in connection with the Frontier sites. The UFG 1 Clothing group percentage was substantially smaller than the Metis range while the UFG 2 frequency was considerably larger. The larger UFG 2 frequency was the result of a concentration of 882 beads within a single excavation unit. The lower Clothing frequency from UFG 1 might be the result of the shoe parts and cloth fragments removed from the assemblage. In addition, tailoring could have been done in

one specific location at the Upper Fort and the bulk of the Clothing group assemblage would likely be recovered in this area.

The UFG 1 Pipe group frequency, although it did fit within the predictive range, was also considerably larger than the Metis mean frequency. This larger frequency may be a result of employees in the Upper Fort smoking while using the privy.

The Activities group in both Upper Fort features was also lower than the Metis range and mean and the removal of the Botanical class is probably the major cause.

Summary

The Metis Farmer-Merchant Pattern was contrasted with four data sets to determine any differentiation. Two tests were used to examine the quantified data, rank order correlation of groups and classes. Subjective comparison was also conducted.

Rank order correlations tested the degree of association between the ranked Metis group totals and each comparative pattern group total. This technique marked a departure from the usual application of South's method. All but one of the tests involving the Metis data produced correlation coefficients of sufficient value to conclude an association. The Farmer-Merchant Pattern was thus not as distinctive as was hypothesized in Chapter IV.

The null hypothesis of no associations was also rejected in all the ranked artifact class tests, although the correlation

coefficient values were smaller than the artifact group coefficients. The largest coefficient values resulted from the Metis-UFG 1 tests and it was assumed that the Metis and UFG 1 data were closely associated. As a result, artifact class correlations between each Metis site and UFG 1 were conducted. The Garden-UFG 1 correlation produced the strongest positive correlation. This finding suggests that time is an important variable because the earliest date for the Garden site, 1845, was similar to the earliest date for UFG 1, 1846.

Subjective comparisons were conducted to isolate any differences between the frequency ranges and means of the various patterns. This analysis produced several differences. For example, the mean percentage values of the Metis artifact groups lay between corresponding means of the Carolina and Frontier groups. It was suggested that the Metis pattern indicated frequency ranges for domestic sites in a frontier setting. Other differences between the comparative and Metis data were discussed and explanations were forwarded to account for the differences.

The main characteristic of the Hivernant Pattern was its exceedingly low artifact group frequencies. This was assumed to be the result of the nomadic or semi-nomadic nature of the Hivernant. Only the Hivernant Clothing, due to a large bead count, showed an increase over the percentage range usually found at Metis sites. A lower bead count at the Metis sites was

assumed to be the result of a lack of beadwork. The differences between the Hivernant and Metis data was possibly the result of (1) different economic orientation, (2) the isolated location of the Hivernants, (3) the duration of occupation, and (4) ethnic variability.

The Metis-Upper Fort Garry comparisons showed that the UFG 1 and UFG 2 artifact group frequencies fit within the Metis Farmer-Merchant Pattern range. It is not known to what extent the preliminary nature of the Upper Fort data affects its association with the Metis data. The removal of at least three artifact classes have probably caused a decrease in the Clothing and Activities groups.

The results of this chapter are that statistically, the artifact group level of analysis is unrelaible to discern differentiation. Although it was shown that most assemblages were associated, differences within group frequencies could be observed when the patterns were subjectively compared. Ranked artifact class correlations were considerably more beneficial as these showed that although there was still an association between the data, the strength of the associations were lower based on the coefficient values. The correlations that produced the largest positive correlations were the Metis-UFG 1 and Metis-UFG 2 examples.

CHAPTER VI

SUMMARY AND CONCLUSIONS:
STUDIES OF ETHNICITY IN THE RED RIVER SETTLEMENT

This final chapter is divided into six parts that discuss: objectives of research, methods, results, interpretation and evaluation of results, contribution to knowledge, and avenues for future research.

Objectives of Research

The objective of this thesis was to determine if Metis assemblages could be distinguished from other assemblages. It was hypothesized that Metis assemblages would be differentiated on the basis of ethnic distinctiveness . A second objective was to determine whether the quanification method of Stanley South was as adequate a research tool to elicit cultural differention as South had postulated.

Ethnic studies throughout the United States have shown that ethnic differentiation can be ascertained based on inferences from the archaeological record. Of prime importance to this research was Kathleen Deagan's study of Spanish St. Augustine in which she found differences between Hispanic assemblages within St. Augustine and also between Florida Hispanic and British assemblages from the Carolinas. Since there were parallels

between St. Augustine and Red River it was hypothesized that ethnic assemblages within Red River would also exhibit quantifiable differences. It should be stressed that this study of Red River is limited to a thin cross-section because all excavated sites from Red River were discussed even though the sample size is small.

Methods

First, the Metis identity of each site's inhabitants was established. It became evident that all inhabitants were most likely upper-class Metis based on relative wealth, status, or economic orientation. Stanley South's method was used to place the Metis data into a standarized format. Each Metis assemblage was placed into the class and group format which formed the raw data base.

Rank order correlation tests were conducted comparing each Metis site using ranked group and class artifact counts. This was to determine if there was any association between the Metis sites. It was considered important to determine whether the Metis data was associated prior to abstracting an artifact pattern. These statistical manipulations marked a departure from South's method.

It was necessary to adjust three Metis assemblages due to certain artifact classes having anomalous counts. These were the

ceramics of Riel 1, the nails at Delorme House and the beads at the Garden site. Mean class ratios were used to adjust the Metis data. A working total for each site was created by substracting the ceramics, nails and bead counts from each assemblage total. The ceramic ratio was calculated by dividing the ceramic count from each site, except Riel 1, by the site working total. The mean ceramic ratio was the average of the three ratios produced. The mean nail and bead ratios were calculated in a similar manner. The adjusted Riel 1 ceramic count was obtained by multiplying the mean ceramic ratio by the Riel 1 working total. The adjusted Delorme House nail and the Garden site bead counts were estimated in the same manner. The Metis Farmer-Merchant Pattern was formed by presenting the percentage range of each artifact group.

Once the Metis pattern had been abstracted it was compared with other artifact patterns. Comparative sites consisted of five Carolina sites, three Frontier sites, four Hivernant sites and the preliminary data from two features at Upper Fort Garry. A Hivernant Pattern was abstracted by first organizing the Hivernant data into the class and group format, conducting rank order correlations to show that ranked group and class counts and Hivernant sites were associated and presenting group frequency ranges as the pattern.

Rank order tests were conducted using the ranked group and class total of each comparative site set. In addition, further correlation tests compared each Metis site with UFG 1 using ranked class counts. When the correlation coefficients were calculated it was noticed that the mathematical differences between certain group ranks were relatively large. These differences were the result of pattern variation which was further ascertained by subjective examination.

Results

When rank order correlations were conducted using the raw Metis data a large degree of association was observed. The largest coefficient values were between Garden site-Riel 1 and Delorme House-Riel 2. Similar ages for each site pairing was probably the cause for these high values.

The adjusted Metis data exhibited some degree of uniformity based on low standard deviations calculated for each artifact group. The Metis Farmer-Merchant Pattern was comprised largely of artifacts of the Kitchen and Architectural groups. The four assemblage mean of these two groups was relatively equal. Also relatively prominent, although of a much smaller frequency, was the Clothing group.

With the Metis comparisons concluded, it was possible to begin comparisons with other site assemblages. Rank order correlations that used ranked group totals and sites showed that

the Metis Farmer-Merchant pattern was associated with all but the Frontier pattern. This led to the conclusion that the Metis sites were not distinctive from other historic assemblages and/or that South's quantification method using artifact groups was not an adequate research tool.

Rank order correlations that used ranked artifact classes were conducted as an additional means of contrasting the Metis data with comparative sites. These tests showed that the Metis data again was closely correlated with the comparative material. Again this suggested that the Metis Farmer-Merchant pattern was not distinctive. The coefficient values were however, lower than the coefficients calculated for ranked group correlation tests. In addition, the strongest positive correlation was the Metis-Upper Fort Garry 1. Therefore, further tests using ranked class counts from each Metis site and Upper Fort Garry 1 were conducted. The two highest coefficients were produced when Garden Site and Riel House were compared with UFG 1 . These sites dated roughly to the same time as the Upper Fort Garry feature.

Subjective comparisons between the Metis Farmer-Merchant, Carolina, Frontier, Hivernant Patterns plus the preliminary Upper Fort Garry frequencies produced several observations. These are summarized below:

1. The large Architectural group at Metis sites was considered to be a function of increased construction

and/or reparation activity in a small area. This was supported by the Upper Fort Garry assemblages which also had large group frequencies. The Hivernant Architectural group was lower than the Metis range and therefore supported the observation as Hivernant wintering cabins were usually left standing.

2. A large percentage of the Arms group was inferred to indicate a hunting economy rather than agriculture. The Hivernant Arms group supported this assumption as it had a slightly larger Arms group range. The Upper Fort Garry Arms group percentage fit within the Metis pattern range.

3. Low Pipe frequencies indicated the presence of non-smokers or, given the nature of the long-stem clay pipe, site occupants had little leisure time to smoke.

4. Lower Kitchen groups can be expected at sites occupied for short periods by nomadic groups. This was based on the difference between the Hivernant and Metis Kitchen groups.

5. The lower Architectural group frequency at Hivernant sites was assumed to be the result of (1) their nomadic lifestyle, (2) different constructional techniques and, (3) smaller amounts of construction or demolition activity due to cabin reutilization.

6. Large Bead class counts at Hivernant sites possibly indicate that beadwork patterns were used as ethnic boundary markers that distinguished the Hivernants from other cultural groups in the northwest. Therefore, if the Hivernants were originally members of the Bison Hunter sector of the Red River Metis, it is possible that large bead class counts can be expected at Red River Bison Hunter sites.

The results showed that the Metis data could only be distinguished from the comparative material on the basis of subjective evaluation. Statistical tests illustrated that some association existed between the Metis and comparative data. The following section outlines a number of possible explanations for this association.

Interpretation and Evaluation of Research

Several possible explanations may account for the similarities between the Metis and comparative assemblages. First, the patterns identified from each group of sites may be merely indicative of assemblages found at domestic sites, as Benson (1978:64) suggested. If this is especially true for the Metis and the Upper Fort sites, the patterns should theoretically be dissimilar from assemblages recovered at Red River commercial sites or any other site where non-domestic activities had occurred. A possible explanation for the Metis-Upper Fort

association is that the preliminary Upper Fort Garry data precludes adequate comparative reliability. The incompleteness of the data may have resulted in the calculation of group percentages similar to the Metis values. Completion of the Upper Fort data recording in the near future should indicate what effect the incompleteness produced. Another possibility for comparative data similarity may be that South's classifactory system does not allow for the separation of the assemblages. This explanation relates to the criticisms of Warfal (1982:164) summarized in Chapter I. Warfal suggested that South's artifact groups are as much a product of his data manipulation techniques as they are of any inherent patterns in the data themselves. In the Metis research, it was assumed that rank order correlations, a test not used by South, might avoid this problem. It appears, however, that rank order tests further indicate that artifact groups and possibly artifact classes are unreliable analytical units. It is possible that by merely placing the data into the group and class format positive correlations will be calculated. If this is known beforehand or taken as a constant then perhaps the r_s value could become the important statistic at both the group and class level. Take, for a hypothetical example, a comparison between the Garden site and excavated assemblages from St. Andrews where the latter example (1) dated to the same time period, and (2) could be identified to an Orkney farmer. Rank order correlations could be conducted between ranked group and

class totals and each site. If it was stated beforehand that an association would likely be concluded because both are in the South format then the factor that would decide the strength of association would be group and class r_s values larger than a predetermined value such as +0.600 or +0.700.

It was anticipated that due to a greater availability of goods in the Carolinas, the largest degree of similarity would exist between the Metis and Frontier patterns. However, when the ranked artifact groups were correlated the reverse was concluded. It was inferred that the domestic nature of both the Carolina and Metis patterns caused the association. This further indicated that the variables of time, latitude and climate might not affect assemblages to any great degree.

The rank order associations between the Metis and Hivernant patterns are interesting especially when the patterns were so apparently different. It is possible that the large Clothing group frequencies, as a result of the Beads class, is the cause of pattern differentiation. This suggests that the Hivernant pattern is merely a Metis Farmer-Merchant pattern with a large bead count. Therefore, the South group analysis can mask certain distinguishing characteristics that are evident only at the class level of analysis.

A factor that could be responsible for the similarity between Metis and Upper Fort Garry assemblages is conscious or unconscious behavioral patterns, on the part of the Metis

families, to emulate British cultural traditions. It was suggested in Chapter II that the Metis were distinct from the British social groups on the basis of religion, language and ancestoral lineage. If, as it has been assumed, the families responsible for the Riel House, Garden site and Delorme House assemblages were all members of the upper class of Metis one of the behavioral practices of reinforcing that social consciousness may have been through the adoption of British cultural practices. The reasoning for this opinion is outlined below.

The interim during which the regiment was stationed at Upper Fort Garry, 1846 to 1848, was a period of either increased farming or trade speculation by a number of Metis individuals. The period of the 1840s and possibly early 1850s also represented a period of increased wealth and status by certain members of the Metis group. The increment in the number of carts owned by Parenteau and Beauchamp may reflect this increased wealth. Therefore, the period during which the Royal Warwickshire Regiment was stationed at Upper Fort Garry coincided with an increased social consciousness and upward mobility by the Metis Farmer-Merchant class. Furthermore, prior to the 1840s much of Metis social organization was based on the bison hunt. The somewhat "militaristic" hunt organization with its captains and councillors, who were usually the best hunters, was imposed only during the hunt and did not extend into the period when the Metis returned to the settlement. However, during the 1840s a certain

amount of wealth began to accumulate among several members of the Metis, particularly the Farmer-Merchant sector. This allowed for a certain degree of class structuring based on wealth and was independent of the bison hunt. Furthermore, during the same time period, the Farmer-Merchant sector also functioned as part of an agrarian middle class within the Red River settlement. The social organization of the settlement in the 1840s may have been similar to that of Upper Canada during the same period. This consisted of an agrarian middle class juxtaposed between an upper class of officials and magistrates and a lower class of wage labourers and small-scale farmers (Careless 1970:76). However, both the middle and lower class groups were dependent on goods imported by the Hudson's Bay Company. This would cause a sense of loyalty by the Metis Farmer-Merchants toward the British system. By their economic advantage over lower class Metis groups, the Farmer-Merchants were able to adopt certain British cultural traits. The large degree of correlation between the Metis Farmer-Merchant and British assemblages may be the result of these practices.

A second possibility is related to the dependence on British goods. This situation may have altered somewhat after the 1850s when the American market was tapped via cart freighting to St. Paul. It is conceivable that since goods were obtained largely through the Hudson's Bay Company there would be an association between all Red River assemblages. If the Hivernants also drew a

large portion of their supplies from the Hudson's Bay Company then this would also account for the statistical association between Metis and Hivernant assemblages.

The association between Metis and Upper Fort Garry assemblages may also be a function of similar environmental conditions faced by both groups. All ethnic groups within the settlement faced similar environmental conditions of limited resources, climatic factors and subsistence requirements. The assemblage associations may therefore be related to these conditions. Variations in artifact group frequencies may reflect alternating methods of facing these conditions. The individuals at Upper Fort Garry may have had more efficient ways of circumnavigating limited resources based on more direct ties with British industrial centres. The Metis Farmer-Merchants may have been able to overcome climatic factors such as drought and grasshopper infestations, by having a larger number of livestock or acres cultivated. The Farmer-Merchants would experience only partial crop failure or livestock depletion whereas a small-scale farmer would face total crop failure.

This thesis was hampered by the small Metis sample size as well as the lack of comparative examples. Although this work is not the first archaeological study of Red River Metis, it is the first synthesis of such research. The thesis discussed three main points: Red River Metis, South's method and the Red River Settlement. The research showed that an association could be

calculated for the four Metis sites when the assemblages were classified in South's class and group format. However, the study also showed that when the Metis data was compared statistically with other group formatted data, a positive correlation was produced. Therefore, South's method could be applied but suffered from a number of inherent problems, such as those discussed in Chapter I, and failed to distinguish the Metis Farmer-Merchant pattern from other patterns. It is possible that patterning in the archaeological record is not related to ethnic associations. Deagan found that inter-ethnic variability correlated with different types of ceramics used by the specific groups. This further suggests that some other technique of data manipulation may elicit ethnic distinctiveness. A technique such as hierarchical clustering, that allows data to group according to relative similarities and/or differences might avoid the masking tendencies that analysis at the artifact group level creates.

Contribution to Research

Quantification using a standard measure of comparison, South's pattern concept, of groups and classes failed to show ethnic diversity. This implies that either South's method is inappropriate for ethnic studies or that material culture does not always reflect ethnicity. Various degrees of success were achieved when using groups and classes to compare Red River and

non-Red River assemblages. The Upper Fort assemblages had little association with the Hivernant data both statistically and subjectively. A significant positive correlation was found between the Metis and Hivernants although subjective examination illustrated several differences.

The study has shown that archaeology in the Red River Settlement is still in an early stage of development. The research may serve as a foundation upon which further studies may be laid or may be used for an example of what methodological applications to avoid.

One of the contributions of this research is that it has demonstrated that material culture does not always show diversity between cultures. This may be a function of cultural borrowing, a homogenizing effect due to the restricted variety of material items, an inadegute method of comparison, an inappropriate technique, or environmental variation.

Aside from the ethnic diversity study, the research has provided initial synthetic archaeological investigations into the Red River Metis. This has been through the examination of all excavated Metis sites. These sites have been linked historically, socio-economically, statistically and quantitatively.

Future Research

It is anticipated that additional Red River assemblages will be excavated in the near future and more assemblages are needed to help support or refute the conclusion reached here. Although additional assemblages from any location within the settlement would be beneficial certain areas would be of greater value. Only one small excavated assemblage (Badertscher 1984) and a number of surface assemblages (McLeod 1985) have been obtained from the northern end of the settlement. Of great potential are English Countryborn assemblages in the parishes of St. Paul, St. Andrew, St. Clement and St. Peter. The inhabitants of these lower Red River parishes were primarily farmers and therefore of the same economic orientation as the Farmer-Merchants. A number of farmers also had large-scale operations and would possibly be part of the same agrarian middle class as the Farmer-Merchants. Also of benefit within the northern portion of the Settlement is the Kildonan area which contained the original Scottish settlers. This would offer additional British examples and would be an ethnic unit separate from the Hudson Bay Company employees . Sites along the Assiniboine River in the White Horse Plains area would be of great significance to Metis studies. Most site materials would theoretically be indicative of lower status hunting Metis and therefore relate to the Metis-Hivernant comparisons. Finally,

Metis sites that predate the 1840s would also be of great importance especially with regard to studies of culture change. Finally, the research has indicated the possibility of combining the Metis and Upper Fort Garry data to study differences between Red River and non-Red River assemblages. This would enable studies of a wider geographic scope to be conducted.

The pattern concept could be used in future research if serious consideration is given to refinement of South's method. Further analysis at the class level might be a valid consideration. Certain artifact classes may exhibit uniform frequencies when compared among sites. Or, as Deagan illustrated, certain types within artifact classes appear to correlate with ethnic groups. It might also be possible to apply quantification in conjunction with other techniques. Hierarchical clustering could be conducted to determine which artifact types or classes cluster to show similarities and/or differences. This could form the basis for further comparisons to determine if the cluster of types or classes show uniformity cross-culturally.

REFERENCES CITED

Adams, Gary
1981 Fur Trade Archaeology in Western Canada: A Critical Evaluation and Bibliography. Saskatchewan Archaeology, 2 (1 & 2).

Badertscher, Patricia M.
1984 Salvage Operations at DlLg-13, a Scots Metis Framstead in the Red River Settlement. Manitoba Archaeological Quarterly 8 (3-4): 1-29.

Baker, Vernon G.
1978 Historical Archaeology at Black Lucy's Garden, Andover Massachusetts: Ceramics from the Site of a 19th Century Afro-American. Papers of the Robert S. Peabody Foundation for Archaeology 8, Andover.

Barth, Frederic
1969 Ethnic Groups and Boundaries. Little, Brown and Company, Boston.

Benson, Donna Lynne
1978 A Reconsideration of the 'Carolina Pattern'. In The Conference on Historic Site Archaeology Papers 1977. Volume 12, edited by Stanley South, pp. 32-67. University of South Carolina, Columbia, S.C.

Bonnichsen, Robson, Roy Moran, Maurice Doll, Stuart J. Baldwin
1973 A Metis Community in the Cypress Hills of Alberta: An Archaeological Investigation. MS on file, Department of Anthroplogy, University of Alberta, Edmonton, Alberta.

Burpee, L.J.
1927 Journals and Letters of Pierre Gaultier de Varennes de La Verendrye and his Sons. The Champlain Society, Toronto.

Careless, J.M.S.
1970 Upper Canada in a Metropolitan Context: A Historian's Analysis. Reprinted in The Frontier Thesis and the Canadas: The Debate on the Impact of the Canadian Environment, edited by M.S. Cross. Copp Clarke Publishing Company, Toronto.

Carrillo, Richard F.
1977 Archaeological variability -sociocultural variability. Reserach Strategies in Historical Archaeology, edited by Stanley South, pp. 73-90. Academic Press, New York.

Chance, David H.
1977 Review of Method and Theory in Historical Archaeology by Stanley South, in Historical Archaeology 11: 126-128.

Chism, James V.
1972 Excavations at Lower Fort Garry, 1965-1967: A General Description of Excavations and Preliminary Discussions. Canadian Historic Sites: Occassional Papers in Archaeology and History, No. 5. Ottawa.

Clarke, John
1966 Population and Economic Activity: A Geographical and Historical Analysis, Based upon Selected Census of the Red River Valley in the Period 1832 to 1836. Unpublished M.A. Thesis, Department of Geography, University of Manitoba, Winnipeg.

Coues, E. (editor)
1965 New Light on the Early History of the Greater Northwest: The Manuscript Journals of Alexander Henry Fur Trader of the North West Company, and of David Thompson, Official Geographer and Explorer of the Same Company. Ross and Haines, Minneapolis.

Deagan, Kathleen
1983 Spanish St. Augustine: The Archaeology of a Colonial Creole Community. Academic Press, New York.

Deetz, James
1977 In Small Things Forgotten. Doubleday, New York.

Dewhirst, John
1974 Archaeological Investigations in the Northwest Bastion and Bake House, Lower Fort Garry, 1973. Manuscript Report Series No. 148. Parks Canada, Ottawa.

Doll, Maurice and Robert S. Kidd
1976 The Buffalo Lake Metis Site (FdPc-1) Report on Project 75-26, Field Season 1975. Alberta Culture, Provincial Museum of Alberta, Human History Section. Archaeology Program, March 30, 1976. Edmonton, Alberta.

Ebell, S. Biron
1983 Preface. In The Garden Site, DkLg-16: A Historical and Archaeological Study of a Nineteenth Century Metis Farmstead, edited by K. David McLeod, pp. ix-x. Papers in Manitoba Archaeology, Final Report No. 16, Department of Cultural Affairs and Historical Resources, Historic Resources Branch, Winnipeg.

Elliott, Jack
1971 Hivernant Archaeology in the Cypress Hills. Unpublished M.A. Thesis, Department of Anthropology, University of Calgary, Calgary, Alberta.

Ferguson, L.
1978 Historic Ceramics of the Dalebozik Site. MS on file, Manitoba Culture, Heritage and Recreation, Historic Resources Branch, Winnipeg.

Foland, W.J. and Peter Priess
1972 Archaeological Investigations at Lower Fort Garry, 1971. Manuscript Report Series No. 84. Parks Canada, Ottawa.

Forsman, Michael
1977 Archaeological Investigations at Riel House, Manitoba, 1976. Manuscript Report Series No. 406. Parks Canada, Ottawa.

Forsman, Michael and Joseph Gallo
1979 Approaches to Fur Trade Archaeology, Project 77-22 in part. Archaeological Survey of Alberta Occassional Paper Number 14, pp. 159-192. Alberta Culture, Historical Resources Division, Edmonton, Alberta.

Foster, John E.
1973 The Country-born in the Red River Settlement 1820-1850. Unpublished PhD. Dissertation, Department of History, University of Alberta, Edmonton.

1976 Origins of the Mixed-Bloods in the Canadian West. In Essays in Western History in Honour of Lewis Gwynne Thomas, edited by Lewis H. Thomas. University of Alberta Press, Edmonton.

Gosman, Robert
1977 The Riel and Lagimodiere Families in Metis Society 1840-1860. Manuscript Report Series No. 171. Parks Canada, Ottawa.

Greenwood, Roberta S.
1980 The Chinese on Main Street. In Archaeological Perspectives on Ethnicity in America, edited by R.L. Schuyler, pp. 113-123. Baywood Publishing Company, Farmingdale, New York.

Hamilton, J.C.
1876 The Prairie Province. Belford Brothers, Toronto.

Hamilton, Scott
1978 Current Paradigms in Historic Archaeology. In MASA Journal, edited by Patricia M. Badertscher, pp. 81-102. University of Manitoba, Winnipeg.

Harvard, Dr. V.
1880 The French Half-Breeds of the Northwest. Smithsonian Institution, Annual Report for 1879, pp. 309-327. Government Printing Office, Washington, D.C.

Kotecki, Martin Christopher
1983 Ethnohistory. In The Garden Site, DkLg-16: A Historical and Archaeological Study of a Nineteenth Century Metis Farmstead, ed. by K. David McLeod, pp. 47-79. Papers in Manitoba Archaeology Final Report No. 16. Department of Cultural Affairs and Historical Resources, Historic Resources Branch, Winnipeg.

Kotecki, Martin Christopher and Diana Brown
1983 Site History. In The Garden Site, DkLg-16: A Historical and Archaeological Study of a Nineteenth Century Metis Farmstead, edited by K. David McLeod, pp. 79-109. Papers in Manitoba Archaeology Final Report No. 16. Department of Cultural Affairs and Historical Resources, Historic Resources Branch, Winnipeg.

Langewalter, Paul E.
1980 The Archaeology of the 19th Century Chinese Subsistence at the Lower China Store, Madera County, California. In Archaeological Perspectives on Ethnicity in America, edited by R.L. Schuyler, pp. 102-112. Baywood Publishing Company, Farmingdale, New York.

Levin, Jack
1977 Elementary Statistics in Social Research. Harper and Row, New York.

Lunn, Kevin, Jennifer Hamilton and Peter Priess
1980 Archaeological Rsearch at Riel House, St. Vital, Manitoba: A Reassessment of the Artifact Data. Manuscript Report Series No. 406. Parks Canada, Ottawa.

Lussier, Antoine S.
1978 The Metis. In The Other Natives: The Metis, Volume 1, edited by Antoine S. Lussier and D. Bruce Sealey, pp. 15-26. Manitoba Metis Federation Press, Winnipeg.

Magry, P.
1878 Discoveries of the Verendryes, 1728-1750. Originally published 1852, Le Moniteur, Paris. Translated into English in Reports on Boundaries of Ontario, 1872-1878 1 and 2:68-80.

Masson, L. (editor)
1890 Les Bourgeois de la Companie Nord-Ouest. Antiquarian Press Limited, New York.

McGuire, Randall H.
1982 The Study of Ethnicity in Historical Archaeology. Journal of Anthropological Archaeology 1: 159-178. Academic Press, New York.

McLeod, K. David
1982 Archaeological Investigations at the Delorme House. Papers in Manitoba Archaeology Final Report No. 13. Department of Cultural Affairs and Historical Resources, Historic Resources Branch, Winnipeg.

1983 Methods of Excavation and Stratigraphy. In The Garden Site, DkLg-16: A Historical and Archaeological Study of a Nineteenth Century Metis Farmstead, edited by K. David McLeod, pp. 111-124. Papers in Manitoba Archaeology Final Report No. 16. Department of Cultural Affairs and Historical Resources, Historic Resources Branch, Winnipeg.

1984 Excavation at the Mather-Walls House in Keewatin, Ontario. Conservation Archaeology Report, Northwestern Region, Report No. 4. Ministry of Citizenship and Culture, Heritage Branch, Kenora, Ontario.

1985 The Selkirk and District Planning Area: A Summary of the Prehistoric and Historic Cultures Based on the 1984 Planning Area Archaeological Survey. MS. on file, Manitoba Culture, Heritage and Recreation, Historic Resources Branch, Winnipeg.

McLeod, K. David and M. Christopher Kotecki
1983 General Conclusions. In The Garden Site, DkLg-16: A Historical and Archaeological Study of a Nineteenth Century Metis Farmstead, edited by K. David McLeod, pp. 347-363. Papers in Manitoba Archaeology Final Report No. 16. Department of Cultural Affairs and Historical Resources, Historic Resources Branch, Winnipeg.

McPhillips, George
1874 Map-plan of River Lots of St. Norbert and St. Vital. P.A.M. 6.4.11, gbbe, 1870s, Sheet 7.

Mendenhall, William and Lyman Ott
1972 Understanding Statistics. Duxbury Press, Belmont, California.

Meuller, John H., Karl F. Schuessler and Herbert L. Costner
1970 Statistical Reasoning in Sociology. 2d ed. Houghton Mifflin Company, Boston.

Monks, Gregory G.
1983 Preliminary Report on Archaeological Investigations in Bonnycastle Park (Upper Fort Garry), 1983. Manitoba Archaeological Quarterly 8 (3 and 4): 30-51.

Moodie, D.W. and Barry Kaye
1969 The Northern Limit of Indian Agriculture in North America. Geographical Review 59: 513-529.

Morton, Arthur S.
1937 Forrest Oakes, Charles Boyer, Joseph Fulton and Peter Pangman in the North-west, 1765-1793. Proceedings and Transactions of the Royal Society of Canada, Third Series, 31: 87-100.

Morton, W.
1957 Manitoba: A History. University of Toronto Press, Toronto.

Noel-Hume, Ivor
1969 Historical Archaeology. Alfred A. Knopf, New York.

Olsen, John W.
1978 A Study of Chinese Ceramics Excavated in Tucson. The Kiva 44: 1-50.

Otto, John Solomon
1977 Artifacts and Status Differences: A Comparison of Ceramics from Planter, Overseer, and Slave Sites on an Antebellum Plantation. In Research Strategies in Historical Archaeology, edited by S. South, pp. 91-118. Academic Press, New York.

Pannekoek, F.
1976 A Probe into the Demographic Structure of Nineteenth-Century Red River. In Essays on Western Canadian History in Honour of Lewis Gwynne Thomas, edited by Lewis H. Thomas. University of Alberta Press, Edmonton.

Payment, Diane
1980 Riel Family: Home and Lifestyles at St. Vital, 1860-1910. Manuscript Report Series No. 407. Parks Canada, Ottawa.

Priess, Peter
1969 Exacavations at Lower Fort Garry (1K) 1968. Manuscript Report Series No. 114. Parks Canada, Ottawa.

1978 Archaeological Excavations at Lower Fort Garry, 1977. Manuscript Report Series No. 336. Parks Canada, Ottawa.

Priess, Peter and Linda Sears
1979 Archaeological Investigations at Lower Fort Garry, 1978. Manuscript Report Series No. 336. Parks Canada, Ottawa.

Pysczyk, H. and G. Praeger
1982 The Significance and Evaluation of Historic Sites. In Directions in Archaeology: A Question of Goals. edited by Peter D. Francis and Eric C. Poplin, pp. 285-297. Proceedings of the Fourteenth Annual Conference of the Archaeological Association of the University of Calgary, Calgary, Alberta.

Renfrew, Colin
1982 Explanation Revisited. In Theory and Explanation in Archaeology, edited by Colin Renfrew, Michael J. Rowlands and Barbara Abott Seagraves, pp. 5-22. Academic Press, New York.

Ross, Alexander
1957 The Red River Settlement: Its Rise, Progress and Present State with Some Account for the Native Races and its General History to the Present Day. Hurtig edition, Edmonton.

Ross, Brian
n.d. Historic Archaeology at the Barber House, Winnipeg, Manitoba. MS. on file, Manitoba Culture, Heritage and Recreation, Historic Resources Branch, Winnipeg.

Sealey, D. Bruce
1978 One Plus One Equals One. In The Other Natives: The Metis, Volume 1, edited by Antoine S. Lussier and D. Bruce Sealey, pp. 1-14. Manitoba Metis Federation Press, Winnipeg.

Sealey, D. Bruce and Antoine S. Lussier
1975 The Metis: Canada's Forgotten People. Manitoba Metis Federation Press, Winnipeg.

Siegel, S.
1956 Non-parametric Statistics for the Behavioral Sciences. McGraw-Hill Book Company, Inc. New York.

Smith, Bruce
1982 Explanation in Archaeology. In Theory and Explanation in Archaeology, edited by Colin Renfrew, Michael J. Rowlands and Barbara Abott Seagraves, pp. 73-83. Academic Press, New York.

South, Stanley
1977 Method and Theory in Historical Archaeology. Academic Press, New York.

Spector, Janet
1976 The Interpretive Potential of Glass Trade Beads in Historical Archaeology. Historical Archaeology, 10: 17-26.

Sprague, D.N.
1983 Introduction. In The Genealogy of the First Metis Nation, compiled by D.N. Sprague and R.P. Frye, pp. 11-38. Pemmican Publications, Winnipeg.

Sprague, D.N. and R.P. Frye
1983 The Genealogy of the First Metis Nation. Pemmican Publications, Winnipeg.

Sprague, Roderick
1981 A Functional Classification for Artifacts from 19th and 20th Century Historical Sites. North American Archaeologist, 2 (3): 251-261.

Sprenger, George Herman
1972 An Analysis of Selective Aspects of Metis Society, 1810-1870. Unpublished M.A. Thesis, Department of Anthropology, University of Manitoba, Winnipeg.

Stevenson, Marc
1983 Pattern in Pattern Recognition? In The Conference on Historic Site Archaeology Papers 1980, Volume 15, edited by Stanley South, pp. 57-70. University of South Carolina, Columbia, S.C.

Tremauden, A.H. de
1982 Hold High Your Heads. Pemmican Publications, Winnipeg.

Van Kirk, Sylvia
1980 Many Tender Ties: Women in Fur-Trade Society in Western Canada, 1670-1870. Watson and Dwyer, Winnipeg.

Walker, Iain C.
1967 Historic Archaeology: Methods and Principals. Historical Archaeology 1: 23-34.

Warfal, Stephen G.
1982 A Critical Analysis and Test of Stanley South's Artifact Patterns. In The Conference on Historic Site Archaeology Papers 1979, Volume 14, edited by Stanley South, pp. 137-190. University of South Carolina, Columbia S.C.

Appendix A-1. Metis Artifact Group
Rank Order Calculations.

Garden-Riel 1

D	D^2
1	1
1	1
1	1
-1	1
-3	9
0	0
2	4
1	1
0	18

$r_s = 1 - \frac{6(18)}{8(8^2-1)}$

$= 0.785$

Garden-Riel 2

D	D^2
1.0	1.0
1.0	1.0
1.5	2.25
-2.0	4.0
-2.0	4.0
2.0	4.0
-1.5	2.25
0.0	0.0
0.0	18.5

$r_s = 1 - \frac{6(18.5)}{8(8^2-1)}$

$= 0.780$

Garden-Delorme

D	D^2
0	0
2	4
2	4
-2	4
-3	9
2	4
-2	4
1	1
0	30

$r_s = 1 - \frac{6(30)}{8(8^2-1)}$

$= 0.643$

Riel 1-Riel 2

D	D^2
0.0	0.0
0.0	0.0
0.5	0.25
-1.0	1.0
1.0	1.0
2.0	4.0
-3.5	12.25
1.0	1.0
0.0	19.5

$r_s = 1 - \frac{6(19.5)}{8(8^2-1)}$

$= 0.768$

Riel 1-Delorme

D	D^2
-1	1
1	1
1	1
1	1
0	0
2	4
4	16
2	4
0	28

$r_s = 1 - \frac{6(28)}{8(8^2-1)}$

$= 0.667$

Riel 2-Delorme

D	D^2
-1.0	1.0
1.0	1.0
0.5	0.25
0.0	0.0
-1.0	1.0
0.0	0.0
-0.5	0.25
1.0	1.0
0.0	4.5

$r_s = 1 - \frac{6(4.5)}{8(8^2-1)}$

$= 0.946$

Appendix A-2. Metis Artifact Class Rank Order Correlations.

Garden-Riel 1		Garden-Riel 2		Garden-Delorme	
D	D^2	D	D^2	D	D^2
2.0	4.0	1.0	1.0	-2.0	4.0
-11.5	132.25	4.5	20.25	2.5	6.25
4.0	16.0	-1.5	2.25	10.0	100.0
16.5	272.25	-1.5	2.25	10.0	100.0
-5.0	25.0	-6.0	36.0	-7.0	49.0
-0.5	0.25	3.0	9.0	3.0	9.0
9.0	81.0	11.5	132.25	-1.0	1.0
-0.5	0.25	0.0	0.0	-3.5	12.25
0.5	0.25	0.0	0.0	3.0	9.0
0.0	0.0	1.0	1.0	1.0	1.0
2.5	6.25	0.5	0.25	2.0	4.0
4.0	16.0	5.5	30.25	3.5	12.25
-3.5	12.25	4.5	20.25	8.0	64.0
-14.5	210.25	-13.0	169.0	-12.0	244.0
4.0	16.0	5.5	30.25	6.5	42.25
16.5	272.25	-1.5	2.25	-3.0	9.0
0.5	0.25	0.0	0.0	-0.5	0.25
4.0	16.0	5.5	30.25	-3.0	9.0
-1.0	1.0	-12.0	144.0	-20.5	420.25
-5.5	30.25	-11.0	121.0	-12.5	156.25
-10.0	100.0	10.5	110.25	3.0	9.0
-9.5	90.25	-17.5	306.25	-10.0	100.0
-3.5	12.25	-9.0	81.0	-1.0	1.0
-3.5	12.25	-9.0	81.0	-10.5	110.25
-10.0	100.0	3.0	9.0	4.5	20.25
7.0	49.0	-8.5	72.25	-10.5	110.25
-7.0	49.0	3.5	12.25	-10.0	100.0
4.0	16.0	9.5	90.25	-3.0	9.0
4.0	16.0	12.0	144.0	20.5	420.25
4.0	16.0	-1.5	2.25	3.5	12.25
4.0	16.0	-1.5	2.25	3.5	12.25
0.0	0.0	3.5	12.25	-3.5	12.25
4.0	16.0	8.5	72.25	24.5	600.25
-8.5	72.25	7.5	56.25	4.5	20.25
-0.5	0.25	-5.5	30.25	4.0	16.0
4.0	16.0	-1.5	2.25	1.0	1.0
0.0	1693.0	0.0	1835.25	0.0	2707.0

Appendix A-2. Continued.

Riel 1-Riel 2		Riel 1-Delorme		Riel 2-Delorme	
D	D^2	D	D^2	D	D^2
-1.0	1.0	-4.0	16.0	-3.0	9.0
16.0	256.0	9.0	81.0	-7.0	49.0
-5.5	30.25	6.0	36.0	11.5	132.25
-18.0	324.0	-6.5	42.25	11.5	132.25
-1.0	1.0	-2.0	4.0	-1.0	1.0
3.5	12.25	3.5	12.25	0.0	0.0
2.5	6.25	-10.0	100.0	-12.5	156.25
0.5	0.25	-3.0	9.0	-3.5	12.25
-0.5	0.25	2.5	12.25	3.0	9.0
1.0	1.0	1.0	1.0	0.0	0.0
-2.0	4.0	-0.5	0.25	1.5	2.25
1.5	2.25	-0.5	0.25	-2.0	4.0
8.0	64.0	11.5	132.25	3.5	12.25
1.5	2.25	2.5	6.25	1.0	1.0
1.5	2.25	2.5	6.25	1.0	1.0
-18.0	324.0	-19.5	380.25	-1.5	2.25
-0.5	0.25	-1.0	1.0	-0.5	0.25
1.5	2.25	-7.0	49.0	-8.5	72.25
-11.0	121.0	-19.5	380.25	-8.5	72.25
-5.5	30.25	-7.0	49.0	-1.5	2.25
20.5	420.25	13.0	169.0	-7.5	56.25
-8.0	64.0	-0.5	0.25	7.5	56.25
-5.5	30.25	2.5	6.25	8.0	64.0
-5.5	30.25	-7.0	49.0	-1.5	2.25
13.0	169.0	14.5	210.25	1.5	2.25
-15.5	240.25	-17.5	306.25	-2.0	4.0
10.5	110.25	-3.0	9.0	-13.5	182.25
5.5	30.25	-7.0	49.0	-12.5	156.25
8.0	64.0	16.5	272.25	8.5	72.25
-5.5	30.25	-0.5	0.25	5.0	25.0
-5.5	30.25	-0.5	0.25	5.0	25.0
3.5	12.25	-3.5	12.25	-7.0	49.0
4.5	20.25	20.5	420.25	16.0	256.0
16.0	256.0	13.0	169.0	-3.0	9.0
-5.0	25.0	4.5	20.25	9.5	90.25
-5.5	30.25	-3.0	9.0	2.5	6.25
0.0	2747.5	0.0	3015.0	0.0	1727.0

Appendix A-2. Continued.

Garden-Riel 1

$$r_s = 1 - \frac{6(1693.0)}{36(36^2-1)}$$

$$= 0.782$$

$$t = 0.782 \sqrt{\frac{36-2}{1-(0.782)^2}}$$

$$= 7.316$$

Garden-Riel 2

$$r_s = 1 - \frac{6(1835.25)}{36(36^2-1)}$$

$$= 0.764$$

$$t = 0.764 \sqrt{\frac{36-2}{1-(0.764)^2}}$$

$$= 6.904$$

Garden-Delorme

$$r_s = 1 - \frac{6(2707.0)}{36(36^2-1)}$$

$$= 0.651$$

$$t = 0.651 \sqrt{\frac{36-2}{1-(0.651)^2}}$$

$$= 5.000$$

Riel 1-Riel 2

$$r_s = 1 - \frac{6(2747.5)}{36(36^2-1)}$$

$$= 0.646$$

$$t = 0.646 \sqrt{\frac{36-2}{1-(0.646)^2}}$$

$$= 4.935$$

Riel 1-Delorme

$$r_s = 1 - \frac{6(3015.0)}{36(36^2-1)}$$

$$= 0.612$$

$$t = 0.612 \sqrt{\frac{36-2}{1-(0.612)^2}}$$

$$= 4.512$$

Riel 2-Delorme

$$r_s = 1 - \frac{6(1727.0)}{36(36^2-1)}$$

$$= 0.778$$

$$t = 0.778 \sqrt{\frac{36-2}{1-(0.778)^2}}$$

$$= 7.221$$

Appendix A-3. Metis Adjusted Artifact Group Rank Order Calculations.

Group Ranks

	Garden	Riel 1	Riel 2	Delorme
Kitchen	1	2	1.0	2
Architectural	2	1	2.0	1
Furniture	8	7	6.5	6
Arms	6	7	8.0	8
Clothing	3	4	3.0	4
Personal	7	7	5.0	5
Pipes	5	3	6.5	7
Activities	4	5	4.0	3

Garden-Riel 1

D	D^2
1	1
1	1
1	1
-1	1
-1	1
0	0
2	4
-1	1
0	10

$r_s = 1 - \frac{6(10)}{8(8^2-1)}$

$= 0.880$

Garden-Riel 2

D	D^2
0.0	0.0
0.0	0.0
1.5	2.25
-2.0	4.0
0.0	0.0
2.0	4.0
-1.5	2.25
0.0	0.0
0.0	12.5

$r_s = 1 - \frac{6(12.5)}{8(8^2-1)}$

$= 0.851$

Garden-Delorme

D	D^2
-1	1
1	1
2	4
-2	4
-1	1
2	4
-2	4
1	1
0	20

$r_s = 1 - \frac{6(20)}{8(8^2-1)}$

$= 0.761$

Riel 1-Riel 2

D	D^2
1.0	1.0
-1.0	1.0
0.5	0.25
-1.0	1.0
1.0	1.0
2.0	4.0
-3.5	12.25
1.0	1.0
0.0	21.5

$r_s = 1 - \frac{6(21.5)}{8(8^2-1)}$

$= 0.744$

Riel 1-Delorme

D	D^2
0	0
0	0
1	1
-1	1
0	0
2	4
-4	16
2	4
0	26

$r_s = 1 - \frac{6(26)}{8(8^2-1)}$

$= 0.690$

Riel 2-Delorme

D	D^2
-1.0	1.0
1.0	1.0
0.5	0.25
0.0	0.0
-1.0	1.0
0.0	0.0
-0.5	0.25
1.0	1.0
0.0	4.5

$r_s = 1 - \frac{6(4.5)}{8(8^2-1)}$

$= 0.946$

Appendix A-4. Ranked Adjusted Data at Metis Sites.

Artifact class	Garden	Riel 1	Riel 2	Delorme
Ceramics	2.0	2.0	2.0	5.0
Liquor bottle	15.0	26.5	10.5	18.5
Case bottle	30.5	26.5	32.0	21.5
Tumbler	30.5	14.0	32.0	21.5
Medicine bottle	8.0	14.0	15.0	17.0
Glassware	5.0	6.5	3.0	3.0
Tableware	19.5	10.5	8.0	21.5
Kitchenware	3.0	4.5	4.0	7.5
Window glass	4.0	4.5	5.0	2.0
Nails	1.0	1.0	1.0	1.0
Construction hardware	10.0	8.5	10.5	9.0
Door parts	30.5	26.5	25.0	28.0
Furniture hardware	23.0	26.5	18.5	15.5
Arms	11.0	26.5	25.0	25.0
Buckles	30.5	26.5	25.0	25.0
Thimbles	30.5	14.0	32.0	34.0
Buttons	6.0	6.5	7.0	7.5
Scissors	30.5	26.5	25.0	34.0
Pins	12.0	14.0	25.0	15.5
Fasteners	21.0	26.5	32.0	34.0
Shoes	16.5	26.5	6.0	13.5
Beads	14.0	10.5	18.5	11.0
Coins	23.0	26.5	32.0	25.0
Keys	23.0	26.5	32.0	34.0
Personal items	16.5	26.5	13.5	12.0
Pipes	9.0	3.0	18.5	21.5
Construction tools	19.5	26.5	16.0	30.5
Farm tools	30.5	26.5	21.0	34.0
Toys	30.5	26.5	18.5	10.0
Fishing gear	30.5	26.5	32.0	28.0
Prehistoric	30.5	26.5	32.0	28.0
Storage items	13.0	14.0	10.5	18.5
Botanical	30.5	26.5	22.0	6.0
Stable and barn	18.0	26.5	10.5	13.5
Miscellaneous hardware	7.0	8.5	13.5	4.0
Other	30.5	26.5	32.0	30.5

Appendix A-4. Continued.

Garden-Riel 1		Garden-Riel 2		Riel 2-Delorme	
D	D^2	D	D^2	D	D^2
0.0	0.0	0.0	0.0	-3.0	9.0
-11.5	132.25	4.5	20.25	-8.0	64.0
4.0	16.0	-1.5	2.25	10.5	110.25
16.5	272.25	-1.5	2.25	10.5	110.25
-6.0	36.0	-7.0	49.0	-2.0	4.0
-1.5	2.25	2.0	4.0	0.0	0.0
9.0	81.0	11.5	132.25	-13.5	182.25
-1.5	2.25	-1.0	1.0	-3.5	12.25
-0.5	0.25	-1.0	1.0	3.0	9.0
0.0	0.0	0.0	0.0	0.0	0.0
1.5	2.25	-0.5	0.25	1.5	2.25
4.0	16.0	5.5	30.25	-3.0	9.0
-3.5	12.25	4.5	20.25	3.0	9.0
-15.5	240.25	-14.0	196.0	0.0	0.0
4.0	16.0	5.5	30.25	0.0	0.0
16.5	272.25	-1.5	2.25	-2.0	4.0
-0.5	0.25	-1.0	1.0	-0.5	0.25
4.0	16.0	5.5	30.25	-9.0	81.0
-2.0	4.0	-13.0	169.0	9.5	90.25
-5.5	30.25	-11.0	121.0	-2.0	4.0
-10.0	100.0	10.5	110.25	-7.5	56.25
3.5	12.25	-4.5	20.25	7.5	56.25
-3.5	12.25	-9.0	81.0	7.0	49.0
-3.5	12.25	-9.0	81.0	-2.0	4.0
-10.0	100.0	3.0	9.0	1.5	2.25
6.0	36.0	-9.5	90.25	-3.0	9.0
-7.0	49.0	3.5	12.25	-14.5	210.25
4.0	16.0	9.5	90.25	-13.0	169.0
4.0	16.0	12.0	144.0	8.5	72.25
4.0	16.0	-1.5	2.25	4.0	16.0
4.0	16.0	-1.5	2.25	4.0	16.0
-1.0	1.0	2.5	6.25	-8.0	64.0
4.0	16.0	8.5	72.25	16.0	256.0
-8.5	72.25	7.5	56.25	-3.0	9.0
-1.5	2.25	-6.5	42.25	9.5	90.25
4.0	16.0	-1.5	2.25	1.5	2.25
0.0	1645.0	0.0	1634.0	0.0	1782.5

Appendix A-4. Continued.

Garden-Delorme		Riel 1-Riel 2		Riel 1-Delorme	
D	D^2	D	D^2	D	D^2
-3.0	9.0	0.0	0.0	-3.0	9.0
-3.5	12.25	16.0	256.0	8.0	64.0
9.0	81.0	-5.5	30.25	5.0	25.0
9.0	81.0	-18.0	324.0	-7.5	56.25
-9.0	81.0	-1.0	1.0	-3.0	9.0
2.0	4.0	3.5	12.25	3.5	12.25
-2.0	4.0	2.5	6.25	-11.0	121.0
-4.5	20.25	-0.5	0.25	-3.0	9.0
2.0	4.0	0.5	0.25	2.5	6.25
0.0	0.0	0.0	0.0	0.0	0.0
1.0	1.0	-2.0	4.0	-0.5	0.25
2.5	6.25	1.5	2.25	-1.5	2.25
7.5	56.25	8.0	64.0	11.0	121.0
-14.0	196.0	1.5	2.25	1.5	2.25
5.5	30.25	1.5	2.25	1.5	2.25
-3.5	12.25	-18.0	324.0	-20.0	400.0
-1.5	2.25	-0.5	0.25	-1.0	1.0
-3.5	12.25	1.5	2.25	-7.5	56.25
-3.5	12.25	-11.0	121.0	-1.5	2.25
-13.0	169.0	-5.5	30.25	-7.5	56.25
3.0	9.0	20.5	420.25	13.0	169.0
3.0	9.0	-8.0	64.0	-0.5	0.25
-2.0	4.0	-5.5	30.35	1.5	2.25
-11.0	121.0	-5.5	30.25	-7.5	56.25
4.5	20.25	13.0	169.0	14.5	210.25
-12.5	156.25	-15.5	240.25	-18.5	342.25
-11.0	121.0	10.5	110.25	-4.0	16.0
-3.5	12.25	5.5	30.25	-7.5	56.25
20.5	420.25	8.0	64.0	16.5	272.25
2.5	6.25	-5.5	30.25	-1.5	2.25
2.5	6.25	-5.5	30.25	-1.5	2.25
-5.5	30.25	3.5	12.25	-4.5	20.25
24.5	600.25	4.5	20.25	20.5	420.25
4.5	20.25	16.0	256.0	13.0	169.0
3.0	9.0	-5.0	25.0	4.5	20.25
0.0	0.0	-5.5	30.25	-4.0	16.0
0.0	2339.5	0.0	2745.5	0.0	2730.5

Appendix A-4. Continued.

Garden-Riel 1

$$r_s = 1 - \frac{6(1645.0)}{36(36^2-1)}$$

$$= 0.788$$

$$t = 0.788 \sqrt{\frac{36-2}{1-(0.788)^2}}$$

$$= 7.462$$

Garden-Riel 2

$$r_s = 1 - \frac{6(1634.5)}{36(36^2-1)}$$

$$= 0.790$$

$$t = 0.790 \sqrt{\frac{36-2}{1-(0.790)^2}}$$

$$= 7.513$$

Garden-Delorme

$$r_s = 1 - \frac{6(2339.5)}{36(36^2-1)}$$

$$= 0.699$$

$$t = 0.699 \sqrt{\frac{36-2}{1-(0.699)^2}}$$

$$= 5.699$$

Riel 1-Riel 2

$$r_s = 1 - \frac{6(2745.5)}{36(36^2-1)}$$

$$= 0.647$$

$$t = 0.647 \sqrt{\frac{36-2}{1-(0.647)^2}}$$

$$= 4.948$$

Riel 1-Delorme

$$r_s = 1 - \frac{6(2730.5)}{36(36^2-1)}$$

$$= 0.649$$

$$t = 0.649 \sqrt{\frac{36-2}{1-(0.649)^2}}$$

$$= 4.974$$

Riel 2-Delorme

$$r_s = 1 - \frac{6(1782.5)}{36(36^2-1)}$$

$$= 0.770$$

$$t = 0.770 \sqrt{\frac{36-2}{1-(0.770)^2}}$$

$$= 7.037$$

Appendix B-1. Hivernant Artifact Group Rank Order Correlation Tests.

Group Ranks

	Cabin A	Cabin B	Cabin E	Buffalo Lake
Kitchen	2	1	1	2
Architectural	3	4	4	3
Furniture	8	8	7	7
Arms	5	6	5	4
Clothing	1	2	3	1
Personal	7	7	6	6
Pipes	6	5	8	8
Activities	4	3	2	5

Cabin A-Cabin B

D	D^2
1	1
-1	1
0	0
-1	1
0	0
1	1
1	1
0	6

$r_s = 1 - \frac{6(6)}{8(8^2-1)}$

$= 0.928$

Cabin A-Cabin E

D	D^2
1	1
-1	1
1	1
0	0
1	1
-2	4
-2	4
2	4
0	16

$r_s = 1 - \frac{6(16)}{8(8^2-1)}$

$= 0.809$

Cabin A-Buffalo Lake

D	D^2
0	0
0	0
1	1
1	1
-2	4
-1	1
0	8

$r_s = 1 - \frac{6(8)}{8(8^2-1)}$

$= 0.905$

Cabin B-Cabin E

D	D^2
0	0
0	0
1	1
1	1
-1	1
1	1
-3	9
1	1
0	14

$r_s = 1 - \frac{6(14)}{8(8^2-1)}$

$= 0.833$

Cabin B-Buffalo Lake

D	D^2
-1	1
1	1
1	1
2	4
1	1
1	1
-3	9
-2	4
0	22

$r_s = 1 - \frac{6(22)}{8(8^2-1)}$

$= 0.738$

Cabin E-Buffalo Lake

D	D^2
-1	1
1	1
0	0
1	1
2	4
0	0
0	0
-3	9
0	16

$r_s = 1 - \frac{6(16)}{8(8^2-1)}$

$= 0.899$

Appendix B-2. Hivernant Artifact Class Rank Order Correlation Tests.

Artifact class	Cabin A	Cabin B	Cabin E	Buffalo Lake
Ceramics	2.0	2.0	1.0	2.0
Liquor bottle	8.0	7.0	3.0	8.5
Case bottle	30.5	30.0	29.0	28.0
Tumbler	30.5	30.0	29.0	28.0
Medicine bottle	9.0	6.0	4.0	7.0
Glassware	5.0	14.0	7.0	8.5
Tableware	16.0	16.0	29.0	17.0
Kitchenware	3.0	3.0	8.5	10.0
Window glass	30.5	30.0	29.0	28.0
Nails	4.0	4.0	6.0	3.0
Construction hardware	22.5	11.5	29.0	28.0
Door parts	30.5	30.0	17.0	28.0
Furniture hardware	30.5	30.0	13.0	17.0
Arms	6.0	9.0	10.0	4.0
Buckles	22.5	22.5	17.0	17.0
Thimbles	19.5	30.0	29.0	28.0
Buttons	7.0	10.0	8.5	6.0
Scissors	30.5	30.0	29.0	28.0
Pins	22.5	30.0	29.0	13.5
Fasteners	17.5	30.0	29.0	28.0
Shoes	19.5	20.5	29.0	28.0
Beads	1.0	1.0	5.0	1.0
Coins	30.5	22.5	29.0	17.0
Keys	30.5	30.0	29.0	28.0
Personal items	17.5	11.5	12.0	12.0
Pipes	15.0	8.0	20.5	28.0
Construction tools	22.5	18.5	20.5	17.0
Farm tools	30.5	30.0	29.0	28.0
Toys	11.0	14.0	14.0	28.0
Fishing gear	30.5	30.0	29.0	28.0
Prehistoric	12.0	5.0	2.0	5.0
Storage items	13.5	14.0	17.0	28.0
Botanical	30.5	30.0	29.0	28.0
Stable and barn	13.5	18.5	17.0	11.0
Miscellaneous hardware	10.0	17.0	11.0	13.5
Other	30.5	20.5	17.0	28.0

Appendix B-2. Continued.

Cabin A-Cabin B		Cabin A-Cabin E		Cabin A-Buffalo Lake	
D	D^2	D	D^2	D	D^2
0.0	0.0	1.0	1.0	0.0	0.0
1.0	1.0	5.0	25.0	-0.5	0.25
0.5	0.25	1.5	2.25	2.5	6.25
0.5	0.25	1.5	2.25	2.5	6.25
3.0	9.0	5.0	25.0	2.0	4.0
-9.0	81.0	-2.0	4.0	-3.5	12.25
0.0	0.0	-13.0	169.0	-1.0	1.0
0.0	0.0	-5.5	30.25	-7.0	49.0
0.5	0.25	1.5	2.25	2.5	6.25
0.0	0.0	-2.0	4.0	1.0	1.0
11.0	121.0	-6.5	42.25	-5.5	30.25
0.5	0.25	13.5	182.25	2.5	6.25
0.5	0.25	17.5	306.25	13.5	182.25
-3.0	9.0	-4.0	16.0	2.0	4.0
0.0	0.0	5.5	30.25	5.5	30.25
-10.5	110.25	-9.5	90.25	-8.5	72.25
-3.0	9.0	-1.5	2.25	1.0	1.0
0.5	0.25	1.5	2.25	2.5	6.25
-7.5	56.25	-6.5	42.25	9.0	81.0
-12.5	156.25	-11.5	132.25	-10.5	110.25
-1.0	1.0	-9.5	90.25	-8.5	72.25
0.0	0.0	-4.0	16.0	0.0	0.0
8.0	64.0	1.5	2.25	13.5	182.25
0.5	0.25	1.5	2.25	2.5	6.25
6.0	36.0	5.5	30.25	5.5	30.25
7.0	49.0	-5.5	30.25	-13.0	169.0
4.0	16.0	2.0	4.0	5.5	30.25
0.5	0.25	1.5	2.25	2.5	6.25
-3.0	9.0	-3.0	9.0	-17.0	289.0
0.5	0.25	1.5	2.25	2.5	6.25
7.0	49.0	10.0	100.0	7.0	49.0
-0.5	0.25	-3.5	12.25	-14.5	210.25
0.5	0.25	1.5	2.25	2.5	6.25
-5.0	25.0	-3.5	12.25	2.5	6.25
-7.0	49.0	-1.0	1.0	-3.5	12.25
10.0	100.0	13.5	182.25	2.5	6.25
0.0	953.75	0.0	1610.0	0.0	1692.0

Appendix B-2. Continued.

Cabin B-Cabin E		Cabin B-Buffalo Lake		Cabin E-Buffalo Lake	
D	D^2	D	D^2	D	D^2
1.0	1.0	0.0	0.0	-1.0	1.0
4.0	16.0	-1.5	2.25	-5.5	30.25
1.0	1.0	2.0	4.0	1.0	1.0
1.0	1.0	2.0	4.0	1.0	1.0
2.0	4.0	-1.0	1.0	-3.0	9.0
7.0	49.0	5.5	30.25	-1.5	2.25
-13.0	169.0	-1.0	1.0	12.0	144.0
5.5	30.25	-7.0	49.0	-1.5	2.25
1.0	1.0	2.0	4.0	1.0	1.0
2.0	4.0	1.0	1.0	3.0	9.0
-17.5	306.25	-16.5	272.25	1.0	1.0
13.0	169.0	2.0	4.0	-11.0	121.0
17.0	289.0	13.0	169.0	-4.0	16.0
1.0	1.0	5.0	25.0	6.0	36.0
5.5	30.25	5.5	30.25	0.0	0.0
1.0	1.0	2.0	4.0	1.0	1.0
1.5	2.25	4.0	16.0	2.5	6.25
1.0	1.0	2.0	4.0	1.0	1.0
1.0	1.0	6.5	42.25	15.5	240.25
1.0	1.0	2.0	4.0	1.0	1.0
8.5	72.25	-7.5	56.25	1.0	1.0
4.0	16.0	0.0	0.0	4.0	16.0
6.5	42.25	5.5	30.25	12.0	144.0
1.0	1.0	2.0	4.0	1.0	1.0
0.5	0.25	-0.5	0.25	0.0	0.0
12.5	156.25	-20.0	400.0	-7.5	56.25
2.0	4.0	1.5	2.25	3.5	12.25
1.0	1.0	2.0	4.0	1.0	1.0
0.0	0.0	-14.0	196.0	-14.0	196.0
1.0	1.0	2.0	4.0	1.0	1.0
3.0	9.0	0.0	0.0	-3.0	9.0
3.0	9.0	-14.0	196.0	-11.0	121.0
1.0	1.0	2.0	4.0	1.0	1.0
1.5	2.25	7.5	56.25	6.0	36.0
6.0	36.0	3.5	12.25	-2.5	6.25
3.5	12.25	-7.5	56.25	-11.0	121.0
0.0	1441.5	0.0	1536.0	0.0	1347.0

Appendix B-2. Continued

Cabin A-Cabin B

$$r_s = 1 - \frac{6(953.75)}{36(36^2-1)}$$

$$= 0.877$$

$$t = 0.877\sqrt{\frac{36-2}{1-(0.877)^2}}$$

$$= 10.642$$

Cabin A-Cabin E

$$r_s = 1 - \frac{6(1610.0)}{36(36^2-1)}$$

$$= 0.793$$

$$t = 0.793\sqrt{\frac{36-2}{1-(0.793)^2}}$$

$$= 7.590$$

Cabin A-Buffalo Lake

$$r_s = 1 - \frac{6(1692.0)}{36(36^2-1)}$$

$$= 0.782$$

$$t = 0.782\sqrt{\frac{36-2}{1-(0.782)^2}}$$

$$= 7.316$$

Cabin B-Cabin E

$$r_s = 1 - \frac{6(1441.5)}{36(36^2-1)}$$

$$= 0.814$$

$$t = 0.814\sqrt{\frac{36-2}{1-(0.814)^2}}$$

$$= 8.171$$

Cabin B-Buffalo Lake

$$r_s = 1 - \frac{6(1536.0)}{36(36^2-1)}$$

$$= 0.802$$

$$t = 0.802\sqrt{\frac{36-2}{1-(0.802)^2}}$$

$$= 7.829$$

$$r_s = 1 - \frac{6(1347.0)}{36(36^2-1)}$$

$$= 0.827$$

$$t = 0.827\sqrt{\frac{36-2}{1-(0.827)^2}}$$

$$= 8.577$$

Appendix B-3. Comparative Site Artifact Group Rank Order Correlation Tests.

Artifact Group Totals and Ranks

Artifact group	Carolina		Frontier		Metis	
	Count	Rank	Count	Rank	Count	Rank
Kitchen	47521	1	13034	2	1205	1
Architectural	20596	2	23586	1	1144	2
Furniture	208	6	101	8	15	8
Arms	165	8	2518	4	23	7
Clothing	2416	4	954	6	260	4
Personal	207	7	118	7	35	6
Pipes	5225	3	3605	3	52	5
Activities	1272	5	2020	5	266	3

Artifact group	Hivernant		UFG 1		UFG 2	
	Count	Rank	Count	Rank	Count	Rank
Kitchen	1275	2.0	755	2	1044	2
Architectural	260	4.0	1327	1	1124	1
Furniture	5	8.0	0	8	0	8
Arms	124	5.0	20	6	5	7
Clothing	6483	1.0	105	4	961	3
Personal	22	6.5	11	7	31	4
Pipes	22	6.5	228	3	19	5
Activities	299	3.0	70	5	13	6

Appendix B-3. Continued.

Carolina-Frontier

D	D^2
-1	1
1	1
-2	4
4	16
-2	4
0	0
0	0
0	0
0	26

$r_s = 1 - \frac{6(26)}{8(8^2-1)}$

$= 0.690$

Carolina-Metis

D	D^2
0	0
0	0
2	4
1	1
0	0
1	1
2	4
2	4
0	14

$r_s = 1 - \frac{6(14)}{8(8^2-1)}$

$= 0.833$

Carolina-Hivernant

D	D^2
-1.0	1.0
-2.0	4.0
-2.0	4.0
3.0	9.0
3.0	9.0
0.5	0.25
-3.5	12.25
2.0	4.0
0.0	43.5

$r_s = 1 - \frac{6(43.5)}{8(8^2-1)}$

$= 0.482$

Carolina-UFG 1

D	D^2
-1	1
1	1
-2	4
2	4
0	0
0	0
0	0
0	0
0	10

$r_s = 1 - \frac{6(10)}{8(8^2-1)}$

$= 0.880$

Carolina-UFG 2

D	D^2
-1	1
1	1
-2	4
1	1
1	1
3	9
-2	4
-1	1
0	22

$r_s = 1 - \frac{6(22)}{8(8^2-1)}$

$= 0.738$

Frontier-Metis

D	D^2
1	1
-1	1
0	0
-3	9
2	4
1	1
-2	4
2	4
0	24

$r_s = 1 - \frac{6(24)}{8(8^2-1)}$

$= 0.714$

Appendix B-3. Continued.

Frontier-Hivernant

D	D^2
0.0	0.0
-3.0	9.0
0.0	0.0
-1.0	1.0
5.0	25.0
0.5	0.25
-3.5	12.25
2.0	4.0
0.0	51.5

$r_s = 1 - \frac{6(51.5)}{8(8^2-1)}$

$= 0.386$

Frontier-UFG 1

D	D^2
0	0
0	0
0	0
-2	4
2	4
0	0
0	0
0	0
0	8

$r_s = 1 - \frac{6(8)}{8(8^2-1)}$

$= 0.904$

Frontier-UFG 2

D	D^2
0	0
0	0
0	0
-3	9
3	9
3	9
-2	4
-1	1
0	32

$r_s = 1 - \frac{6(32)}{8(8^2-1)}$

$= 0.619$

Metis-Hivernant

D	D^2
-1.0	1.0
-2.0	4.0
0.0	0.0
2.0	4.0
3.0	9.0
-0.5	0.25
-1.5	2.25
0.0	0.0
0.0	20.5

$r_s = 1 - \frac{6(20.5)}{8(8^2-1)}$

$= 0.756$

Metis-UFG 1

D	D^2
-1	1
1	1
0	0
1	1
0	0
-1	1
2	4
-2	4
0	12

$r_s = 1 - \frac{6(12)}{8(8^2-1)}$

$= 0.857$

Metis-UFG 2

D	D^2
-1	1
1	1
0	0
0	0
1	1
2	4
0	0
-3	9
0	16

$r_s = 1 - \frac{6(16)}{8(8^2-1)}$

$= 0.809$

Appendix B-3. Continued.

Hivernant-UFG 1		Hivernant-UFG 2		UFG1-UFG 2	
D	D^2	D	D^2	D	D^2
0.0	0.0	0.0	0.0	0	0
3.0	9.0	3.0	9.0	0	0
0.0	0.0	0.0	0.0	0	0
-1.0	1.0	-2.0	4.0	-1	1
-3.0	9.0	-2.0	4.0	1	1
-0.5	0.25	2.5	6.25	3	9
3.5	12.25	1.5	2.25	-2	4
-2.0	4.0	-3.0	9.0	-1	1
0.0	35.5	0.0	34.5	0	16

$$r_s = 1 - \frac{6(35.5)}{8(8^2-1)} = 0.577$$

$$r_s = 1 - \frac{6(34.5)}{8(8^2-1)} = 0.589$$

$$r_s = 1 - \frac{6(16)}{8(8^2-1)} = 0.809$$

Appendix B-4. Comparative Site Artifact Class Rank Order Correlation Tests.

Metis-Carolina		Metis-Frontier		Carolina-Frontier	
D	D^2	D	D^2	D	D^2
1.0	1.0	0.0	0.0	-1.0	1.0
15.0	225.0	15.0	225.0	0.0	0.0
17.0	289.0	18.0	324.0	1.0	1.0
18.0	324.0	-1.5	2.25	-19.5	380.25
5.0	25.0	2.0	4.0	-3.0	9.0
-7.0	49.0	-8.0	64.0	-1.0	1.0
4.5	20.25	-0.5	0.25	-5.0	25.0
-15.0	225.0	-13.0	169.0	2.0	4.0
-1.0	1.0	-2.0	4.0	-1.0	1.0
-1.0	1.0	0.0	0.0	1.0	1.0
-8.0	64.0	-4.0	16.0	4.0	16.0
4.5	20.25	1.5	2.25	-3.0	9.0
6.0	36.0	3.0	9.0	-3.0	9.0
3.0	9.0	16.0	256.0	13.0	169.0
5.5	30.25	4.5	20.25	-1.0	1.0
3.0	9.0	2.5	6.25	-0.5	0.25
-5.0	25.0	-3.0	9.0	2.0	4.0
4.5	20.25	4.5	20.25	0.0	0.0
7.5	56.25	2.5	6.25	-5.0	25.0
-3.0	9.0	-2.0	4.0	1.0	1.0
-27.0	729.0	-26.0	676.0	1.0	1.0
-16.0	256.0	-10.0	100.0	6.0	36.0
0.0	0.0	2.5	6.25	2.5	6.25
6.5	42.25	3.5	12.25	-3.0	9.0
-4.5	20.25	-6.5	42.25	-2.0	4.0
7.0	49.0	7.0	49.0	0.0	0.0
-2.0	4.0	-2.5	6.25	-0.5	0.25
-4.5	20.25	0.0	0.0	4.5	20.25
-10.0	100.0	-12.0	144.0	-2.0	4.0
-0.5	0.25	-4.0	16.0	-3.5	12.25
17.0	324.0	14.5	210.25	-2.5	6.25
1.5	2.25	6.5	42.25	5.0	25.0
-13.0	169.0	-26.0	676.0	-13.0	169.0
-2.5	6.25	4.5	20.25	7.0	49.0
-5.0	25.0	-9.5	90.25	-4.5	20.25
-1.5	2.25	22.5	506.25	18.5	342.25
0.0	3154.0	0.0	3739.0	0.0	1362.25

Appendix B-4. Continued.

Carolina-Hivernant		Frontier-Hivernant		Carolina-UFG 1	
D	D^2	D	D^2	D	D^2
1.0	1.0	0.0	0.0	-2.0	4.0
6.0	36.0	-6.0	36.0	-4.0	16.0
25.0	625.0	-26.0	676.0	-23.0	529.0
27.0	729.0	-7.5	56.25	-4.0	16.0
1.0	1.0	2.0	4.0	1.0	1.0
3.0	9.0	4.0	16.0	5.0	25.0
2.0	4.0	3.0	9.0	-3.0	9.0
17.0	289.0	15.0	225.0	4.0	16.0
28.0	784.0	-27.0	729.0	4.0	16.0
2.0	4.0	-3.0	9.0	0.0	0.0
1.5	2.25	-5.5	30.25	8.0	64.0
4.0	16.0	-1.0	1.0	-7.0	49.0
6.5	42.25	-3.5	12.25	-15.0	225.0
12.0	144.0	-1.0	1.0	4.0	16.0
1.5	2.25	-0.5	0.25	-10.0	100.0
3.5	12.25	4.0	16.0	0.5	0.25
1.0	2.0	-1.0	1.0	3.0	9.0
3.0	9.0	-3.0	9.0	-1.0	1.0
16.5	272.25	-11.5	132.25	-4.0	16.0
8.5	72.25	7.5	56.25	10.5	110.25
12.5	156.25	11.5	132.25	14.5	210.25
28.0	784.0	22.0	484.0	17.0	289.0
1.5	2.25	-4.0	16.0	3.0	9.0
5.0	25.0	-2.0	4.0	-3.0	9.0
4.0	16.0	6.0	36.0	2.0	4.0
9.0	81.0	-9.0	81.0	0.0	0.0
5.0	25.0	5.5	30.25	-6.0	36.0
0.0	0.0	-4.5	20.25	2.0	4.0
13.5	182.25	15.5	240.25	6.0	36.0
1.5	2.25	2.0	4.0	0.5	0.25
9.0	81.0	11.5	132.25	-17.0	289.0
3.0	9.0	-8.0	64.0	-2.0	4.0
4.5	20.25	17.5	306.25	4.0	16.0
9.0	81.0	2.0	4.0	-1.5	2.25
1.0	1.0	5.5	30.25	3.0	9.0
13.5	182.25	-10.5	110.25	12.5	156.25
0.0	4704.0	0.0	3715.5	0.0	2296.5

Appendix B-4. Continued.

Frontier-UFG 1		Frontier-UFG 2		Carolina-UFG 2	
D	D^2	D	D^2	D	D^2
-1.0	1.0	-3.0	9.0	-4.0	16.0
-4.0	16.0	-4.0	16.0	-4.0	16.0
-24.0	576.0	-8.0	64.0	-7.0	49.0
15.5	240.25	15.0	225.0	-4.5	20.5
4.0	16.0	4.0	16.0	1.0	1.0
6.0	36.0	9.0	81.0	8.0	64.0
2.0	4.0	2.0	4.0	-3.0	9.0
2.0	4.0	-10.0	100.0	-8.0	64.0
5.0	25.0	3.0	9.0	2.0	4.0
-1.0	1.0	-3.0	9.0	-2.0	4.0
2.0	4.0	-5.0	25.0	-1.0	1.0
-4.0	16.0	-1.0	1.0	-4.0	16.0
-12.0	144.0	-9.0	81.0	-12.0	144.0
-9.0	81.0	-8.0	64.0	5.0	25.0
-9.0	81.0	-6.0	36.0	-7.0	49.0
1.0	1.0	4.0	16.0	3.5	12.25
1.0	1.0	-1.5	2.25	0.5	0.25
-1.0	1.0	2.0	4.0	2.0	4.0
1.0	1.0	-14.0	196.0	-19.0	361.0
9.5	90.25	5.0	25.0	6.0	36.0
13.5	182.25	6.0	36.0	7.0	49.0
11.0	121.0	22.0	484.0	28.0	784.0
0.5	0.25	-4.0	16.0	-1.5	2.25
0.0	0.0	3.0	9.0	0.0	0.0
4.0	16.0	13.0	169.0	11.0	121.0
0.0	0.0	-5.0	25.0	-5.0	25.0
-5.5	30.25	7.5	56.25	7.0	49.0
-2.5	6.25	0.5	0.25	5.0	25.0
8.0	64.0	0.5	0.25	-1.5	2.25
4.0	16.0	7.0	49.0	3.5	12.25
-14.5	210.25	-11.5	132.25	-14.0	196.0
-7.0	49.0	-6.0	36.0	-1.0	1.0
17.0	289.0	20.0	400.0	7.0	49.0
-8.5	72.25	-13.0	169.0	-6.0	36.0
7.5	56.25	4.5	20.25	0.0	0.0
-11.5	132.25	-16.0	256.0	8.0	64.0
0.0	2584.5	0.0	2841.5	0.0	2311.5

Appendix B-4. Continued.

Hivernant-UFG 1		Hivernant-UFG 2		UFG 1-UFG 2	
D	D^2	D	D^2	D	D^2
-1.0	1.0	-3.0	9.0	-2.0	4.0
2.0	4.0	2.0	4.0	0.0	0.0
2.0	4.0	18.0	324.0	16.0	256.0
23.0	529.0	22.5	506.25	-0.5	0.25
2.0	4.0	2.0	4.0	0.0	0.0
2.0	4.0	5.0	25.0	3.0	9.0
-1.0	1.0	-1.0	1.0	0.0	0.0
-13.0	169.0	-25.0	625.0	-12.0	144.0
32.0	1024.0	30.0	900.0	-2.0	4.0
2.0	4.0	0.0	0.0	-2.0	4.0
7.5	56.25	0.5	0.25	-7.0	49.0
-3.0	9.0	0.0	0.0	3.0	9.0
-8.5	72.25	-5.5	30.25	3.0	9.0
-8.0	64.0	-7.0	49.0	1.0	1.0
-8.5	72.25	-5.5	30.25	3.0	9.0
-3.0	9.0	0.0	0.0	3.0	9.0
2.0	4.0	-0.5	0.25	-2.5	6.25
2.0	4.0	5.0	25.0	3.0	9.0
12.5	156.25	-2.5	6.25	-15.0	225.0
2.0	4.0	-2.5	6.25	-4.5	20.25
2.0	4.0	-5.5	30.25	-7.5	56.25
-11.0	121.0	0.0	0.0	11.0	121.0
4.5	20.25	0.0	0.0	-4.5	20.25
2.0	4.0	5.0	25.0	3.0	9.0
-2.0	4.0	7.0	49.0	9.0	81.0
9.0	81.0	4.0	16.0	-5.0	25.0
-11.0	121.0	2.0	4.0	13.0	169.0
2.0	4.0	5.0	25.0	3.0	9.0
-7.5	56.25	-15.0	225.0	-7.5	56.25
2.0	4.0	5.0	25.0	3.0	9.0
-26.0	676.0	-23.0	529.0	3.0	9.0
1.0	1.0	2.0	4.0	1.0	1.0
-0.5	0.25	2.5	6.25	3.0	9.0
-10.5	110.25	-15.0	225.0	-4.5	20.25
2.0	4.0	-1.0	1.0	-3.0	9.0
-1.0	1.0	-5.5	30.25	-4.5	20.25
0.0	3407.0	0.0	3740.5	0.0	1392.0

Appendix B-4. Continued.

Metis-Hivernant		Metis-UFG 1		Metis-UFG 2	
D	D^2	D	D^2	D	D^2
0.0	0.0	-1.0	1.0	-3.0	9.0
9.0	81.0	11.0	121.0	11.0	121.0
-8.0	64.0	-6.0	36.0	10.0	100.0
-9.0	81.0	14.0	196.0	13.5	182.25
4.0	16.0	6.0	36.0	6.0	36.0
-4.0	16.0	-2.0	4.0	1.0	1.0
2.5	6.25	1.5	2.25	1.5	2.25
2.0	4.0	-11.0	121.0	-23.0	529.0
-29.0	841.0	3.0	9.0	1.0	1.0
-3.0	9.0	-1.0	1.0	-3.0	9.0
-9.5	90.25	-2.0	4.0	-9.0	81.0
0.5	0.25	-2.5	6.25	0.5	0.25
-0.5	0.25	-9.0	81.0	-6.0	36.0
15.0	225.0	7.0	49.0	8.0	64.0
4.0	16.0	-4.5	20.25	-1.5	2.25
6.5	42.25	3.5	12.25	6.5	42.25
-4.0	16.0	-2.0	4.0	-4.5	20.25
1.5	2.25	3.5	12.25	6.5	42.25
-9.0	81.0	3.5	12.25	-11.5	132.25
5.5	30.25	7.5	56.25	3.0	9.0
-14.5	210.25	-12.5	156.25	-20.0	400.0
12.0	144.0	1.0	1.0	12.0	144.0
-1.5	2.25	3.0	9.0	-1.5	2.25
1.5	2.25	3.5	12.25	6.5	42.25
-0.5	0.25	-2.5	6.25	6.5	42.25
-2.0	4.0	7.0	49.0	2.0	4.0
3.0	9.0	-8.0	64.0	5.0	25.0
-4.5	20.25	-2.5	6.25	0.5	0.25
3.5	12.25	-4.0	16.0	-11.5	132.25
-2.0	4.0	0.0	0.0	3.0	9.0
26.0	676.0	0.0	0.0	3.0	9.0
-1.5	2.25	-0.5	0.25	0.5	0.25
-8.5	72.25	-9.0	81.0	-6.0	36.0
6.5	42.25	-4.0	16.0	-8.5	72.25
-4.0	16.0	-2.0	4.0	-5.0	25.0
12.0	144.0	11.0	121.0	6.5	42.25
0.0	2983.0	0.0	1324.0	0.0	2406.0

Appendix B-4. Continued.

Metis-Carolina

$$r_s = 1 - \frac{6(3154)}{36(36^2-1)}$$

$$= 0.594$$

$$t = 0.594 \sqrt{\frac{36-2}{1-(0.594)^2}}$$

$$= 4.306$$

Metis-Frontier

$$r_s = 1 - \frac{6(3739)}{36(36^2-1)}$$

$$= 0.518$$

$$t = 0.518 \sqrt{\frac{36-2}{1-(0.518)^2}}$$

$$= 3.530$$

Carolina-Frontier

$$r_s = 1 - \frac{6(1362.25)}{36(36^2-1)}$$

$$= 0.825$$

$$t = 0.825 \sqrt{\frac{36-2}{1-(0.825)^2}}$$

$$= 8.512$$

Carolina-Hivernant

$$r_s = 1 - \frac{6(4704)}{36(36^2-1)}$$

$$= 0.394$$

$$t = 0.394 \sqrt{\frac{36-2}{1-(0.394)^2}}$$

$$= 2.499$$

Frontier-Hivernant

$$r_s = 1 - \frac{6(3715.5)}{36(36^2-1)}$$

$$= 0.522$$

$$t = 0.522 \sqrt{\frac{36-2}{1-(0.522)^2}}$$

$$= 3.568$$

Carolina-UFG 1

$$r_s = 1 - \frac{6(2296.5)}{36(36^2-1)}$$

$$= 0.704$$

$$t = 0.704 \sqrt{\frac{36-2}{1-(0.704)^2}}$$

$$= 5.780$$

Appendix B-4. Continued.

Frontier-UFG 1

$$r_s = 1 - \frac{6(2584.5)}{36(36^2-1)}$$

$$= 0.667$$

$$t = 0.667 \sqrt{\frac{36-2}{1-(0.667)^2}}$$

$$= 5.223$$

Frontier-UFG 2

$$r_s = 1 - \frac{6(2841.5)}{36(36^2-1)}$$

$$= 0.634$$

$$t = 0.634 \sqrt{\frac{36-2}{1-(0.634)^2}}$$

$$= 4.783$$

Carolina-UFG 2

$$r_s = 1 - \frac{6(2311.5)}{36(36^2-1)}$$

$$= 0.702$$

$$t = 0.702 \sqrt{\frac{36-2}{1-(0.702)^2}}$$

$$= 5.748$$

Hivernant-UFG 1

$$r_s = 1 - \frac{6(3407)}{36(36^2-1)}$$

$$= 0.562$$

$$t = 0.562 \sqrt{\frac{36-2}{1-(0.562)^2}}$$

$$= 3.958$$

Hivernant-UFG 2

$$r_s = 1 - \frac{6(3740.5)}{36(36^2-1)}$$

$$= 0.519$$

$$t = 0.519 \sqrt{\frac{36-2}{1-(0.519)^2}}$$

$$= 3.538$$

UFG 1-UFG 2

$$r_s = 1 - \frac{6(1392)}{36(36^2-1)}$$

$$= 0.821$$

$$t = 0.821 \sqrt{\frac{36-2}{1-(0.821)^2}}$$

$$= 8.383$$

Appendix B-4. Continued.

Metis-Hivernant

$$r_s = 1 - \frac{6(2983)}{36(36^2-1)}$$

$$= 0.616$$

$$t = 0.616 \sqrt{\frac{36-2}{1-(0.616)^2}}$$

$$= 4.560$$

Metis-UFG 1

$$r_s = 1 - \frac{6(1324)}{36(36^2-1)}$$

$$= 0.830$$

$$t = 0.830 \sqrt{\frac{36-2}{1-(0.830)^2}}$$

$$= 8.677$$

Metis-UFG 2

$$r_s = 1 - \frac{6(2406)}{36(36^2-1)}$$

$$= 0.690$$

$$t = 0.690 \sqrt{\frac{36-2}{1-(0.690)^2}}$$

$$= 5.558$$

Appendix B-5. Metis and UFG 1 Artifact Class Rank Order Correlation Tests.

Garden-UFG 1		Riel 1-UFG 1		Riel 2-UFG 1	
D	D^2	D	D^2	D	D^2
-1.0	1.0	-1.0	1.0	-1.0	1.0
8.0	64.0	19.5	380.25	3.5	12.25
-0.5	0.25	-4.5	20.25	1.0	1.0
20.5	420.25	4.0	16.0	22.0	484.0
2.0	4.0	8.0	64.0	9.0	81.0
0.0	0.0	1.5	2.25	-2.0	4.0
1.5	2.25	-7.5	56.25	-10.0	100.0
-13.0	169.0	-11.5	132.25	-12.0	144.0
3.0	9.0	3.5	12.25	4.0	16.0
-1.0	1.0	-1.0	1.0	-1.0	1.0
-1.0	1.0	-2.5	6.25	-0.5	0.25
-0.5	0.25	-4.5	20.25	-6.0	36.0
-8.0	64.0	-4.5	20.25	-12.5	156.25
-3.0	9.0	12.5	156.25	11.0	121.0
-0.5	0.25	-4.5	20.25	-6.0	36.0
-0.5	0.25	-17.0	289.0	1.0	1.0
-2.0	4.0	-1.5	2.25	-1.0	1.0
-0.5	0.25	-4.5	20.25	-6.0	36.0
-1.0	1.0	1.0	1.0	12.0	144.0
-2.5	6.25	3.0	9.0	8.5	72.25
-4.0	16.0	6.0	36.0	-14.5	210.25
2.0	4.0	-1.5	2.25	6.5	42.25
-0.5	0.25	3.0	9.0	8.5	72.25
-8.0	64.0	-4.5	20.25	1.0	1.0
-0.5	0.25	9.5	90.25	-3.5	12.25
5.0	25.0	-1.0	1.0	14.5	210.25
-11.5	132.25	-4.5	20.25	-15.0	225.0
-0.5	0.25	-4.5	20.25	-10.0	100.0
10.0	100.0	6.0	36.0	-2.0	4.0
-0.5	0.25	-4.5	20.25	1.0	1.0
-0.5	0.25	-4.5	20.25	1.0	1.0
-2.0	4.0	-1.0	1.0	-4.5	20.25
11.5	132.25	7.5	56.25	3.0	9.0
-5.5	30.25	3.0	9.0	-13.0	169.0
-2.0	4.0	-0.5	0.25	4.5	20.25
7.0	49.0	3.0	9.0	8.5	72.25
0.0	1319.0	0.0	1581.5	0.0	2618.0

Appendix B-5. Continued.

Delorme-UFG 1

D	D^2
2.0	4.0
11.5	132.25
-9.5	90.25
11.5	132.25
11.0	121.0
-2.0	4.0
3.5	12.25
-8.5	72.25
1.0	1.0
-1.0	1.0
-2.0	4.0
-3.0	9.0
-15.5	240.25
11.0	121.0
-6.0	36.0
3.0	9.0
-0.5	0.25
3.0	9.0
2.5	6.25
10.5	110.25
-7.0	49.0
-1.0	1.0
1.5	2.25
3.0	9.0
-5.0	25.0
17.5	306.25
-0.5	0.25
3.0	9.0
-10.5	110.25
-3.0	9.0
-3.0	9.0
3.5	12.25
-13.0	169.0
-10.0	100.0
-5.0	25.0
7.0	49.0
0.0	2000.5

Appendix B-5. Continued.

Garden-UFG 1

$$r_s = 1 - \frac{6(1319)}{36(36^2-1)}$$

$$= 0.830$$

$$t = 0.830 \sqrt{\frac{36-2}{1-(0.830)^2}}$$

$$= 8.677$$

Riel 1-UFG 1

$$r_s = 1 - \frac{6(1581.5)}{36(36^2-1)}$$

$$= 0.796$$

$$t = 0.796 \sqrt{\frac{36-2}{1-(0.796)^2}}$$

$$= 7.668$$

Riel 2-UFG 1

$$r_s = 1 - \frac{6(2618)}{36(36^2-1)}$$

$$= 0.663$$

$$t = 0.663 \sqrt{\frac{36-2}{1-(0.663)^2}}$$

$$= 5.164$$

Dclorme-UFG 1

$$r_s = 1 - \frac{6(2000.5)}{36(36^2-1)}$$

$$= 0.742$$

$$t = 0.742 \sqrt{\frac{36-2}{1-(0.742)^2}}$$

$$= 6.454$$