CERAMICS, CHERT AND CULTURE: AN ANALYSIS OF THREE PREHISTORIC SITES LOCATED IN THE MICHIPICOTEN AREA

MORRIS J. BRIZINSKI AND KENNETH T. BUCHANAN,
LAURENTIAN UNIVERSITY, SUDBURY, ONTARIO.

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BY

MORRIS J. BRIZINSKI AND KENNETH T. BUCHANAN

LAURENTIAN UNIVERSITY, SUDBURY, ONTARIO

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PREFACE BY K. C. A. DAWSON AND

FAUNAL ANALYSIS BY JAMES BURNS

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The essence of archaeological research is the attempt to understand a people's culture from its material remains. For the novice, this monumental task is complicated by the lack of specific knowledge, confidence and foresight. These elements have from time to time tempted us to abandon the project. It was Helen Devereux and Allen Tyyska whose encouragement, support and guidance provided the inspiration to see this undertaking to fruition. To these two individuals this manuscript is sincerely dedicated.

Preface

In the summer of 1971 a prehistoric archaeological survey of the lower Michipicoten valley was undertaken by the National Museums of Canada, Wawa project. The survey was extended up the valley toward the height of land, north along the Lake Superior shore and across the Harbour to Michipicoten Island. It was done by road vehicle and boat. Twenty-two sites were located and five others examined, representing eleven Late Woodland, ten historic, four Archaic and three Middle Woodland manifestations.

Concentrations of prehistoric populations are known from historic records to have existed at the mouths of the few major rivers which occur across the north shore of Lake Superior. The Michipicoten river valley is of particular interest because it marks the transition zone between the boreal forest which extends northwest and the Great Lakes - St. Lawrence forest cover which extends southeast.

In 1960 Dr. J.V. Wright, of the National Museum of Man, recorded a few sites in the area but with one exception these were characterized by only a thin veneer of refuse.

One of the major purposes for carrying out the survey was to determine the nature of the prehistoric habitation and to ascertain whether there were sites which warranted excavation. Three sites discovered near the mouth of the river were sufficiently extensive to excavate. Two were multi-component Late Woodland sites while the third was a Middle Woodland, Laurel Tradition site.

The Archaic sites were represented by only a thin veneer of artifacts, hearth stones and detritus. The latter appeared more characteristic of Laurel detritus and probably represents late Shield Archaic. The Middle Woodland sites were small seasonal Laurel camps. The Late Woodland sites included extensive habitation areas and small seasonal camp sites. With the exception of one site which had northwestern derived ceramics of the Blackduck focus, the sites were characterized by ceramics from the southeast, Northern division, Huron-Petun branch, Ontario Iroquois Tradition, and the south Peninsular Woodland and Michigan derived ceramics. The assemblages included both historic and prehistoric components. The single component historic sites were from the period of exploration and earlier settlement.

In addition to the archaeological survey, botanical, entomological, and geological surveys were also undertaken. The extent of the diverse origins of the archaeological recoveries confirmed and broadened the base of earlier findings suggesting a somewhat higher density of occupation. The human occupations like the forest cover appear to reflect a transitional zone of habitation for the Michipicoten area.

K.C.A. Dawson

In the fall of 1975 an application was made to the Heritage Foundation for funds to analyze the artifactual material from the "Big Dig". Previous to this a request was made to K.C. Dawson of Lakehead University for permission to acquire the Michipicoten Collection for purposes of analysis. This request was graciously granted and the material, with the exception of the Nymen Site (ClIf-11) collection, was transported to the Archaeological Research Laboratory on the campus of Laurentian University in Sudbury. Funding was granted by the Ontario Heritage Foundation in October 1975 and work commenced. After much consideration a decision was made to analyse the three excavated sites only. This report then, is an analysis of the Michipicoten Harbour Site (ClIf-2), the Wawa Site (ClIf-8) and the Morrison Site (ClIf-6).

K.T. Buchanan

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ABSTRACT

This report is the result of a theoretical study of three sites which are located in the region adjacent to the mouth of the Michipicoten River in Northern Ontario. Two of the sites are early Initial Woodland, Laurel Culture occupations, while the third is a Terminal Woodland Algonkian Site. In addition to the individual site reports, three chapters are devoted to specific aspects of the occupation: adapation to the environment, the impact of pottery and the pattern of subsistence. The underlying theme is cultural conservatism.

Chapter I

INTRODUCTION

It has often been stated that one of the unique characteristics of man is his ability to solve problems. Archaeologists aspire to this characteristic in their approach to analysis. For the inexperienced researcher working with new data a problem arises in which several decisions have to be made as to what observations will be important in allowing for the necessary interpretations that will conclude in various factual statements about the people and the culture under study. In order to facilitate the problem-solving process a model is formulated that allows the archaeologist to deduce expected observations which can than be compared with the archaeological record. In this way the model can be used as an explanatory device.

The three sites under analysis, Michipicoten Harbour, ClIf-2, Wawa, ClIf-8, and Morrison, ClIf-6, posed a challenging problem because here were three discrete cultural units separated in time by as much as 2400 years, and the people who occupied the sites represented either a part of a single evolving culture or different cultural groups. The question we tried to resolve was: how would it be possible to demonstrate the cultural homogeneity or heterogeneity of the three sites?

In order to make the necessary observations on the seperate assemblages it was important to understand what cultural processes could be incorporated into a framework that would either integrate the sites into one or fragment them into separate cultural realities. To this end the model must explain assemblage variability, discriminate individual activities and discern certain cultural processes. In other words, the model must be universal in its application to any and all archaeological problems. The model used in this report can be described in one word--decisions.

The decision making process is universal in its application to individuals (see Bonnichsen 1974) and to groups of people (see Flannery 1972). Once one is able to demonstrate alternative modes of actions, then the choice made can be assumed to be culturally determined and therefore subject to comparative analysis.

In Chapter II climatic factors influencing the environment are discussed. The Michipicoten area is ideally situated in an ecotone whereby changes in the climate have a profound effect on the surrounding environment. Needless to say, man is part of any environment and while no cultural differences were discerned over different climatic and environmental zones in the Michipicoten region, certain cultural adaptations or modifications may have occurred in response to microclimatic factors.

The defining characteristic of the Woodland era in Northern Ontario is the introduction of ceramics. Chapter III discusses the intricacies of ceramic technology and examines by a chemical analysis of the pottery the changes through time of the ceramic ware found at Michipicoten.

Chapter IV is a brief statement concerning the subsistence pattern of Woodland people. Although evidence is sparse the different avenues of analysis point to a single conclusion: that given a choice the prehistoric occupants at Michipicoten would procure mammals rather than fish, fowl or plants.

The three sites, Michipicoten Harbour, Wawa, and Morrison, are described and analysed individually in chapters V, VI, VII. The analysis is oriented towards individual and seasonal activities. In addition to these sites, the Michipicoten Site, ClIf-1, provides further data for comparative and statistical purposes.

On this basis, comparisons between sites do not reflect different cultural groups, but suggest that all three sites belong to the same evolving culture as evidenced by material concepts.

CHAPTER II

CLIMATE AND CULTURE

Recently, anthropologists and particularly archaeologists have become interested in studying man not only from a cultural perspective but also from an ecological one. Since climate is the ultimate environmental control (Hare 1953), climatological studies have been incorporated into archaeological research.

The knowledge gleaned from this discipline can be instrumental in determining what factors may be siginficant in inducing or reinforcing cultural change as well as in determining limitations in the daily routine of people's lives. For instance, Griffin (1961), Baerreis and Bryson (1965), Bryson, Irving and Larsen (1965), and Hill (1972), have suggested a causal relationship between climatic change and cultural change.

A variety of techniques have been used in the recent past to determine palaeoclimates. However, it was not until certain concepts, assumptions and hypotheses were introduced that palaeoclimates could at least be outlined if not determined.

Due to insufficient data, the synthesis of palaeoclimates is far from complete. We feel, however, that a climatic study of the Michipicoten River area has great value because of its strategic location in an ecotone in which there is a transition not only between two distinct biotic communities but also between two climatic communities. This implies that when climatic change occurs, this area would be the most sensitive in terms of recording this change.

Available evidence indicates that, in the Michipicoten area, over a period of time there occurred macroclimatic changes which in turn produced environmental changes. In addition, the particular microclimatic conditions, which exist presently and probably in the past as well, may have directly influenced certain cultural adaptations to the region.

DEVELOPMENT OF CLIMATIC STUDIES

Previously, palaeoclimates were determined on the basis of biotic communities (eg. the boreal forest). Climatic parameters were arbitrarily chosen to fit a particular biotic distribution (Bryson and Wendland 1967). This led to a circular argument in which a biotically defined climate was used to describe the climate of a biotic region (*Ibid*.:271). Bryson and Wendland argued that plant communities are indicators of climatic change, but do not necessarily define the conditions of the climatic change. They demonstrated that it was possible to determine climatic distributions as well as changes in the climate by utilizing the following concepts, assumptions and hypotheses.

The concept of world airstreams had long been realized and acknowledged by meteorologists to be a valid one, and Bryson (1966) used this concept to determine climatic boundaries. To summarize this concept, Bryson and Hare (1974:18) state:

> The atmospheric circulation has distinctive monthly patterns which interact with surface thermal and topographic characteristics to give each place on earth a particular annual sequence of dominant airstreams. These airstreams, with their physical properties derived from their previous history, plus the dynamics of the locales and its radiation regime, largely determine the climatic character of the place.

Bryson and Wendland (1967:272-277) then used three assumptions to explain palaeoclimate:

1) "...climate is the ultimate ecological control".
2) "...glaciers retreat in a 'post-glacial' climate".
3) "...within the past ten or fifteen millenia a mix of air masses occurring in the frequency and annual sequence as at the present would be associated with a similar biotic system to that with which it is now associated".

Finally, these authors were able to hypothesize several climatic episodes by using the following information:

1) The airstream patterns over North America consist of streams from three distinct sources; the Pacific, the Atlantic and the Arctic (Bryson and Hare 1974).

2) It is possible to delineate regions bounded by the modal positions of distinct interair-mass boundaries (fronts) and occupied by a definite mean annual sequence of air masses (Bryson 1966).

Palaeoclimates

Bryson and Wendland (1967:280) hypothesized the existence of several climatic episodes whose basis in fact has been supported by data from other studies (Nichols 1967; Cleland 1966). As expected, these climatic changes coincided with those which occurred in Europe. They are listed in Table I and are described briefly.

TABLE I: CLIMATIC EPISODES OF THE WOODLAND ERA

EPISODE	ROUGH DATE
Sub Atlantic	550 BC - AD 400
Scandic	AD 400 - AD 900
Neo Atlantic	AD 900 - AD 1200
Pacific I	AD 1200 - AD 1450
Pacific II	AD 1450 - AD 1550
Neo Boreal	AD 1550 - AD 1850
Recent	AD 1850 - AD 1960

SUB ATLANTIC:

"...summers differed from the present primarily in the position of the upper-air anticyclonic eddy normally found over the Great Basin in summer. A displacement of the eddy northeastward would place the isentropic moist tongue, which normally brings rains to Arizona in summer (Bryson and Lowry 1955), along the Colorado Rockies, then curving eastward across the boreal forest of the prairie provinces and Ontario." (Ibid.:292)

SCANDIC:

A return to conditions similar to the Atlantic started about AD 350 to AD 400. These conditions are generally comprised of a warming trend with the northern boundary of the boreal forest moving 2° north. (Ibid.:29)

NEO ATLANTIC:

"During the Neo Atlantic...open water appeared in the Canadian Arctic Archipelago, the tree-line readvanced into the tundra (Bryson et al. 1965), summer rains extended farther into the southwest and corn-farming became practical across the Great Plains (Bryson and Julian 1963). Glaciers disappeared from the U.S. Rockies (Richmond 1965). These evidences suggest weaker westerlies and more meridional circulation. The boreal forest probably expanded both south and north, while prairies shifted west at the expense of the steppe. It would appear from a comparison of summer rainfall with strong westerlies, and summer rainfall with real westerlies that a strip along the present forest-prairie ecotone between northwestern Minnesota and Southern Wisconsin was somewhat drier." (Ibid.:294).

PACIFIC:

"The Pacific episode...of increased westerlies was followed by an expansion of the circumpolar vortex and a return to patterns more like the Sub-Atlantic. A far south jet stream in winter associated with blocking highs over northwest Europe and a reduced summertime penetration of Tropical air northward across the United States and into Canada is indicated by historical data. It would appear that the boreal forest climate was broader: extending this climate perhaps five degrees farther south in the Great Lakes area is indicated (E. Wahl, personal communication), and is consistent with Lamb's (1963) estimate for the corresponding frontal pattern in the Atlantic sector." (Ibid.:296).

NEO BOREAL:

Summers were cool and autumns cold (about 4°F. below normal in the eastern United States). (Ibid.:296).

RECENT:

Although the early twentieth century had been marked by general increases

> in temperature, researchers such as Lamb (1966) and Wahl and Lawson (1970) indicated that the present climatic trend is similar to that of the "Little Ice Age" (Neo Boreal) and that we can expect the cooling trend to persist in the future.

Inasmuch as the descriptions of these climatic episodes have not been modified in recent years, some review is required. What each of these episodes represents is a broad climatic pattern that occurred during a specific period of time. The climate of a delimited area can be expected to differ slightly from the modal type. Bryson and Hare (1974:21) state:

> ...the climata are macroclimatic in origin but microclimatic, topographic, and edaphic factors modify their boundaries somewhat.

Our intentions are, first, to establish that the above mentioned climatic episodes are valid, second, to present palynological data from two archaeological sites which may in future studies lead to climatic as well as biotic interpretations and third, to suggest any modifying climatic factors.

<u>Climate of the Michipicoten River Area</u>

The area of the Michipicoten River mouth is ideally suited for climatic studies in that it is located in a transitional zone between two distinct biotic and climatic communities.

The area north of the river mouth is characterized by the vast boreal forest which Rowe (1972:6) describes as follows:

> The white and black spruces are characteristic species...Although the forests are primarily coniferous, there is a general admixture of broadleaved trees such as a white birch and its varieties, trembling aspen and balsam poplar...

The area to the south of the mouth of the Michipicoten River is called the "Hemlock, White Pine, Northern Hardwoods Region."

> ...With these are associated certain dominant broadleaved species common to the Deciduous Forest Region, such as sugar maple, red maple, red oak, basswood, and white elm... Boreal species such as the white and black spruces, balsam fir, jack pine, trembling aspen, balsam poplar, and white birch are intermixed. (Rowe 1972:11).

Bryson (1966) has shown that the boreal forest occupies the region between the mean or modal southern boundaries of the Arctic air in winter and summer. When climatic change occurs, the extremities of these climatic boundaries will be the most sensitive in terms of recording these changes.

The evidence compiled by Bryson, Irving and Larsen (1965) demonstrates that the northern limits of the boreal forest advanced and retreated during the climatic episodes later hypothesized by Bryson and Wendland (1967). In 1967, Nichols presented palynological evidence gathered at Ennadai Lake, in the Keewatin District, N.W.T. which lies in the ecotone between the boreal forest and the tundra. His conclusions again support Bryson and Wendland's climatic episodes.

Pollen studies were carried out on two archaeological sites, Michipicoten, ClIf-1, and Michipicoten Harbour, ClIf-2, and in the Michipicoten River mouth area.

For pollen diagrams derived from land sediments, the distribution of the pollen is a function of the surrounding vegetation. Although pollen is dispersed a great distance, Tauber (1967) has suggested that pollen can be concentrated at the source. For an archaeological site, the pollen diagram derived from land sediments may represent the surrounding vegetation of the specific locale, and/or the general biotic distribution of the general area. In either case, the explanations of the particular distributions will be the result of certain climatic and biotic factors.

The success of pollen studies carried out on archaeological sites has been limited in the past because of poor pollen preservation in the soil. The sharp sand sediments in which the pollen is trapped not only aerate the pollen grains but crush and decimate them as well. Possibly, the excellent preservation of the Michipicoten pollen samples can be attributed to the large amounts of charcoal found on the sites. Most of the pollen samples were taken within or near the hearths.

This brings up the problem of contamination. There are basically three sources of contamination:

experimental, cultural and natural.

Standard techniques in processing the sediment were used. In one instance, three runs were done from one site and over 200 pollen grains per run counted. The differences in percentage between each run were insignificant. If contamination did occur one would be able to control for experimental error within any one sample.

The next consideration, cultural contamination, presents the question of whether the pollen grains were derived from the remains of hearth materials or the surrounding vegetation. In the case of the former occurrence, one might expect that the specific tree type used in the fire would produce an overwhelming amount of that particular pollen. In our samples, the very high percentages of *Pinus* pollen might seem to substantiate this assertion. There are, however, two facts which may justify the high *Pinus* pollen count. First, *Pinus* pollen does travel a great distance so that its dominance does not necessarily indicate a particular significance.

Secondly, the presence of certain species of *Pinus*, for instance *banksiana* (Jack Pine), is indigenous to this area, and one would, therefore, expect a great deal of *Pinus* pollen.

However, if we compare the percentage of *Pinus* pollen from our site with that from Alfies Lake which is derived from a lake bottom pollen core (Table 2 and Figure 1), these differences in the pollen diagrams are real.

TABLE - 2 : POLLEN DISTRIBUTION FROM TWO ARCHAEOLOGICAL SITES

Site	con-taminated	ClIf-I		ClIf-2	Alfies Lake		
		Level III	Level VII				
		I500 AD	II00 AD	200 BC	I500 AD	II00 AD	200 BC
Picea	I3.4	I3.3	8.5	I3.0	I3.0	I6.0	23.0
Abies	3.0	6.0	2.0	5.0	3.0	3.0	3.0
Larix	2.0				3.0	I.0	I.0
Pine	42.0	56.0	48.0	68.0	22.0	23.0	I5.0
Betula	I.5	II.0	7.5	2.0	49.0	40.0	43.0
Populus	I2.0		I.0				
Quercus	5.0		8.0		I.0	3.0	2.0
Ulmus	2.0		4.0		I.0	I.0	I.0
Ostrya/Carpinas		3.0	4.0	5.0	I.0	2.0	I.0
Salix	3.0		I.0				
Acer	6.0		7.0		I.0	I.0	I.0
Tilia							
Juglans			2.0				
Carya	2.0						
Tsuga	3.0	4.0		3.0			I.0
Alnus	4.0	2.0	4.0	I.0	6.0	8.0	8.0
Corylus		3.0	I.0	3.0			
TOTAL	98.9	98.3	98.0	I00.0	I00.0	98.0	99.0

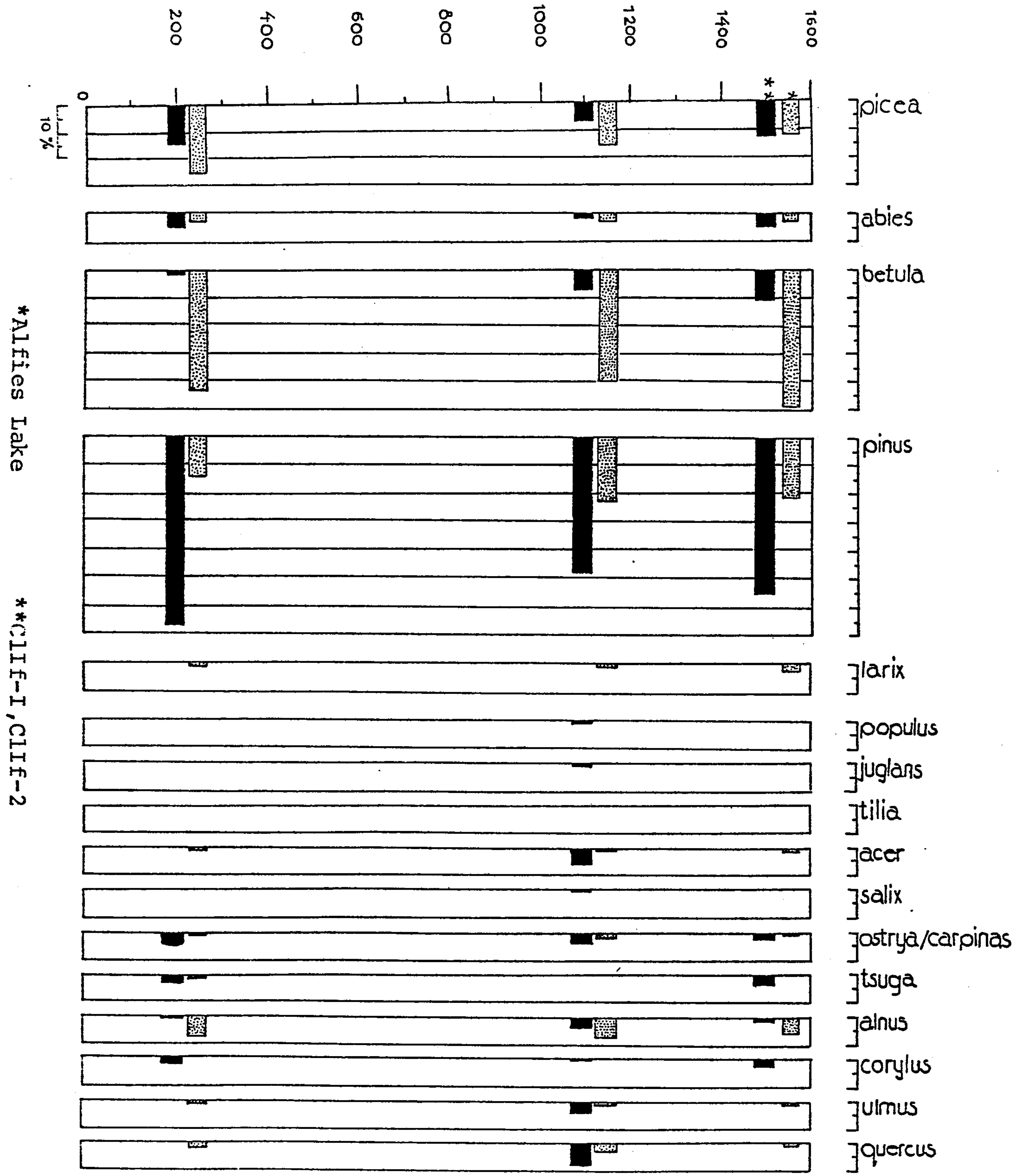


FIGURE I: POLLEN DISTRIBUTION FROM TWO ARCHAEOLOGICAL SITES AND A LAKE BOTTOM SEDIMENT CORE.

One might expect that there would be differences between the two samples from Alfies Lake and the ClIf sites because the surrounding vegetation would tend to disperse the pollen grains of the immediate area in far greater numbers and also act as a partial barrier to the pollen grains from the general area. If the vegetation immediately surrounding the site was *Pinus*, then the difference would be justified.

In the charcoal analysis (Bawden: personal communication) of the hearth material, *Betula* (birch) and *Abies* (fir) were also found yet both species were a relatively insignificant source of pollen for the site.

The third type of contamination occurs from natural processes, for example, flooding. Since there is very little control over the types and amounts of pollen deposition, this type of contamination presents many new problems in interpreting data. Since the sites are located where they are susceptible to these processes, interpretation of data should be tempered with cognizance of the possible ramifications.

As mentioned previously, there are certain factors which modify the macroclimata of an area. For the most part, the geomorphology is inconsistent throughout the Lake Superior area, so that soil and landforms play a significant role in constituting differences in biota and climata. Unfortunately, the extent and the cultural relevance of such changes cannot be examined in this brief discussion on climate. However, the major factor which will be significant in modifying the climata of our study area is Lake Superior itself.

This large body of water exerts considerable influence on weather and it may be safe to assume that these influences would have been exerted during the study period. Chagnon and Jones (1972:369) state that all the Great Lakes produce noticeable changes in weather in two predictable locations: the approximate central area of any Great Lake and the immediate down wind shore area, generally a belt 1-30 miles wide. (See Map 1).

The changes in weather that do occur in our study area are (Ibid.:369)

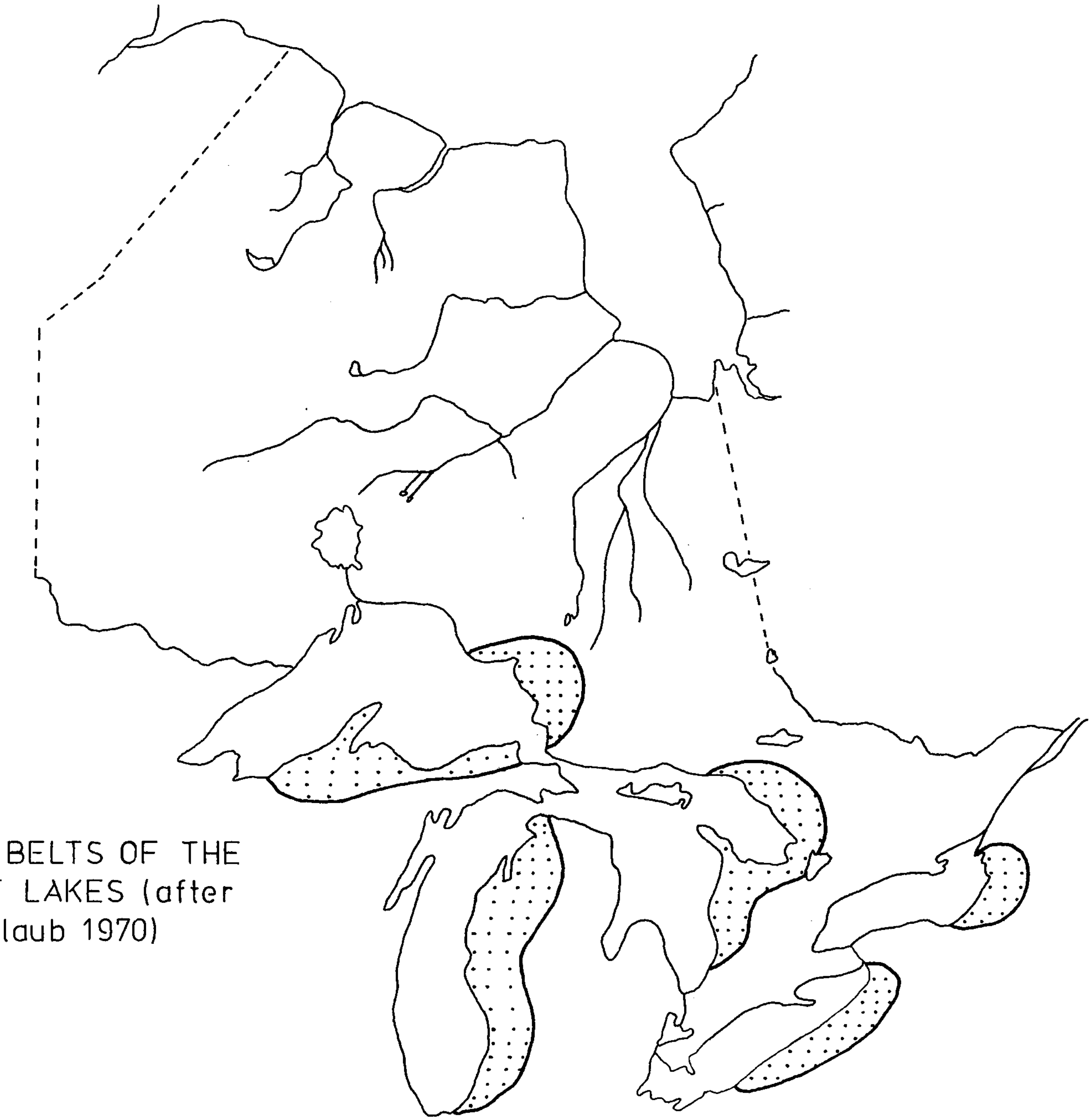
1) Increased winter precipitation

2a) Increased wind speeds in all seasons

2b) Increased wind speeds in downwind areas

3) Temperature moderation, particularly in winter.

Another area in which microclimatic changes occur is along the fringe area of the Lake Superior Coastline.



MAP 1: SNOW BELTS OF THE GREAT LAKES (after Eichenlaub 1970)

The climata of this area have been assumed to represent conditions similar to those of the Arctic because of the presence of numerous Arctic plants. Soper and Maycock (1963:183) state:

> It is suggested that the arctic-alpine species reached the Old Woman Bay region (10 miles south of Michipicoten River), by a natural migration during or soon after the retreat of the last glaciers of the Wisconsin stage of the Pleistocene ice age. Later the boreal forest invaded the area but the arctic-alpine species have been able to survive on the rocky shores where suitable habitats with cooler microclimatic conditions prevail.

These microclimatic factors are very significant from a cultural point of view in that they may aid in the location of as yet undiscovered sites, as well as in the explanation of the archaeological record.

It was reported (M. O'Conner, Ministry of Natural Resources; personal communication) that the Wawa area (10 miles north of the Michipicoten River) receives higher snowfalls during the winter months of December, January and February than any other area in Ontario. This fact in conjunction with warmer winter temperatures would make habitation in such an area extremely difficult during this particular season for the following reasons:

1) Most edible plant foods would be covered by snow.

2) All aquatic food resources from fish to mammals would be inaccessible.

3) Other mammals such as deer and caribou winter outside the snow belt area.

4) Mobility would be hampered since moist snow is difficult to travel upon.

5) Increased humidity with cool temperatures causes general discomfort, ie., it is harder to keep warm in cool, damp conditions than in cold, dry conditions.

Therefore, the native people may have travelled out of the snow belt region during the winter months rather than remain in it (See Map 1). In other words, one may predict that there will be an absence of winter habitation sites in the snow belt region.

A rather puzzling phenomenon for the archaeologist working in the Shield area is the occurrence of rock structures. These structures are variable in form (See Tyyska 1973, Dawson and McLeod 1975); however, along the Lake Superior Coastline they are usually constructed to form a pit or depression in the numerous cobble beaches. These features have been referred to in the literature as "Puckasaw Pits" (Emerson 1960).

One hypothesis used to explain this phenomenon is that some of the pits were used as Vision Pits (Noble 1968) in which a person attempted to achieve a spiritual state of perception.

The following climatic conditions would certainly indicate why this particular area would be favourable to changes in perception: a substantial increase in thunderstorm activity during the fall, the cold air, the periodic fog conditions, the absence of plant foods and the hypnotic effect of lapping water along the shoreline.

These factors do not necessarily suggest that there is a cause and effect relationship between climatic conditions and the "Puckasaw Pit" phenomenon, but rather, that this particular area is conducive to unusual perceptual experiences.

Although the explanation of "Puckasaw Pits" can only be derived through cultural processes, there is increasing evidence to show that native people are acutely sensitive to their environment and that specific cultural adaptions were made because of this awareness.

SUMMARY

The Michipicoten River Area is unique in its location because it borders on two distinct climatic and biotic distributions.

Within this region there have been several macrolimatic changes over a period of time spanning several thousand years.

The microclimata of this area are affected by various factors such as landforms, but major climatic changes occur because of the presence of Lake Superior.

It is suggested that certain cultural modifications resulted from the native peoples adaptation to the environment.

Chapter III

CHEMICAL ANALYSIS OF CERAMIC WARE FROM THE MICHIPICOTEN AREA

Model

Although no absolute dating is available at the present time, artifactual evidence indicates that the area near the mouth of the Michipicoten River has been occupied at least since Archaic times (Dawson 1971). It is probable that the river mouth and harbour have been occupied on a seasonal basis, more or less continuously since those early times, possibly by the descendants of the Archaic hunters and gatherers.

Although the earliest date for the introduction of pottery in Northern Ontario is not positively known it is probable that the people of Michipicoten would have been exposed to ceramic technology by 740 B.C. Judging from the excavated pot sherds from two Laurel sites in the Michipicoten area, the potters had acquired a considerable sophistication in ceramics.

In the production of a functional clay vessel there are three aspects of ceramic technology that are vital: knowledge of clay properties, selection and ratio of temper, and firing.

Clay is a sub-microscopically fine-grained, crystalline substance composed primarily of silica, alumina and water. When mixed with water, this material becomes plastic and workable. When heated, clay becomes hard and will no longer become plastic when mixed with water; it can then be described as refractory. While the foregoing is generally true, actual workability of clay depends to a large extent on the kind and amount of impurities present. Impurities of a non-plastic nature such as a finely divided quartz tend to reduce the plastic or malleable quality of the clay. Micro-organisms present in the clay tend to make the clay too "slippery" and not "sticky" enough. Careful selection of suitable raw material from among the available clay bodies is essential for successful pottery production.

A common problem with many clay formations suitable for pottery manufacture becomes apparent after a pot is formed and allowed to dry: shrinkage may occur. Shrinkage appears in the form of checks and cracks or a general distortion of the "green" vessel. This problem appears to be a function of the amount of water a particular clay requires before it is suitable for working. If very little water is required, shrinking is minimal, whereas if considerable amounts of water are required to render the clay workable, it is very likely that the greenware will crack and even crumble as this excess water evaporates. In order to reduce shrinkage during the drying process, non-plastic materials such as quartz, feldspar, shell, crushed pottery and plant fibres are added to the clay. This additive material is referred to as "temper". Since temper does not absorb water it will not shrink during the drying process; thus, the more temper added to the clay, the less total shrinkage there will be.

While this solves the problem of shrinkage to a large degree, it unfortunately creates another problem of its own. As temper is added to clay, the mixture becomes less plastic and more difficult to form. There is a limitation to the amount of temper that can be added to the clay in order to reduce shrinkage. If shrinkage is overcome at the expense of workability then the clay is still nonfunctional as a ceramic material. This problem can be solved today by mixing samples from different clay bodies. The primitive potter did not have this solution available to her and would have had to find a suitable source of clay strictly by empirical methods.

The firing of a formed and dried pot is another technological area that is fraught with the possibility of disaster. It is a combination of kiln, fuel and chimney that, when combined in correct ratio, will produce a slowly rising, even, draught free, and eventually intense heat that, upon reaching a critical maximum temperature, will decline at the same slow, even rate. If any of these criteria are neglected, the potter will be disappointed by a cracked, shattered or even forcefully exploded pot (Shepard 1965:49-94).

There are three critical temperatures which must be carefully controlled during the firing process. With a modern kiln these temperatures are usually held for a few minutes in order to allow the necessary chemical and physical changes to take place within the pot.

The first critical temperature, around 130° to 180° C., causes the water which is trapped between the crystals of clay to be released. This is referred to by present day potters as "water smoking". If water smoking is accomplished too quickly by a rapid temperature rise, the chance of explosion or spalling is considerable. Depending on the size of the kiln and load, water smoking may require that the temperature be held relatively constant for as much as 15 minutes.

The next critical stage in firing occurs at around 500° - 600° C., at which temperature the oxidizable impurities in the clay, principly iron compounds, take up the maximum amount of oxygen. Also, at this temperature, organic impurities are oxidized to carbon dioxide gas. If the temperature rise is too rapid at this point, the gases will attempt to escape more rapidly than the porosity of of the clay will allow, and spalling or explosion will again result. A pause of 10 to 15 minutes, depending on the density of the clay will circumvent this problem with controlled temperature kilns.

The final stage at which complications may occur is the vitrifying temperature of the particular clay being used. This range of temperatures varies from a low of 700°C. for clays containing low temperature fluxes to a high of approximately 1300°C. for stoneware clays. At the vitrifying temperature of a particular clay the adjacent crystals soften and fuse thus bonding the clay particles into a single unit. If the temperature is too low, the clay will not fuse while too high a temperature will actually melt the clay, causing blistering and distortion of the pot. This fusing action is also a function of time in that a lower temperature over a longer period of time will produce a similar result to a higher temperature for a short period. In potter's parlance this is the "soak time" and is usually measured by specially compounded samples of clay called "pyrometric cones", with a specific time-temperature melt constant. These cones are placed in the kiln adjacent to a "peep-hole" so that they can be observed by the potter. The cones provide an accurate measure of soak time required for the particular grade of clay being fired.

The vitrifying stage is often erroneously considered the final critical stage of the firing process. This is due to the efficiency of the fire-brick insulation found in almost all modern kilns which tends to mask the fact that the heat applied to pottery must be removed very slowly. A rapid decrease in temperature would create severe differential contraction of the pot with the result that it would probably crack or disintegrate.

The native Canadian potter of the Initial and Terminal Woodland times would have had to face all of the inherent problems of pottery manufacture that the modern potter faces today and without the help of the 2500 or so intervening years of experience and technology. Perhaps the many sherds that are found with pristine interior surfaces bear witness to the many pots that were put to the ultimate test of the fire and failed. Notwithstanding, the primitive potter did produce ceramic ware and of excellent quality. Certainly the Laurel ware from Michipicoten is very well formed and fired and compares very favourably with the Terminal Woodland pottery from adjacent sites. To have achieved and produced such work, the Initial Woodland potters of Michipicoten must have acquired a comprehensive knowledge of ceramic processes gleaned probably over a few short generations.

PROBLEM

To a large extent, pottery analysis depends on the decoration and shape of the vessel. These highly important characteristics have enabled trained and experienced researchers to identify the makers of pots in space and time. The changes in the shape and decoration of these ceramic remains have also afforded a diachronic view of the cultures which espoused them. Attribute analysis and the utilization of computer techniques have provided powerful statistical tools for comparison. Temper has been identified in a few instances using the geologic technique of thin-section slides and petrographic microscopy (Shepard 1974). The methods of construction of pottery have been studied so that it is now known with some certainty how pots were made and, in some cases, which cultural groups used one method and which used another. Analysis of decorative techniques is well advanced. It is known that some people preferred incising their ware while others preferred stamping or impressing.

There are some aspects of pottery and other ceramics artifacts which are largely unknown. Some of these unknowns lie in the area of chemical composition. While it is certain that the pottery is made from fired clay, the composition of the clay is unknown. The source of the clay is also unknown. Did the people of a geographic region gather the clay for their pots close to where they were camping or did they have a favourite source of clay located some distance away? Did the potters make pots wherever they happened to be, out of material that was at hand or were the pots carried from place to place? Was there a cultural preference for certain sources or kinds of clay? Were pots trade items? Was the kind, amount and ratio of temper culturally controlled? Did these factors vary with time?

Some of the answers to the foregoing questions may be determined by chemical anaylsis. Two techniques were used for this analysis, x-ray diffractometry and x-ray spectrography.

X-ray diffractometry provides an analysis of the crystalline compounds contained therein.

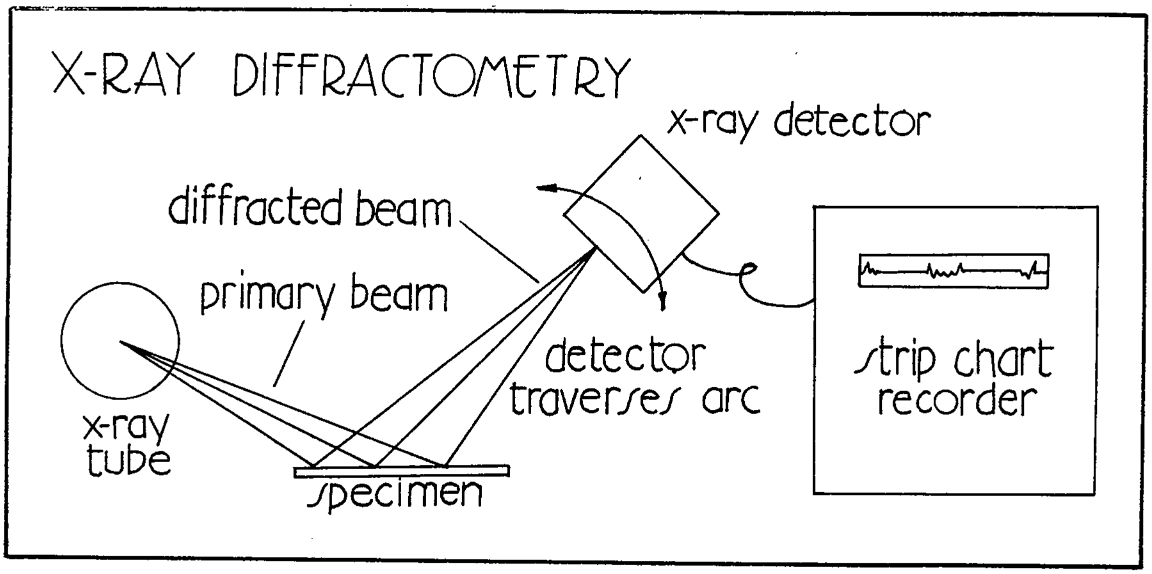
X-ray spectrography, using the same sample, offers a means of rendering a chemical analysis of any material which can be ground into a powder form, including pottery.

The significance is apparent; the former technique analyzes the temper while the latter analyzes the clay. Both of these techniques are relatively recent so a discussion of the theoretical principles may be of some value.

Technique of Analysis

X-ray diffraction is a sophisticated technique for studying very minute quantities of crystalline materials. A crystal is an orderly array of atoms arranged in three dimensional lattice planes which for any given material bear a constant angular relationship to each other and are a definite distance apart. An x-ray beam striking a large number of randomly oriented crystals will be diffracted at a characteristic angle which depends on the crystals' inter-lattice spacing. A geiger type detector mounted on a goniometer, which allows the detector to traverse through an arc, will respond to the sample at its characteristic angle. If a strip chart recorder is connected to the detector, a record of angles versus responses will be recorded (See Figure 2). This technique permits a recorded analysis of any crystalline material.

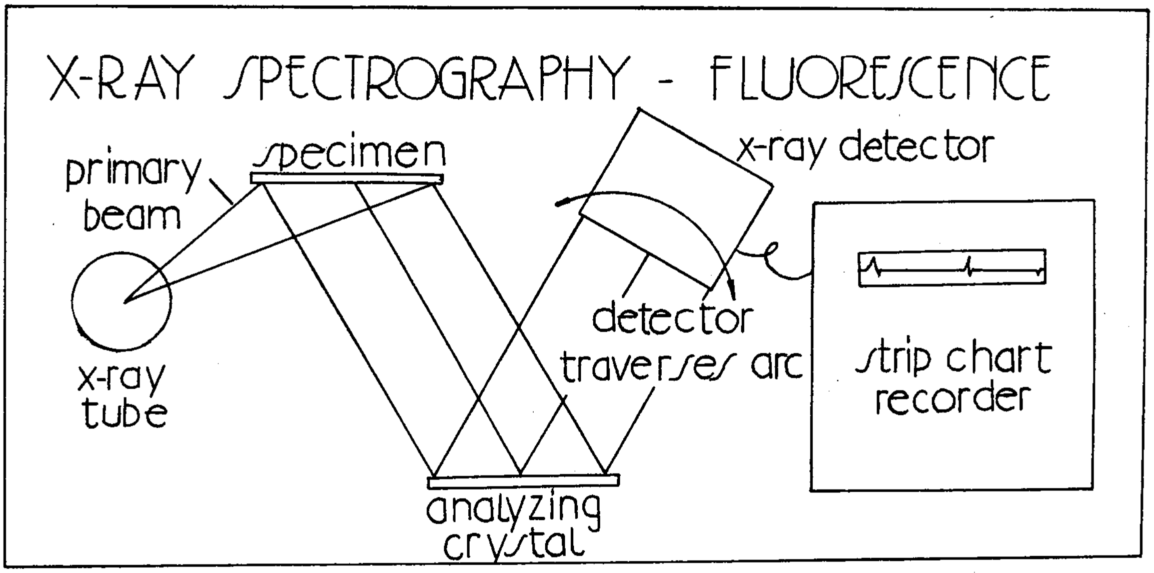
FIGURE 2: Schematic Representation of an X-Ray Diffractometer



Fired pottery is composed of both crystalline and non-crystalline material; the fired clay is vitrified and therefore non-crystalline, whereas the temper, which is not greatly affected by the normal firing temperature of approximately 900° C. maximum, is crystalline and thus detectable. This circumstance should allow a clear-cut identification of the temper in each sample of fired pottery.

The x-ray spectrograph differs from the x-ray diffractometer in that it will provide an elemental analysis of any powdered or liquid material whether crystalline or not.

FIGURE 3: Schematic Representation of an X-Ray Spectrometer



The x-ray spectrograph utilizes the principle of fluorescent excitation (See Figure 3). High intensity x-rays from a special wide spectrum tube are aimed at the specimen. Each element in the sample absorbs the energy from a part of the spectrum and fluoresces, thereby emitting its own characteristic spectrum. These spectra strike a single crystal which diffracts each wave length at a different and characteristic angle. A geiger type detector mounted on a goniometer traverses an arc in the path of the diffracted emission. The detector is connected to a strip chart recorder which registers emission magnitude versus angle.

With this technique no discrimination is made between crystalline and non-crystalline material so the temper is analyzed along with the fired clay. This is not a disadvantage since the temper has already been identified in the x-ray diffractometer.

For archaeological purposes these two techniques, x-ray diffraction and x-ray spectrography, are complementary, providing analysis of the two main constituents of pottery, fired clay and temper. While both forms of analysis are primarily qualitative, it is possible to extract a quantitative component also by comparing peak maximums from one sample with peak maximums from another. In this way, relative concentrations between samples are comparable. With standardized samples available, absolute concentrations are possible. Standardized samples were not available for any of the components of clay or temper.

SAMPLE PREPARATION AND ANALYSIS TECHNIQUE FOR X-RAY DIFFRACTOMETRY

METHOD 1:

Since this technique is sensitive only to crystalline matter, its application to pottery analysis is restricted to the temper and other possible refractory materials contained within the sample. The fired clay appeared on the strip-chart recorder as an unrecognizable background. While the firing appeared to have shifted the minor peaks of some of the tempering materials, the major peaks were quite identifiable. The minerals isolated were quartz, microcline and plagioclase.

It is possible to place a potsherd directly into the sample chamber of the diffractometer and not destroy it. While this procedure will allow a qualitative analysis of the refactory material, it would not allow quantitative comparisons between samples. This is due to the difference in size of the samples and the possibility of preferred orientation of crystals within a given sherd. For these reasons, it was reluctantly decided to reduce each sample to a powder, realizing that in doing so, each sherd would be destroyed.

A minimum of six sherds were selected from each of the four sites. Body sherds were used where possible. An attempt was made to select samples from a scattering which encompassed the whole geographic area of each site.

In order to reduce repeatability problems due to preferred orientation of crystals, it was decided that each sample must be ground finely enough to pass through a 325 mesh/inch screen. Initially, the grinding was done with a mortar and pestle. This proved much too time consuming (and arduous) so an oscillating crusher called a "shatter box" was used with excellent results. The powdered sample from the crusher was brushed through a 325/inch nylon screen, placed into a sample vial and mixed in a mechanical shaker for 10 minutes. Each sample was then capped and labelled. For identification purposes, samples of quartz, microcline, biotite, muscovite, and plagioclase were prepared in a similar fashion. These minerals were chosen because they represent the common minerals found in granite outcrops and beach sand.

As a preliminary check, a series of thin-section slides were prepared using sherds from the four sites. The results indicated that quartz, microcline and plagioclase were present. It should be noted that the feldspathic minerals appeared to be slightly altered when viewed with a petrographic microscope. This alteration is attributed to the heating effect of the firing.

The next step was to do an x-ray diffraction scan of samples taken from the same sherds from which thin-sections were made. The results verified the thin-section analysis.

Once it was established that the only temper minerals present to any significant degree in the samples were quartz, microcline and plagioclase, complete scanning of the samples was halted to save time. A complete scan of angles from 6° to 75° takes about one hour per sample while scanning the previously mentioned minerals, which peak between 25° and 30°, takes only about five minutes.

In order to reduce problems of preferred orientation of crystals in the samples, each sample was rotated at a rate of 30 RPM while being analyzed.

In all, a total of 31 sherds were analyzed: 10 from ClIf-1, 8 from ClIf-2, 6 from ClIf-6 and 7 from ClIf-8. In addition, five mineral samples and three soil samples, two from the area around ClIf-1 and one from the ClIf-2 site, were analyzed. The three soil samples consisted almost entirely of quartz, microcline, plagioclase and small but significant amounts of biotite and magnetite.

A comparison of particle size between the beach sand and the temper in the pottery samples indicated similarity. Since the mineral analysis was also very close, it is considered highly probable that the Michipicoten potters were using beach sand for their temper.

OBSERVATIONS AND RESULTS

The row data listed in Table 3 are actual geiger counts taken from the recorder chart.

TABLE 3: X-RAY DIFFRACTOR RAW DATA

SAMPLE	QUARTZ	MICROCLINE	PLAGIOCLASE
ClIf-1-1	78	24	34
ClIf-1-1249	60	10	26
ClIf-1-S	61	13	26
ClIf-1-TTI	83	19	38
ClIf-1-1095	90	22	36
ClIf-1-1230	97	12	26
ClIf-1-ST3	67	27	29
ClIf-1-1265	58	11	25
ClIf-1-1333	93	9	31
ClIf-1-P	86	30	28
ClIf-2-16	59	12	24
ClIf-2-17	63	13	25
ClIf-2-1	86	23	28
ClIf-2-361-1	85	2.5	3
ClIf-2-3	71	11	13
ClIf-2-361-2	138	8	9
ClIf-2-265	77	12	17
ClIf-2-303	77	13	19
ClIf-6A-1	96	26	37
ClIf-6A-420A-1	89	22	20
ClIf-6A-379A	70	21	33
ClIf-6A-524A	62	4	20
ClIf-6A-420A-2	71	23	34
ClIf-6A-434A	59	12	21
ClIf-8-260A	49	8	18
ClIf-8-164	42	7.5	11.5
ClIf-8-57	41	6	11
ClIf-8-264A	42	7	14
ClIf-8-1	93	13	17
ClIf-8-18	53	13	26
ClIf-8-246A	47	11	19
SOILS			
ClIf-1 Level 5	560	108	460
ClIf-1 Level 14	620	84	304
ClIf-2	500	56	164

From Table 3, it is evident that quartz is the dominant mineral in all of the samples including the soil samples. Microcline and plagioclase, both feldspathic minerals are much softer and therefore more easily eroded than quartz; thus, it would be expected that beach sand, which is subjected to continuous grinding by wave action, would contain a greater proportion of quartz. Finally, there is an absence of the black minerals, biotite and magnetite, in the sherd samples.

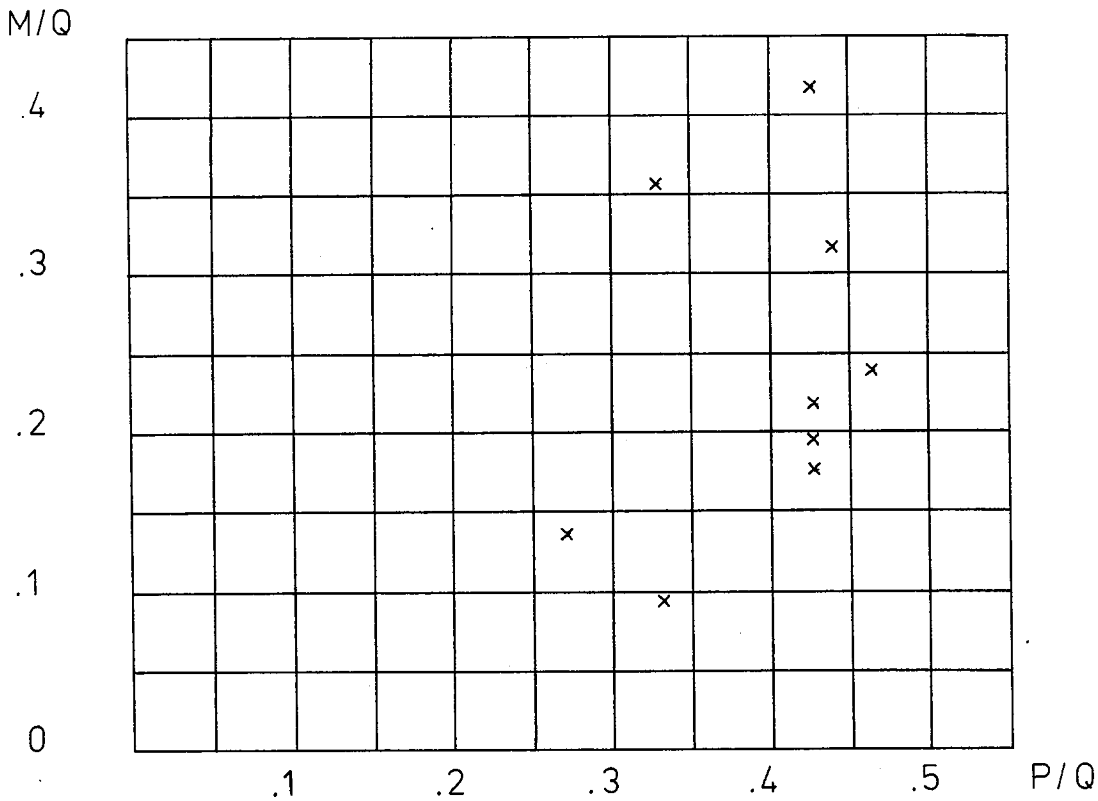
TABLE 4: RATIO OF MINERALS PRESENT AS TEMPERING AGENTS IN POTTERY

SAMPLE	MICROCLINE/QUARTZ	PLAGIOCLASE/QUARTZ
ClIf-1	.31	.44
ClIf-1-1249	.17	.43
ClIf-1	.21	.43
ClIf-1-TT	.23	.46
ClIf-1-109S	.24	.40
ClIf-1-ST-3	.40	.43
ClIf-1-1265	.19	.43
ClIf-1-1333	.096	.33
ClIf-1-1230	.12	.27
ClIf-1-P	.35	.33
ClIf-2-303	.17	.25
ClIf-2-265	.16	.22
ClIf-2-16	.20	.41
ClIf-2-17-2	.21	.40
ClIf-2-1	.27	.33
ClIf-2-361-1	.029	.035
ClIf-2-3	.16	.18
ClIf-361-2	.057	.065
ClIf-6A-1	.27	.38
ClIf-6A-420A-1	.25	.22
ClIf-6A-379A	.30	.47
ClIf-6 -524A	.064	.32
ClIf-6A-420A-2	.32	.48
ClIf-6A-434A	.20	.36
ClIf-8-260A	.16	.37
ClIf-8-164	.18	.27
ClIf-8-57	.029	.27
ClIf-8-264A	.17	.33
ClIf-8-1	.14	.18
ClIf-8-18	.25	.49
ClIf-8-246A	.23	.40
SOILS		
ClIf-1 Level 5	.19	.82
ClIf-1 Level 14	.14	.49
ClIf-2	.11	.33

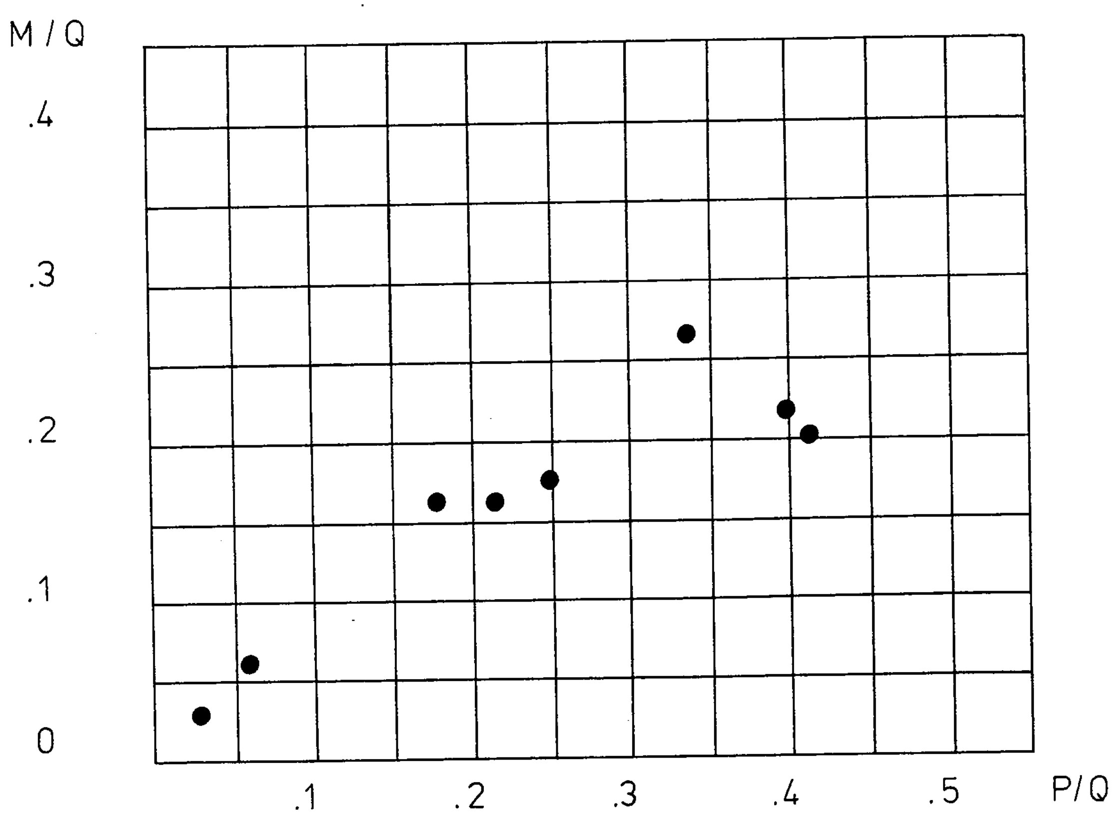
If the Michipicoten potters were using beach sand as temper, it would be reasonable to assume that the ratio of quartz to both microcline and plagioclase would be similar to that of beach sand. Table 4 presents the data in ratio form. This allows a graphical presentation of the data and reduces inter-sample error due to zero shift of the diffraction apparatus.

It is evident from Table 4 that there is considerable variation in ratios within site populations but a similarity between sites. Graphs 1, 2, 3 and 4 demonstrate the within site variation. The control soil samples are contrasted with the between sites similarity on Graph 5.

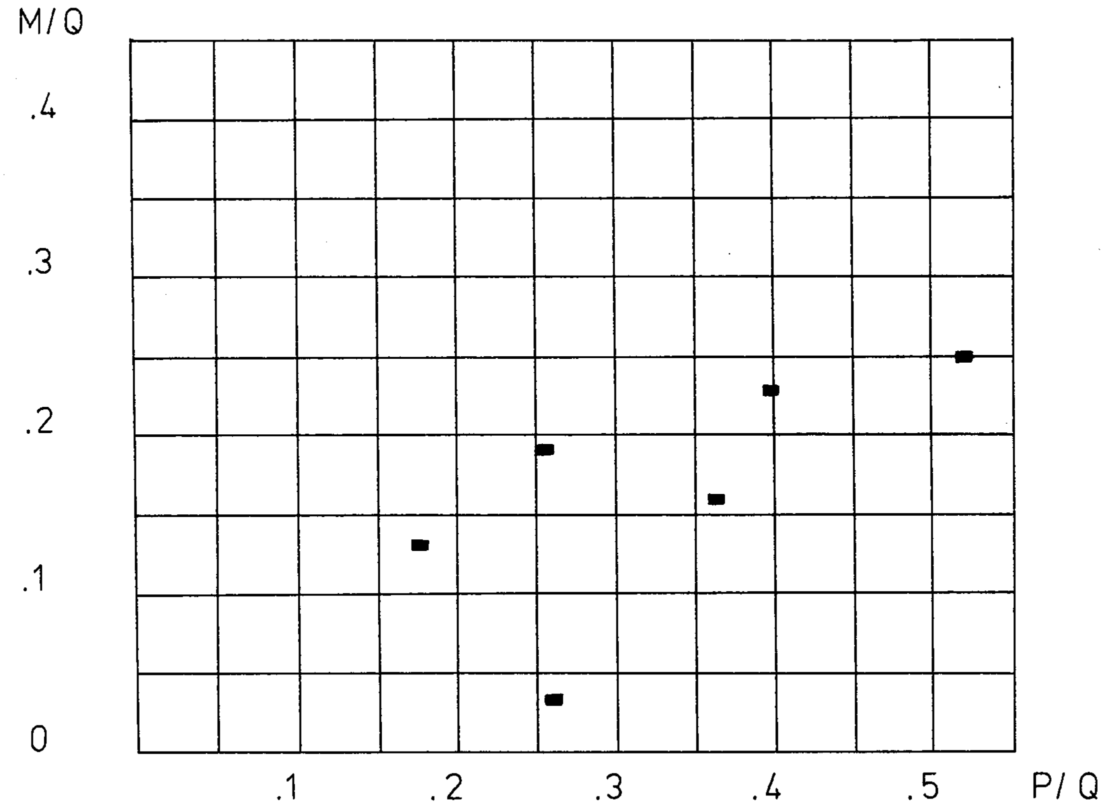
GRAPH 1: RELATIVE RATIOS OF MICROCLINE/QUARTZ VS PLAGIOCLASE/QUARTZ, CIIf-1



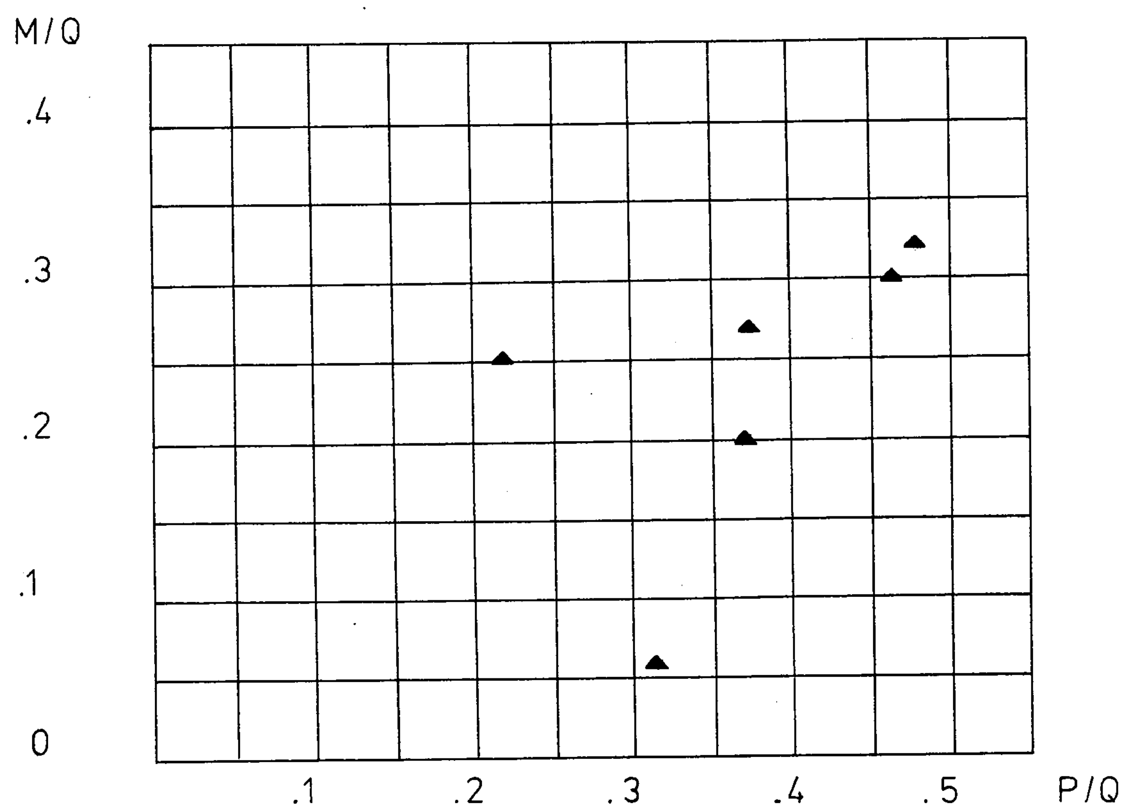
GRAPH 2: RELATIVE RATIOS OF MICROCLINE/QUARTZ VS PLAGIOCLASE/QUARTZ, CIIf-2



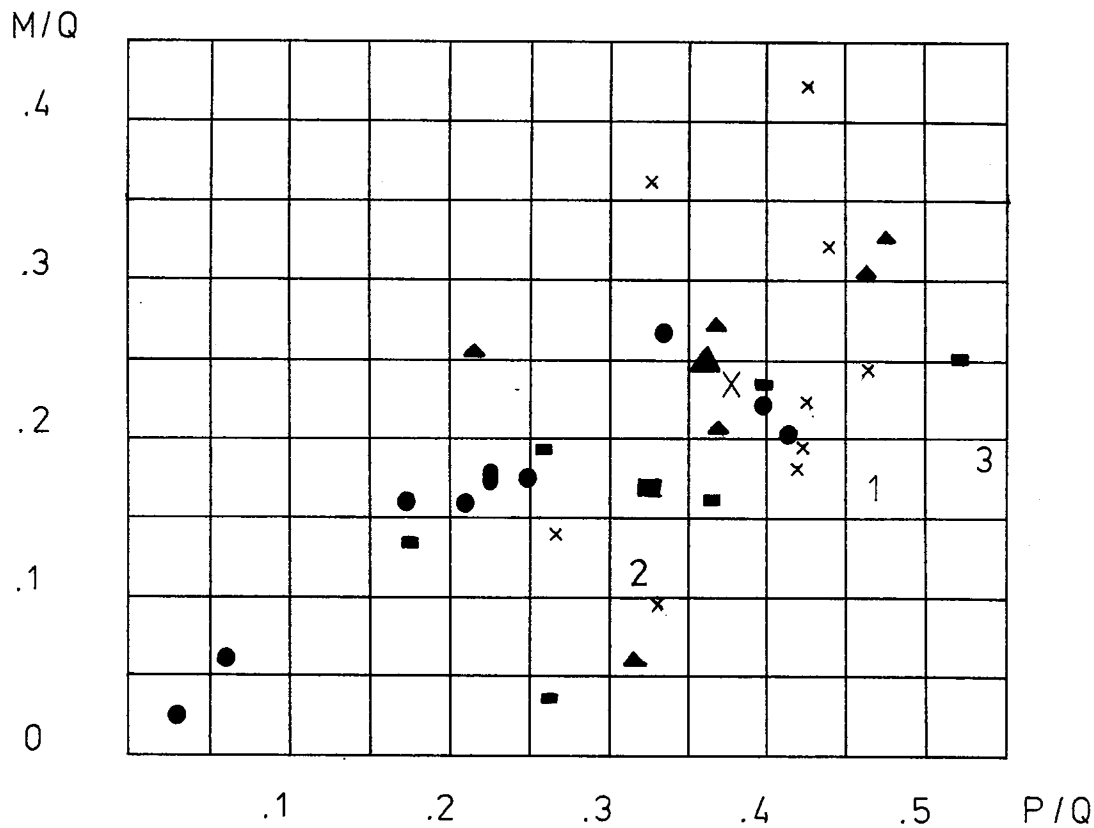
GRAPH 3: RELATIVE RATIOS OF MICROCLINE/QUARTZ VS PLAGIOCLASE/QUARTZ, CIIf-8



GRAPH 4: RELATIVE RATIOS OF MICROCLINE/QUARTZ VS PLAGIOCLASE/QUARTZ, CIIf-6



GRAPH 5: RELATIVE RATIOS OF MICROCLINE / QUARTZ VS PLAGIOCLASE / QUARTZ



LEGEND

ClIf-1: ×; mean: X

ClIf-2: ●; mean: ⬮

ClIf-8: ▪; mean: ■

ClIf-6: ▲; mean: ▲

ClIf-1, soil (L14): 1; soil (L   ): 3

ClIf-2, soil: 2

It should be emphasized that the graphs demonstrate the proportion of microcline and plagioclase to quartz and do not in any way indicate proportion or percentage of temper to clay.

The soil samples, as indicated in Graph 5, are grouped in the lower, right-hand quadrant. This means that the soils contain a lower ratio of microcline to quartz and a larger ratio of plagioclase to quartz than most of the pottery sherds. If the hypothesis is correct, that the beach sand was the source of the temper, then the only explanation for the difference between the control samples and observed samples would be that there had been active cultural selection of the different minerals from the soil/beach sand when it was being used as temper.

An analysis of variance was applied to the sample groups for the four sites using as the null hypothesis that all groups were from the same population.

TABLE 5: F TEST FOR FOUR SITES ON MICROLCINE/QUARTZ RATIOS.

	ClIf-1		ClIf-2		ClIf-6		ClIf-8	
	X_1	$(X_1)^2$	X_2	$(X_2)^2$	X_3	$(X_3)^2$	X_4	$(X_4)^2$
	.31	.0961	.17	.0289	.27	.0729	.16	.0256
	.17	.0289	.16	.0256	.25	.0625	.18	.0324
	.21	.0441	.2;	.04	.30	.09	.029	.000841
	.23	.0529	.21	.0441	.064	.004096	.17	.0289
	.40	.16	.029	.000841	.20	.04	.25	.0625
	.24	.0576	.27	.0729	.32	.1024	.14	.0196
	.19	.0361	.16	.0256			.23	.0529
	.096	.009216	.057	.003249				
	.12	.0144						
	.35	.1225						
TOTAL	2.316	.6218	1.256	.24119	1.404	.3718	1.159	.222741

F - 1.762
F required to reject at .01 > 4.60; hypothesis upheld.

TABLE 6: F TEST FOR FOUR SITES ON PLAGIOCLASE/QUARTZ RATIOS.

	ClIf-1		ClIf-2		ClIf-6		ClIf-8	
	X_1	$(X_1)^2$	X_2	$(X_2)^2$	X_3	$(X_3)^2$	X_4	$(X_4)^2$
	.44	.1936	.25	.0625	.38	.1444	.37	.1369
	.43	.1849	.22	.0484	.22	.0484	.27	.0729
	.43	.1849	.44	.1936	.47	.2209	.27	.0729
	.46	.2116	.40	.16	.32	.1024	.33	.1089
	.40	.16	.33	.1089	.48	.2304	.18	.0324
	.43	.1849	.035	.001225	.36	.1296	.49	.2401
	.33	.1089	.18	.0324			.40	.2401
	.27	.0729	.065	.004225				
	.33	.1089						
	.43	.1849						
TOTAL	3.95	1.5955	1.92	.61125	2.23	.8761	2.31	.8241

F - 1.985
F required to reject at .01 > 4.60; hypothesis upheld.

TABLE 7: F TEST FOR FOUR SITES AND SOIL GROUP MICROCLINE/QUARTZ RATIOS.

	ClIf-1		ClIf-2		ClIf-6		ClIf-8		SOILS	
	X_1	$(X_1)^2$	X_2	$(X_2)^2$	X_3	$(X_3)^2$	X_4	$(X_4)^2$	X_5	$(X_5)^2$
	.31	.0961	.17	.0289	.27	.0729	.16	.0256	.19	.0361
	.17	.0289	.16	.0256	.25	.0625	.18	.0324	.14	.0196
	.21	.0441	.20	.04	.30	.09	.029	.000841	.11	.0121
	.23	.0529	.21	.0441	.064	.004096	.17	.0289		
	.24	.0576	.27	.0729	.32	.1024	.14	.0196		
	.40	.16	.029	.000841	.20	.04	.25	.0625		
	.19	.0361	.16	.0256			.23	.0529		
	.096	.009216	.057	.003249						
	.12	.0144								
	.35	.1225								
TOTAL	2.316	.6218	1.256	.24119	1.404	.3718	1.159	.222741	.44	.0678

F - 5.0615

F required to reject at .01 level > 4.04; hypothesis rejected.

The results of the analysis of variance for the samples from the four sites indicate that the ratios of microcline to quartz and plagioclase to quartz used by the potters were consistent at all four sites or at least the range of variation was similar. Since ClIf-2 and ClIf-8 sites were Laurel Culture (700 BC - 700 AD) whereas the ClIf-6 and ClIf-1 sites were Terminal Woodland sites (700 AD - 1600 AD), there is a probability of consistency of pottery making tradition over a period of nearly 2500 years in the Michipicoten River mouth area.

In order to determine whether the ratios for the control soil samples could be considered as being from a different population than the sherd sample groupings for the four sites, another analysis of variance was applied to the five groups, ClIf-1, ClIf-2, ClIf-6, ClIf-8 and the control soil sample group with the null hypothesis that all groups are from the same population.

TABLE 8; F TEST FOR FOUR SITES AND SOIL GROUP FOR PLAGIOCLASE/QUARTZ RATIOS.

	ClIf-1		ClIf-2		ClIf-6		ClIf-8		SOILS	
	X_1	$(X_1)^2$	X_2	$(X_2)^2$	X_3	$(X_3)^2$	X_4	$(X_4)^2$	X_5	$(X_5)^2$
	.44	.1936	.25	.0625	.38	.1444	.37	.1369	.82	.6724
	.43	.1849	.22	.0484	.22	.0484	.27	.0729	.49	.2401
	.43	.1849	.44	.1936	.47	.2209	.27	.0729	.33	.1089
	.46	.2116	.40	.16	.32	.1024	.33	.1089		
	.40	.16	.33	.1089	.48	.2304	.18	.0324		
	.43	.1849	.035	.001225	.36	.1296	.49	.2401		
	.33	.1089	.18	.0324			.40	.16		
	.27	.0729	.065	.004225						
	.33	.1089								
	.43	.1849								
TOTAL	3.95	1.5955	1.92	.61125	2.23	.8761	2.31	.8241	1.64	1.0214

F - 5.4315
F required to reject .01 level > 4.04; hypothesis rejected.

With the null hypothesis rejected, it becomes evident that something had caused a change in the mineral ratios when the material was used for temper. The nature of the change was to a lower ratio of plagioclase to quartz but to a higher ratio of microcline to quartz.

Cultural selection of the various minerals which constitute the soil of the Michipicoten area could be easily accomplished due to the large grain size of the material and the colour difference of the minerals. While both quartz and plagioclase are colourless, the plagioclase tends to be more opaque and possesses a "glassy" lustre. The microcline, very often, has a salmon-pink colour with an attractive lustre. The smaller amounts of biotite and magnitite are a very dark brown to black.

It was possible in the laboratory to separate the various components of the soil into discrete piles very quickly. In about 10 minutes, there was enough separated material to provide temper for at least one large pot.

SAMPLE PREPARATION AND ANALYSIS TECHNIQUES FOR X-RAY SPECTROGRAPHY

METHOD 2:

The spectrograph will respond to any of the non-gaseous and some of the heavier gaseous elements. This means that the vitrified clay, the temper and any other refractory present in a potsherd will be detected. The strip-chart record is very similar to that of the diffractometer except that each element fluoresces at only two angles, the K alpha peak and a smaller K beta peak. Identification of each substance is, thereby, much easier to determine except when the K beta peak of one element fluoresces at the same angle as the K alpha peak of another. In this case the smaller alternate peak must be used for determining relative quantities. With this type of record, quantity is determined by measuring peak height or by calculating the area under the peak.

In all, each sample produced 19 peaks. These were determined to be:

Barium K Beta
Zirconium K Alpha/Strontium K Beta
Yttrium K Alpha/Rubidium K Beta
Rubidium K Alpha
Strontium K Alpha
Zinc K Alpha
Copper K Alpha
Nickel K Alpha
Iron K Alpha
Manganese K Alpha
Chromium K Alpha
Titanium K Alpha
Calcium K Alpha
Potassium K Alpha
Chlorine K Alpha
Sulfur K Alpha
Phosphorus K Alpha/Ca K Beta
Silicon K Alpha
Aluminum K Alpha

The K Beta peaks were ignored unless they were coincident with K Alpha peaks.

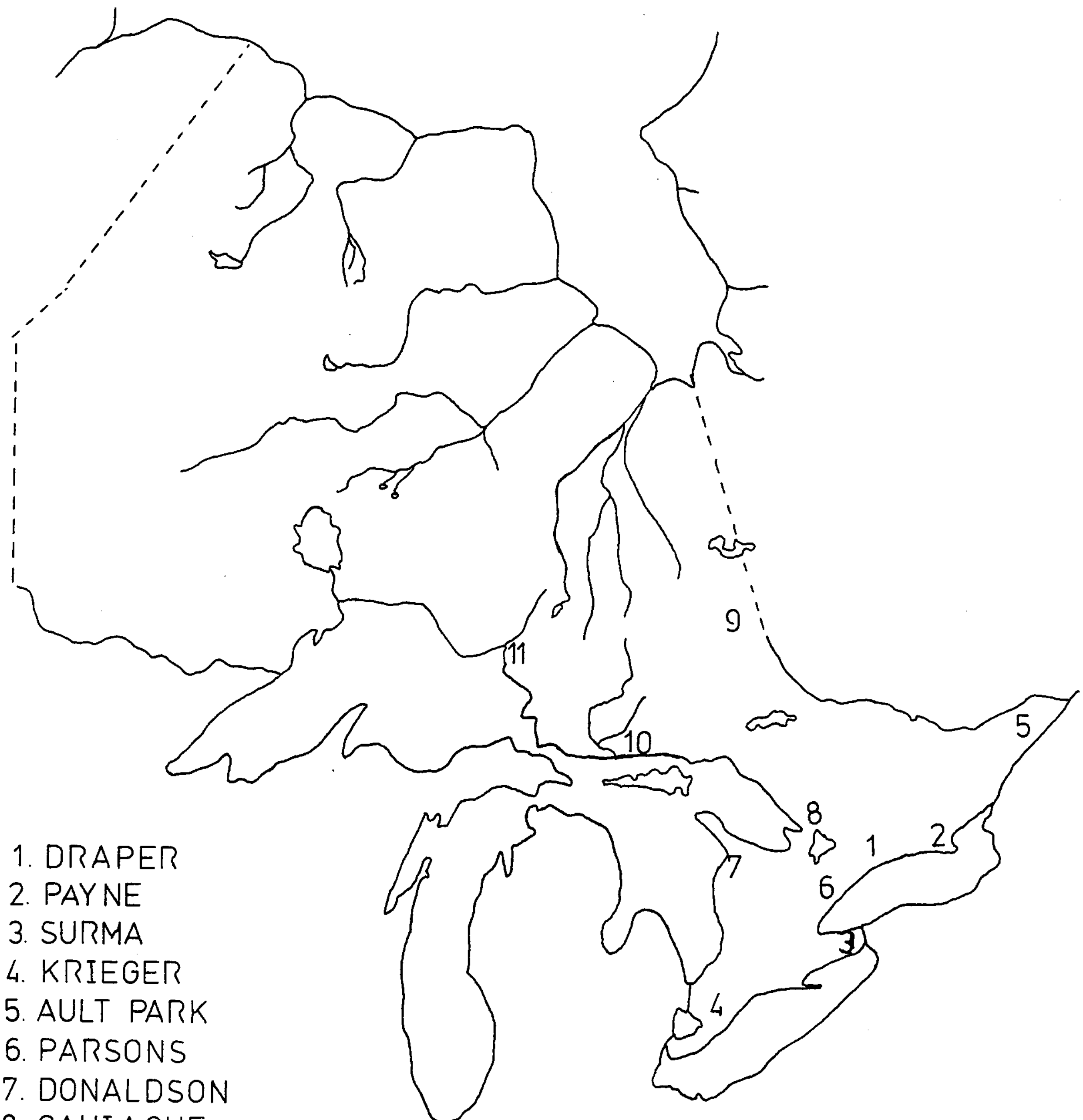
Since the primary objective of this investigation was to determine whether there was a significant correlation between the geographical origin and the chemical analysis of each sample, it was necessary to secure samples with a wide distribution. A number of sherds were provided by Mr. John Reid of the Department of Anthropology of the University of Toronto.

The sherds were from the following sites: Draper, Payne, Surma, Kreiger, Ault Park, Parsons, Donaldson and Cahiague in southern Ontario and a site on the Montreal River in northern Ontario. Professor Helen Devereux supplied samples from the Mississagi River delta (See Map 2). These were added to the 31 sherds from 4 sites at the mouth of the Michipicoten river and samples of clay from locations in the same area.

The sample requirements for the x-ray spectrograph demand homogeneity and a flat surface. This is most easily accomplished by compressing a ground sample into a pellet with a diameter of approximately 30 mm. and a thickness of approximately 6 mm. Since the samples used in the diffractometer were already ground, screened and mixed, these could be pelletized without further treatment. Fresh potsherds were pulverized in the "shatter-box" crusher, screened through a 325 mesh/inch screen and mixed in the mechanical shaker for 10 minutes. Two and one half grams of each sample were than weighed out and pelletized in a mold under a pressure of 20 tons.

Several of the Michipicoten samples and all of the southern Ontario samples were given complete spectrographic scans in order to determine if there were any significant proportional changes due to geographic variation. Results indicated that 3 peaks were varying: Zinc K Alpha, Manganese K Alpha, and Phosphorous K Alpha/Calcium K Beta peaks. Thereafter, the samples were scanned for these peaks only.

MAP 2: SOURCES OF POTTERY USED IN X-RAY SPECTROGRAPHY ANALYSIS



1. DRAPER
2. PAYNE
3. SURMA
4. KRIEGER
5. AULT PARK
6. PARSONS
7. DONALDSON
8. CAHIAGUE
9. MONTREAL RIVER
10. MISSISSAGI RIVER
11. MICHIPICOTEN RIVER

OBSERVATIONS AND RESULTS

Table 9 contains the x-ray spectrograph detector counts for the three elements, Zinc, Manganese and Phosphorus (for the four sites and three clay samples). The Calcium K Beta peak also occurs simultaneously with the Phosphorus K Alpha peak but it is not considered significant as it appears to be nonvarying in its K Alpha peak.

Since they were not pertinent to this report, the detector counts from sites other than Michipicoten have been deleted from Table 9.

TABLE 9: X-RAY SPECTROMETER RAW DATA

SAMPLE	ZnK ALPHA	MnK ALPHA	PK ALPHA/CaKB
ClIf-1-p	440	320	520
ClIf-1-1	300	400	420
ClIf-1-S	250	480	527
ClIf-1-ST-3	250	424	440
ClIf-1-1095	340	560	475
ClIf-1-1249	220	1300	360
ClIf-1-TT	220	510	410
ClIf-1-1265	320	580	300
ClIf-1-1230	330	1040	360
ClIf-1-1333	260	460	230
ClIf-2-303	240	560	55
ClIf-2-3	460	760	85
ClIf-2-1	980	1920	130
ClIf-2-16	200	492	55
ClIf-2-17	260	710	97
ClIf-2-361-2	240	280	55
ClIf-2-361-1	200	280	75
ClIf-2-265	240	560	90
ClIf-6A-1	260	440	380
ClIf-6A-420A-1	440	640	170
ClIf-6A-379A	520	560	320
ClIf-6 -524A	280	800	120
ClIf-6A-434A	320	380	180
ClIf-6 -420A-2	580	700	150
ClIf-8-260A	360	1510	80
ClIf-8-1	280	560	60
ClIf-8-164	320	1360	80
ClIf-8-264A	300	1360	70
ClIf-8-57	260	1240	70
ClIf-8-264A	300	1340	110
ClIf-8-18	240	940	60
Michipi. Clay-area 1	160	470	90
Michipi. Clay-area 2	80	340	75
Michipi. Clay-area 3	200	840	80

A perusal of Table 9 indicates some interesting trends. The Zinc K Alpha and the Manganese K Alpha counts, while varying considerably, appear to come from the same population. The Phosphorus K Alpha counts, however, show some interesting differences: ClIf-1 and ClIf-6 counts appear to be of much greater magnitude than ClIf-2 and ClIf-8. Since ClIf-1 and ClIf-6 are Terminal Woodland sites and ClIf-2 and ClIf-8 are Initial Woodland, Laurel Culture sites, the presumed difference acquires additional significance.

An analysis of variance was applied to the Zinc K Alpha counts for all four sites with the null hypothesis that all samples were from the same population.

TABLE 10: ANALYSIS OF VARIANCE (F) OF ZINC K ALPHA FOR FOUR SITES.

	ClIf-1		ClIf-2		ClIf-6		ClIf-8	
	X_1	$(X_1)^2$	X_2	$(X_2)^2$	X_3	$(X_3)^2$	X_4	$(X_4)^2$
	440	193600	240	57600	260	67600	360	129600
	300	90000	460	211600	440	193600	280	78400
	250	62500	980	960400	520	270400	320	102400
	340	115600	200	40000	280	78400	300	90000
	220	48400	260	67600	320	102400	260	67600
	320	102400	200	40000	580	336400	300	90000
	220	48400	240	57600			240	37600
	330	108900	240	57600				
	260	67600						
	250	62500						
TOTAL	2930	899900	2820	1492400	2400	1048800	2060	595600

F - 0.7980
F required to reject at .01 level 4.60; hypothesis upheld.

With the hypothesis upheld it was assumed that variation in count level for the samples from the four sites was random and the Zinc K Alpha counts could not be used to differentiate clays geographically. Although an analysis of variance was not performed on the off-site samples, the Zinc K Alpha for those sites strongly resembled the counts from the Michipicoten sites.

An analysis of variance was also applied to the Manganese K Alpha peaks for the four sites using the same null hypothesis that all samples were from the same population.

TABLE 11: ANALYSIS OF VARIANCE (F) OF MANGANESE K ALPHA FOR FOUR SITES.

	ClIf-1		ClIf-2		ClIf-6		ClIf-8	
	X_1	$(X_1)^2$	X_2	$(X_2)^2$	X_3	$(X_3)^2$	X_4	$(X_4)^2$
	320	102400	560	313600	440	193600	1510	2280100
	400	160000	760	577600	640	409600	560	313600
	480	230400	1920	3686400	560	313600	1360	1849600
	424	179776	492	242064	800	640000	1360	1849600
	560	313600	710	504100	380	144400	1240	1537600
	1300	169000	280	78400	700	490000	1340	1795600
	580	336400	280	78400			940	883600
	510	260100	560	313600				
	1040	1081600						
	460	211600						
TOTAL	6074	4565876	5562	5794164	3520	2191200	8310	10509700

F - 4.3397
F required to reject at .01 level 4.60; hypothesis upheld.

A similar assumption was made for the Manganese K Alpha results, that is, that variation was random. Thus Manganese K Alpha could not be used as a geographic marker of clay bodies.

The Phosphorus K Alpha counts for the four sites showed considerable differentiation. A similar null hypothesis was projected, that all samples were from the same population, and an analysis of variance was applied to the four groups. The data and results appear in Table 12.

TABLE 12: ANALYSIS OF VARIANCE (F) OF PHOSPHORUS K ALPHA FOR FOUR SITES.

	ClIf-1		ClIf-2		ClIf-6		ClIf-8	
	X_1	$(X_1)^2$	X_2	$(X_2)^2$	X_3	$(X_3)^2$	X_4	$(X_4)^2$
	520	270400	55	3025	380	144400	80	6400
	420	176400	85	7225	170	28900	60	3600
	527	277729	130	16900	320	102400	80	6400
	440	193600	55	3025	120	14400	70	4900
	475	225625	97	9409	180	32400	70	4900
	360	129600	75	5625	150	22500	110	12100
	300	90000	55	3025			60	3600
	410	168100	90	8100				
	360	129600						
	230	52900						
TOTAL	4042	1713954	642	56334	1320	345000	530	41900

F - 37.951
F required to reject at .01 level 4.60; hypothesis rejected.

With the rejection of the null hypothesis, it can be stated that the sherd samples from the four sites were from different populations, that is, the clays from which the pots were made were different clays. Were all sites different? With this question in mind the data from the four sites were paired; ClIf-1 with ClIf-6 and ClIf-2 with ClIf-8, again operating with the null hypothesis that each pair was from the same population. The pairing was based on simple observation; ClIf-1 sample counts appeared similar to those of ClIf-6 and ClIf-2 sample counts appeared similar to those of ClIf-8. As a check on observation another analysis of variance was performed on one from each of the above pairs: ClIf-1 against ClIf-8.

TABLE 13: ANALYSIS OF VARIANCE (F) OF PHOSPHORUS K ALPHA FOR TWO SITES.

	ClIf-1		ClIf-6	
	X_1	$(X_1)^2$	X_2	$(X_2)^2$
	520	270400	380	144400
	420	176400	170	28900
	527	277729	320	102400
	440	193600	120	14400
	475	225625	180	32400
	360	129600	150	22500
	300	90000		
	410	168100		
	360	129600		
	230	52900		
TOTAL	4020	1713954	1320	345000

F - 13.215
F required to reject at .01 level 8.86; hypothesis rejected.

TABLE 14: ANALYSIS OF VARIANCE (F) PHOSPHORUS K ALPHA FOR TWO SITES.

	ClIf-2		ClIf-8	
	X_1	$(X_1)^2$	X_2	$(X_2)^2$
	55	3025	80	6400
	85	7225	60	3600
	130	16900	80	6400
	55	3025	70	4900
	97	9409	70	4900
	75	5625	110	12100
	55	3025	60	3600
	90	8100		
TOTAL	642	56334	530	41900

F - 0.1516
F required to reject at .01 level 9.07; hypothesis upheld.

TABLE 15: ANALYSIS OF VARIANCE (F) PHOSPHORUS K ALPHA FOR TWO SITES.

	ClIf-1		ClIf-8	
	X_1	$(X_1)^2$	X_2	$(X_2)^2$
	520	270400	80	6400
	420	176400	60	3600
	527	277729	80	6400
	440	193600	70	4900
	475	225625	70	4900
	360	129600	110	12100
	300	90000	60	3600
	410	108100		
	360	129600		
	230	52900		
TOTAL	4042	1713954	530	41900

F - 81.33
F required to reject at .01 level 8.40; hypothesis rejected.

The results of the foregoing indicate that the clays of the sherd samples of ClIf-1 and ClIf-6 are from different populations while the clays from the sherd samples of ClIf-2 and ClIf-8 are from the same population. In addition, the results from Table 13 indicate that the original pairs ClIf-1, ClIf-6 and ClIf-2 and ClIf-8 are indeed from different populations. It would appear, then that the pots from four sites in the Michipicoten River mouth are made from three different clay bodies. It is also true that the potters from the two Laurel Culture sites used the same clay body while the potters from the two Terminal Woodland sites were each using different clay sources.

Included with the samples that were analyzed were three clay samples from the immediate area of the Michipicoten River mouth. The clay deposits were located and collected by Mr. Carl Nymen of Wawa. Map 3 indicates the locality of the four sites and the three clay deposits.

It should be noted that any one of the three clay deposits is found within a short distance of the four habitation sites which are located on the banks of rivers, or streams within range of easy access.

The Phosphorus K Alpha counts for all three samples of clay were very similar to each other and, in turn, appeared similar to the sherd analysis of the Laurel Culture sites, ClIf-2 and ClIf-8, but different from the sherd analysis of the Terminal Woodland sites, ClIf-1 and ClIf-6. Again two analysis of variance tests were set up with the null hypothesis that all groups were from the same population; one analysis compared the clays with the Laurel Culture sites and the other compared the same clays with the Terminal Woodland sites. Tables 16 and 17 contain the data and the results.

MAP 3: SITES AND CLAY DEPOSITS IN THE MICHIPICOTEN RIVER MOUTH AREA

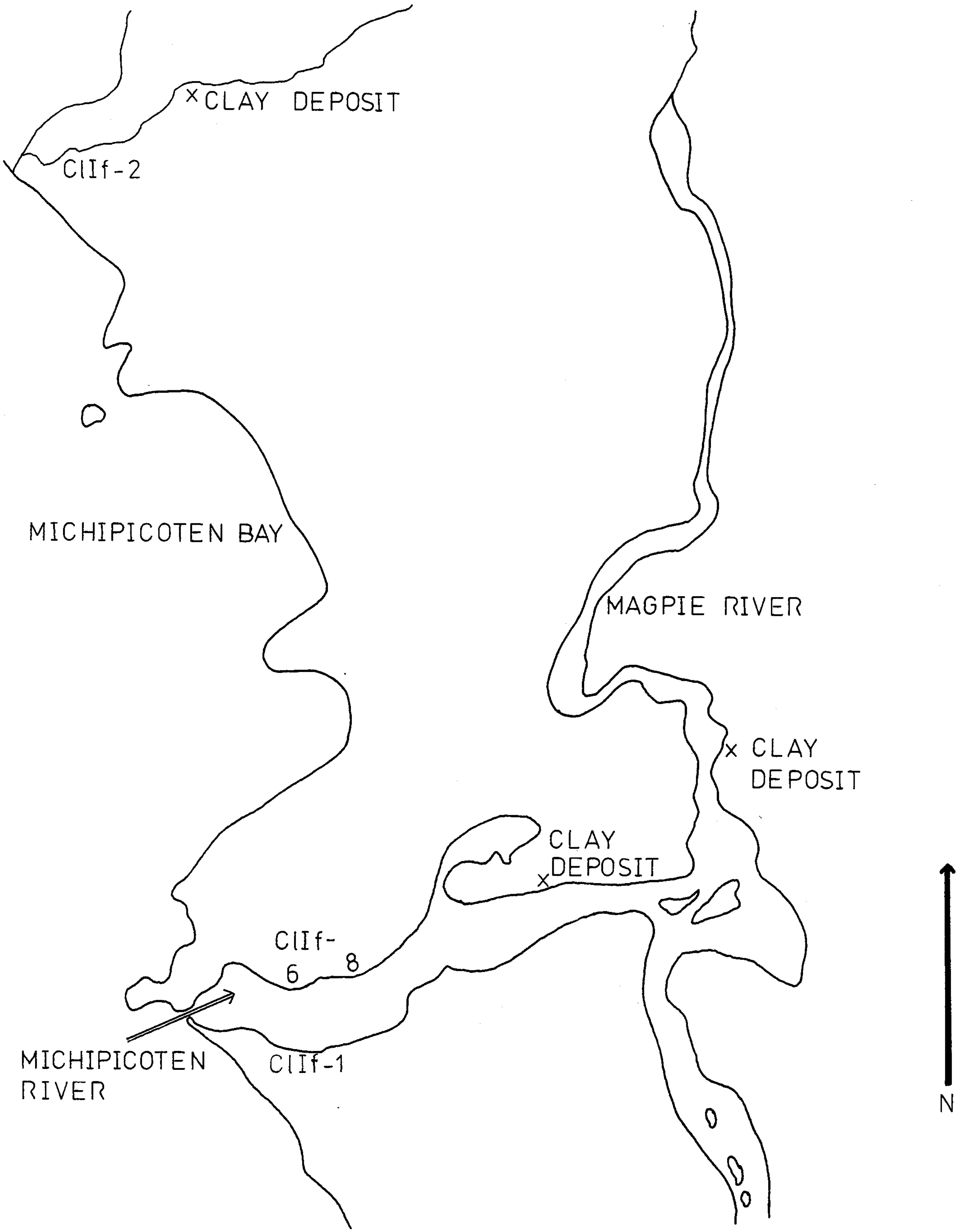


TABLE 16: ANALYSIS OF VARIANCE (F) OF PHOSPHORUS K ALPHA FOR TWO SITES AND THREE CLAY SAMPLES.

	ClIf-1		ClIf-6		Michipicoten Clays	
	X_1	$(X_1)^2$	X_2	$(X_2)^2$	X_3	$(X_3)^2$
	520	270400	380	144400	90	8100
	420	176400	170	28900	75	5625
	527	277729	320	102400	80	6400
	440	193600	120	14400		
	475	225625	180	32400		
	360	129600	150	22500		
	300	90000				
	410	168100				
	360	129600				
	230	52900				
TOTAL	4042	1713954	1320	345000	245	20125

F - 18.545
F required to reject at .01 level 6.23; hypothesis rejected.

TABLE 17: ANALYSIS OF VARIANCE (F) OF PHOSPHORUS K ALPHA FOR TWO SITES AND THREE CLAY SAMPLES.

	ClIf-2		ClIf-8		Michipicoten Clays	
	X_1	$(X_1)^2$	X_2	$(X_2)^2$	X_3	$(X_3)^2$
	55	3025	80	6400	90	8100
	130	16900	80	6400	80	6400
	85	7225	60	3600	75	5625
	55	3025	70	4900		
	97	9409	70	4900		
	75	5625	110	12100		
	55	3025	60	3600		
	90	8100				
TOTAL	642	56334	530	41900	245	20125

F - 0.1197
F required to reject at .01 level 6.36; hypothesis upheld.

It is evident from Tables 16 and 17 that the earliest potters in the Michipicoten River mouth area were using local clay for their products whereas the later people were bringing their clay from other deposits. At present it is not known where the Terminal Woodland potters were obtaining their clay; possibly a collection of samples of clay deposits from rivers and streams emptying into Lake Superior would provide the answer.

SUMMARY AND CONCLUSIONS

Clay from deposits on the banks of the Michipicoten and Magpie Rivers and a small stream a short distance to the north of the Michipicoten River mouth were probably discovered and experimented with by the Laurel potters until a clay with satisfactory characteristics was found. In later times as more deposits were uncovered during journeys up and down the Lake Superior coastline, a preference for a particularly "good" clay was probably established. This deposit might have been a considerable distance from the campsite but due to its preference by the potters it would have been considered worthwhile to make periodic forays in order to secure the superior clay.

While the concept of adding temper to clay in order to reduce shrinkage was probably introduced at the same time as pottery, the local potters of Michipicoten would have had to adapt the technology to their own particular environment. The rock outcrops around the river mouth are composed of a metamorphosed mixture of clay, shale and mica with some small quartz inclusions. This material is unsuitable for temper due to the expansion of the mica when heated. It is also very difficult to break up the talus from the weathered outcrops. Effective tempering material is available in abundance in a sand spit across the entrance of the river. Although deposited by wave action from the north-westerly storms on Lake Superior, the sand is quite sharp with a grain size between 1.5 and 2.5 mm. This sand is composed of quartz, microcline, plagioclase, biotite, magnetite, and a few particles of garnet. The first four would be suitable for temper: not so the biotite. The potters would have determined, through experience, that biotitic mica expands considerably during the firing process and results in spalling and fracturing. The potters would probably have selected against the conspicuously dark biotite. There may have been a selection in favour of one or more of the other component minerals based on a preference for colour or texture or, perhaps, on alleged success with a particular combination and proportion.

Most pottery failures among modern potters occur at the firing stage and it is certain that the same set of inexorable rules vititated against the ancient potter. The fact that more fuel on a fire produces more heat would probably have been a familiar concept to them. Whether the addition of a chimney to induce more primary oxygen into the fuel was known has, as yet, not been ascertained; nor is it known whether the potters dug fire pits to concentrate the heat. Judging from the hardness and colour of the sherds, the primitive "kiln" certainly reached temperatures between 750° and 950° C. To reach these temperatures, one or more of the above firing concepts must have been known and utilized.

While it is not known whether the Michipicoten potters were aware of the critical temperatures during the firing process, Shepard (1965:81) mentions that primitive Yuma potters place their greenware around a bush fire for about 15 minutes and that Pueblo potters do much the same thing. This practice would, at least partially, drive off some of the trapped water. Michipicoten potters might have evolved a similar technique of water smoking.

Once the pots were placed in the fire and the fuel ignited the potter would have had very little control of firing temperature or rate. If the oxidation temperature was exceeded too quickly it would be quite possible for the inner and outer surfaces of a pot to oxidize while the portion between would be incompletely oxidized, and therefore characterized by a darker centre section. If the clay was relatively impervious and contained little temper it would be possible for escaping gases to cause spalling of the inner and/or outer surface of the pot.

The vitrifying temperature was probably not exceeded due to the high temperature required to vitrify clays of the Michipicoten region. If overfiring had occurred, the evidence for such over-firing would be found in sherds which would appear glassy or porcelain-like on the outer surfaces, an indication that some component of the clay had actually melted.

Colour is another rough guide to the maximum temperature reached during firing. If light grey clays such as those from Michipicoten are used and a generally oxidizing fire is presumed, the clay assumes a light buff colour at the lower vitrifying temperature which changes through a pink-buff* to a light terra-cotta colour at approximately 900° C. It is not considered likely that the potters of Michipicoten were able to attain or exceed over-firing temperatures at any time during their long occupation of the area.

It is probable that prolonged cooling of the fired pottery was not a difficulty. The amount of fuel required to fire the pottery and the possibility of a slight pit in which the fire would be built

*This data was derived from a controlled experiment using Michipicoten clay and an electric kiln.

would promote slow cooling. The ashes from the fuel piled up around the pottery pieces and the heating and shielding effect of a pit would retain heat for a considerable length of time, possibly as much as two to three hours.

If the foregoing procedure of selection of clay, addition of a fixed ratio of temper carefully mixed into the clay and then a consistent technique of firing with piled up fuel in a slight pit was adhered to, then it is quite probable that pottery of consistent hardness and colour would be produced.

Little difference in the colour, hardness and temper content of the pottery over the 25 centuries of production would suggest considerable cultural conservatism, at least as it pertains to ceramic technology, among the potters. With little evidence of experimentation, it must be assumed, that after its introduction, adaptation of ceramic techniques to the Michipicoten environment must have been achieved in a very short time, perhaps only a generation or two.

The foregoing suggest that in order to produce successful pottery, a detailed knowledge of ceramic technology is mandatory, and that variations on a basic technology must be made in order to adapt it to a particlular environment. It is suggested that the form of adaptation is a function of the cultural traditions of the potters and that several conclusions or hypotheses regarding their cultures may be generated.

CONCLUSIONS

1. There is a technological basis for selecting temper.

2. Within a possible universe of choices that are technically possible, there is a pattern of possible selections.

3. Ceramic culture is stable after initial local adaptation.

4. Among the possible choices of temper, certain temper ratios will be made.

5. A group newly introduced to ceramic technology will attempt to adapt the technology to its immediate environment.

6. Exogamy and patrilocality will exert a modifying influence on a group's ceramic tradition.

CONCLUSIONS

1. There is a technological basis for selecting temper.
2. Within a possible universe of choices that are technically possible, there is a pattern of possible selections.

It is evident from the diffraction analysis that the minerals from the beach sands of the Michipicoten River mouth area were being culturally selected by the local potters.

This mineral selection was constant from the time of introduction of pottery to the area, through Terminal Woodland times.

Biotite, a dark micaceous mineral and magnetite, a black iron oxide, were actively selected against from the start. Whether a tradition about dark minerals existed before ceramic technology was introduced into the Michipicoten area or whether the early Michipicoten potters discovered biotite's unfortunate thermal expansion characteristic, it is apparent that the selection was based on colour. This must be the case because magnetite does not exhibit any characteristic which would be deleterious to pottery manufacture; thus both biotite and magnetite were rejected because of the colour similarity.

A myth related by Alexander Henry about the Michipicoten region refers to an island on which is found yellow sand and which is guarded by huge serpents (Bain 1969:218). The island is called Isle de Ponchartrain or Caribou Island and lies approximately 60 miles off Lake Superior's north shore. While Henry assumed that the yellow sand was gold dust, it is possible that the "sand" was either an excellent pottery clay or a type of sand which was devoid of dark minerals. In any case, Henry's account negates the presence of gold dust, yellow sand or large serpents on the island.

CONCLUSIONS

3. Ceramic culture is stable after initial local adaptation.
4. Among the possible choices of temper certain temper ratios will be made.

Why the potters of Michipicoten chose to select against plagioclase and in favour of microcline is puzzling since neither one is of greater efficiency than the other for use as temper.

It is interesting to note that the formula for temper in the Michipicoten area remained relatively constant from Laurel Culture, Initial Woodland time through to Terminal Woodland time. It is possibly an indication that the people who oocupied this area had remained relatively indigenous for at least 20 centuries with a strong tradition of cultural conservatism.

CONCLUSIONS

5. A group newly introduced to ceramic technology will attempt to adapt the technology to its immediate environment.

Spectrographic analysis indicated that clay from the potsherds of the ClIf-2 and ClIf-8 sites was the same as the clay from the three deposits near the sites. This is based on the similarity of the Phosphorus K Alpha counts of the relevant samples.

Since ClIf-2 and ClIf-8 are Laurel Culture sites, it is probable that these sites represent the locale of the earliest potters in that area. Because ceramic technology was relatively new to these people, it is likely that they would attempt to find their raw materials within easy access. With the local clay a few minutes walk away and the temper almost under their feet, their immediate raw materials needs would have been adequately met. Fuel, both soft and hard wood, would have been in plentiful supply in the sub-environment immediately surrounding the river mouth where maple, birch and pine would grow in the biota of the river valley. Spruce was locally abundant also.

Presuming that pottery was a female craft, it is proposed that a woman from a region which possessed a ceramic industry married into the Michipicoten band, bringing her knowledge with her (after Wright 1972). Such knowledge would spread rapidly within the band as the advantages of a ceramic vessel for cooking became evident among the population. They would have emulated her technique of clay gathering and preparation, temper selection and firing in every detail, thus ensuring success.

This immediate accommodation to a proposed imported technique would produce the ceramic artifactual evidence that is present at Michipicoten. The constant utilization of a particular local clay, a constant selection of particular temper minerals and a consistent ratio of these minerals all point to the same conclusion: ceramic technology was imported into the Michipicoten River mouth area.

CONCLUSIONS

6. Exogamy and patrilocality will exert a modifying force on a group's ceramic tradition.

From Tables 13 and 16, it would appear that the Terminal Woodland potters of ClIf-1 and ClIf-6 had, through time, modified the ceramic tradition of the people who had occupied the area during Laurel Culture times. Table 16 reveals that the samples from ClIf-1 and ClIf-6 are dissimilar to the samples from the three Michipicoten clay deposits, that is, the pots from the latter sites were not made from local clay. By the beginning of the Terminal Woodland era, pottery manufacture and tradition in the Lake Superior north shore area would probably be about 1000 years old. Presuming that the bands in this same area were exogamous and patricocal (Wright 1972:93), it is most probable that many women, representing a considerable variety of local pottery traditions, had married into the bands at Michipicoten, bringing their ceramic knowledge with them. Part of this expertise would be the ability to assess the viability of a clay deposit.

If it was recognized that another, perhaps distant deposit was superior to those at Michipicoten, it is possible that this information would have been acted upon. Table 11 indicates that there were at least two such deposits since the pots from ClIf-1 were not made of the same clay as the pots from ClIf-6.

Could the pots have been imported? While this is a possible alternative, the evidence of the temper ratio vitiates against it. It would be much easier to transport clay from a distant deposit than carry the coarse sands of Michipicoten to a distant site, mix it with the local clay, make the greenware and fire it in an unfamiliar area and then transport the fragile vessels back to Michipicoten.

From the evidence presented, it is suggested that the pottery tradition of Michipicoten was introduced to the area approximately 2500 years ago and had been maintained with little variation by a relatively indigenous population until the time of European contact.

CHAPTER IV

THE SUBSISTENCE PATTERN

PROBLEM

In the following chapters, the sites analyzed are unique in that they represent occupations of prehistoric peoples separated from each other in terms of time and space. In several instances, evidence is presented to demonstrate a continuity between the sites, with regard to material culture. If this sequence indicates a cultural continuum, it should be possible to relate each of the sites to a specific aspect of culture--in this case subsistence.

METHOD

Assuming that a cultural continuum between these sites exists, theoretically, it should be possible to deduce the subsistence strategy of the aboriginal people by comparing those resources which one expects were utilized to those resources known to have been exploited by early historic native groups in this area.

ECOLOGICAL POTENTIAL

PLANTS

Fortunately a relatively complete list of plants native to the Michipicoten area was compiled in 1971 under the direction of G.E. Gratton of Lakehead University. To establish the range of edible plants available to the aboriginal people, the plants identified in 1971 were cross referenced to Yarnell's (1964) book, Aboriginal Relationships Between Culture and Plant Life in the Upper Great Lakes Region, and Fernald et al (1958) Edible Wild Plants. In all there were 92 edible plant species identified. Although this is by no means an absolute dietary plant list for this area, it does indicate the variety of plants that are available. Of these 92 plants, the majority are edible during the summer months, but certain species may be utilized as a food resource the year round.

ANIMALS

FOWL

A list of birds native to the "Hudsonian" and "Canadian" biotic provinces (areas north and south of the boreal forest edge) was compiled by Cleland (1966). Although this area is not noted as a nesting ground for all species, certain species are available the year round, while most are seasonally abundant during the annual spring and fall migrations.

FISH

The various species of fish mentioned in

Table 18 are periodically available in large quantities during individual spawing seasons which extend from spring to fall. Mr. J.M. Hughs (Regional Director, Ministry of Natural Resources, Sault Ste. Marie, Ontario) was kind enough to delineate which species of fish spawn were economically feasible to procure on various rivers that flow into Lakes Superior and Huron. The fish-river correlation is presented in Table 18.

TABLE 18: FISH-RIVER CORRELATION (KNOWN AND SUSPECTED)OF THE NORTHERN GREAT LAKES

	Pic River	Heron Bay	White River	Michibishu River ++	Michipicoten River	Baldhead River	Agawa River	Montreal River	Pancake River	Chippewa River	Goulais River	Spragge River	Serpent River	Spanish River	Mississagi River	Thessalon River	Batchewana River	St. Mary's River
	SUPERIOR											HURON					SUP.	
Sturgeon (Lake)	*	*	*	*	*		*	*	*	*	*		*	*	*	*	*	*
Longnose gar	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO							
Lake Trout	*	*	*	*	*	*	*	*		*							*	*
Whitefish	*	*	*	*	*	*	*	*		*	*		*	*	*	*	*	*
Shorthead redhorse+																		
Silver redhorse																		
White Sucker	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Brown Bullhead	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	*	*	*	*	*		
Channel Catfish	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO							
Northern Pike	*	*	*	*	*					*	*	*	*	*	*	*	*	*
Yellow Perch	*	*	*	*	*						*	*	*	*	*	*	*	*
Walleye	*	*	*	*	*			*		*	*	*	*	*	*	*	*	*
Sanger																		
Largemouth Bass	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO							
Smallmouth Bass																		
Rock Bass																		
Freshwater Drum	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO							

+ NORTHERN REDHORSE
++MISHIBISHU = UNIVERSITY (DOG) RIVER

LEGEND
* Fish available
NO Fish not available
unknown

MAMMALS

Cleland (1966) lists 34 species of mammals native to the surrounding region. Although some mammals hibernate for the winter, it probably would not deter man from procuring them as a staple resource. Game animals which do not hibernate can be utilized effectively the year round.

Thus there are four basic procurement systems available in the Michipicoten River area which can be applied to the Northern Great Lakes area as a whole since Michipicoten is strategically located between two ecotones: the boreal forest and the Great Lakes-St. Lawrence Forest growth. It is within this area that the range of resources available for the Northern Great Lakes will be located. Within any one of these systems (plant, fowl, fish, mammal procurements) food can be obtained on a yearly basis. It is assumed that the resource relied upon at a particular time of the year will be the one that can be most easily exploited with the minimum amount of labour and the maximum reward.

Cleland has shown that an "efficient" resource strategy for the four procurement systems would involve a seasonal adaptive pattern because of the abundance of a food type at a specific time of year.

The strategy can be simply stated in the following manner: hunting--all year round; fishing--spring to fall; fowling--an emphasis during the annual spring and fall migrations; plant gathering--year round with a particular emphasis in the summer when most edible fruits ripen.

It is important to note that the exploitation of a food system is not exclusive, and the absence of one type of procurement does not necessarily preclude the fact that it was not utilized because it was not efficient. Other factors could account for its neglect. However, on a general level the above mentioned strategy for resource exploitation is assumed to be valid.

THE HISTORIC SUBSISTENCE PATTERN

In the historic period, Rogers and Smith (1973) outline three major changes in subsistence as well as other facets of culture that native people in the Shield Area have endured: The Modern Period (1945-1970); the Contact Traditional Period (1821-1970); and the Early Contact Period (1500-1850).

The direct historical approach is applicable only if any change which may have occurred between the Early Contact and Terminal Woodland Periods would not have affected the subsistence pattern. Only time will substantiate or refute this assumption. The subsistence pattern during the Early Contact Period was based "upon big game and secondary reliance upon small game, fish and fowl" (Ibid.:12)

The ecological potential of the area dictates what food resources are seasonally available. For this general area fish, fowl and plants are abundant seasonally while mammals are available the year round. The direct historical approach provides a basic insight into which activities would be scheduled if a conflict between the procurement systems arose. In this instance a native person would hunt rather than fish, fowl or gather plants.

TECHNIQUE

There are two basic procedures used in evaluating a particular subsistence activity at a site. One is to assume that the particular faunal and floral ecofacts recovered are representative of the food processing activities. The second is to infer these particular activities from the artifacts recovered. However, certain natural and cultural problems do exist in the interpretation of the data. For example, the acidic nature of the soil hampers the preservation of organic material, so that the ecofactual material recovered may not be a representative sample of the original remains. Further, certain cultural taboos may alter the distribution of animal remains.

For example, the Huron did not throw fish bones into a fire (Kinietz 1940).

Once aware of these as well as other associated problems, a simulation of the food procurement system is possible.

OBSERVATIONS

ECOFACTS

In recent years there has been an emphasis on recovering organic remains although primary analysis is centered towards faunal recoveries. Plant recoveries have been restricted to seed remains and recent experiments have shown that plant material becomes encrusted during the cooking process, principally on the interior surface of ceramic vessels. On this basis it is probable that plants were not overlooked as a source of food but that the extent they were depended upon cannot be properly documented as yet.

While the faunal reports for this area generally support the anticipated pattern, that is, faunal recoveries are comprised of a majority of game animals, usually beaver, moose and woodland caribou, it must be cautioned that since these recoveries do not represent the entire seasonal cycle, certain generalities postulated may not be valid the year round.

For the Terminal Woodland Sites, Morrison Site (ClIf-6), Michipicoten Site (ClIf-1), Nyman Site (ClIf-11), Snake Arm Inlet Site (DcHu-1), Renard Site (CbHs-5) (See Map 4) Burns (1971, 1974), has stated that the major faunal recoveries are associated with game animals, primarily beaver and woodland caribou. It is interesting to note that these sites represent a seasonal occupation from spring to fall. It is in this seasonal range that alternate sources of food are most abundant. In other words, on the basis of faunal remains, Terminal Woodland peoples selected a hunting activity around which alternate sources of food would be secondarily scheduled.

A similar comparison with Initial Woodland Sites within this area, Michipicoten Harbour Site (ClIf-2), Wawa Site (ClIf-8), the Heron Bay Site (DdIn-1), shows a distribution identical to that of the Terminal Woodland Sites. This continuity of distribution of faunal remains suggests that the subsistence strategy for Woodland Times for this area has remained relatively constant and is defined by a primary reliance towards game animals with a secondary reliance upon fish, plants and fowl.

MAP 4: TERMINAL WOODLAND SITES REFERRED TO IN TEXT

1. SNAKE ARM INLET
2. MICHIPICOTEN HARBOUR
3. MICHIPICOTEN
4. MORRISON
5. WAWA
6. NYMAN
7. RENARD

ARTIFACTS

If the foregoing assertion is correct, certainly the artifacts associated with the procurement system will provide supporting evidence to show a continuity of function through time and across space.

There are, however, a number of problems encountered which make intersite comparisons rather tenuous. First, it is necessary to assume that the tools being compared were utilized in a similar fashion from site to site and that the tools were used in a subsistence activity. Generally speaking, the types of tools expected in a hunting activity should reflect cutting, scraping, piercing and incising operations. Although these functions may represent activities associated with other food procurement systems or other cultural activities, the association of these tools with faunal and featural remains supports the contention that the majority of these tools were directly or indirectly involved in a hunting activity.

A second problem encountered is the possible disparity in function between sites due to different seasonal and settlement adaptation. These factors will have a profound effect on the distribution and the types of tools found on a site.

A third problem in comparing sites is that a site may represent a highly specialized activity within the continuum of activities associated with hunting. The Wawa Site (ClIf-8) is a good example of a primary butchering activity.

The lack of a standard technique of analysis among researchers also creates difficulties; for instance, some authors compute statistical frequencies on the basis of number while others use weight. Although a preference for weight is used in this report it should not matter which measure is used since either will support or reject the predicted pattern--that the functional properties of the tools used in a subsistence activity between sites remain relatively constant over time.

In the analysis of the Michipicoten Sites, certain regularities and discrepancies of the tool kit are noted over time and across space. It is suggested that both similarities and differences between the tool kits represent the continuity of the subsistence pattern which is hypothesized to occur in Woodland Times for the Northeastern Great Lakes.

<u>SIMILARITIES</u>

In the analysis of the Michipicoten Sites, tools were categorized as either unmodified or retouched. The majority of unmodified tools are ideal in providing an effective cutting edge. The wear on the unmodified flakes is characterized by continuous marginal flake scars (less than 2 mm. in length) and edge angles which range from 20 to 50 degrees. According to Wilmsen (1974:91) "edges of 35 to 45 degrees are highly efficient for cutting soft materials and for butchering operations."

For the Michipicoten Sites (Michipicoten Harbour, Morrison, Stratum I and III), the percentage of unmodified flakes for the sites remains relatively constant (between 20-35%) of the total number of tools (See Figure 4). In addition, within the retouched tools the percentage of bifacial tools is exceptionally small (usually less than 10% of the total number of tools). This pattern appears to hold true for various Woodland river mouth sites.

One way to account for such a distribution is to suggest that not all activities associated with hunting take place on site. For instance, it is expected that the animals would be hunted away from the principal site and initial quartering would take place at the kill site. It is at these locations that one would expect a high percentage of bifacial tools. The Wawa Site assemblage is a good example of the tools expected;

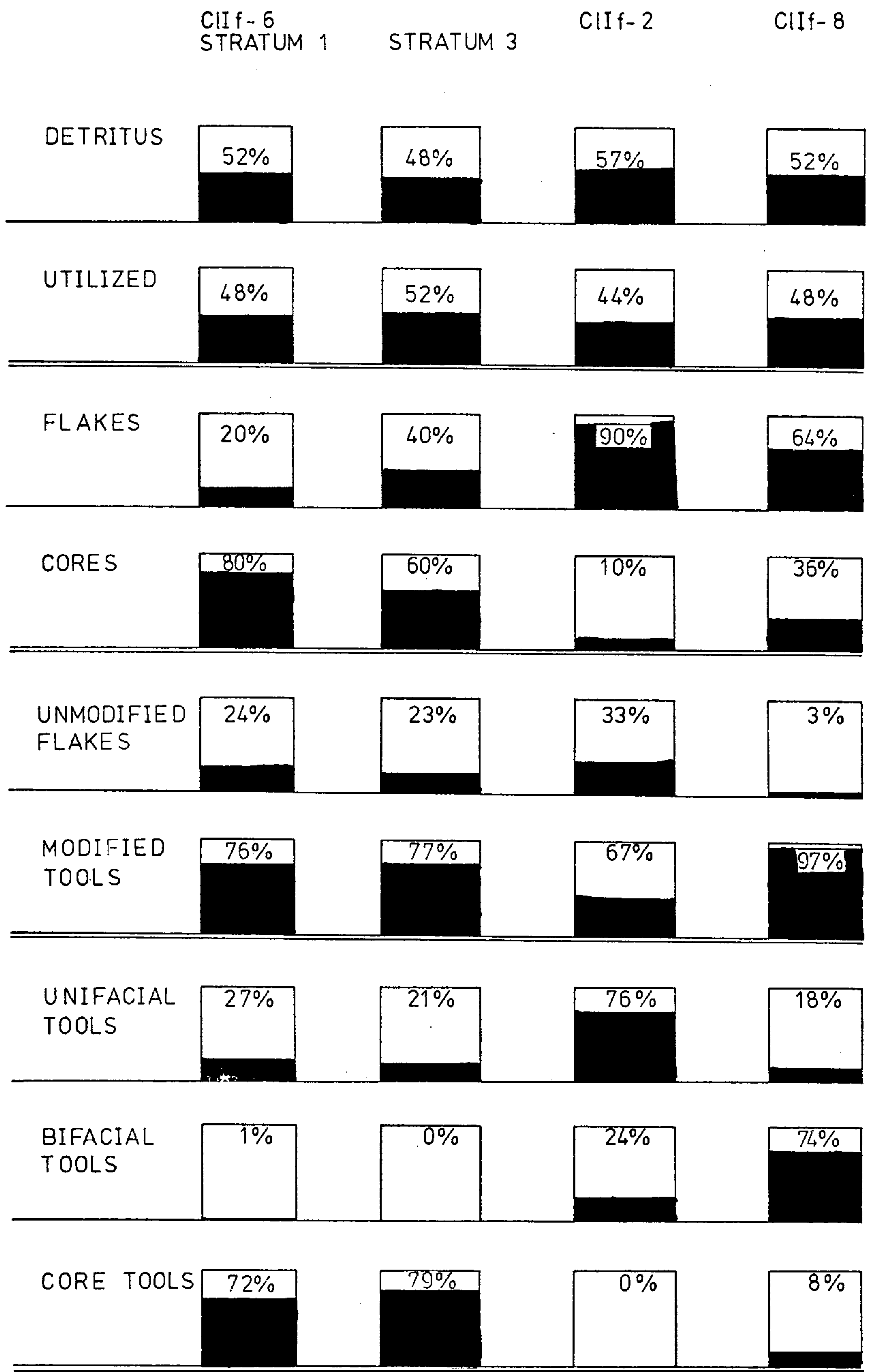
it may represent a primary butchering and kill site in the early spring months. Here the distribution shows a low percentage of unmodified tools with a primary emphasis on bifacial tools, (See Figure 4).

The remains of the animal returned to the principal site would require further processing which would involve cutting, scraping and incising operations. This accounts for the significant percentage of unmodified flakes and the small percentage of bifacial tools.

A similar hunting practice is described by Dawson (1977:45) who states:

> large game was butchered and largely devoured on location rather than bringing the game back to the living area. Burns does note that butchering of large game at the site of the kill would result in only limited portions of such animals being brought back to the camp. Such a practice would account for the large percentage of caribou foot and wrist/ankle joints reported at the Nyman Site and the disproportionately high percentage of beaver bone.

FIGURE 4: HISTOGRAM OF ARTIFACT CLASSES BY WEIGHT FOR THREE MICHIPICOTEN SITES



DIFFERENCES

On a specific level of analysis there are numerous differences both within and between each site, when comparing certain functional attributes. For example, within the tool category of bevelled flakes (end scrapers) exist fundamental differences such as the presence or absence of a hafting element, a graver spur, more than one bevelled face, and a varied wear pattern on the scraping face all of which suggest different uses for certain types of end scrapers (see analysis of the Michipicoten Harbour Site). These differences may not be significant in terms of a general procurement system since all of the bevelled flakes could be associated with a hunting activity.

Further, one expects differences to occur between sites because certain variables (for example, stylistic preference for a tool design) are independent of the subsistence pattern.

These factors will certainly affect the makeup of the tool kit.

On a general level of comparison there appears to be a distinct pattern occurring in the retouch tool category: it is either dominated by end scrapers or pebble-core tools. This distribution appears to be characteristic of several Woodland Sites occupied during the summer season in this region. Figure 4 graphically illustrates the frequency distribution of the utilized artifacts for the Michipicoten Sites.

This pattern is significant in that it may reflect two functionally distinct activities occurring during the summer season, that is, the lithic collection dominated by small scraping tools reflects a certain type of activity such as hide preparation (see analysis of the Michipicoten Site) while the preponderance of pebble-core tools emphasizes a different activity, possibly wood or bone working.

At present, a lack of a complete set of functional attributes, a paucity of artifacts and too few sites does not permit the necessary seasonal pattern to be established among Algonkian Peoples. However, on the basis of the probable activities inferred from the stone tools which exhibit such primary functions as cutting, scraping, and piercing, a hunting activity is a most reasonable choice.

Chapter V

The Michipicoten Harbour Site

INTRODUCTION

The Michipicoten Harbour Site (ClIf-2) was discovered by J.V. Wright of the National Museum of Canada in 1960. A small collection of artifacts consisting of pseudo scallop shell designed ceramics and a minor quantity of lithic artifacts was recovered (Wright 1967).

In 1971 the site was partially excavated by K.C.A. Dawson of Lakehead University, under a National Museum of Man Grant. Because of the sparse and the particular material recovered the site was defined as a veneer Middle Woodland Site of the Laurel Tradition.

In the analysis to follow it is proposed that the site was seasonally occupied during the mid-summer months of July and August some 2700 years ago. Certain activities are noted, for example ceramic manufacture, berry picking, and the hunting and fur bearing animals. Inasmuch as the meat added to a nutritous diet, the hides, once processed, furnished the people with adequate protection from the elements. Since this activity is scheduled during the summer months, it is suggested that the people were preparing themselves for the upcoming winter.

THE SITE

The Michipcoten Harbour Site is situated 230 metres behind and 8 metres above the present level of Lake Superior on a old, southwest-facing, sandy strand line immediately south of the confluence of two small creeks (Dawson 1971). Cultural debris appears to be concentrated on a series of sand ridges approximately one hundred metres behind the large forward dunes (Wright 1967:70).

Two cultural problems concerning the geomorphology of the area are whether the old strand line was extinct at the time of cultural occupation and whether the creeks were seasonal at the time of cultural occupation as they are at present.

Mothersill (n.d.) indicates that the particular sand formations at the Michipicoten Harbour Site are a result of aeolean deposition. Thus, the particular feature described as a strand line may not have special significance in terms of former lake levels or isostatic rebound. More data are needed to confirm the above suggestion.

No data concerning the seasonality of the creeks have been collected.

The open exposure of the site rather than the characteristic thick brush or coniferous growth of the boreal forest may have been one of the reasons why this area was occupied.

Eighteen ten foot squares and one five foot square were excavated and one 160 foot trench two feet wide was opened paralleling the beach line (See Figure 5).

Cultural refuse occurred below a layer of duff and humus and a thin layer of wind blown sand at an average depth of two and a half inches. It occurred in a grey lens which was one to three inches thick (Dawson 1971). Beneath this lens was a yellow sand of aeolean origin which varied in thickness from 3-14 inches. Below this horizon, finely bedded sand lenses occurred (See Figure 6).

FIGURE 5: CONTOUR MAP OF THE MICHIPICOTEN HARBOUR SITE, CIIf-2, SHOWING 1' CONTOURS AND LOCATION OF EXCAVATION UNITS

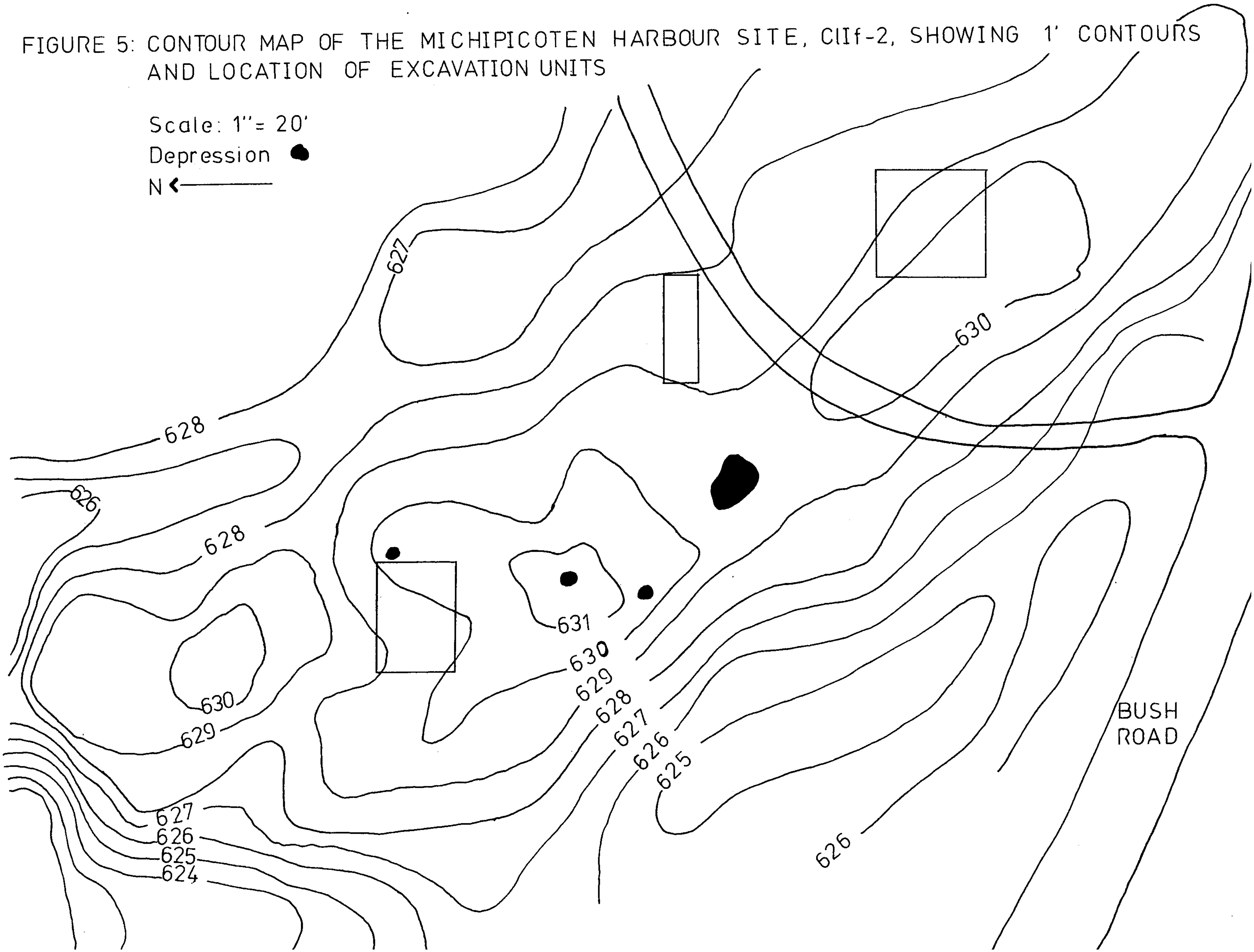
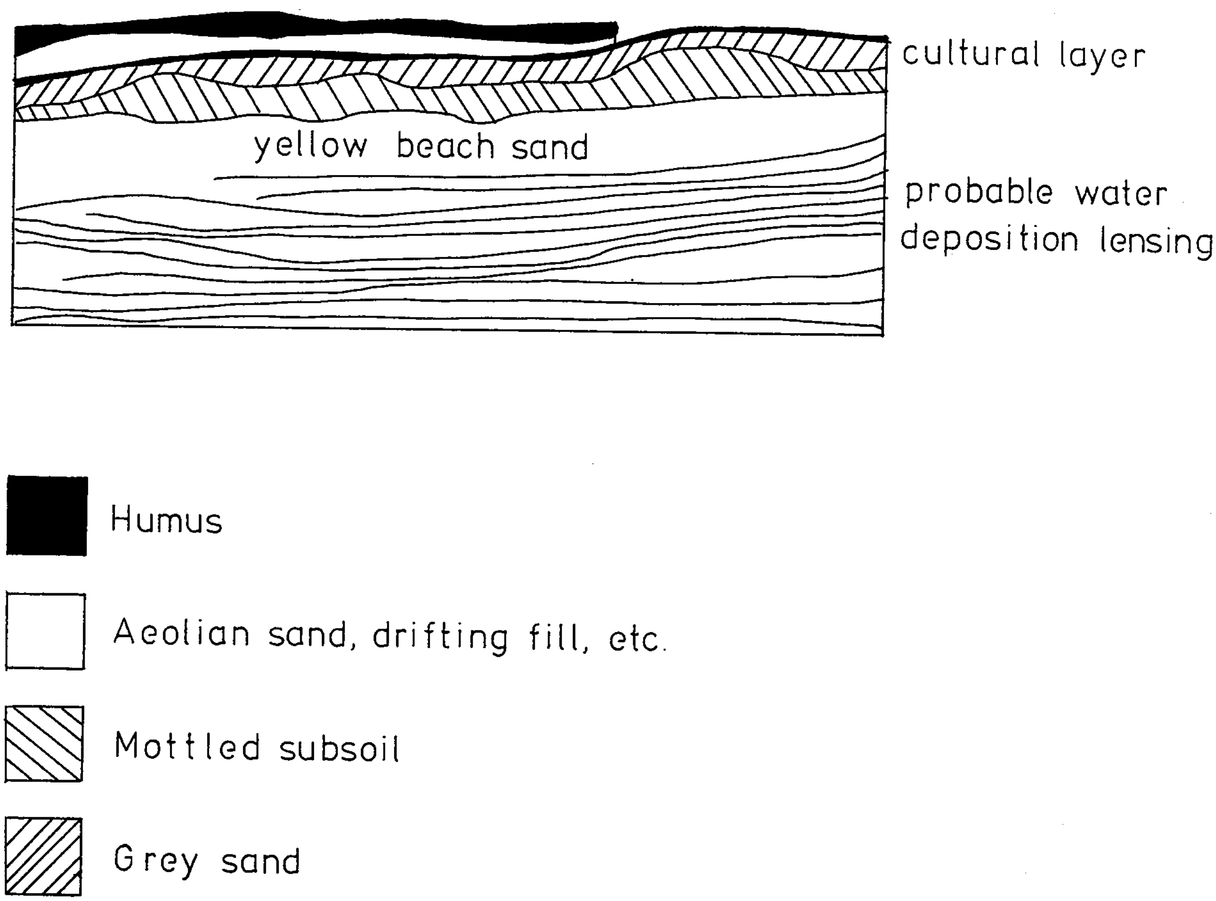


FIGURE 6: TYPICAL SOIL PROFILE OF THE MICHIPICOTEN HARBOUR SITE, CIIf-2



Profile of east wall of 20N10E
Scale: 1/4" = 6"; depth: 3"

FEATURES

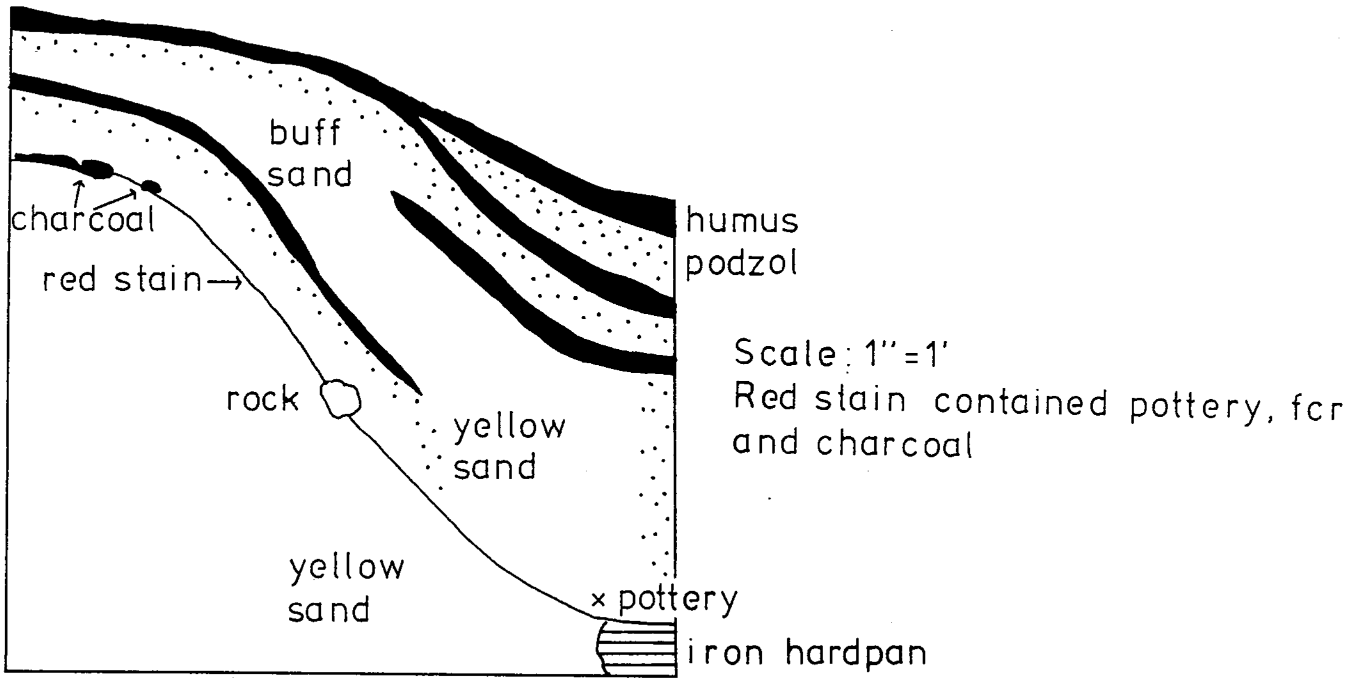
Unfortunately, adequate records of features were not maintained and analysis is consequently limited by the lack of specific information. In some cases, the field notes bear references to several different features, but basic descriptions, and delineations of these features were not accurately recorded, severely restricting interpretation.

Four different kinds of features were recognized: depressions, post moulds, hearths and pits.

DEPRESSIONS

There were four depressions found on the sandy beach, but only the depressions located near units 7 and 8 and unit 22 (See Figure 5) were partially excavated. The depression located near units 7 and 8 were circular in outline with a diameter of approximately 8 feet and reached a maximum depth of 2 feet. A cross section of the feature is shown in Figure 7.

FIGURE 7: PROFILE OF DEPRESSION EXTENSION OF UNITS 7 and 8 from ClIf-2.



Each cultural lens of the depression was separated by sterile soil and contained debris consisting of fire-cracked rock, red to pink oxydized sand as well as ceramic and lithic artifacts.

Although evidence is scant, it is hypothesized that this depression was used in a food processing activity such as cooking meat and as a kiln for firing ceramic vessels.

Supportive data include the facts that 81% of the identifiable faunal remains from ClIf-2 were recovered from units 7 and 8 and 22, the areas in which the depressions occurred, and that units 7 and 8 contain a higher than average concentration of lithics such as small retouch and secondary percussion flakes as well as utilized and bevelled flakes. It seems probable that these people were manufacturing and utilizing these tools as well as others in butchering beaver and woodland caribou/moose.

Evidence for kiln use is discussed in the ceramic section of this report.

POST MOULDS

The recognition of post moulds is extremely difficult in beach sand and the near absence of post moulds from the site is perhaps insignificant. One post mould located in square 10N10E near a pit was identified.

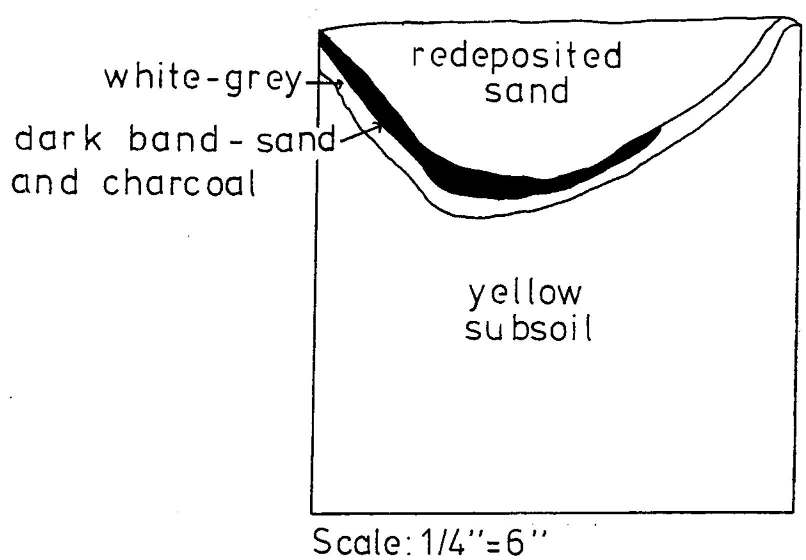
HEARTHS

Although several references to hearths appear in the field notes only one was partially delineated. Located in squares 10N20E and 20N20E, it is characterized by an abundance of fire-cracked rock, red stained sand, and bits of charcoal. It appears to be approximately 3 X 5 feet in outline. Associated with the hearth is a less than average amount of sherds and unworked flakes, while there is an average amount of worked flakes. Faunal remains comprised 12% of the total found on the site. Perhaps this feature was used in a cooking and/or heating activity. It is from this hearth that a charcoal sample (S-1265) was submitted for C14 dating through Dr. R. Wilmeth from the National Museum of Man. A date of 3115 ± 425 B.P. or 1165 B.C. was derived. This date is surprisingly early for the Laurel Culture; however, by applying the maximum deviation, a date of 740 B.C. is accepted as an approximate date of occupation of this site by Laurel People. This date is discussed in more detail in the Wawa Site report where a second early Laurel date is argued as being relevant.

PITS

Only one pit was located (in square 10N10E) and has a diameter of 5 feet and a maximum depth of 2 feet. A cross section of the pit is given in Figure 8.

FIGURE 8: PROFILE OF PIT No. 1 FROM SQUARE 10N10E, ClIf-2.



In cross section, the pit resembles the depressions in that both are saucer shaped; the pit however,is filled with sterile soil and exhibits a stratification of lenses within the cultural layer and an absence of fire-cracked rock and red oxidized sand. The soil from the pit was unusually acidic having a pH of 3.7 whereas the average pH of the soil was 4.8.

A soil sample from the pit was subjected to pollen analysis and later flotated. The pollen analysis has been recorded in the section on climate. Because of the good pollen preservation "economic" pollen grains may be identified in the future although it was not feasible in this particular case due to the authors' inexperience in the identification of economic pollen grains.

Flotation revealed macroscopic organic remains, basically bits of charcoal, (identified by H. Bawden, Laurentian University) seeds, (identified by R. Fecteau, Royal Ontario Museum) and bone fragments which were too small to be identified. Bawden (person communication) noted that some of the charcoal samples characterized by the presence of bark and uncharred wood were incompletely combusted.

The results of the identifications are summarized in Table 19.

TABLE 19: IDENTIFICATION OF CHARCOAL AND SEED REMAINS FROM PIT NO. I, C1If-2.

IDENTIFICATION	SEASON OF AVAILABILITY
Pinus banksiana (jack pine)	year round
POLYGONACEAE *Polygonum*	July, August
CYPERACEAE *Carex aurea*	July, August
ROSACEAE *Physocarpus opulifolius* (ninebark)	July
ERICACEAE *Vaccimium* (blueberry)	July, August

The particular lensing found in the pit (charcoal beneath a layer of charcoal and sand) indicates "in situ" burning of wood in the pit. The incomplete combustion of the wood fragments indicates that the burning which took place produced a low heat (200-500^{o} C). In addition, the fact that the burning took place in a pit which would be partially deprived of oxygen and the absence of fire-cracked rock indicates that a low heat was desired. The species of tree used in the burning process (jack-pine) produces smoke under low temperatures and especially so if the wood is green. If it is assumed that the pit was used for burning the fact that the soil in the pit was noticeably acidic may indicate that the wood was green. Alternately, the acidity of the soil in the pit may be due to another cultural process such as the tanning of hides which requires the immersion of the hide in an acidic solution (See Lithic Section, p.261).

This feature was likely used to produce a low heat with considerable smoke such as would be desirable in a cooking or smoking process.

The fact that the bone and seed remains were carbonized indicates that these products were fired, possibly for cooking. A smoking process is involved in the preservation of food and in tanning hides. Further, the season in which the pit was utilized (July, August) is a conventional time of the year for hide preparation (Steinbring 1966).

SUMMARY OF FEATURES

Four types of features have been distinguished at the Michipicoten Harbour Site. No significant information could be deduced from the postmould.

From the hearth located in squares 10N20E and 20N20E a charcoal sample was submitted for dating with a resulting age estimate of 3115 ± 425 B.P. or 1165 B.C. As will be discussed later (See Chapter VI) a date of 740 B.C. (by applying the maximum standard diviation) is a preferred date of occupation for this site.

Cultural material associated with the hearth indicates that it was used in a cooking/heating capacity.

The two depressions that were partially excavated revealed that both were used in cooking food and in addition it is probable that both were used as kilns to fire ceramic vessels.

From the saucer-shaped pit located in square 10N10E a seasonal occupation of the site during mid-summer was deduced based on the presence of charred seed remains. It seems probable that this pit was utilized in both smoking and cooking operations.

FAUNAL ANALYSIS

The following section was written by James Burns, University of Toronto, Ontario.

The Michipicoten Harbour Site excavations recovered only 42 bones of which all were mammalian and all of which were burnt or calcined. Beaver was the only identifiable species, although the occurrence of caribou or moose is indicated. (See Table 20).

TABLE 20: FAUNAL ASSEMBLAGE AT THE MICHIPICOTEN HARBOUR SITE ClIf-2.

SPECIES	NO. OF BONES
Beaver (*Castor canadensis*)	6
Cervidae sp. (Caribou or Moose)	1
Other Mammal	35
Total	42

This Laurel tradition site, probably dating to the middle of the period is presently situated on a flat sandy area, somewhat removed from the shore of Lake Superior, with a back-drop of coniferous forest. This latter, no doubt, provided the habitat suitable for the cervids which are indicated by the all too scant faunal remains. The beaver could be taken with little effort from the many lakes and rivers in the Wawa area.

CERAMIC ANALYSIS OF ClIf-2, MICHIPICOTEN HARBOUR SITE.

INTRODUCTION

The Michipicoten Harbour Site is located approximately 2.6 km. north of the mouth of the Michipicoten River on a cold and windswept beach, fully exposed to the savage storms and chilling mists which frequent the Lake Superior area. The site occupies a raised strand of softly undulating coarse sand situated approximately two hundred and thirty metres from and eight metres above the waters of Lake Superior.

The relative botanical sterility of the sand in the immediate area and its exposed locale precludes the probability of anything but the most sparse vegetation. It is considered likely that this situation has existed for as long as the lake has been at its present level.

The exposed nature of the site and the lack of forest cover would indicate that the area was occupied only during the warmest time of year, probably during the time of high insect infestation. The cool winds from Lake Superior would drive away the black flies and mosquitoes. In the mid-summer months of late June to late August when the mean noon temperature exceeds 35°C., the raised beach of the Michipicoten Harbour Site would have been a pleasant place to camp and, incidentally, to manufacture pottery.

A total of 4151 sherds were recovered from the excavation. Of this number, 52 were rims and 221 were decorated body sherds. From the rims and decorated body sherds it was possible to isolate 11 analyzable vessels and 10 unanalyzable vessels. The unanalyzable vessels were composed of rim sherds that were simply too small to surmise anything more than that they were indeed rim sherds. All of the vessels analyzed displayed the characteristics of the Laurel Culture. In this respect the entire ceramic artifact collection is remarkably homogeneous.

As is evident from the site map, (Figure 5) the site was excavated in three separate sections. The centre section was approximately 12 meters north of the south section and 21 meters south of the north section. A test trench, 2 feet wide and running in a north west direction from the south section connected with the north section. Two 10 foot squares were extended from test units 7 and 8 of the test trench and two 5 foot squares were extended from test units 21 and 22. In addition a small test trench was opened approximately 8 meters to the east of the south section. There is no indication in the site log book that any further testing or excavation took place.

It seems evident from the abbve that the full extent of ClIf-2 has not been delineated. The three excavation areas were opened in 10 foot squares, and both test trenches were 2 feet in width.

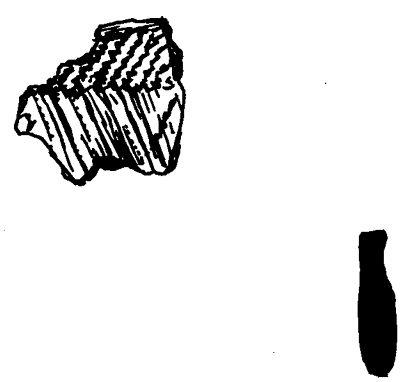
DESCRIPTION AND ANALYSIS

VESSEL DESCRIPTION

Eleven analyzable vessels and ten unanalyzable vessels are represented by 52 rims and 221 decorated body sherds that were found on the site. Rim profile and an illustration of a representative rim from each vessel accompanies most descriptions. While decorative technique provides the greatest discrimination between vessels, on this site, other attributes are described, e.g. colour and hardness. The temper used in all samples of sherds appears to be similar, both in content and amount. With some minor but significant percentage differences and the removal of two black minerals, temper is similar to the beach sand of the area (See Chapter III). Minerals present are quartz, microcline and plagioclase. As mentioned previously, the two black minerals removed from the beach sand were biotite and magnetite.

VESSEL I

FIGURE 9: VESSEL I, No. 108, C1If-2.



This vessel is represented by three rim sherds. The lip is smoothed with a very slight external radius on its outer edge. From the lip, right to left oblique pseudo scallop shell decoration extends a distance of 7 mm. below the lip. The decoration appears to be made with a dentate stamp which has been applied at an approximate angle of 45^{o} to the surface, the tool being held in the right hand. Immediately below the pseudo scallop shell, left to right channelling extends an unknown distance. The channelling was apparently made by dragging the same dentate tool while maintaining the same 45° angle to the surface.

An experimental dentate stamp was fabricated very quickly by notching the end of a flattened stick with a small chert end-scraper, and then smoothing the notched end by rubbing it on a granite cobble. This simple tool could be used to form dentate stamp decoration by impressing the tool into the clay at an angle of 90°. As mentioned previously, if the tool was held at a 45° angle to the surface, a pseudo scallop shell design would result. A variation on the pseudo scallop shell design was produced by holding the tool at 45° to the surface and then pushing the end of the tool into the clay instead of the side, dragging the tool a short distance and then pushing again. This action causes the clay between the impressions to be extruded above the surface slightly. Wright refers to this effect as Dragged Stamp (Wright 1967:12). One corner of the same device served quite well as an incising tool.

From the foregoing it seems quite possible that the Laurel potters of ClIf-2 were able to decorate their ware with one multi-purpose tool.

Sherd colour of Vessel I varied from Munsell 7.5YR6/4 (light brown) on the exterior surface of one sherd to a 7.5YR5/6 (strong brown) on the exterior surface of another.

Hardness of the rims sherds are just below 4 on the Mohs scale.

VESSEL 2

FIGURE 10: VESSEL 2, No. 321, ClIf-2.

Two very small sherds represent this vessel. The lip is smooth and rounded on its exterior edge, with an approximate 2 mm. radius. Two mm. below the lip, right to left oblique simple impressions extend for a very short distance of about 2.5 mm. measured vertically. These impressions are 1 mm. in width and could have been made with the first tooth of a dentate stamp by using a corner of the tool. Two mm. below the impressions an unknown number of horizontal rows of transitional dentate stamp to pseudo scallop shell are visible. Internal surfaces of both sherds are missing.

External colour of both sherds is 5YR7/6 with a hardness of 3.

VESSEL 3

FIGURE 11: VESSEL 3, No. 96, ClIf-2.

The decorative elements of Vessel 3 are quite similar to those of Vessel 2, but the lip form is different. The pot is represented by 4 small rim sherds. The lip is quite rounded with a 2.5 mm. radius on the inner edge meeting a 1 mm. radius on the outer edge. Two mm. below the lip is a series of right to left oblique impressions which appear at first glance to be incising. These impressions are narrow and closely spaced with a vertical length of 3 mm., a width of 0.5 mm. and a spacing of 1.25 mm. The tool used, possibly the edge of the dentate stamp, resembled the end of a small screwdriver.

Immediately below the impressing, and in places, slightly overlapping it, is a series of fine horizontal rows of pseudo scallop shell impression. Some of the pseudo scallop shell rows tend to dentate stamp as the potter, whether accidentally or intentionally, changed the angle of her tool from an approximate 45° towards 90°. These horizontal rows extend down the side of the pot an unknown distance with a mean spacing of 2 mm.

The colour of these sherds varies from 10YR7/4 (very pale brown) to a 10YR5/4 (yellowish brown) on exterior surfaces. Hardness is between 2.5 and 3. As is the case with all rims from ClIf-2, the inner surfaces are smoothed but undecorated.

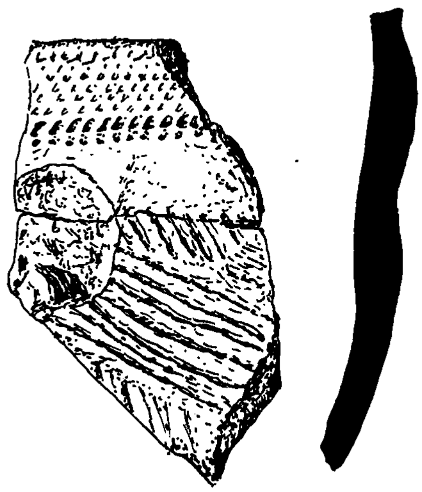
VESSEL 4

FIGURE 12: VESSEL 4, No. 402, ClIf-2.

This pot is represented by 4 rim sherds. The inner edge of the lip makes a sharply defined right-angle with the interior surface whereas the outer edge has a radius of 2 mm. Where the radius blends into the exterior surface a series of rather widely spaced (4 mm.) right to left oblique pseudo scallop shell impressions extend for a vertical distance of 7 mm. Immediately below is an unknown number of horizontal rows of pseudo scallop shell impressions with a mean spacing of 3 mm. The spacing between undulations of this pseudo scallop shell decoration has a mean of 3 mm. also, somewhat wider than the previous vessels. The impressions on these sherds are sharp and very clearly defined, possibly indicating a dentate stamping tool with relatively sharp edges. External colour varies from 5YR7/4 (pink) to 7.5YR6/4 (light brown) with a complementary variation in hardness from 3 to 2.5.

VESSEL 5

FIGURE 13: VESSEL 5, No. 659, C1If-2.



Six rims sherds and six decorated body sherds that were "near-rims" from this vessel excavated. The lip is flat and smooth with internal and external radiusing that is too slight to measure. Very close-spaced right to left oblique pseudo scallop shell impressions begin at the lip. In places, the pseudo scallop shell blends into dentate stamp as the potter changed not only the angle of the tool but the amount of applied pressure as well so that only the tips of the teeth of the stamp impress the clay. This sequence terminates 14 mm. below the lip in a row of closely spaced right to left oblique impressions that have been made with the corner of the dentate stamp. In places the impression is deep enough to leave the imprint of the second tooth in the row as well. The vertical height of these impressions is 3 mm. Starting immediately below the band of impressions and extending a considerable distance down the sides of the vessel, possibly covering the total surface, the vessel is randomly channeled. The channelling has been accomplished by dragging the dentate stamp tool sideways thus leaving what, on first observation, appears to be shallow multiple parallel incising. The channelling is random in direction with some slight overlapping which produces criss-crossing. Colour is 7.5YR7/4 (pink) with a hardness of 2.5.

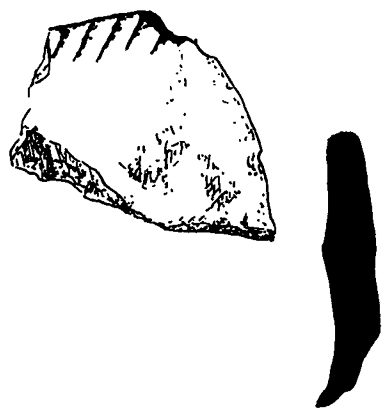
VESSEL 6

Represented by 3 rim sherds, Vessel 6 may, in fact, be two vessels in that there is a slight difference in the lip profile so that while two sherds have a straight or even insloping profile, one rim indicates very slight eversion. Since this may represent possible rim variation within one pot and since in all other respects the rims are similar, these rims have been classified as belonging to one vessel.

No decoration is evident on this pot and the external surface does not appear to have been smoothed. The interior has received the self-slipping which appears typical of pots from this site. The lip is smooth and flattened with sharp interior and exterior edges. Colour is 7.5YR6/6 (reddish yellow) and hardness is 2.

VESSEL 7

FIGURE 14: VESSEL 7, No. 313, ClIf-2.



Six rim sherds of this vessel were removed from a hearth-like feature in square 30N20E. All sherds possess the slightly carbonized colour mentioned earlier. The lip is smooth with a slight (1 mm.) radius on its interior edge and forms a sharp junction with the external edge. Starting at the lip, very narrow right to left oblique impressions encircle the rim with a vertical dimension of 5 mm. and a mean spacing of 3 mm. This type of impressing has often been referred to as "finger nail impressing", probably due to the narrowness and depth of the impression compared with its length. It is quite possible to duplicate this decoration using a long finger-nail on plasticene, rolling the finger slightly from side to side in order to lengthen the impression. Whether prehistoric potters were equipped to accomplish the same feat is debatable. Pottery manufacture necessitates that the potter's hands be in intimate contact with the mixed clay and temper in such a way that the mixture is constantly abraiding both the skin and nails. In a very short time the finger nails become worn down very close to the quick. Presuming that the females were occupied with considerable manual labour in addition to potting it is considered unlikely that their nails would have been long enough to produce what has been called "finger nail impressing". It seems much more likely that this form of decoration was made with the thin edge of, for instance, a clam shell.

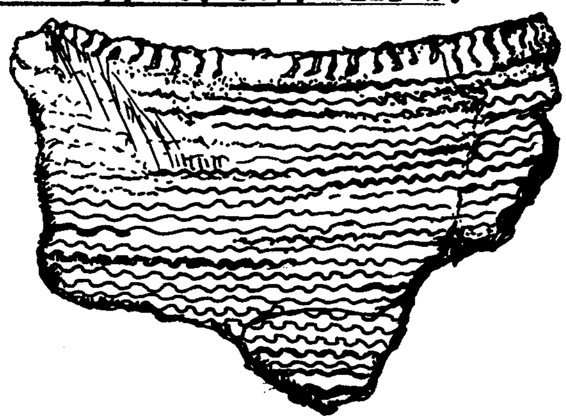
No decoration exists below the row of encircling impressions but the surface has been carefully smoothed. The interior surface has also been smoothed but reveals somewhat more temper. This surface does not appear to have been self-slipped. The colour of the exterior surface varies from a 5YR5/3 (reddish brown) to a 5YR3/2 (dark reddish brown). The hardness is slightly less than three.

VESSEL 8

Evidence for Vessel 8 is contained in 3 very small but adjacent sherds. The lip is flattened so that it is extruded slightly both on the interior and exterior surfaces. The flattening process appears to be somewhat intermittent so that slight undulations indent the surface of the lip in a manner similar to the edge of a pie crust. Decoration consists of an unknown number of horizontal rows of pseudo scallop shell impressions which begin immediately below the lip. The rows have a mean spacing of 2.5 mm. Colour is 7.5YR6/4 (light brown) and hardness is 3.

VESSEL 9

FIGURE 15: VESSEL 9, No. 627, C1If-2.



Two rims and three decorated body sherds, all abutting, comprise the inventory for Vessel 9. The lip is flat with sharp edges and has been impressed with what appears to be the edge of a dentate stamp, giving the appearance of shallow pseudo scallop shell impressions at right angles to the peripheral surface of the vessel. Close to the lip, the external surface is decorated with vertical pseudo scallop shell impressions which have a mean spacing of 2.5 mm. and extend down the rim a distance of 4 to 5 mm. Immediately below this decoration are 19 horizontal rows of pseudo scallop shell impressions which occupy a vertical height of 40 mm. The surface is smooth below this dimension. The colour is 10YR6/3 (pale brown) and the hardness is 3 to 3.5.

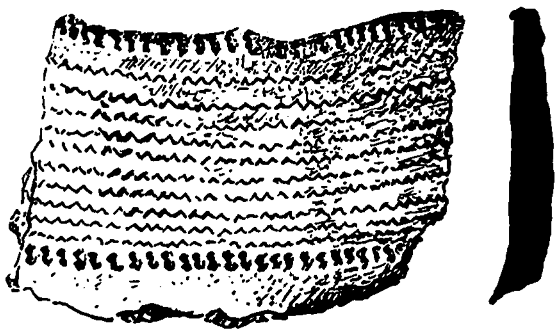
VESSEL 10

FIGURE 16: VESSEL 10, No. 512, C1If-2.

Evidence for this vessel is supplied by 4 rim sherds, none of which are adjacent. The lip is smooth and rounded due to the manner in which rim thickness diminishes as it approaches the lip. Both internal and external edges have a 2 mm. radius. Decoration consists of a variation of 7 or 8 horizontal rows of dentate stamp impressions so closely spaced as to overlay on some rows. While referred to as dentate stamp impressions there is evidence that the potter did not impress the clay with the tool held at 90^{o}, but that she tended to vary the angle somewhat so that in places the decorative element begins to resemble pseudo scallop shell. This decoration extends down the side of the vessel a vertical distance of 15 mm. The sherd colour is 7.5YR6/4 (light brown) and the hardness is 3.

VESSEL 11

FIGURE 17: VESSEL 11, No. 338, C1If-2.



Evidence for this vessel consists of one large rim sherd. The lip of this sherd has been finger-flattened in such a way as to cause undulations in the lip surface and splaying of the inside edge. The outside edge has a 2 mm. radius. Starting immediately below the lip, vertical pseudo scallop shell impressions with a mean height of 3 mm. encircle the rim. Below an undecorated 3 mm. band, are 10 horizontal rows of pseudo scallop shell impression with a mean spacing of 2.3 mm. and a vertical height of 23 mm. Immediately below the horizontal pseudo scallop shell is one row of short, vertical, encircling impressions apparently made with the corner of the dentate stamp and having a vertical height of 2 mm. The vessel exterior surface is smooth below the decoration. The sherd colour is 7.5YR6/4 (light brown) with a hardness of 2.5.

ANALYSIS

RAW MATERIAL-CLAY

The basic material from which pottery is made is clay. Clay may be described as a very fine-grained mineral material that acquires a plastic character when mixed with water and becomes a hard, brittle, insoluble material when exposed to the heat of a fire. It is composed, largely of the metamorphosed breakdown products of feldspathic minerals.

X-ray spectrography indicates that the Initial Woodland people of the ClIf-2 site used the clay from one of the three deposits that exist close to the site. One of these deposits crops out on the bank of the same stream which runs very close to the habitation area, a distance of less than

.25 km. upstream.

Of the other deposits in the area, one is on the east bank of the Magpie River just above the falls where it empties into the Michipicoten River and the other is on the north bank of the Michipicoten River itself about .8 km. upstream from its entry into Lake Superior.

Samples from the three clay deposits were tested for suitability as pottery material. Each sample was formed into several rectangles. A sample from each deposit was then fired to 700°C. and tested for friability. This test was repeated at temperature of 900°C. and 1100°C. The results of the testing indicated that the samples from the deposits on the Magpie River and the Michipicoten River would have been suitable for pottery in that the fired samples from those deposits were quite strong and hard even at the lower firing temperature of 700°C.

The samples from the stream near the ClIf-2, site, however, proved to be unsuitable for pottery use. Each sample from this deposit, regardless of firing temperature, crumbled easily in the hand. A thin section slide indicated the presence of a large percentage of refractory or non-plastic material.

Since the pottery remains from the ClIf-2 site were quite hard and strong, it is apparent that the potters of that site were obtaining their raw material from one, or both of the other, more distant, clay deposits. It is most probable that the clay from the deposit near the site was tried and discarded.

TEMPER

It was determined by x-ray diffraction that the temper used at ClIf-2 was selected from the beaches that line the shore in the Michipicoten area.

The sand from the area has a grain size ranging from 1.5 to 2.5 mm. and is composed largely of quartz with smaller amounts of the feld-spathic minerals, microcline and plagioclase. A small percentage of biotite and magnetite is also present.

As outlined in the ceramic report, the potters of the Michipicoten area manipulated the proportions of the beach sand that was to be used as temper. The biotite was removed almost completely, probably because experience had shown that this material would expand greatly when heated to form vermiculous mica--a material guaranteed to shatter a pot when fired.

The magnetite, while thermally inert at the firing temperature of pottery has the same colour and lustre as biotite and was removed also, un-doubtedly due to its close resemblance to the latter mineral.

The selection was slightly in favour of the salmon coloured microcline and slightly against the white plagioclase. Since both of these feldspars work equally well as tempering materials it can only be speculated that there was a colour preference, of unknown cultural origin, for the microcline.

The quartz proportion in the temper is similar to that of the beach sand.

The resultant temper was ideal from a potter's point of view; it was composed entirely of strong, sharp refractory material of an acceptable grain size that was available close at hand in unlimited quantities.

There is no evidence with the pottery of ClIf-2 that the potters were experimenting with the makeup of the temper--an indication that the temper proportion was introduced along with the ceramic technology itself and, being, successful, was retained.

The ceramic raw material was composed of approximately 89% clay and 11% temper, a proportion that appears to have produced from the local clays a strong pot with low porosity.

MANUFACTURE

FABRICATION TECHNIQUE

When a fired pot breaks it usually fractures at points of weakness. These points or lines of weakness generally provide clues as to the original technique that was used to form the vessel.

If it had been possible for the primitive potter to form a pot without join lines and areas where wet clay had been applied to drier clay, the pot would be much stronger than the evidence of the sherds indicates. Even today, without the use of a throwing wheel, it is not possible to construct a pot whole unless the molding technique is used. The reason for this is found in the wet clay itself. Clay that is wet enough for forming into ceramic vessels is much too plastic and pliable to support its own weight for a height much greater than 10 to 15 times its thickness. Since anything higher than a shallow dish has an aspect ratio much greater than this, it was possible to form a pot only by building it in sections, letting one section partially dry and forming another section on to it or by causing the pot to dry as it was being constructed.

Within these constructional limitations a number of techniques were used by the prehistoric native potter.

The least complex technique consisted of taking a suitably sized lump of already moistened and kneadable clay and pressing a depression in it with the fist of one hand while shaping the exterior of the clay lump with the other (Shepard 1965:54). With this technique, as the pot becomes larger, the potter must both shape and support the vessel until the clay dries enough to support itself. Considerable expertise is required to produce a pot much taller than 15 cm.

An adaption or improvement on this technique is the so-called "paddle and anvil" method. In this case the inside of the vessel is formed around a spherical stone of appropriate size, again starting with a suitable lump of clay. The exterior of the pot is continuously beaten with a flat paddle or stick, very often wrapped with vegetal twine or a piece of coarse fabric. The act of beating accomplishes three things: the clay is compacted and air pockets are removed, water is drawn to the surface as the clay is beaten, and the pot is shaped against the anvil stone. The drying action is very important in order to reduce the plasticity of the clay so that it will support its own weight. The twine or fabric wrapping on the paddle produces a rough external surface with a much greater surface area, thus facilitating drying. As the vessel wall becomes thin due to the paddling, more clay is added to the external surface and is paddled into intimate contact with the previous layer.

Any height and thickness of pot may be achieved using this technique with the proviso that the clay is paddled enough to be sufficiently dry to support itself before clay is added for additional height and/or thickness.

Another technique, probably slower but requiring less expertise, consisted of building up a pot from layers of handrolled coils of clay. The base of the pot could be made either from one piece or could, itself, be composed of a concentric series of coils formed in the palm of one hand or in the base of a broken vessel. The coil could also be continuous, with clay rolled and added to the end as it was laid in place. Adjacent coils were attached by overlapping on the inside and/or outside of the pot and pinched along both edges by the potter in an attempt to achieve cohesion. The process would be interrupted after a few coils were placed in order to allow the clay to dry somewhat. The coiling technique tended to produce rather thick-walled pots compared to their height.

When viewing the sherds from a broken pottery vessel it is usually possible to determine the method of construction. The paddle and anvil technique is evidenced by a discernible layering of the fired clay from interior to exterior surface so that when viewed from the edge the sherd appears similar to the slightly open pages of a book. The number of "pages" varies according to the number of layers required by the potter to achieve the desired thickness of the vessel wall. Sherds that are found with either the inner or outer surface missing entirely are a very probably from pots that have been constructed by potters who were using the paddle and anvil technique. In addition to the layering of the clay, the paddle and anvil technique is very often indicated by the impressions left on the exterior surface by the twine of a fabric covered paddle. Where this is the case the patterns left by the paddle will be randomly juxtaposed so that they do not match. This happens as the potter rotates the pot while paddling and also rotates the paddle so that it strikes the pot at varying angles. The pattern is not always clearly evident due to a subsequent smoothing operation by the potter, probably performed by lightly rubbing the exterior surface with a dampened hand or brushing the surface with a wad of coarse grass or similarly textured material. The inner surface, conversely, is usually quite smooth, due, in part, to the surface of the anvil stone, and also the manner in which it is slid around the interior of the pot. The paddling action on the exterior of the vessel causes surplus moisture to rise to the interior surface as well. This water, in turn, floats the finer grains of clay to the inner surface, a form of self-slipping.

The sherds from a vessel constructed by the coil technique break horizontally along the coil joints where the cohesion between adjacent coils is weak. It is usually possible, by carefully observing the top or bottom edge of a coil-wound sherd, to discern the method of lapping that the potter used, that is, internal or external lap, or a modified form of tongue and groove joint. These joints are characterized by relatively smooth and somewhat rounded surfaces if compared with the sherds from paddle and anvil fabricated pots or those shaped from a single lump of clay.

The sherds from hand-formed pots are usually somewhat thicker when compared with the overall size of the pot than the sherds from pots made by other techniques. The edges are rough but do not display the layering characterized by sherds from paddle and anvil manufactured pots. There is no discernible difference between horizontal and vertical edges.

If there are enough sherds available from a single pot it is often possible to notice a transition in the technique of construction used.

The sherds near the base of the pot will most often indicate simple hand-formed construction. Since the base is rather simple to construct in that it is really just a shallow bowl shape, no sophisticated constructional technique is required. As the walls of the vessel rise above the base there is a transition to one of the other techniques. It is sometimes possible to find a single sherd that exhibits this change.

The sherds from ClIf-2 exhibit two constructional techniques: hand-forming and smoothed paddle and anvil. The hand formed pots exhibit an uncharacteristic thin section on the smaller vessels, an indication of the quality and consistency of the clay-temper molding material and the degree of expertise of the potter. As well as punching and pulling to form the vessel, it is probable that the potter was holding the vessel, in the palm of one hand, while the other hand rotated the pot from the interior. This is indicated by the axial finger markings which appear on the interior of the sherds and the low incidence of grains of temper appearing on either the interior or exterior surface, an evidence of self-slipping the surfaces. Self-slipping is achieved by rotating the pot as previously described with water-soaked hands. This action brings the finer particles of clay to the surface of the vessel, thus affording a smoother finish (Shepard 1965:191). It would appear that the potters of the ClIf-2 site were aware of and utilized this technique. There is no evidence of an application of external slip nor were any of the pots polished.

The sherds from the larger vessels at the ClIf-2 site were constructed using a combination of the hand form and paddle and anvil techniques. After the vessel was formed, the exterior surface was smoothed by hand rubbing to remove the paddle marks. The interior surfaces appear to be self-slipped.

FIRING

The evidence of recovered ceramic artifacts indicate that the fundamental firing technique used for aboriginal pottery differs from the technique used today only in minor detail. That this should be the case does not suggest a lack of progress on the part of modern potters but merely denotes a somewhat striking fact: there is only one way to fire pottery successfully. As described in the ceramic study the pot must first be air-dried in order to remove the surplus moisture, a process that is accomplished simply by setting the vessel out in an atmosphere of relatively low humidity, such as out-doors in sunlight or perhaps by setting the greenware close to a cooking fire. In the latter case the greenware would have to be rotated periodically in order to reduce differential drying--a phenomenon usually accompanied by a pattern of cracks along the joints and other areas of weakness. While such a vessel might be successfully fired, the resultant product would tend to be quite friable and pervious.

There is little evidence to indicate whether the pots from ClIf-2 were fired in an upright or inverted position, but what there is, indicates an inverted firing position. This is based on the observation that all of the recovered rim and neck sherds were fired completely through, that is, all of the carbonaceous impurities in the clay had been completely oxidized, leaving the sherd colour similar throughout its section. Some body sherds, not necessarily from the same vessels but from the same area of the pot, were observed to have a central core of unoxidized clay so that while the inner and outer surfaces were fired to a buff colour, the interior or central section of each sherd was coloured a dark grey to black. Such a situation would arise with a pot which if fired from an inverted position, had experienced a thermal gradient from lip to base. The lip of such a pot was probably resting on a few stones so that it was elevated from the base of the "kiln" approximately 15 cm. With the bulk of the fuel beneath the pot there would be a considerable difference in temperature between lip and base, especially as ash builds up around the support stones, thus blocking heat ingress into the interior.

In addition to this, unburnt gases would be trapped in the inverted vessel, creating a cooler pocket inside the pot, again preventing the basal area from achieving the same temperatures as the upper or lip portion of the pot. While piling fuel up around the pot would raise the external basal temperature, the unburnt gases inside the vessel would provide an insulating layer, thus preventing complete firing. If the pots were fired under similar conditions but in an upright position, the base would be exposed to the hottest part of the "kiln" and gases on the inside would be constantly changing due to thermal expansion and consequent replacement from the edges. The resultant pot would probably be more evenly fired or, at worst, be slightly under fired near the lip.

Emerson (1967:147) in his analysis of the Payne Site, hypothesizes a similar technique from Iroquoian pots based on a significant hardness differential between the interior and exterior of body sherds and a similar differential between rim and body sherds. His inverted pot firing hypothesis is strengthened by an analysis of colour differential between exterior and interior surfaces of sherds, which would indicate, again, a cooler internal firing atmosphere. A test with a round-bottomed pot and a few cobbles indicated that it was considerably easier to balance the pot in an upright position, probably due to the self-aligning action of the rounded exterior. When the pot was inverted over the same stones, substantial care was required in order to ensure that the vessel would be stable during a subsequent firing.

A pot which is fired upright might collect some of the products of incomplete combustion such as charred wood and ash. While a large accumulation of this material could act as an insulating blanket thus preventing complete vitrification of the interior of the ceramic container, the amount that might normally fall in during a firing would be insignificant. There is also the possibility that flat stones of equal height were used to support the inverted pot. Such a platform would certainly have provided a stable base, although with a high probability of blocking heat ingress to the interior of the vessel. Another possible problem with flat stones is that ones which are flat on opposite sides tend to be composed of sedimentary material such as the shales and slates which contain considerable amounts of moisture trapped in the cracks and checks characteristic of this kind of material. If this type of rock is heated to the vitrifying temperature of common clay it is probable that the contained water would be released with varying degrees of explosive force, an unacceptable situation in any kiln. If the rocks did not explode they would certainly gradually disintegrate neccessitating a continual replacement search.

There are other sources of rocks which have, at least, one flat surface. Granite cobbles which have been fire-cracked tend to be sharp and angular with, occasionally one or more reasonably flat surfaces. How long it would take to accumulate three or more of these sections, with parallel flat sides and of equal or similar height it is not possible to state but with a kiln base of coarse sand it would be possible to support, with reasonable care, round bottomed, flat-topped cobble sections.

As the foregoing suggests it is possible, but not without difficulty to fire pottery in an inverted position under primitive conditions. Conversely, it is a relatively simple procedure to support an upright vessel of generally spherical morphology on a few rounded cobbles of dissimilar dimensions. No search for supports of special size in equal height is required and no special construction of the base of the kiln is needed. The more difficult technique, however, appears to be the norm or the custom.

With a technological procedure that is fraught with difficult but essential techniques it is unlikely that the primitive potter would select the more arduous of two alternatives without considerable coercion.

While the technique may have simply been a habit, it is highly improbable due to the difficulty involved, the likelihood of failure and the subsequent irritation experienced by the potter.

To be lasting a habit must be devoid of irritation or pain and in many situations provide a degree of pleasure or comfort. If these stipulations cannot be met a habit is quickly dropped or modified. Since the practice of inverted firing of pottery is one of long duration, there must be a stronger justification than simple habit.

It is most probable that this technique was a custom or group behaviour pattern established by tradition. A custom among potters would provide the restrictive social pressure necessary to preserve the continuance of the technique.

If one specific technique of ceramic manufacture is circumscribed by tradition then it is entirely likely that the total technology was likewise traditional and was passed on through the generations from mother to daughters in the form of a secular ritual. Ritualization of the technology would preserve its integrity, thereby precluding or at least minimizing diachronic change.

Pottery manufacture has indeed, changed very little in the intervening 2500 years since its appearance in the Michipicoten area. Ritualization would certainly have preserved this long-standing homogeneity and probably points to the method of its inception-introduction in the form of a complete technology, probably from an adjacent area.

The Terminal Woodland Iroqoian potters of the Payne Site also inverted their pots for firing, a possible indication that the same ritual was being practised not just diachronically but cross-culturally as well. The inverting of pottery for firing is practised also by the present day Yuma potters (Shepard 1965:75). Primitive Papago potters, however, fire a pot on its side (Fontana, Robinson, Cormack and Leavitt Jr., 1962:186). While the latter case represents an exception it is interesting to note that the practise of inverted firing has been in existence for at least 2700 years and spans a distance of close to 3000 miles. While tantalizing to speculate further it is sufficient perhaps that the foregoing suggest that native pottery manufacture was a traditional and relatively unchanging industry carried on by a culturally conservative sub-group.

FUNCTION

The average hardness of a random sampling of the sherds from ClIf-2 is 2.9 on the Mohs Scale with a range of 2.5-4.5, a figure which is near the centre of the range of hardness for sites in Northern Ontario. This would indicate that the potters of this exposed, wind-swept site were able to raise the heat in their kilns to a satisfactory firing temperature. Concentrations of sherds were found around four features which were located in squares 30N20E, 90N10W and in test units 7 and 8, and 21 and 22, the latter two being depressions. The sherds from test units 7 and 8 and those from test units 21 and 22 were of a buff to buff-pink colour throughout and without any indication of a cooking deposit. Conversely, the surfaces of the sherds from squares 30N20E and 90N10W were considerably darker in colour as though exposed to a carbonizing atmosphere. Suspecting that the darker sherds were sooted by a low temperature cooking fire, a sample of these were fired in an electric kiln to 700°C. After firing, the previously dark sherds acquired the same colouration as the ones from test units 7 and 8 and 21 and 22. This test suggests that the features containing the darker sherds were used probably in a cooking function while the depressions containing the clean sherds may have been used as kilns in addition to the cooking function. It may also indicate that the pristine sherds found around the depressions represent pots that were destroyed in the firing operation.

From the foregoing it appears probable that the potters of this exposed site had difficulty in raising the temperature of their kilns to a vitrifying temperature unless the firing was performed in a depression or hollow in the local terrain. Small amounts of faunal material were also found in each feature with the exception of 90N10W, suggesting that the depressions were not reserved for use as kilns only, but served also as cooking hearths.

There is no direct evidence to indicate that the ClIf-2 people were actually cooking in ceramic vessels. Neither is it known what other possible function the pots served. The carbonized sherds from squares 30N20E and 90N10W do indicate that the pots were exposed to low temperature heating atmospheres. This evidence, in addition to the hearth-like features and the associated faunal material, should, in turn, suggest cooking or smoking operations.

Representative samples of sherds from the three other sites adjacent to ClIf-2, one of which, was also a Laurel Culture site, were observed to have relatively thick carbonaceous encrustations on the interior surfaces. A subsequent analysis of this coating revealed that it was composed of carbonized vegetable and, possibly, faunal matter, in other words food residue. This, in effect, represents negative evidence for cooking in ceramic vessels at the ClIf-2 site unless ground conditions at the other three sites were more conducive to the preservation of the carbonized material. Since all four sites are situated in the same sandy over-burden it is assumed the chemical and physical environments were similar. A check of the soil pH of the sites revealed that the acidity of the areas tested was similar.

Presuming that the environmental conditions of the sites were essentially the same it appears that the dissimilarity in encrustation on sherd interiors between ClIf-2 and the other 3 sites is due to cultural differences, that is, the cooking of food at ClIf-2 may not have involved the use of ceramic containers at all. This possibility does not preclude the use of pots in other phases of food preparation such as collection and storage but does pose some presently unanswer-

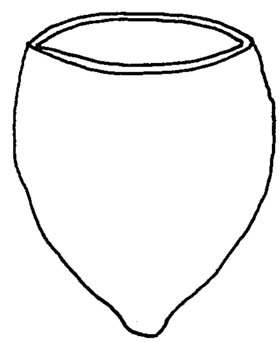
able questions regarding the cooking techniques
of the occupants of ClIf-2.

STYLE

As mentioned previously, the sherd collection from ClIf-2 has a homogeneous characteristic. This characteristic is illustrated by the apparent morphology of the ceramic vessels. With the exception of the one basal sherd, all sherds, both body and rim, indicated an external convexity, both horizontally and vertically, with a complimentary internal concavity. This would denote that all analyzable pots, at least, were shoulderless. The single basal sherd reveals that its parent pot had a lower section which was probably conoidal with slight nippling. Some of the rims are of large enough section as to indicate that the upper portion of the pot morphology was globular. All rims revealed a complete absence of collaring. Correlating these observations, it is possible to generate a typical shape for ClIf-2, ceramic vessels (Figure 18).

The result is a shape which can be defined as ovaloid with a nipple-like basal protrusion. (Shepard 1965:233) and an insloping rim profile.

FIGURE 18: TYPICAL MORPHOLOGY OF AN EARLY LAUREL CERAMIC VESSEL FROM THE MICHIPICOTEN HARBOUR SITE.



With the exception of the last characteristic, this description fits most of the Laurel ceramic ware found in the Lake Superior and Northern Lake Michigan area (Janzen 1968:49; Wright 1972, diagram 1). The insloping rim profile manifests itself in a minor way at the Killala Lake Site (DgIp-1) and the EAKA Site (EaKa-3) (Wright 1967) in Northwestern Ontario and in a similar manner at the Naomikong Point Site on the south shore of Lake Superior in the Upper Peninsula of Michigan (Janzen 1968:49-55). All of the other sites on Lake Superior's north shore, described by Wright, had ceramic vessel assemblages which were dominated by straight or outsloping rim profiles. It is curious indeed that all 11 identifiable vessels from the Michipicoten Harbour Site had insloping rim profiles. Finding a single vessel morphology on a Laurel site is unusual and on an Algonkian site is almost unheard of.

While positive evidence is scant, there is some to suggest that the Terminal Woodland, Algonkian people of the Lake Superior area are descendants of the Initial Woodland, Laurel Culture people of the same area (Wright 1972:98). It is generally accepted that the Algonkians practised exogamy and if, indeed they are descended from the Laurel People, this custom may be extrapolated back into Initial Woodland times. Exogamy, thus female mobility, in combination with the fact that pottery manufacture was a female tradition, would suggest that the pottery found on any site, in this region, would be heterogeneous, both in morphology and decorative style. Every married woman in every village would have been born elsewhere, within the female exchange region, bringing with her the ceramic culture passed on to her by her mother. Any ceramic decorative or morphological idiosyncracy would then appear to be passed down the female blood line, spreading across the exchange region as the daughters marry. This situation of criss-crossing ceramic variability would produce what archaeologists of the northern Great Lakes region find--ceramic artifactual remains of what appears to be many pottery traditions.

Accepting the foregoing as the norm, how does the Michipicoten Harbour Site (ClIf-2) fit this picture? One possibility is that the site is rather early in terms of a pottery industry, so that variation in shape and decoration had not, as yet, been attempted. In support of this hypothesis is the predominance of pseudo scallop shell decoration and the total absence of linear punctating. In The Laurel Tradition and the Middle Woodland Period, Wright (1967:121) states that "the technique pseudo scallop shell is predominantly early and decreases with time."

In the same publication, Wright (p.123) says that "linear punctate shows an increase in popularity in the Laurel Tradition." Taken together, the foregoing suggests that the Michipicoten Harbour Site is an early, perhaps isolated, Laurel Culture site with the possibility that it was one of the first sites in the region to have adopted ceramic technology. It would be expected that such a site would show very little diversity, either in shape or decoration.

Another possibility is that the site is very small, with perhaps one family. This situation would certainly narrow the diversity of style and shape of the artifactual remains. To have produced 4150 sherds with an average weight of 2.8 grams, a single family group would have had to occupy the site for many seasons, expecially since the locale mitigated against anything but mid-summer habitation. The site itself does not offer any evidence of time depth in that it contains a single, thin cultural horizon and a total absence of stratigraphic layering.

A more extensive excavation of the site would also be valuable in light of the artifact concentrations and features that were uncovered during the 1971 exploration.

RIM METRICS

The mean lip thickness of the sherds from ClIf-2 (See Table 21) reveals that this measurement falls very close to the mean of lip thickness of Laurel sites within the Lake Superior basin, reflecting perhaps a similar attitude by potters of the area regarding this one attribute. Since this collection of sites represents both early and late Laurel Culture, this attribute would appear to be a diachronic constant.

Rim thickness was measured at a distance of 1.5 cm. below the lip. This distance was adopted so that rim sherds of this depth could be included in the data. It has no comparative value, at present, because other investigators have chosen different depths for rim thickness, (e.g. Wright's 1972 thickness values are for a distance one inch below lip). The outside diameter of rims was determined by comparing each rim with a series of concentric semi-circles. The reliability of this figure is largely dependent on the sector of the circumference which contains the particular rim-sherd in relation to the rim circumference. A reliability figure for each rim diameter was calculated by dividing the sector length by half the derived rim circumference since a half rim would provide a reliability of one (or 100%).

At the present time, rim diameters are of little comparative value since this information has not been included in Laurel site reports as yet.

TABLE 21: ClIf-2 RIM METRICS

Vessel	Thickness lip	Thickness rim	Diameter	Sector length	Reliability factor	
1	5.1	6.0	180	24	.085	
2	4.9	5.5				
3	3.4	5.0	180	39	.138	
4	4.5	6.8				Mean lip thickness
5	4.3	6.6	160	24	.095	4.47 mm.
6	4.7	6.1				Mean rim thickness
7	5.0	6.1	160	29	.115	(15 mm. below lip)
8	4.2	5.3	180.	27	.095	
9	4.6	6.0	160	73	.290	5.98
10	4.7	7.2	160	58	.231	Mean diameter
11	3.8	4.9	120	22	.117	164 mm.

TABLE 22: ClIf-2 SHERD HARDNESS

Location	Sample 1	2	3	4	5	Mean	
10N20E	2.5	2.5	3	2.5	2.5	2.6	
30N20E	2.5	3	2.5	4.5	2.5	3	
90N10W	2.5	3	2.5	2.5	3	2.7	
160N90W	3.5	3.5	2.5	3	3.5	3.2	
160W80W	3	2.5	3	3	2.5	2.8	Mean 2.9
170N90W	3	2.5	3.5	3	3	3	Range 2.5-4.5
Test Trench 1	3	3	3.5	3	2.5	3	
Test unit 3	3.5	3	3	2.5	2.5	2.9	
Test unit 7	3	2.5	3	3	2.5	2.8	
Test unit 22	3	3	3	3	2.5	2.9	

SUMMARY

The evidence derived from the ceramic remains of the Michipicoten Harbour Site indicate that this site is somewhat unique among Laurel Culture Sites, of the Lake Superior drainage basin.

From the small number of vessels (21) recovered and the paucity of decorative design, it is evident that the site was occupied by a small group, probably an extended family, not exceeding 15 in number. Of this number it is likely that 7 or 8 were female and thus the bearers of the ceramic tradition. If some form of group exogamy is assumed then 3 or 4 of the potters were women who had married into the group. Judging from the single vessel morphology and the characteristics of the decoration, that is, prevalence of pseudo scallop shell and total lack of encircling punctates it is quite possible that one of these women introduced ceramic technology to the region.

Whether pottery was introduced on this site or not, the local potters, after adopting the technology to local environmental conditions, displayed no desire to experiment with different shapes or styles, an indication that the process was remembered and passed on as a form of custom or ritual. It indicates also that the potters were a conservative group, at least in their approach to ceramics.

The pots appeared to be fired on-site, in at least 2 kiln areas which were also used for cooking. The kilns were located in depressions, which might indicate that the constant winds in the area had caused the potters problems with insufficient firing temperatures. This adaptation to a local condition must have been accomplished very shortly after introduction since no sherds tested indicated a hardness of less than 2.5.

While some of the sherds were darker than others, there was no indication on any sherds of encrustation due to carbonized food residue. While this is not conclusive it suggests that the ceramic vessels were not as yet being used as cooking vessels in the same manner as vessels found on the other sites. What they might have been used for can only be left to speculation. Since the pottery from the other 3 sites (ClIf-1, ClIf-6, ClIf-8) in the vicinity and especially the other Laurel Site indicated the presence of cooked vegetal and possible faunal matter on the interior surfaces, the possibility exists that the people of ClIf-2 were either cooking their food in another manner, or were eating different food. It is quite probable that they were consuming a largely meat diet which was being roasted, a process that does not require containers. The faunal material found on site would tend to corroborate this hypothesis.

LITHIC ANALYSIS OF THE MICHIPICOTEN HARBOUR SITE (ClIf-2).

INTRODUCTION

The lithic artifacts from the Michipicoten Harbour Site are comprised of cherts, slates and cobblestones of various compositions. Slate and cobblestones are locally abundant but chert was imported to the site. It is concluded that a particular type of chert was used for a particular type of tool, that is, Southern Palaeozoic Cherts were extensively used in fashioning bifacial tools while Northern Palaeozoic Cherts, were reduced to form unifacial and pebble core tools.

Two knapping techniques are discernible: bifacial flaking of a preform and the bipolar technique of core reduction. The former technique is used primarily in fashioning bifacial and unifacial tools while the latter produces a core tool called a wedge. This technique was reserved for the Northern Palaeozoic Cherts.

The lithic artifacts reflect the ingenuity of the people living in the area since a very basic tool such as the "bevelled flake" (scraper) probably served a number of purposes.

Functionally, the lithic assemblage of ClIf-2 reflects involvement in a butchering operation of which certain aspects (skinning and tanning of animal hides) will be discussed. This particular industry is significant in that it reflects an activity associated with the "seasonal round" of the Laurel people.

RAW MATERIAL

LOCALE

1a) Chert

There is no locally available chert.

1b) Quartz and Quartzite

These two materials are locally abundant as pebbles and cobbles in the glacial till but the specimen recovered from ClIf-2 do not appear to exhibit any evidence of cultural utilization.

1c) Slate

This material is copious in the local environment. As in the case of the quartz and quartzite specimens, modification of the slate material is difficult to discern. Because the slate recovered from ClIf-2 itself does not outcrop naturally in the immediate area of the site, it is assumed that its occurrence on the site is a result of cultural selection.

1d) Cobblestones

Along the Lake Superior shoreline, cobblestone beaches are a natural phenomena. These cobblestones are usually comprised of gabbros and basalts.

Imported

The initial identification of cherts was carried out by Mr. William Fox (Ministry of Culture and Recreation, London, Ontario) to whom we are greatly indebted. In addition to identifying the particular types of chert, Mr. Fox has identified the source location of these chert types. (See Map 5).

NORTHERN PALAEOZOIC CHERTS

2a) Hudson Bay Lowland Chert

The Hudson Bay Lowland Chert is glacially derived cobble chert from the Palaeozoic Ekwan River, Severn River and/or Stooping River, formations in the Hudson Bay Lowlands (Sanford, Norris and Bostock 1968).

The chert varies in colour; the dominant colour is grey but hues of light blue, green, yellow and red may be present. The chert has a glossy-overall appearance and inclusions are not characteristic.

SOUTHERN PALAEOZOIC CHERTS

3a) Manitoulin Island Chert

Manitoulin Island Chert is derived from the Palaeozoic Fossil Hill Formation found on the island. The mottled white and grey colours of the chert give it an overall appearance of having been thermally altered. There are numerous inclusions of various sizes, shapes and colours.

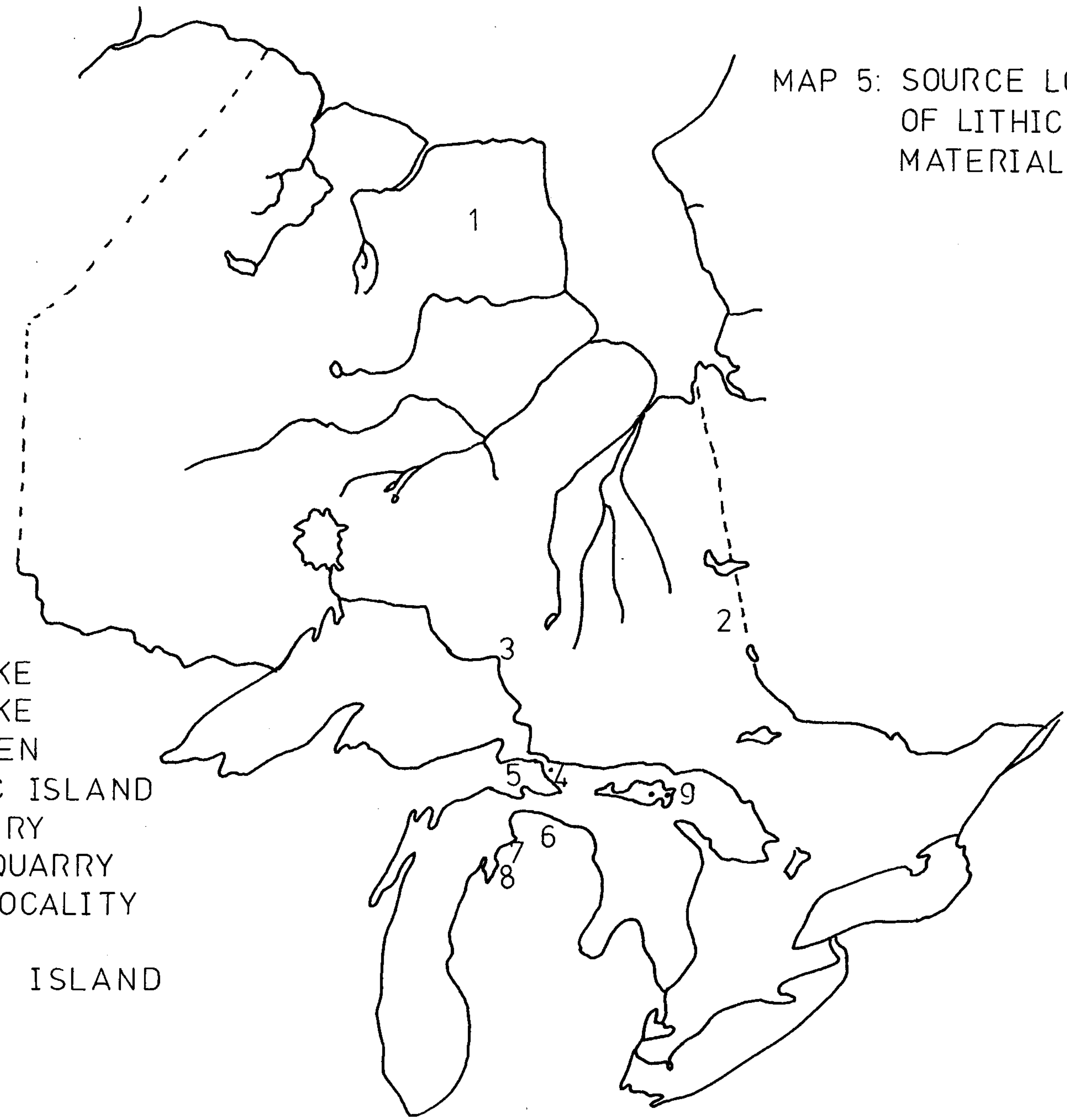
Michigan Cherts

There are at least five chert sources in Michigan; the Norwood Locality, Scott Quarry, Campbell Quarry, Bayport Formation and Bois Blanc Island.

Only chert from Scott Quarry (3b) appears in our C1If-2 collection. Scott Quarry is a part of the Cordell formation.

The source location is approximately 150 miles by water from Michipicoten (See Map 5).

MAP 5: SOURCE LOCATIONS OF LITHIC RAW MATERIAL



1. HAWLEY LAKE
2. LARDER LAKE
3. MICHIPICOTEN
4. BOIS BLANC ISLAND
5. SCOTT QUARRY
6. CAMPBELL QUARRY
7. NORWOOD LOCALITY
8. EASTPORT
9. MANITOULIN ISLAND

Chert from this location ranges in colour from a very dark brown (Munsell 10YR2/2) to a greyish brown (Munsell 10YR5/2). Inclusions are present and range in size from one millimeter to five millimeters.

Agate

4a) Lake Superior Agate is probably derived from the Precambrian Osler Group Formation. Colour of the material ranges from red (Munsell 10YR4/4) to weak red with numerous striations present.

Table 23 illustrates the distribution by weight and number of the lithic raw material utilized at ClIf-2.

TABLE 23: DISTRIBUTION BY WEIGHT OF LITHIC RESOURCES AT THE MICHIPICOTEN HARBOUR SITE (C1If-2).

CLASSIFICATION	WT. (gm)	%
LOCAL		
1a) Quartz and Quartzites	2.5	0.3
1b) Cobblestones	395.4	46.3
1c) Slate	44.6	5.2
SUB-TOTAL	442.5	51.8
IMPORTED		
2a) Hudson Bay Lowland Chert	193.65	22.7
3) Southern Palaeozoic Chert	27.15	3.2
3a) Manitoulin Island Chert	57.75	6.8
3b) Scott Quarry Chert	15.25	1.8
4a) Lake Superior Agate	1.15	0.1
?) Unknown	116.1	13.6
TOTAL	853.55	100

DESCRIPTION OF LITHIC ARTIFACTS

INTRODUCTION

In general the artifacts recovered can be separated into two families: conchoidally fractured material and non-conchoidally fractured material or rough stones.

The lithic assemblages of ClIf-2, 6, 8 were classified as follows:

A: Conchoidally - fractured material

I: Detritus

I:a) Flakes

- (i) Pressure flakes
- (ii) Secondary flakes
- (iii) Primary flakes

I:b) Cores

- (i) Shatter fragments
- (ii) Chips
- (iii) Rejuvenated Core Fragments
- (iv) Core Fragments
- (v) Cores
- (vi) Bipolar Cores
- (vii) Exhausted Cores

II: Utilized Artifacts

II:a) Unmodified Flakes
  (i) Edge Deteriorated Flakes

II:b) Retouched Tools
  (i) Unifaces
    (1) Bevelled Flakes
    (2) Unifacial Tools
    (3) Problematic Chert Tools
  (ii) Bifaces
    (1) Biface-preforms
    (2) Projectile Points
  (iii) Core Tools
    (1) Wedges
    (2) Core fragments
    (3) Cores
    (4) Gouges

B: <u>Non-conchoidally fractured material--rough stones</u>

I: Hammerstones, Problematic Cobblestones
II: Slate

A) CONCHOIDALLY FRACTURED MATERIAL

The only material which was fractured conchoidally was chert. Table 24 illustrates the frequency distribution of all conchoidally fractured material.

TABLE 24: THE FREQUENCY DISTRIBUTION BY WEIGHT OF ALL CONCHOIDALLY FRACTURED MATERIAL FROM THE MICHIPICOTEN HARBOUR SITE (C1If-2).

CLASSIFICATION		WT.	%
2a)	Hudson Bay Lowland Chert	193.65	47.1
3)	Southern Palaeozoic Chert	27.15	6.6
3a)	Manitoulin Island Chert	57.75	14.0
3b)	Scott Quarry	15.25	3.7
4a)	Lake Superior Agate	1.15	.3
?)	Unknown	116.10	28.2
TOTAL		411.05	99.9

All conchoidally fractured material was further classified into two major groups: (1) detrital material and (2) utilized artifacts.

This level of description may be useful in delimiting generalized stages of tool production at a particular site.

For example, one can expect different frequencies of these two categories when comparing a quarry site, to a site where tools are constantly used.

Table 25 is a summary of the frequency distribution for these two categories.

TABLE 25: THE FREQUENCY DISTRIBUTION BY WEIGHT OF RAW MATERIAL FOR GROUPS I AND 2 FROM THE MICHIPICOTEN HARBOUR SITE (ClIf-2).

RAW MATERIAL

CLASSIFICATION

	2a	3	3a	3b	4a	unknown	total
DETRITUS	107.50	0.0	30.55	0.0	1.15	90.75	229.95
%	27.2	0.0	7.4	0.0	0.3	22.1	57.0
UTILIZED	86.15	27.15	27.20	15.25	0.0	25.35	181.10
%	21.0	6.6	6.6	3.7	0.0	6.1	44.0
TOTAL	193.65	27.15	57.75	15.25	1.15	116.10	411.15
%	48.2	6.6	14.0	3.7	0.3	28.7	101.0

The distribution is slightly skewed to the detrital category, with half of the detritus and utilized material being derived from Northern Palaeozoic Chert.

GROUP I: DETRITUS

DETRITUS SPECIMENS

Detritus specimens were divided into two categories: flakes and cores. The flakes were divided into three types: pressure, secondary and primary percussion, while shatter fragments, core fragments, cores and exhausted cores were assigned to the category of cores. The frequency distribution by weight for each group is summarized in Table 26.

TABLE 26: THE FREQUENCY DISTRIBUTION BY WEIGHT OF RAW MATERIAL FOR DETRITUS SPECIMENS FROM THE MICHIPICOTEN HARBOUR SITE (C1If-2).

TYPE OF MATERIAL

CLASSIFICATION

	2a	3a	4a	Unknown	Total
FLAKES	91.5	30.6	1.2	84.5	207.8
%	39.8	13.3	0.5	36.7	90.3
CORES	16	0.0	0.0	6.3	22.3
%	7.0	0.0	0.0	2.7	9.7
TOTAL	107.5	30.6	1.2	90.8	230.1
%	46.8	13.3	0.5	39.4	100.0

The distribution of the detrital material is dominated by the flake category which may indicate that tool shaping and sharpening activities were important.

I:a) FLAKES

I:a(i) PRESSURE FLAKES

There were 234 small pressure flakes from the site. If the percentages by number (18.9%) and by weight (2.7%) are compared there is a significant difference between the two measurements. As in the previous analysis of raw material, weight rather than number is used in the statistical analysis. The average weight of each unutilized flake is .025 grams.

During the excavation of the site, the backdirt was not screened and for this reason the field recovery of these miniscule flakes was not as efficient as it might otherwise have been.

Even though the retouch flakes were poorly represented by weight (2.7%), a very large increase in number would not significantly skew the results in the other major categories, nor would an increase in number appreciably increase the percentage by weight.

In addition to their small size, these flakes are generally characterized by flat profiles, slightly crushed platforms, parallel sides, and a feather termination. Table 27 summarizes their distribution on the site.

Since no specific analysis was carried out on this particular category, only number, weight and type of material was recorded, the details of which are tabulated in Table 27.

TABLE 27: THE DISTRIBUTION BY NUMBER, WEIGHT AND RAW MATERIAL OF PRESSURE FLAKES FROM THE MICHIPICOTEN HARBOUR SITE.

TYPE OF MATERIAL	N	%	WT.	%	AV.WT.
2a (HBL)	146	62.3	4.05	70	0.027
Unknown	88	37.6	1.70	30	0.02
Total	234	99.9	5.75	100	0.025

I:a(ii) Secondary Flakes

"Secondary Flaking refers to the processes of knapping flakes from a core" (White 1963:7, Binford, Papworth 1963:7). Within this category, the most common flake types are those of bifacial retouch (Fitting, DeVisscher and Wahla 1966:21). This category is the largest flake category of the three types, comprising 66.9% by weight of the unutilized category and 51.9% of the total flake class.

The basic characteristic of these flakes is that the angle between the outer surface and the platform is acute. Additionally, these flakes are distinguished by crushed, simple, single-faceted or multi-faceted platforms, diffuse bulbs of percussion, and hinge, step and feather terminations. The overall shape was varied, ranging from triangular, oval, square, rectangular to irregular. Undulations were present on the ventral surface but the degree of intensity varied from heavy to nonexistent.

A sample of 96 flakes or 24% of the total population by weight was selected for comparative analysis. The sample was selected non-randomly in that the same type of material utilized was kept constant between the differing populations of ClIf-2 and ClIf-8. Seven variables per flake were recorded: platform thickness, platform length, platform angle, maximum thickness, maximum width (perpendicular to length), maximum percussion length, and weight, along with the catalogue number of each flake.

Table 28 summarizes the total distribution both in terms of number and weight for the particular type of material used for this flake type.

TABLE 28: THE FREQUENCY DISTRIBUTION BY NUMBER, WEIGHT, RAW MATERIAL OF SECONDARY FLAKES FROM THE MICHIPICOTEN HARBOUR SITE (ClIf-2).

TYPE		N	%	WT	%	AV.WT.
2a)	HBL	168	19.3	24.8	17.8	.15
3a)	Manitoulin	178	20.4	30.55	21.9	.17
4a)	Lake Superior Agate	2	0.2	0.9	0.6	.45
?)	Unknown	522	60.0	82.8	59.5	.16
TOTAL		870	99.9	139.05	99.8	.160

I:a(iii) PRIMARY FLAKES

Primary percussion flakes, (those knapped in shaping a block or nodule of flint into a core) comprised 30.3% by weight of the unutilized category. All of the flakes were identified as Hudson Bay Lowland Chert, accounting for 99.6% by weight of the sample. The following is a list of characteristics attributed to the primary percussion flakes of C1If-2: the dorsal surface is covered with cortical material; platforms are the result of a percussion technique; flakes are generally flat in profile but slight concave curvature may occur on the ventral surface. Table 29 summarizes their distribution.

TABLE 29: THE FREQUENCY DISTRIBUTION BY NUMBER, WEIGHT AND RAW MATERIAL FOR PRIMARY FLAKES OF THE MICHIPICOTEN HARBOUR SITE (C1If-2).

TYPE	N	%	WT.	%	AV.WT.
2a	132	99.2	62.65	99.6	0.47
4a	1	0.8	.25	.4	0.40
Total	133	100	62.90	100	0.47

I:b) CORES

Only two pebble cores (Nos. 373 and 202) and two exhausted cores (Nos. 359 and 318) were recovered. Table 30 summarizes the data obtained.

TABLE 30: SUMMARY OF DATA FOR CHERT CORES FROM ClIf-2.

No.	373	202	359	318
Location	unit 10	10N10E	160N80W	160N80W
Type of Chert	2a	2a	unknown	unknown
Wt. (gm)	11.50	4.50	3.25	3.00
Rotation Platform	80^{o}, 30^{o}	90^{o}	absent	absent
Length	1.3,2.0,.9	1.5	absent	absent
Comments	crushed surfaces present on distal end away from platform.	rotation result of rejuvenation of platform.	absent exhausted cores.	absent exhausted cores.

GROUP II: UTILIZED ARTIFACTS

Any artifact displaying any signs of utilization was assigned to one of two categories: unmodified flakes or secondarily retouched tools. The frequency distribution by weight of raw material for these two categories is summarized in Table 31.

RAW MATERIAL

CLASSIFICATION

	2a	3	3a	3b	Unknown	Total
UNMODIFIED	14.8	12.7	21.05	5.3	6.0	59.85
%	8.2	7.0	11.6	2.9	3.3	33.0
MODIFIED	71.35	14.45	6.15	9.95	19.35	121.25
%	39.4	8.0	3.4	5.5	10.7	66.9
TOTAL	86.15	27.15	27.20	15.25	25.35	181.10
%	47.6	15.0	15.0	8.4	14.0	99.9

The unmodified flakes are primarily derived from Southern Palaeozoic material in contrast to the modified tool category which is dominated by Northern Palaeozoic Cherts.

Although function will be discussed later, the large percentage (33%) of unmodified flakes suggests that a "fine" cutting function, for which unmodified flakes are well suited, was an important activity associated with the lithic tools.

II:a) UNMODIFIED FLAKES

II:a(i) Edge Deteriorated Flakes

The 35 flakes included in this category exhibited a worked or retouched marginal edge. Although many had flake scars, there were no signs of retouching on the dorsal or ventral surfaces. When compared to the unutilized flakes, these flakes were found to be larger in all proportions. This difference was best expressed by weight. The utilized flakes were approximately four times the weight of the primary percussion flakes. Platforms vary from faceted to crushed. Lipping is occasionally present and undulations range from heavy to light. Terminations are usually hinged or step, although two crushed ends were noted. Inasmuch as there was no statistically valid preference for a particular chert type, Southern Palaeozoic Cherts comprised 65.5% of all chert types of utilized flakes. See Table 32 for the particular flake distribution.

TABLE 32: THE FREQUENCY DISTRIBUTION BY NUMBER, WEIGHT AND RAW MATERIAL OF UNMODIFIED FLAKES FROM MICHIPICOTEN HARBOUR SITE.

RAW MATERIAL	N	%	WT.	%	AV.WT.
2a) H.B.L.	10	28.5	14.8	24.7	1.48
3) Southern Palaeozoic	5	14.4	12.70	21.2	2.50
3a) Manitoulin	13	37.0	21.05	35.0	1.62
3b) Scott	2	5.7	5.3	8.8	2.65
?) Unknown	5	14.4	6.0	10.0	1.20
Total	35	100.0	59.85	99.7	1.71

II:b) RETOUCHED TOOLS

Any tool exhibiting technological modification was assigned to one of five types: bevelled flakes; unifacial tools; preforms-bifaces; points; and core tools. At this site 31 bevelled flakes, one unifacial tool (problematic object 1), 2 bifaces and 5 points are represented.

Table 33 summarizes the frequency distribution by weight and raw material of all types of retouched tools.

TABLE 33: THE FREQUENCY DISTRIBUTION BY WEIGHT OF RAW MATERIALS FCR RETOUCHED TOOLS OF THE MICHIPICOTEN HARBOUR SITE.

RAW MATERIAL

CLASSIFICATION

	2a	3	3a	3b	Unknown	Total
BEVELLED	66.1	1.6	6.15	2.3	15.2	91.3
%	54.5	1.3	5.1	1.9	12.5	75.3
UNIFACIAL	0.0	0.0	0.0	0.0	1.2	1.2
%	0.0	0.0	0.0	0.0	1.0	1.0
BIFACE	3.4	0.0	0.0	7.7	0.0	11.1
%	2.8	0.0	0.0	6.3	0.0	9.1
POINTS	1.9	12.9	0.0	0.0	3.0	17.8
%	1.6	10.6	0.0	0.0	2.4	14.6
TOTAL	71.4	14.5	6.2	10.0	19.4	121.4
%	58.9	11.9	5.1	8.2	15.9	100

Bevelled flakes dominate the distribution with the majority of flakes being derived from Northern Palaeozoic chert.

II:b(i) UNIFACES

BEVELLED FLAKES

This artifact type comprises 75.3% of all modified tools, emphasizing the importance of the activity associated with this tool type.

Northern Palaeozoic Cherts were used to fashion 72% of the artifacts in this category while Southern Palaeozoic Cherts were used in 11.5% of the cases--a direct contrast to the proportions which exist in the utilized flake category.

The presence of cortical material was an unimportant attribute for bevelled flakes since two of the end scrapers were decortification flakes.

In general, the bevelled flakes are characterized by secondary retouch along one or more edges; unifacial working along the dorsal surface; plano-convex ventral surfaces; dorsal surfaces with a ridge perpendicular to the bevelled face and formed from two flake scars, and bevelled faces convex in cross section.

The bevelled flakes have been classified into two sub-types: those with a single bevelled face and those with more than one bevelled face.

SINGLE BEVELLED FLAKES (SEE FIGURE 19)

Those with a single bevelled face have been labelled end scrapers since the bevelled edge occurs at the end distal to the striking platform. There is a total of 31 end scrapers.

Within this subtype there are two varieties--trapezoidal and triangular (Dawson 1975:55).

FIGURE 19: TWENTY-SEVEN SINGLE BEVELLED FLAKES FROM THE MICHIPICOTEN HARBOUR SITE, ClIf-2.

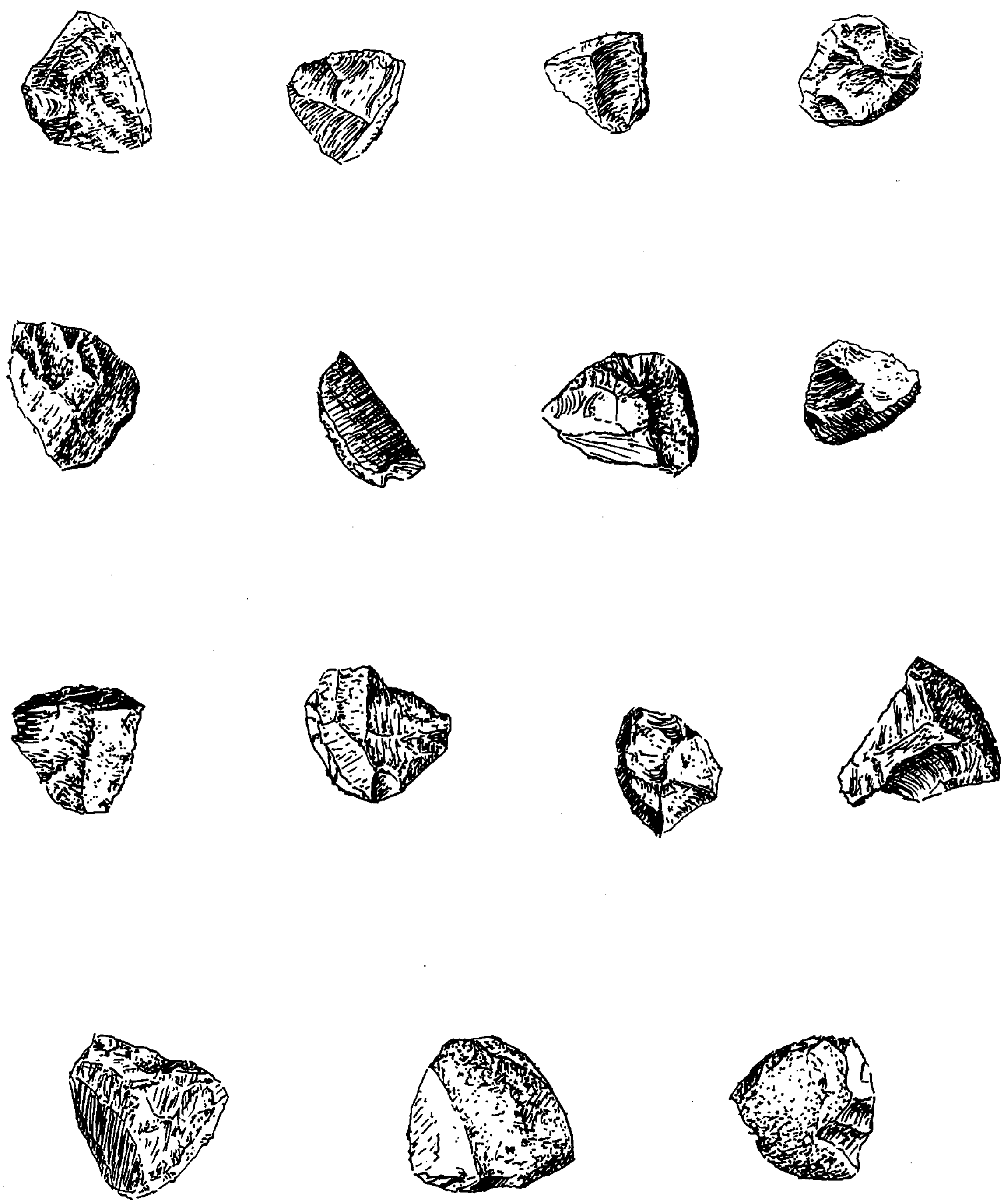
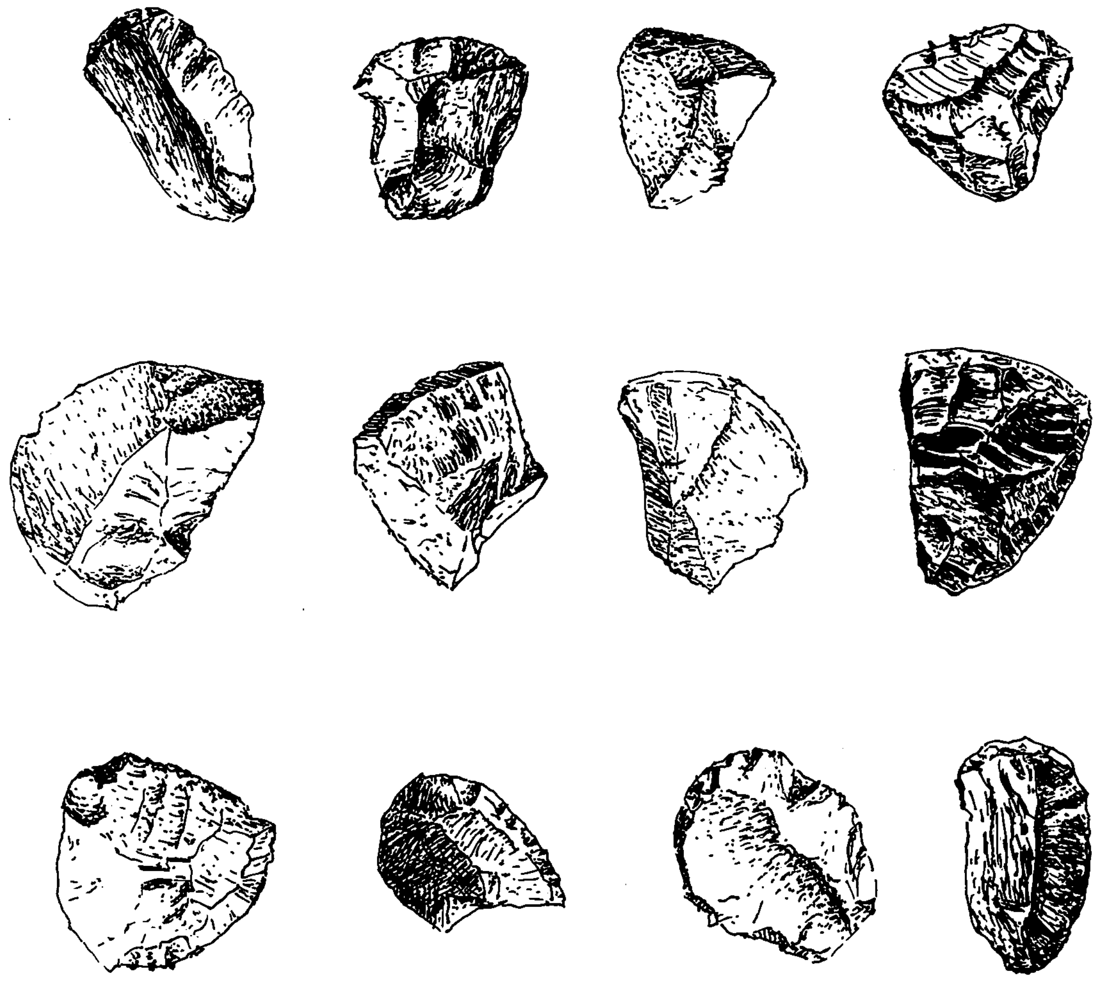


FIGURE 19 CONT'D.



TRAPEZOIDAL END SCRAPERS

Of the 13 trapezoidal end scrapers, seven were of the oblong variety and six were prolate. Two of the oblong variety were small convex, while five were medium convex. Of the prolate variety, one was a small sub-parallel type; two were medium sized sub-convex prolate. (Table 34 summarizes the basic dimensions of the end scrapers).

TRIANGULAR END SCRAPERS

The 18 triangular end scrapers were separated into two varieties according to size: those less than 2.0 cm. were called small, and those greater then 2.0 cm. were called medium. There were 9 small and 9 medium triangular end scrapers. In the medium variety, No. 52 is rather unique in that the dorsal surface was thinned by secondary retouch (pressure flakes) (See Figure 21).

MULTI-BEVELLED FLAKES

The seven multi-bevelled flakes were divided into small and medium varieties as in the triangular end scraper category. There were three scrapers in the small variety. The bevelled faces were arranged in the following manner; one end and end, one side and side and one end and left side bevels.

In the medium variety the bevelled faces were two end and right side, one end and ventral right side, and No. 543 had three bevelled faces (See Table 34 for summary of basic dimensions).

TABLE 34: METRICAL SUMMARY OF BASIC DIMENSIONS OF CHERT SCRAPERS FROM ClIf-2.

TYPE	LENGTH (cm)		WIDTH		BREADTH		WEIGHT	
	RANGE	MEAN	RANGE	MEAN	RANGE	MEAN	RANGE	MEAN
TRAPEZOIDAL								
Oblong Small	1.5-2.0,	1.75	1.6-2.0,	1.8	.50-.55,	.53	1.45-1.55,	1.5
f	2		2		2		2	
Medium	2.5-3.7,	2.95	1.6-2.7,	2.3	.45-.7,	.6	2.55-5.85,	4.0
A	5		5		5		5	
Prolate Small Parallel		1.0		2.1		.25		.6
f	1		1		1		1	
Small Convex		.5		1.8		.35		.2
f	1		1		1		1	
Medium Parallel	2.25-2.35,	2.3	2.3-2.5,	2.4	.4-.5,	.45	2.65-3.2,	2.8
f	2							
Medium Convex	1.9-2.1,	2.0	2.3-2.5,	2.4	.45-.5,	.48	2.25-2.7,	2.5
f	2		2		2		2	
TRIANGULAR								
Small	1.4-1.9,	1.6	1.5-2.1,	1.76	.2.5-.5.5,	0.36	.55-1.85,	1.0
f	9		9		9		9	
Medium	1.75-2.75,	2.2	1.9-2.9,	2.2	.3-.75,	.47	1.4-6.0,	2.5
f	9		9		9		9	
MULTIFACED								
Small	1.5-1.7,	1.57	1.7-1.9,	1.76	.3-.4,	.36	.95-1.4,	1.1
f	3		3		3		3	
Medium	1.3-3.35,	2.2	1.3-2.55,	2.1	.5-.75,	.6	2.35-7.35,	4.0
f	4		4		4		4	

II:b(i)-3 TWO PROBLEMATIC CHERT TOOLS No. 196, No. 514 (See Figure 20).

The first object (No. 196) is a small linear flake. The differential wear found on the blade suggests that it was used in a variety of ways. The wear consists of step fractures along the left edge which is characterized by secondary retouch. The tip of the blade is marked by slight hinge fractures on both surfaces. The particular wear patterns suggest that the tool was used as a drill or perforator and as a scraper. Although the chert material was unidentifiable the following data are given:

Location	30N30E
Length (cm)	3.00
Width (cm)	1.10
Breadth (cm)	0.35
Weight (gm)	1.20

The second problematic tool (No. 514), derived from Hudson Bay Lowland Chert, was a broken biface that probably had been reworked after it had been broken. In size, it was comparable to most scrapers and in shape, had the outline of an equilateral triangle. The sides of the biface had been snapped, and the base is concave. Although both surfaces had been flaked, a greater number of flakes were removed from the ventral surface resulting in a gouged or hollowed surface at the base. The following data were obtained:

Location	Ext. unit 22
Length (cm)	2.35
Width (cm)	2.40
Type	2a
Weight (gm)	3.40

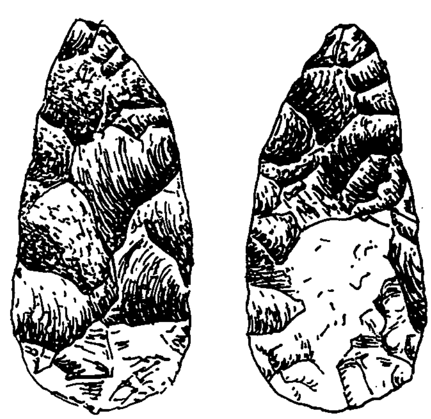
FIGURE 20: PROBLEMATIC CHERT OBJECTS FROM ClIf-2.

II:b(ii)-1 BIFACE

Only one biface, No. 184, was recovered from the site. It is derived from Scott Quarry Chert (3b). Expanding flakes were removed from the dorsal surface, indicating that this surface was thinned and shaped by using freehand percussion with a small bone flaker. The ventral surface is pressure-flaked as evidenced by the small retouch scars. Basic measurements are:

No	184
Location	unit 3
Length (cm)	5.20
Width (cm)	2.35
Breadth (cm)	0.70
Weight (gm)	7.65
Type	3b
Shape	ovate

FIGURE 21: BIFACE No. 184 FROM ClIf-2.



II:b(ii)-2 CHERT PROJECTILE POINTS (See Figures 22-23).

Although only one complete projectile point, No. 576, was recovered, the outline of a second point, No. 598, broken in the midsection, could be extrapolated.

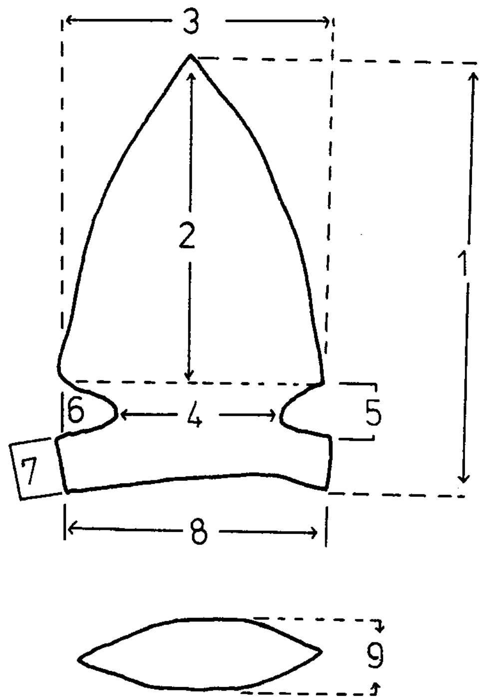
The basal portions of two points were also admitted to this case. A fifth artifact, No. 203, is believed to have been used as a knife.

All five points were side notched and all but point No. 642 were derived from Southern Palaeozoic Cherts.

The two projectile points exhibited differences in knapping styles with No. 598 having larger side notches, a smaller width, a greater thickness to width ratio, plus an absence of large flake scars.

FIGURE 22: PROJECTILE POINT, No. 203, POSSIBLY USED AS A KNIFE.

FIGURE 23: DIAGRAM DEMONSTRATING MEASUREMENTS TAKEN ON PROJECTILE POINTS



1. OVERALL BLADE LENGTH
2. LENGTH OF BLADE
3. MAXIMUM WIDTH OF BLADE
4. WIDTH AT NECK
5. WIDTH OF NOTCH
6. DEPTH OF NOTCH
7. DISTANCE, NOTCH TO CORNER
8. BASAL WIDTH
9. MAXIMUM THICKNESS

TABLE 35: METRICAL DATA OF FIVE CHERT POINTS FROM C1If-2

No.	642	302	576	598	590
Location	ext.7	90N10W	160N90W	SQC	SQC
Length (cm)	undetermined	4.0	3.45	undetermined	undetermined
Width	2.1	2.35	2.5	1.9	undetermined
Thickness	0.5	0.75	0.6	0.55	undetermined
Width at Neck	1.5	1.75	1.7	1.1	1.45
Width at Notch (R,L)	0.25,0.3	0.6,0.4	0.35,0.3	0.5,0.5	0.2.0.35
Depth of Notch (R,L)	0.45,0.5	0.3,0.2	0.2,0.3	0.3,0.4	0.15,0.15
Distance of Notch to Corner (R,L)	0.1,0.2	0.35,0.5	0.2,0.2	0.4,0.4	0.45,0.4
Basal Width	1.75	2.3	2.05	1.75	1.85
Weight (gm)	1.9	7.25	4.9	2.95	0.75
Type	2a	3	3	unknown	3

B) NON-CONCHOIDALLY FRACTURED ARTIFACTS

Non-conchoidally fractured artifacts were limited to 3 cobblestones and several pieces of slate.

I) HAMMERSTONES

The hammerstones were derived from gneissic and basaltic waterworn cobbles which are locally available. Hammerstone No. 391 was derived from gneissic material. It is cigar shaped but was split longitudinally along one of the lines of weakness within the material. Hammerstone No. 444, derived from basaltic material, is basically much smaller in mass than No. 391. Table 36 summarizes the metrical data.

TABLE 36: METRICAL DATA FOR THREE COBBLESTONES FROM ClIf-2.

No.	391	444	607
Length (cm)	10.6	5.5	5.45
Width (cm)		4.4	4.45
Breadth (cm)	3.6	2.7	2.80
Weight (gm)	191.5	99.9	104.0

PROLEMATIC COBBLESTONE No. 607

The stone is rectangular in shape and transverse section and ovoid in cross section. The end of the cobble is flat and the original size of the tool may have been larger than it is at present. There are three types of cultural alteration present on the stone: flake removal, roughing, and smoothing.

Basically two types of flakes have been removed: large expanding flakes were removed from the posterior end of the stone in what may have been an effort to thin the artifact, possibly for hafting purposes before it had been broken; and small flake scars are irregularily distributed along the edge in conjunction with slight step fractures. It is suggested that these flakes were removed as a result of use, perhaps in a hammering motion.

The right rounded edge of the cobblestone is characterized by slight peck marks that have created a pitted surface, whereas the flat ventral surface of the stone is particularily smooth with slight scratch marks perpendicular to each other.

The fact that this artifact was found in an area of high concentration of chert flakes and tools, ceramic sherds, faunal remains, and hearth material, suggest that it may have been used in a butchering operation.

B:II) <u>SLATE</u>

Although slate fragments were recovered from the site, only one (No. 66) exhibits wear which could be associated with cultural utility. Weighing 446 grams, it is diamond shaped in cross section and somewhat lanceolate in transverse section.

ANALYSIS

INTRODUCTION

In the analysis of the lithic assemblage of ClIf-2 the selection of raw material is considered and two questions are asked: how were the stone tools produced and what were the functions of the stone tools?

SELECTION OF RAW MATERIAL

It is impossible to identify most of the lithic detritus. A very significant percentage (60%) of the secondary and pressure flakes were not identifiable and were omitted from the analysis. In the remaining nine types (primary percussion flakes, edge deteriorated flakes, bevelled flakes, biface, projectile points, blade tool, broken biface, cores and exhausted cores) there is a high percentage (17%) of unknown material (See Table 37). It is assumed that the unknown sample will not significantly skew the other chert types.

Percentage by weight is used for comparative purposes rather than percentage by numerical magnitude since the distributions would be skewed towards the primary percussion and edge deteriorated flake categories.

TABLE 37: PERCENTAGE DISTRIBUTION BY WEIGHT OF ALL CHERT TYPES FROM THE MICHIPICOTEN HARBOUR SITE, ClIf-2.

NAME	CODE	WEIGHT (gm)	% WEIGHT
Hudson Bay Lowland	2a	193.65	47.1
Manitoulin Island	3a	57.75	14.0
Scott Quarry	3b	15.25	3.7
Southern Palaeozoic Chert	3	27.15	6.6
Lake Superior Agate	4a	1.15	0.3
Unknown		116.1	28.2
TOTAL		411.05	99.9

It is obvious from Table 37 that the Hudson Bay Lowland is the most abundant chert type. To test the null hypothesis, "The ClIf-2 people had no preference for a particular type of chert in a particular category," an analysis of variance test was used.

The eight categories in which the cherts were observed are:

- primary percussion flakes
- edge deteriorated flakes
- bevelled flakes
- points
- a biface
- blade tool
- a broken biface
- cores
- core fragments.

Table 38 represents the values obtained for variable x_n for each chert type.

TABLE 38: VALUES OF A VARIABLE X_N OBTAINED IN EACH OF SIX CHERT SAMPLES.

CATEGORY	Group 2a		Group 3a		Group 3b		Group 3		Group 4a		Group Unknown	
	X_1	$(X_1)^2$	X_2	$(X_2)^2$	X_3	$(X_3)^2$	X_4	$(X_4)^2$	X_5	$(X_5)^2$	X_6	$(X_6)^2$
PRIMARY FLAKES	62.65	3925.02	0	0	0	0	0	0	0.25	0.06	0	0
DETERIORATED FLAKES	14.80	219.65	21,65	443.1	5.3	28.09	8.75	76.56	0	0	6.0	36.0
BEVELLED FLAKES	66.05	4362.60	6.15	37.8	2.3	5.29	1.55	2.40	0	0	15.2	231.04
PROJECTILE POINTS	1.90	3.61	0	0	0	0	13.60	184.96	0	0	2.95	8.7
BIFACE	0	0	0	0	7.65	58.75	0	0	0	0	0	0
BLADE TOOL	0	0	0	0	0	0	0	0	0	0	1.20	1.44
BIFACE	3.4	11.62	0	0	0	0	0	0	0	0	0	0
CORE	16.00	256.00	0	0	0	0	0	0	0	0	6.25	39.60
TOTAL	164.80	8777.89	27.80	480.90	15.25	92.13	23.90	263.92	0.25	0.06	31.6	316.78

Table 39 is a summary of the analysis of variance for the observations in Table 38.

TABLE 39: SUMMARY OF THE ANALYSIS OF VARIANCE FOR THE OBSERVATIONS IN TABLE 38.

SOURCE OF VARIATION	SUM OF SQUARES	df	MEAN SQUARES
1) Between Groups	1973.78	5	493.45
2) Within Groups	6214.78	42	177.51
Total	8188.56	47	

The F value obtained was 2.79 which is below that of 3.45 required to reject the null hypothesis. We can accept the hypothesis.

In Table 38 note the high number of zero observations which may cast doubt on the results because of the small sample size. To overcome this problem, five of the smaller categories were withdrawn. The remaining three categories (primary percussion flakes, edge deteriorated flakes and bevelled flakes) contained 80% of the chert sample (See Table 40).

Table 40 contains the values of the variable x_n for each of the chert types in the remaining three categories.

TABLE 40: VALUES OBTAINED FOR VARIABLE X_N IN EACH OF FIVE CHERT SAMPLES.

CATEGORY	GROUP 2a		GROUP 3a		GROUP 3b		GROUP 3		GROUP UNKNOWN	
	X_1	$(X_1)^2$	X_2	$(X_2)^2$	X_3	$(X_3)^2$	X_4	$(X_4)^2$	X_5	$(X_5)^2$
Primary Flakes	66.6	3925	0	0	0	0	0	0	0	0
Edge Deteriorated Flakes	14.8	219	21.1	443	5.3	28	8.7	77	6	36
Bevelled Flakes	66.1	4363	6.1	38	2.3	5	1.6	2	15.2	231
Total	147.5	8507	27.2	481	7.6	33	10.3	79	21.1	267

Table 41 is a summary of the analysis of variance for the observations in Table 40.

TABLE 41: SUMMARY OF THE ANALYSIS OF VARIANCE FOR THE OBSERVATIONS IN TABLE 40.

SOURCE OF VARIATION	SUM OF SQUARES	df	MEAN SQUARES
Between Groups	4395	4	1099
Within Groups	2004	10	200
Total	6399	14	1299

The F value obtained was 5.49. This again was below the required F value of 5.99.

The hypothesis that the C1If-2 people had no preference for a particular type of chert for these three categories was accepted; however, the analysis was suspect because of the high F value obtained.

In a similar fashion, the hypothesis that the C1If-2 people exhibited no preference between Northern Palaeozoic Chert and Southern Palaeozoic Cherts was tested, in order to confirm the above results.

Table 42 represents the values of a variable x_n obtained in three samples.

TABLE 42: THE VALUES FOR VARIABLE X_N OBTAINED IN THREE CHERT SAMPLES.

	NORTHERN PALAEOZOIC CHERTS		SOUTHERN PALAEOZOIC CHERTS		UNKNOWN	
CATEGORY	X_1	$(X_1)^2$	X_2	$(X_2)^2$	X_3	$(X_3)^2$
Primary Flakes	62.65	3925	0	0	0	0
Edge Deteriorated Flakes	14.80	219	35.1	1232	6	36
Bevelled Flakes	66.05	4363	10.0	100	15.2	231
Total	144.50	8507	45.1	1332	21.1	267

Table 43 is a summary of the analysis of variance for the observations in Table 42.

TABLE 43: SUMMARY OF THE ANALYSIS OF VARIANCE FOR THE OBSERVATIONS IN TABLE 42.

SOURCE OF VARIATION	SUM OF SQUARES	df	MEAN SQUARES
Between Groups	2624	2	1312
Within Groups	2372	6	395
Total	4996	8	1707

As the observed F value was 3.2 while the rejecting value was 10.92, we accepted the hypothesis that ClIf-2 people showed no preference between Northern Palaeozoic Cherts and Southern Palaeozoic Cherts for these categories. Table 44 is the distribution of the chert types for ClIf-2 for each category.

The hypothesis, however, is not accepted when referring to a particular type of tool. From Table 43 it is evident that a particular type of chert was used for a particular type of tool. For instance, in the bevelled flake category 72% of the tools are comprised of Northern Palaeozoic Cherts while in the other tool categories (Points, Biface, and Blade Tool) 78% of these are comprised of Southern Palaeozoic Cherts.

The limiting factors in the utilization of the Hudson Bay Lowland Chert are the size of the cores. The chert cores found on the site are always pebbles. Even though these cherts do occur in cobbles, the cobbles are often irregularly shaped and would not permit the removal of large flakes necessary in preform production (MacDonald 1968:69).

To account for the high percentage of Hudson Bay Lowland Chert (2a-46%, See Table 37) the distribution of chert types (Table 44) is considered. The primary percussion category has a highly significant distribution of chert being comprised entirely (99.6%) of Hudson Bay Lowland Chert. Coupled with the fact that the only two cores recovered from the site were of Hudson Bay Lowland Chert this would suggest that the Northern Palaeozoic Chert was the most accessible chert type.

Although the exact locations of the Hudson Bay Lowland Chert sources are unknown at this time, we predict that their distance from the site is less than the distance to the Southern Palaeozoic Cherts, which is 150 miles.

TABLE 44: THE PERCENTAGE DISTRIBUTION OF CHERT TYPES BY CATEGORY OF CHERT ARTIFACTS FROM ClIf-2.

CATEGORY	N	%	WT.	%	TOTAL%	TYPE
Primary Percussion	132	99.2	62.65	99.6		2a
	1	0.8	0.25	0.4		4a
TOTAL	133		62.90		15.3	
Edge Deteriorated Flakes	10	29.0	14.80	24.0		2a
	13	37.0	21.05	35.0		3a
	2	6.0	5.30	9.0		3b
	5	14.0	12.75	21.6		3
	5	14.0	6.00	10.0		unknown
TOTAL	35	100.0	59.90	99.6	14.5	
Bevelled Flakes	29	78.0	66.05	72.0		2a
	2	5.0	6.15	7.0		3a
	2	5.0	2.30	2.5		3b
	1	3.0	1.55	2.0		3
	3	8.0	15.20	17.0		unknown
TOTAL	37	99.0	91.25	100.0	22.1	
Projectile Points	1	20.0	1.9	12.0		2a
	1	20.0	2.95	18.6	3.8	unknown
	3	60.0	13.60	69.4		3
Biface	1	100.0	7.65	100.0	1.9	3b
Blade Tool	1	100.0	1.2	100.0	.3	unknown
Broken Biface	1	100.0	3.4	100.0	.9	2a
Cores	2	100.0	16.0	100.0	3.8	2a
Core Fragments	2	100.0	6.25	100.0	1.5	unknown
TOTAL					64.1	

TECHNIQUES OF CORE REDUCTION

INTRODUCTION

In fashioning a stone tool, there are several stages of flake removal which the parent material must undergo.

At the Michipicoten Harbour Site (CIIf-2), flakes were initially removed from a core or a preform by bipolar or freehand percussion. Shaping and thinning of the artifacts were effected with the use of a soft percussor such as deer antler or a small cobblestone and final shaping and sharpening of the tool were achieved by pressure flaking.

EVIDENCE

BIPOLAR TECHNIQUE

The bipolar technique refers to the process in which a core is placed on an anvil stone and struck with a hard hammer in order to produce irregular or random flakes. The core bears characteristic features of hard hammer percussion such as a crushed platform, but the distinctive feature is a crushed surface at the opposite end to the striking platform. MacDonald (1968:69) states:

> It is not a technique designed to yield flake preforms for subsequent tool manufacture since the flakes so produced are very irregular in form.

The prime use of this technique is the utilization of the core. Cores that are utilized are referred to in the literature as wedges (Wright 1969).

Two pebble cores, No. 373, and No. 202, were worked with the bipolar technique. Present on core No. 373 are three striking platforms with the characteristic crushed surface at the opposite end of each platform. The core was not utilized possibly due to its thinness which could cause difficulties in reduction.

Core No. 202 was split in half. Although the platform appears to be rejuvneated (removed), no signs of wear were detected along the edge.

In addition to the two cores, two edge deteriorated flakes (utilized flakes) of irregular shape were the products of a bipolar technique, and each manifested the diagnostic features mentioned above.

It is suggested that hammerstone No. 391 is suitable for reducing pebble cores. The cobble is of a relatively heavy mass (when compared with hammerstone No.449) and wear in the form of small indentions was evident on the polar ends of the cobble.

FREEHAND PERCUSSION TECHNIQUE

> This is a technique of holding the objective piece in one hand and striking with a hammerstone or billet to detach flakes or blades.(Crabtree 1972:11)

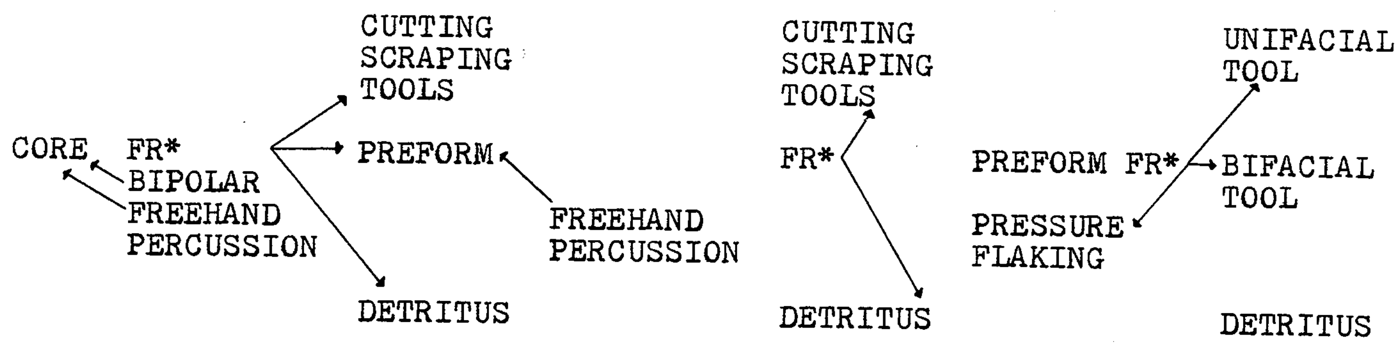
Within this technique, there are several stages of flake removal. Initially, freehand percussion producing expanding flakes is used in removing cortical material from the core; in two cases these primary flakes from ClIf-2 were utilized as scraping tools. The second stage is the knapping of a flake preform after which the preform is shaped and thinned by the removal of bifacial flakes. Bifacial flakes are characterized by an acute angle between the outer surface of the flake and the striking platform and in some cases by edge grinding (Fitting, DeVisscher and Wahla 1966:21). In a few cases the ends of the expanding flakes were secondarily flaked to create a steep angle, probably for a scraping purpose, while the side edges of some bifacial flakes were characterized by rip retouch (Wright 1972) and probably utilized as cutting tools. Judging from its crushed surface Cobble No. 444 was used extensively. The low weight of the cobble and large striking surface would have been effective in bifacial flake removal.

Final thinning was effected by means of percussion (possibly with a bone percussor) with the removal of small bifacial flakes exhibiting previous flake scars on the dorsal surface. Sharpening was achieved by pressure flaking.

The ovate biface, No. 184, knapped from Scott Quarry Chert is believed to represent the final stage in this process. The dorsal surface of the biface is characterized by small expanding flakes while the ventral surface displays both expanding and small pressure retouch flake scars. Two small bifacial thinning flakes believed to be derived from the biface were found on the site. It is assumed that the biface was fashioned as a preform (Fitting et al 1966:61) at some other location.

The knapping stages of tool manufacture at the Michipicoten Harbour Site are schematically shown in Figure 24.

FIGURE 24: KNAPPING STAGES OF TOOL MANUFACTURE AT THE MICHIPICOTEN HARBOUR SITE (CIIf-2).



*FLAKE REMOVAL

FUNCTION OF STONE TOOLS

MODEL

Two concepts 'seasonality' and 'scheduling' which Flannery (1972:227) has used to explain cultural process with band groupings are pertinent to the Michipicoten study area.

> 'Seasonality' was imposed on man by the nature of the wild resources themselves:
> 'Scheduling' was a cultural activity which resolved conflict between procurement systems.

An important factor in dealing with band societies is the changes that occur in the seasonal cycle of the group. MacNeish (1964a, 1964b) has shown that fluctuations from macroband to microband organizations are a result of adaptation to the seasonal environment.

The Michipicoten area is characterized by four distinct seasons. Because of the adverse weather conditions and general unavailability of abundant food resources in winter, it is impossible for groups to maintain a macroband structure. Further, certain activities other than food procurement must be carried out in the remaining seasons in order to ensure group maintenance. The time in which these activities are enacted revolves on the concept of scheduling,

" and it involves a decision as to the relative merits of two or more courses of action" Flannery 1972:227.

One activity which would be scheduled is the procurement of fur-bearing animals whose skins would furnish adequate protection from the elements.

Does the Michipcoten Harbour Site (ClIf-2) reflect such an activity?

Although direct evidence of the preparation of animal hides for use is usually not recovered from archaeological site, pertinent inferences can be made.

It is known from the faunal analysis of the site (Burns 1971) that both large and small mammals, such as woodland caribou and beaver, were procured.

Preservation of bone material from Northern Ontario sites ranges from poor to non-existent because of the acidic nature of the soil. The preserved bone material from ClIf-2 was carbonized and, hence, impervious to the corrosive action of the acidic soil. The extremely small size of the bone fragments, their association with hearth material and the animals' known importance to a nutritional diet support the fact that these animals were being consumed. Furthermore, there exists the probability that the skins of these animals were used for clothing.

In order to determine whether the hides were processed on the site, it is necessary to know what the requirements in the preparation of furs are. The processing of furs revolves on certain basic principles.

> The skin or hide of the animal consists of three layers, the outer layer of epidermis, the middle layer or corium, the inner layer of flesh or adipose tissue. Leather is made from the middle layer... (Coles 1973:144).

The removal of the epidermis and adipose tissue is necessary to make the leather pliable.

Once this principle is realized the steps taken to remove the epidermis and adipose tissue may become integrated into a cultural tradition. Through comparison of various techniques described in ethnographic accounts, it is possible to postulate a general set of rules followed in hide preparation.

The initial step of fat removal is carried out by means of scraping. The tool used varies and is sometimes referred to in literature as a beamer (Rogers 1967) or "mekingun" (Steinbring 1966:576).

The removal of the hair involves the application of different techniques. For instance, the Saultaux allowed the animal skins to decompose before scraping the hair with a tool called a 'matingum' (Steinbring 1966). Others soaked their skins in different acidic and then alkaline solutions (Semenov 1964:90, Steinbring 1966, Rogers 1966; Coles 1973). After soaking, the skins were scraped to remove any remaining hair.

Smoking or curing served to kill bacteria and final softening would be achieved by kneading or pounding or even chewing, as in the case of the Eskimo.

Utilizing this framework it is possible to deduce what kinds of data should be present in the archaeological record if animal hide processing was carried out on site.

TESTING THE MODEL

Within the lithic assemblage there are three areas that require specilization of function: the hunting of the animal, the removal of the skin of the animal and the removal of the two layers of tissue.

HUNTING

Man devised many ingenious methods to capture and kill an animal. Traps or snares are very effective but because of poor preservation are absent from the archaeological record. One technique of hunting which would appear archaeologically is the use of projectiles.

With the assemblage of lithic artifacts from ClIf-2 there are several specimens which have been grouped in the Point category. However, the determining factor in defining function is wear patterns or traces of use (Semenov 1964:89).

EVIDENCE

All five points from ClIf-2 were side notched and exhibited the following characteristics:

1) There were very slight pressure and step fractures noticeable on both sides of the notches.

2) Step fractures on the distal edge of the base were very slight, and continuous (3mm.) with two and sometimes three rows of stepping.

It is concluded that all points were hafted. In the following descriptions it is assumed that the dorsal surface of the artifact is facing the observer.

Point No. 203 (See Figure 22) is the largest specimen. Retouch pressure flakes (3-4 mm.) were removed from the left and upper right dorsal margins of the point resulting in a blunted edge. Minute step fractures (3-5 rows) associated with the edge are continuous for 23 mm. and 13 mm. on the left and right sides respectively. It is on the right side that wear is the most intensive. The wear is characterized by large step fractures; the fractures are not numerous and wear is pronounced in the middle of the blunted face rather then the lower edge. The mid to lower right edge is serrated, with slight striations present on the edge. In all likelihood, this specimen was used as a knife.

However, certain knapping features such as several hinge fractures found on the dorsal surface indicate that this particular specimen had been previously utilized as a point. These fractures occur as a result of the faults within the chert, but indicate the artisan's desire to thin the artifact. It is possible to remove these hinge fractures but in so doing the possibility of breaking the tool looms large. Further, the lower side edges are acute and resemble other points which functioned as projectiles.

The third piece of evidence is that the base has been thinned and the notches show excessive wear patterns. It is suggested that point No. 203 was originally a projectile point but through the process of dulling and resharpening could no longer function as such at which time it was converted into a knife.

Small (3 mm.) marginal pressure flakes were alternately removed from the dorsal and ventral margins of Point No. 576. This particular flaking style has left a serrated edge which is very effective for cutting (Coles 1973). Small and discontinuous striations parallel to the edge are found on these serrated edges. The tip is slightly blunted and is characterized by tiny step fractures (1-3 rows) on both ventral and dorsal surfaces. They continue back from the tip for approximately eight mm. This wear pattern suggests that this artifact was used as a projectile point.

Point No. 598 was broken at the midsection. Alternate pressure flakes were removed leaving a serrated edge similar to that of No. 576. Marginal retouch in the form of very fine flake scars (1-2 mm. in length) is found on the lower left edge, while step fractures appear on the lower right edge. Possibly, this point was broken in use as a projectile and later functioned as a cutting and graving tool.

The remaining two points, No. 642 and No. 598, were broken near the base and only the base sections were recovered. Further evidence is needed to suggest that they had been broken through use as projectile points.

SKIN REMOVAL

The initial procedure in butchering an animal is the removal of the skin.

In the removal of an animal's skin, initial cuts encircling the neck and legs of the animal were followed by a long incision from the neck to the anus along the ventral surface. The skin was then 'peeled' off from the fatty tissue.

The initial cut requires a knife that would puncture the skin as well as cut it. Point No. 203, previously described, has the expected wear pattern.

To remove the skin from the fatty tissue requires an effective cutting edge. Wilmsen (1974:91) states:

> Tools with edge angles of less than 20° concentrate very little mass along their edges. They are fragile and break under moderate pressure... Edges of 35-45° are highly efficient for cutting soft materials and for butchering operations.

EVIDENCE

There are two categories of artifacts recovered from ClIf-2 that have the required edge angles: utilized flakes, and bifaces.

The wear on the utilized flake is characterized by very small (1-2 mm.) marginal flake scars. In a few cases, step fractures in conjuction with a slightly squared face were noticed along the edge. Table 45 summarizes the retouch edge lengths and angles.

TABLE 45: MEASUREMENTS TAKEN ON UTILIZED FLAKES FROM THE MICHIPICTOEN HARBOUR SITE (ClIf-2).

SIDE	N	MEAN LENGTH	ANGLES* VERY ACUTE	ACUTE	MEDIUM	OTHER
Right	22	1.89	6	8	4	1
Left	20	2.01	6	9	3	2
Proximal	1	1.0	1	-	-	-
Distal	10	1.47	3	2	4	1
TOTAL	53	1.83	19	19	11	4

*Angle measurements according to Movius et al (1968:14): very acute-0-25°; acute-25-50°; medium 51-75°; other-no measurement taken.

The high number of very acute and acute angles of utilized flakes as well as the associated wear patterns suggest that these were used as cutting tools. It is interesting to note that flakes with angles greater than 50^{o} exhibited wear characterized by step fractures similar to that of bevelled flakes (scrapers) even though the edge had no secondary retouch to create the characteristic bevelled face of a scraper. It is presumed that these flakes were used in the same manner as bevelled flakes.

No. 184, the only complete biface in the collection, had edge angles that varied from $35\text{-}45^{o}$ (See Figure 21). The minute marginal retouch, as well as the parallel striations which occur along the serrated edge indicate that this tool used for cutting. However, the lack of polish suggests that the tool was seldom used or had been resharpened. Two thinning flakes believed to be derived from this tool support the latter interpretation. The original function of the tool may have differed from its final use as a cutting tool.

In summary, the utilized flakes and lone biface were effectively used as cutting tools. While that is no direct evidence that these tools were actually used for butchering or skinning it is certainly a viable contention.

LEATHER PREPARATION

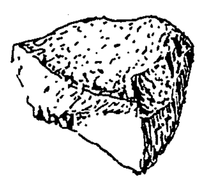
One of the basic problems in assigning a particular function to a category of tools is that, within a category, a variety of uses could have been performed. It is proposed that within the category of artifacts called "bevelled flakes" there are different functional features which may indicate differences in use. In addition, there are certain features which suggest the possibility that some or all of these tools could have been used in the processing of furs. This is particularily significant since this category of artifacts comprises 50% by weight of all lithic tools found on the site.

EVIDENCE

If the bevelled flakes recovered from ClIf-2 were used in a scraping motion, hafting was necessary simply because the small size of the flakes would place a great strain on the fingers if they were hand held. There is, however, some evidence to indicate that the larger specimens (3-4 cm.) were not hafted.

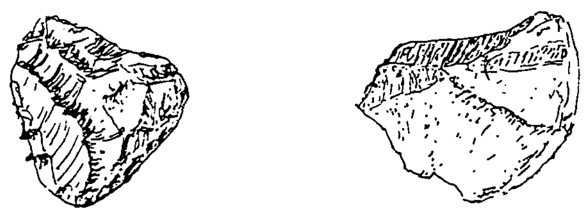
There are three types of wear which support the hypothesis that some of the scrapers were hafted. The first occurs on two broken end scrapers, No. 477 and No. 201. Both scrapers are broken approximately 4-6 mm. from the scraping face. The slightly protruding edge on the dorsal surfaces indicates that pressure was placed on the ventral surface. Because of the thinness of the flakes (3 mm.) moderate pressure would be required to cause breakage if they had been hafted. Unsuccessful attempts to break similar scrapers by holding them between the fingers were made.

FIGURE 25: BROKEN END SCRAPER No. 477 FROM ClIf-2.



The second element which would indicate hafting of the bevelled flakes occurs on the proximal end of the flake or striking platform. Small retouch flakes were removed from the dorsal surface of the majority of flakes in an effort to thin the artifact. In two cases, the platform was removed entirely. There would be no reason to remove these flakes if the tool was to be hand held.

FIGURE 26: EXAMPLES OF DORSAL THINNING OF THE PLATFORM AREA OF END SCRAPERS No. 79 and 543, ClIf-2.



The third area of wear occurs along the side edges of the scrapers. However, dissimilarities in wear patterns are evident between the scrapers greater than 3 cm. in length, and the smaller scrapers. The wear along the edges of the larger scrapers is identical to that found on the edge deteriorated flakes which are characterized by slight continuous marginal flake scars, while the edge on the smaller scraping flakes were found to be slightly serrated with discontinuous marginal flake scars. In addition, there is no dorsal thinning on the larger scrapers. This difference in wear may be due to the presence or absence of a hafting element.

The above evidence strongly suggests that the smaller flakes were hafted, but there is some doubt as to the hafting of the larger flakes. This brings us back to the problem of use: can the presence or absence of a hafting element indicate a difference in use?

The wear associated on the bevelled face of the flake is a result of at least six factors--intensity and duration of use, type of material being worked, convexity of the scraping face, convexity or concavity of the scraping surface and the degree of inclination of the scraping face relative to the surface.

Within the ClIf-2 collection there are two areas of wear affected by these factors: the side edge of the retouched face and the lower edge of the face. The area to the side of the scraping face on some of the bevelled flakes is characterized by a slight spur created by the removal of a ventral or dorsal flake from the marginal edge. This characteristic is referred to in the literature as a graver spur (Dawson 1975). Figure 27 exemplifies this particular feature.

FIGURE 27: BEVELLED FLAKE No. 204 WITH CHARACTERISTIC GRAVER SPUR FROM C1If-2.

In 23 of 30 cases, graver spurs were absent, In one case they are present on both sides, and in six they occur equally on either the right or left side. Table 46 summarizes the distribution of the graver spurs.

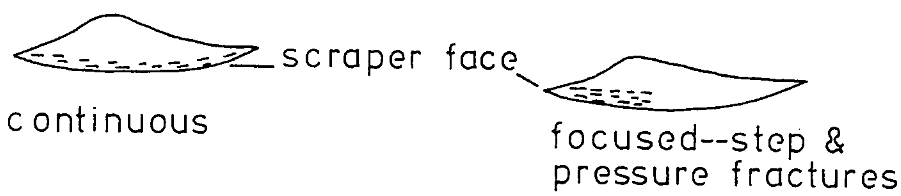
TABLE 46: DISTRIBUTION OF GRAVER SPURS ON SCRAPING TOOLS FOR THE MICHIPICOTEN HARBOUR SITE.

	Right	Left	Both	Absent	Total
N	3	3	1	23	30
%	10%	10%	3%	77%	100%

The wear patterns such as slight step and pressure fractures and occasional scratch marks at a 45° angle to the edge indicate that these graver spurs were used as incising tools.

The wear along the lower edge of the face of the bevelled flake is characterized by small step fractures that are either continuous along the entire length of the face or are focused, at the maximum height of the face (See Figure 28).

FIGURE 28: SCHEMATIC REPRESENTATION OF CONTINUOUS AND FOCUSED WEAR ON SCRAPING TOOLS.



As mentioned previously, there are several factors which effect the wear pattern. The problem is to determine if these different wear patterns are unique or if they indicate the range of wear to be encountered from the same type of use. To test the null hypothesis that there is no difference between the type of wear, one-way analysis of variance tests were used against five other variables: maximum length, maximum thickness, the face length, the face height and the weight.

Of the five variables tested, only face length was significant. Table 47 summarizes the data for the analysis of variance of face length between the two types of wear.

TABLE 47: ANALYSIS OF VARIANCE OF THE VARIABLE 'FACE LENGTH' BETWEEN TWO TYPES OF WEAR

SOURCE	DF	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
Between Groups	1	1.56	1.56	6.5	0.015
Within Groups	35	8.39	0.24		
TOTAL	36	9.95			

TABLE 48: SUMMARY OF DATA FROM TABLE 47

GROUP	COUNT	MEAN	S.D.	S.E.	MIN.	MAX.
Continuous	20	1.94	0.53	0.12	1.25	3.2
Focused	17	2.36	0.48	0.10	1.80	3.3
TOTAL	37	2.13	0.53	0.08	1.25	3.3

The very low F probability of 0.015 suggests that as the face length increases, the wear becomes focused. At this point it is very tempting to suggest that the wear types are a result of different uses but other factors such as the lack of significance between the other variables, lack of experimental evidence and the need for further analysis between other variables not measured in this report, mitigate against such an hypothesis.

In the tanning process the delimiting property of a scraping tool is that it should be sharp enough to remove the fatty tissue or hair and yet not so sharp as to puncture the hide. One important attribute is the shape of the working edge. All bevelled flakes from ClIf-2, whether worked on one or a number of faces, exhibited a convex outline along the scraping surface and a convex ventral cross section as viewed from the scraping edge.

Semenov (1964:88) states:

> This roundness and convexity was necessary in working on the under (flesh) side of the skin, which would yield under the pressure of a comparatively narrow implement like a scraper. Had it not been round but rectilinear it would have lacerated or even cut through the pelt...

Another important variable associated with the area of use is the angle of the working edge. Table 49 shows the distribution of the edge angles of the bevelled flakes.

TABLE 49: EDGE ANGLES OF BEVELLED FLAKES FROM ClIf-2.

TYPE	ANGLE*				
	Acute	Medium	Steep	Perpendicular	Total
End Bevelled	3	15	9	3	30
Multi-Bevelled	3	8	3		14
TOTAL	6	23	12	3	44

*Angle measurements taken from Movius et al 1968:14 where acute = 26-50°; medium = 51-70°; steep = 76°-85°; perpendicular = 86°.

As Table 49 indicates there is a marked tendency (74%) for bevelled faces to cluster between the angles 50-85°. Wilmsen (1974:91) states:

> Angles between 50° and 75° have relatively large edge mass concentrations. They are able to absorb heavy shear stresses... The smaller angles in this range are suitable for cutting bone and wood, the steeper ones for scraping and shaping these materials.

The scraping face angles of ClIf-2 tools are suitable for butchering operations which would include scraping hides.

Thus within the category of bevelled flake exist fundamental differences such as the presence or absence of the hafting element and graver spur, more than one bevelled face and a varied wear pattern on the scraping face which suggest different uses for certain types of scrapers.

Considering the limitations set on the design of these scrapers each could have functioned efficiently in the processing of leather.

SUMMARY

The lithic assemblage offers a limited amount of information which coupled with other observations permits certain insights into a people's life style. It has been demonstrated that the lithic technology was geared towards a hunting subsistence. However, a hunting activity during a season in which alternate sources of food are most abundant seems incongruous. This minor conflict is resolved when it is shown that attention was focused upon the processing of hides, which brings us back to the concepts of seasonality and scheduling.

Because of the constraints and hardships brought on by the adverse weather conditions of winter, it is postulated that one way in which the people would prepare themselves for the onslaught of cold, snow and howling winds would be to replenish their stock of material necessary in providing clothing and shelter.

SUMMARY AND CONCLUSIONS

Situated as it is on an elevated strand, ClIf-2 overlooks 350 miles of one of the coldest and most wind-swept bodies of fresh water in North America. The present occupants of this site are mid-summer cottagers and it is a certainty that the aboriginal hunters and gatherers of the Laurel Culture were also here during the hottest part of the year only.

The narrowness of the occupation level and the absence of stratification indicates that the site was occupied annually for a period not greater then 50 years, and possibly for a considerably shorter time.

Activities such as ceramic manufacture, cooking, and leather processing were primarily centred around various hearths, depressions and pit-like features that characterized the site. These activities are of paramount importance since information concerning the seasonal lifestyles, culture history and cultural processes of these early Algonkian people may be discerned. For example, evidence indicates that pottery was introduced into this area at the very early date of 740 B.C.

The weight of this evidence suggests that ceramic technology was already at a sophisticated level at the time of its introduction to the Michipicoten region.

Further, one of the many activities associated with hunting subsistence is the tanning and curing of animal hides. This pursuit illustrates just one of the many imperative seasonal decisions that were required for continued survival of the group.

From the foregoing, emanates a picture of an extended family emerging from the Archaic stage of cultural development, occupying this site during the hot months of mid-summer, subsisting primarily on a diet of meat, replenishing the supplies that were necessary for the upcoming winter and generally luxuriating in the cool on-shore breezes from Lake Superior.

CHAPTER VI

THE WAWA SITE

INTRODUCTION

In 1971 the Wawa Site (ClIf-8) was partially excavated by K.C.A. Dawson of Lakehead University, under a National Museum of Man grant. Both European and Laurel culture material were mixed together in a single stratum.

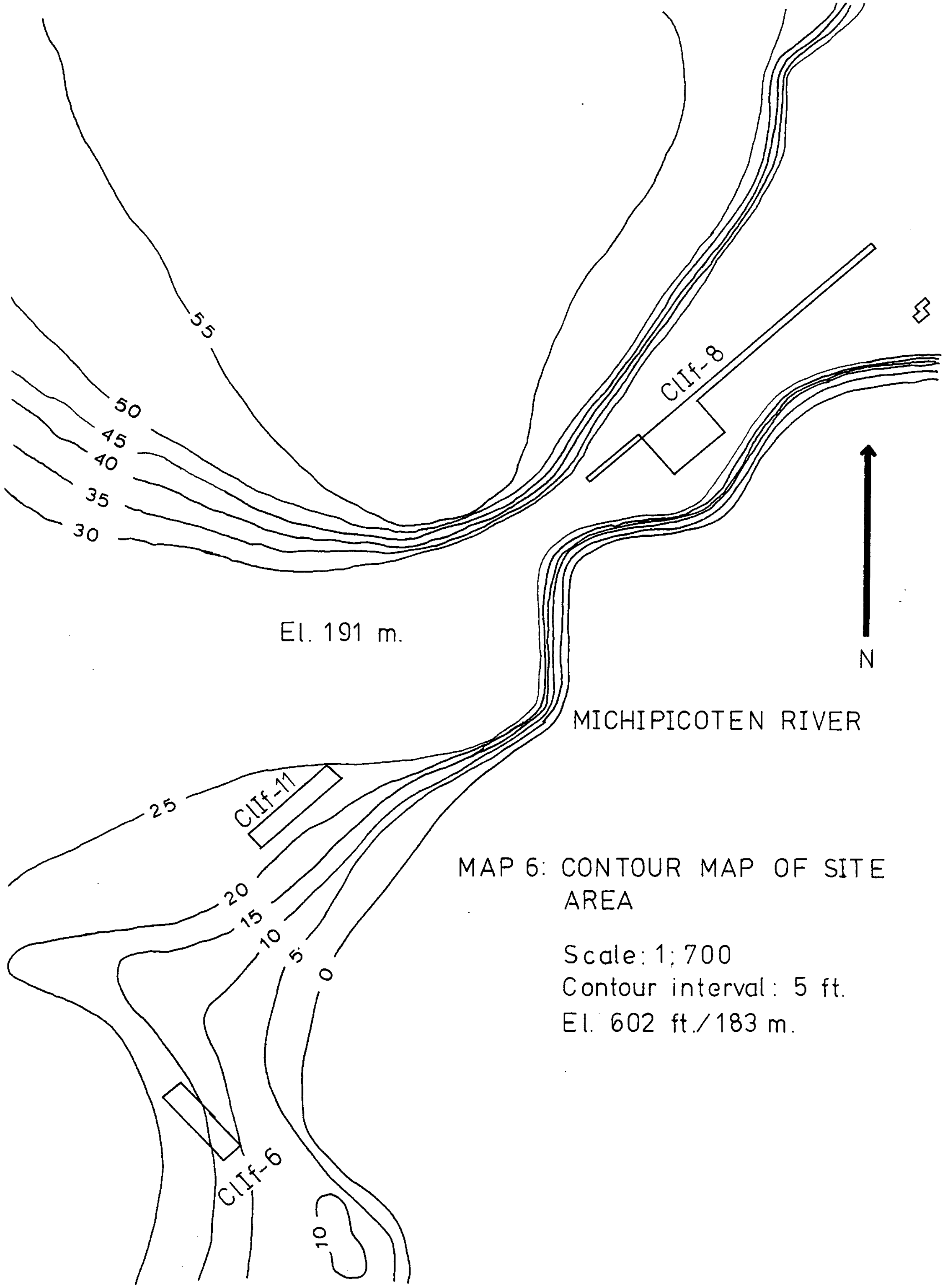
It is proposed that the site was occupied intermittently between the dates A.D. 1876 and A.D. 1894, during the historic period and approximately 2300 years earlier or 535 B.C. during the Laurel culture period.

In the analysis to follow it is suggested that the Laurel people occupied the site for a limited time interval (perhaps one month) during the late winter-early spring seasons.

It is not surprising, considering the expertise of the early potters, that ceramic vessels were manufactured during this season. The people subsisted on game animals, specifically woodland caribou, during this time of year and it is probable that they butchered and consumed the animals at this location.

THE SITE

The north bank of the Michipicoten River, from near its outlet to the point where the Magpie River tumbles in to join it, rises steeply from the river level of 183 metres, pauses briefly on a terrace at approximately the 191 metre level, and continues its climb to the top of the bank at 198 metres. During the season of low water a narrow pebble beach emerges from the bank. The major flora is a typical mixture of Great Lakes and Boreal forest, composed primarily of Spruce, Pine and Birch, each clutching tenaciously to the thin layer of sandy soil covering the bed-rock. About one-half kilometre from Lake Superior, the single, narrow terrace of this north bank begins to slope gently toward the sand dunes on each side of the river mouth, thus providing easy access from the aforementioned terrace to the beach along the bank. With the forest covered hills behind and to the north, this ledge is well protected from the weather while receiving the benefits of its southern exposure. Due to its present elevation above the water level, the view up and down stream is excellent. It is hardly surprising, then, that adjacent sections of this ledge have been inhabited from at least Initial Woodland times until the recent past. The easternmost section of this terrace has an elevation of approximately 7.63 metres (25 feet) above present lake level, a fact of some possible significance, since this area was occupied by a small group of Initial Woodland people of the Laurel material culture (See Map 6). The Laurel Culture in Northern Ontario occupies an approximate chronological niche from 700 B.C. to 1000 A.D. (Wright 1972:59). During this time period the waters of Lake Superior in and around the mouth of the Michipicoten River were receding from the Lake Nipissing high of 220 metres (722 feet) above sea



MAP 6: CONTOUR MAP OF SITE AREA

Scale: 1; 700
Contour interval: 5 ft.
El. 602 ft./183 m.

level or 36.6 metres (120 feet) above the present lake level. Wright's earliest date of 700 B.C. for the Laurel culture would place the site of ClIf-8 and incidentally ClIf-2 as well, under 10.4 metres (34 feet) of water if Saarnisto's (1974:314) interpolation of data from stratified lake-bottom sediments in the Michipicoten area is accepted. Wright's terminal date for the Laurel culture of 1000 A.D. intersects with Saarnisto's curve for water level changes in the Michipicoten area at a lake level of 191 metres (627 feet) above sea level which would place ClIf-8 at lake level. Since Wright's evidence for his initial data is based on C14 samples from the Donaldson and Burley Saugeen sites (S-119 and C-192) located near the base of the Bruce peninsula some 480 km. (298 miles) from the Michipicoten area, a date of 700 B.C. for the introduction of Laurel culture in the Lake Superior area appears somewhat early. In rejecting Wright's dates for the Laurel florescence, Fitting (1970:141) states:

> The majority of the other Lake Forest Middle Woodland dates fall in the first millennium A.D. The Saugeen material (from the Donaldson and Burley sites) should date to this time period too.

Partly with this problem in mind a C14 sample (S1265) of charcoal found in direct association with a Laurel sherd cluster, was submitted for dating through Dr. R. Wilmeth of the National Museum of Canada. The result indicated a date of 2485 ± 250B.P. or 535 B.C. This date suggests that Wright's hypothesis may be correct and that the level of Lake Superior was falling at a more rapid rate than Saarnisto's curves would indicate.

As further corroboration, a C14 sample (S1265) of charcoal from the ClIf-2 site, again found in direct association with Laurel pottery, revealed a date of 3115 ± 425 B.P. or 1165 B.C. By applying the maximum standard deviation of 3115 minus 425, a date of 2690 B.P. or 740 B.C. is derived. Wright's date of 700 B.C. thus assumes greater credibility. When this information was presented to Dr. Saarnisto he stated that "... the water level at 625 feet 2500 years ago fits perfectly well with your Wawa Site date and suggests that your date is correct. The date for the Michipicoten Harbour Site (3115 B.P.) seems to be slightly too old but not significantly" (personal communication):1977). In addition the difference in morphological data and decorative style of the pottery between ClIf-8 and ClIf-2 correlates closely with the difference in radio carbon dates. It appears probable that what is presently a raised terrace was, during the Laurel occupation, a beach on the northern shore of a rather large bay. The adjacent Terminal Woodland sites (ClIf-6 and ClIf-11) were likely partly underwater at this time.

The site excavation is composed of twenty five foot squares, one section containing sixteen squares while the other a short distance away, contains four. Extending northeast from the main section is a 100 foot test trench (TT-2) with a width of 3 feet. Extending southeast from the same section is a 32 foot test trench with a width of 3 feet (T.T.1) (See Map 7). A small extension of squares, A-1 and A-2, was excavated as was a similar widening of the southwest test trench (T.T.1). No mention of additional testing can be elicited from the field notes.

The soil matrix consists of coarse sand immediately below the humus layer for a depth of approximately one foot where it meets a two inch pebble-gravel lens. The sand lens varies in colour from black to dark brown near the surface to an orange-"iron" red colour at the base.

Cultural debris occurred at various depths of between one to nine inches below the forest duff, usually in association with the coarse black sand (See Figure 29).

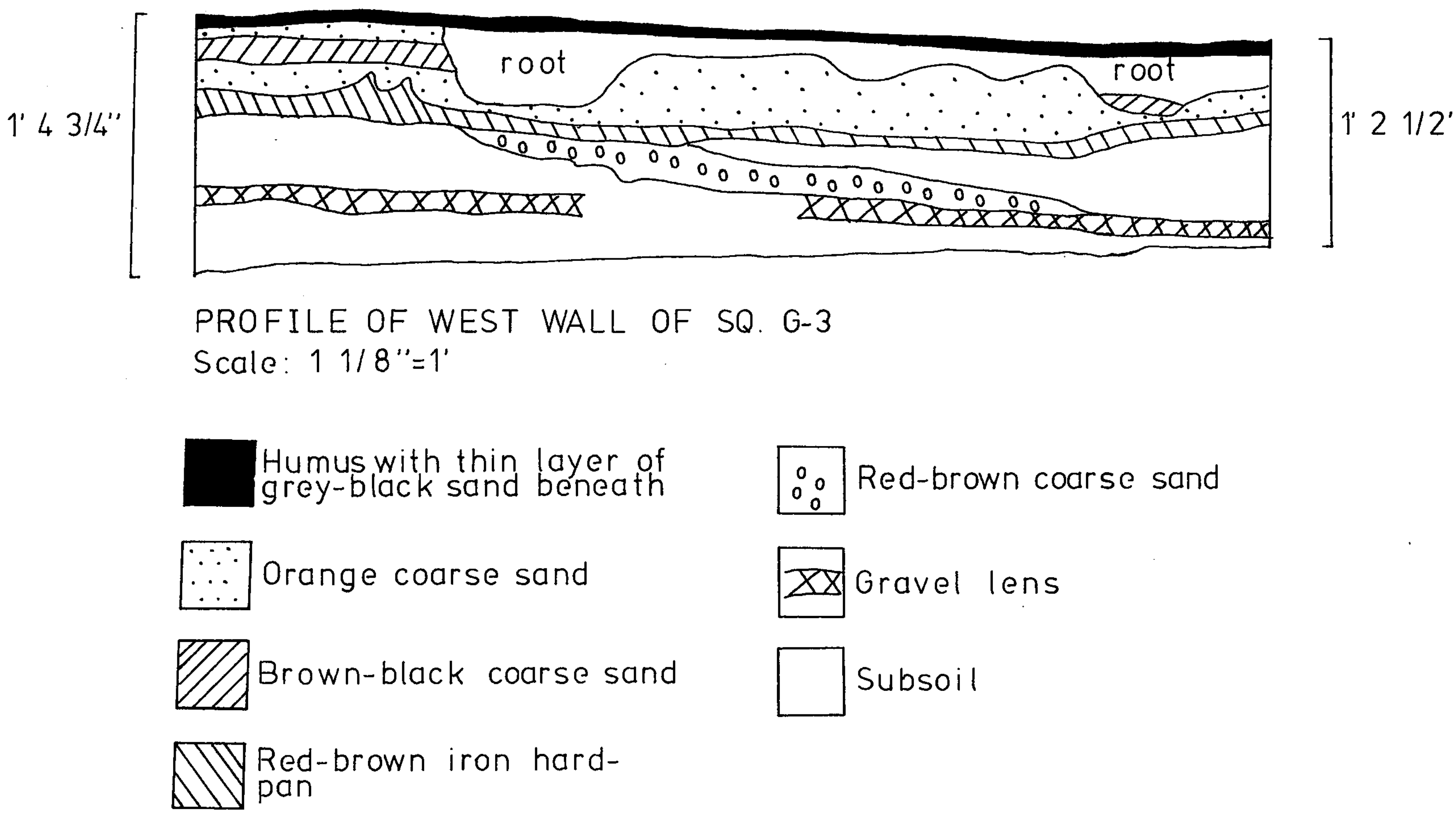
FEATURES

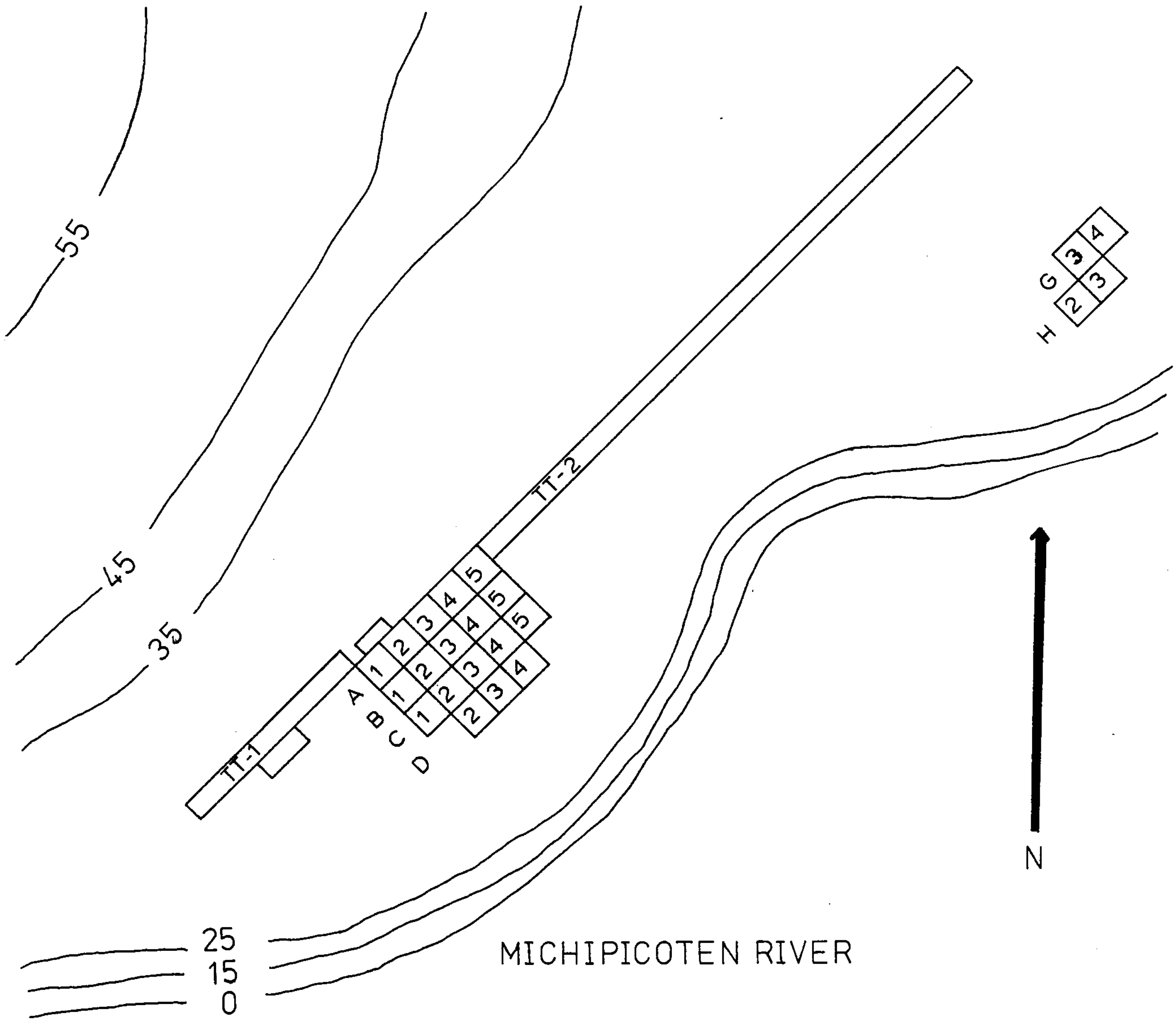
Rather surprisingly only three features, two hearths and one pit, were recorded for the entire site.

The irregularly-shaped hearths, located in squares A1, A3 (See Map 7) consisted of fire cracked rock, red-stained sand, and charcoal in association with calcined bone and lithic and ceramic debris. The hearths probably functioned for both heating and cooking purposes.

The pit, delineated in the northwest wall of square 132, contained pottery fragments and fire cracked rock in a charcoal-sand matrix. No soil samples were obtained. The pit has tentatively been defined as refuse pit.

FIGURE 29: TYPICAL SOIL PROFILE FROM THE WAWA SITE, CIIf-8





MAP 7: CONTOUR MAP OF ClIf-8

Scale: 1:300

FAUNAL ANALYSIS

The following data are taken verbatim from the faunal report by James Burns, now at the University of Toronto.

The Wawa Site yielded only 19 bones, all mammalian and all burnt but for 5. These 5 bones comprise a large part of the right hock or ankle joint of a woodland caribou. No other species was identified.

TABLE 40: FAUNAL ASSEMBLAGE AT THE WAWA SITE (ClIf-8).

SPECIES	NO. OF BONES
Caribou (*Rangifer tarandus*)	7
Other mammal	12
Total	19

The site lies close on the north shore of the Michipicoten River, just upstream from the river's mouth. It has a sheer, high rock outcrop in back of it. Much of the vegetation now is coniferous with mixed deciduous trees. By present conditions caribou would have been well adapted to the environment around the site, and the absence of other beasts ordinarily found in similar habitat is no doubt a function of the smallness of the sample. That no fish or avian bone is present may be a function of poor preservation. However, the amount of fish bone, totaled for the Wawa Site and the 2 adjacent sites ClIf-6 and ClIf-11, is surely explainable in other terms--probably cultural. Certainly the opportunity is readily available only a few paces away, in the river and the Lake, to take quantities of fish.

HISTORIC MATERIAL

INTRODUCTION

Both Laurel Culture and late historic material were associated with each other in stratum 1. Although most of the historic goods were excavated from the upper levels, odd bits and pieces persisted to level 4 of the site.

The historic artifacts date to the late 1800's and may be part of the continuum of historic goods recovered from the Morrison Site (ClIf-6) and the Nyman Site (ClIf-11) (Dawson 1977).

ARTIFACTS RECOVERED

In order to arrive at an absolute date for the site, all the historic artifacts, which are summarized in Table 51, have been assigned two dates: the range of dates which exists for each artifact type, and the probable date based on the popularity of an artifact type at a particular time.

TABLE 51: HISTORIC TRADE GOODS RECOVERED FROM THE WAWA SITE.

	N	TIME RANGE	PROBABLE TIME
PIPES	2	1876 - 1894	1885 ± 10
BEADS	2	1660 - 1977	1850 ± 50
BUTTONS	5	1851 - 1977	1850 ± 70
BOTTLES	2	1650 - 1977	1870 ± 30
WINDOW PANE	2	1816 - 1904	1860 ± 50
CROCKERY	1	1840 - 1890	1865 ± 25
CERAMICS	3	1850 - 1900	1875 ± 25
FISH GAFF AND HOOK	2	1823 - 1880	1860 ± 30
NAILS	62	1821 - 1977	1870 ± 60
MISCELLANEOUS	6	1821 - 1904	1860 ± 40

PIPES (2)

Of the six stem fragments recovered, at least two pipes were distinguished. On two of the stem fragments the letters "DIX and DIXO" on one side, and "EAL and NTREAL" on the other were impressed. These letters obviously refer to W.H. Dixon of Montreal who succeeded Henderson in 1876 and continued manufacturing clay pipes up until the year 1894 (Walker 1971:25). There were no identifying marks present on the other pipe fragments.

BEADS (2)

The two beads recovered not only display morphological differences but were manufactured by two distinct techniques. The blue "seed" or embroidery bead was manufactured by breaking a glass tube at the desired length, in this case 3.4 mm. The large (1.05 cm.) blue bead was constructed by winding a thin glass filament around a wire. The former technique is referred to as "drawn" while the latter is called "wound" (Karklins 1971:1).

These bead types were relatively important trade items; unfortunately for archaeological dating purposes, their popularity has lasted three centuries.

BUTTONS (5)

The single most important attribute of these buttons is that they were manufactured from plastic. It is unknown when plastic buttons became fashionable, but they certainly were not popular pre 1850 (Forma 1971:83).

Three buttons are identical morphologically and display the following characteristics: 4-holed, white, 1.1 cm. diameter and a depressed center.

One white, fragmentary, possible 4-holed, button has an extrapolated diameter of 2.2 cm.

The fifth button, also fragmentary, is black and has a diameter of 1.5 cm.

BOTTLES (2)

A wine or spirits bottle is represented by two plain fragments of a dark green glass.

Impressed on the side of the second, a

medicine bottle, were the letters "CLE".

Although the initial date of bottle manufacture began ca. 1650, most of the bottles recovered from the nearby Hudson Bay Post date from 1850 to 1904 (Forma 1971:69).

WINDOW PANE GLASS (2)

Two distinct panes of glass are represented by seven pane fragments, that have a thickness of either 0.1 cm. or 0.18 cm. The presence of window pane glass at the Hudson Bay Post, and its absence from early posts would suggest an introductory date of use around 1830.

CERAMICS

One English stoneware vessel, with an everted lip and squared shoulder, had the letters AB

J. BO---NE,
ATENTEE
ro M

impressed on the side of this 10 cm. high bottle. The vessel was probably manufactured by the firm of Joseph Bourne of Denby, England between the years 1840 and 1890. It may have been used to contain ink or ginger beer (Hume 1974:79).

Of the 52 refined earthen ware sherds recovered only one presented a distinguishable decorative design. The decorative technique, monochromatic transfer prints, was popular from 1850 to 1900 (Forma 1971:60).

FISH GAFF AND HOOK (2)

The iron gaff which is identical to those recovered from ClIf-6 is broken at the second barb.

The fish hook which is also identical to those recovered at ClIf-6 and ClIf-11 measures 9.5 cm. in length.

These artifacts may reflect commercial interests in a fishing industry which was well established as early as 1823, but after 1859 was gradually down scaled (Weiler 1973:31).

NAILS

All of the nails are machine cut, rectangular in cross section and have a square stamped head, except for a lone wire nail. Groupings of nails of the same length were placed in an arbitrary class with a total of seven classes being established, The results are tabulated in the Table 52.

TABLE 52: NAIL GROUPINGS FROM THE WAWA SITE.

CLASS (LENGTH)	N	%
3.7 cm	11	18
5.3 cm	6	10
6.8 cm	9	14
8.0 cm	11	18
10.6 cm	8	13
13.0 cm	4	6
spikes	2	3
fragments	10	16
wire	1	2
Total	62	100

These nails are late in manufacture and date from 1821 to 1950.

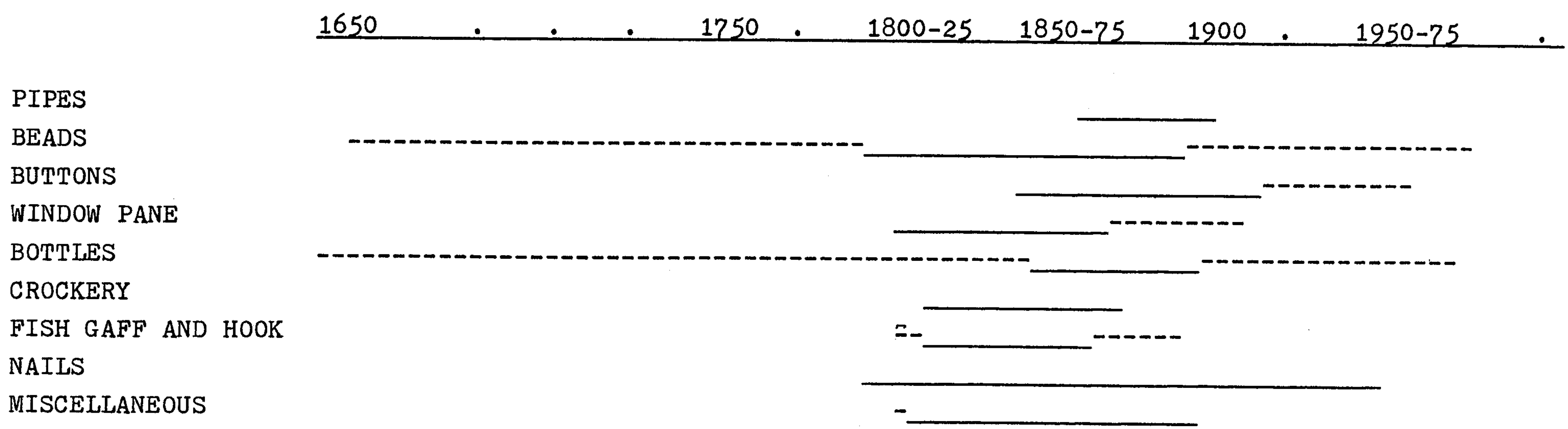
MISCELLANEOUS METALS (6)

Included in the miscellaneous category are: one horse shoe, one rat tail file, two barrel hoop fragments, one iron fragment and an iron head from a gun hammer. A range of dates between 1821 and 1904 is likely for these artifacts.

DATE DERIVED FOR THE HISTORIC COMPONENT

The temporal occurrence for each artifact is schematically represented in Figure 30. The range of dates for all artifacts extends from 1660 to the present, with the majority of artifacts being manufactured in the 19th and early 20th centuries. The probable dates derived for each artifact decrease the range considerably in that the majority of artifacts were manufactured in the late 1800's. It is assumed that the site was occupied for a brief time interval between the dates of 1876 to 1890.

FIGURE 30: SCHEMATIC REPRESENTATION OF THE TEMPORAL OCCURRENCE OF EACH HISTORIC ARTIFACT TYPE FROM THE WAWA SITE (CIIf-8).



CERAMIC DESCRIPTION AND ANALYSIS OF THE WAWA SITE

VESSEL DESCRIPTION

The very small ceramic collection for this site is represented by 6 rims, 25 decorated body sherds and 41 undecorated body sherds. Five of the 6 rims represent four analyzable vessels while the fifth is classed as unanalyzable due to its minute dimensions. All rims and decorated sherds bear the overt characteristics of Laurel culture ceramic ware. The temper used for each vessel is similar in composition, i.e. a predominance of quartz with lesser amounts of the feldspathic minerals, microcline and orthoclase. The amount of temper used, however, appears quite variable from vessel to vessel, a distinct change from the CIIf-2 collection.

No coil breaks were apparent and an inspection of sherd cross-sectional edges revealed the layering characteristic of the paddle and anvil technique.

The general morphology of the analyzable vessels is heterogeneous in that rims vary from straight sided to outsloping. The body of the vessels are ovaloid. Base morphology is unknown since no basal sherds were recovered.

VESSEL ONE

FIGURE 31: VESSEL ONE, C1If-8.

Vessel one is represented by two rims and four decorated body sherds. The two rims abut and two of the body sherds could be attached to the bottom of the rim sherds. The lip of this vessel is flat and squared with little evidence of either internal or external radius. The lip is decorated with pseudo scallop shell impressions which are oriented perpendicularly to the lip edge. The dentate stamp tool which made these impressions had sharp rather than rounded teeth so that the decoration looks more like a saw tooth motif than a pseudo scallop shell. The same tool was used to produce similar pseudo scallop shell impressions on the external surface of the vessel. This decoration extends in a vertical configuration for a distance of 13 mm. starting from the lip. Immediately below, a row of rectangular punctates, which do not produce interior bosses, encircles the vessel. The punctates have a vertical dimension of 7 mm., width of 1.5 mm. and a mean spacing of 7 mm. Superimposed upon and extending below the encircling punctates, is an unknown number of right to left oblique rows of impressions which have been variously referred to as complex push and pull, stab and drag and dragged stamp. The impressions are accomplished, in this case, by pressing the side of a dentate stamp tool into the clay at an angle of approximately 60° to the surface. It appears that the pressure is applied perpendicular to the edge of the tool, rather than parallel, so that the impression is an image of the side of the dentate stamp. After the first impression the tool is moved, possibly dragged, slightly to the right and another impression is made. This action is continued in horizontal rows around the periphery of the vessel. An experiment with a tool which reproduces the aforementioned decoration indicated that the potter must have been right-handed in view of the direction of the impressing force and the oblique angle of the impressions. It would also appear that there was a slight force bias on the upper corner of the working surface of the tool since the impression is deeper at the top. The surface of the vessel indicates that there was some attempt at smoothing after the completion of decoration.

Sherd colour was a consistent 10YR3/2 (very dark grayish brown) on the Munsell Soil Colour Charts while the hardness was three on the Moh's Hardness Scale.

VESSEL TWO

FIGURE 32: VESSEL TWO, ClIf-8.

The single rim sherd from Vessel Two indicates that the orifice diameter is approximately 60 mm. The lip interior and exterior surfaces are undecorated although the external surface has the appearance of having been superficially smoothed. Temper appears to be sparse and not evenly distributed. This pot has either been fired to a relatively high temperature or has been left in the firing process for an extended period of time. The external surface has areas where the vitrification process has been prolonged to the point of actually melting the clay. Vessel colour is 10YR7/4 (very pale brown) and the hardness is an unusually soft 1.5 for a sherd which appears to have been overfired. There is a possibility that the clay for this pot came from another source than that which was used for the rest of the collection.

The information pertaining to this sherd might suggest that it came from a vessel crafted by a juvenile. While this might be quite correct, there is one incongruous note: the lip and wall thickness of the sherd, 3 mm. and 5 mm. respectively, is unusually thin. A pot with a narrow wall dimension is considerably more difficult to fabricate than one with greater thickness. It is possible that this vessel represents a pot quickly and somewhat carelessly made by an adult potter for use by or as an example to, a juvenile.

VESSEL THREE

FIGURE 33: VESSEL THREE, ClIf-8.

Vessel Three is represented by one rim and twelve decorated body sherds, none of which join. For this reason, the juxtaposition of the external design elements can only be inferred. The cross-sectional dimension, fifteen mm. below the lip, is a rather thick ten mm. This measurement tapers to a narrow rounded lip of 4 mm. in thickness with internal and external edges rounded to a 1.5 mm. radius. The internal surface of the vessel is decorated with a right to left oblique dentate stamp impression which has been subsequently smoothed. The stamp was pressed into the clay at an approximate angle of 75° to the surface. This impression extends for a vertical distance of 10 mm. and has a mean spacing of 4 mm.

Starting immediately at the lip, the external surface has been "channeled" by dragging a dentate stamp in a sideways direction, thus producing a series of parallel channels. The striations are oblique to horizontal and it is apparent that the potter wavered the tool slightly from side to side as she drew it along the clay. The result could easily be mistaken for fabric impressing were it not for the complete absence of weft thread impressions. This decorative element extends for an unknown distance down the side of the vessel and is followed, in uncertain order, by an unknown number of rows of right to left oblique dragged stamp and a single row of right to left oblique impressions. Both the dragged stamp and the row of impressions appear to have been made by the same dentate stamp that was used for the other elements of decoration.

The amount of temper used in this vessel is unusually high and appears to be distributed evenly through the clay. The exterior has a somewhat granular surface texture due to the prevalence of white and near white grains of temper. The interior surface has been self-slipped so that it appears smooth and temper-free.

The colour determined by the Munsell Colour Charts is 10YR7/4 (very pale brown) with a hardness of 3.

VESSEL FOUR

FIGURE 34: VESSEL FOUR, ClIf-8

This vessel is unanalyzable in the normal sense due to the diminutive size of the single sherd which represents it.

The lip has a sharp interior corner and a well-rounded exterior edge with a radius of 2 mm. Both the lip and the first 4 mm. of the exterior surface are impressed with a narrow blade-like tool. The impressions which have a mean spacing of 3 mm. are perpendicular to the edge of the lip and continue over the exterior edge and down the side as a single impression. Immediately below the row of impressions are an unknown number of horizontal incised lines with a spacing of 1.5 mm. These lines may have been made by dragging a dentate stamp sideways but the sherd is too small to afford positive identification.

The colour of this sherd is 10YR3/2 (very dark greyish brown) with a hardness of 2.5.

VESSEL FIVE

FIGURE 35: VESSEL FIVE, C1If-8.

Vessel Five is represented by a single rim with, unfortunately, a damaged lip. The junction of the exterior surface and the lip is intact but the rest of the lip has spalled off. Below the lip and extending down the exterior surface for a distance of 8 mm. is a row of vertical dentate stamp impressions. The tool used had a maximum of four teeth and a length of four mm. so that it was used twice for each impression. One mm. below the dentate stamp impression appears an unknown number of horizontal rows of right to left oblique dragged stamp impressions. The length of these impressions correlates with the length of the dentate stamp tool previously described. An encircling row of rectangular punctates having vertical and horizontal dimensions of three mm. and one mm. respectively is superimposed over the first row of dragged stamp impressions. Since the vertical dimension of the punctates is shorter than the length of the dentate stamp tool, it is probable that a corner of the tool was used to produce the punctates.

The extrusions between the rows of dragged stamp impressions have been superficially smoothed. Mean spacing for the dragged stamp rows is five mm.

Sherd colour is 10YR7/4 (very pale brown) and hardness is two.

ANALYSIS

RAW MATERIAL - CLAY

The clay from which the ClIf-8 pottery was fabricated was determined by X-ray spectrography analysis to be similar in composition to the three boreal deposits mentioned in the ClIf-2 ceramic report. In the case of ClIf-8, a deposit was located less than 500 metres upstream on the same north bank of the Michipicoten River. The clay from this deposit was tested and proved to be eminently suitable for pottery manufacture. Of the other two deposits, the one located on the east bank of the Magpie River was similar in all respects to the one previously mentioned. The third deposit, adjacent to ClIf-2, proved to be unsuitable for ceramic work due to its high refractory content.

It is highly probable that the ClIf-8 potters were securing their clay from the deposit near at hand.

TEMPER

The tempering material used in the pottery from ClIf-8 consisted of quartz, microcline and plagioclase in the ratio of 67% quartz, 11% microcline and 22% plagioclase. This proportion is very close to that of the beach sand which proliferates this coastal area and there is little doubt that this is the source. The same statistically significant difference which exists between the temper ratio of ClIf-2 pottery and the beach sand ratio is apparent in the ClIf-8 ware and it is presumed that the same cultural forces were at work.

The amount of temper used in the analyzable vessels from this site is quite variable, ranging from an approximate five percent in Vessel Two to over twenty percent in Vessel Three, with the other vessels falling between these extremes. No explanation of this variation is offered here for such a small sample beyond the speculation that during early spring or late fall, one or the other of the main consituents of the pottery may have been difficult to secure, for example, the clay deposits may have been frozen or the sand snow covered.

MANUFACTURE

FABRICATION TECHNIQUE

The reader is referred to the general discussion on fabrication technique in the ceramic portion of the ClIf-2 report.

While both Wright (1967:25) and Janzen (1968:47) state that Laurel ceramic manufacture involves the coil technique to some degree at least, no certain evidence of this was discovered within the sherd collection from the Wawa Site. The amount of cohesion that exists between two adjacent coils is to a considerable extent, dependent on the amount of moisture contained in the clay. If the clay is too wet when the coils are bonded, the contraction that occurs as the water in the clay evaporates causes the coils to separate partially, thus reducing the effectiveness of the inter-coil bond. Conversely, if the moisture content of the clay is too low, the "stickiness" of the clay is reduced and between-coil bonding is lessened. Since the ideal proportion is rarely realized it is most likely that the weakest area of a coil wound vessel will be the joint between coils. Wright (1967:25) observes that:

> The fact that coil breaks are extremely common suggests that the bond between two coils was definitely a point of weakness in the vessel.

Accepting that such is the case, it would be expected that if a pot was fabricated by the coil method, there would be a preponderence of sherds with at least one edge exhibiting a coil juncture.

Within the ClIf-8 collection, only one sherd exhibits a horizontal edge that could possibly be construed as having a coil break. A number of the sherds display the foliation which is characteristic of the paddle and anvil technique. In addition, a number of sherds were recovered in a split condition, an indication possibly, that an inter-layer weakness existed which, in turn, again suggests utilization of the paddle and anvil technique. Wright (1967:71) notes that the Laurel culture sherds from the ClIf-2 site display "a marked tendency for the interior and/or exterior of the sherds to fissility", a condition that has been corroborated by the 1971 ceramic collection from the same site.

This apparent dichotomy in fundamental construction practice may possibly be explained by the two very early radiocarbon dates for the ClIf-2 and ClIf-8 sites. These sites may possibly have been the recipients of the first of several waves of a diffusing ceramic culture wherein paddle and anvil ceramic construction represented an early technique.

FIRING

A comparison of the means of sherd hardness from the Wawa Site, ClIf-8, and the Michipicoten Harbour Site, ClIf-2, reveals a significant difference; not only are the ClIf-2 sherds considerably harder but the mean of hardness for ClIf-8 sherds falls outside the range of hardness for ClIf-2 sherds. It has already been established that the potters from the two sites were using the same clay and temper to fabricate pots of the same general morphology and size. While there is a difference in wall thickness 15 mm. below the lip this is not considered to be significant as it is probably a function of the small sample size from ClIf-8. The variables remaining which relate directly to vessel hardness are the firing temperature and soak time, and these, in turn, are a function of the type of fuel, design of the firing area and the firing technique of the potters. Since

ClIf-8 is situated generally in the Great Lakes/ Boreal transition zone and specifically in the temperate microenvironment associated with the immediate vicinity of Lake Superior, it is a reasonable assumption that the aboriginal potter would have a large variety of both hard and soft wood available to her for use as fuel.

Unless situated in an exposed location, thus necessitating some form of sheltering pit, the aboriginal pottery firing area in this region, is nothing more than the surface hearth which is used in food preparation. The depression and pit hearths of the Michipicoten Harbour Site (ClIf-2) are examples of sheltered firing areas. The Wawa Site (ClIf-8) was, however, situated on a southeast-facing forested shoreline, protected from the prevailing northwest winds by a high, steep bluff. The two hearths that were found on this site, each associated with a concentration of sherds, are at the occupation level, thus indicating that no special firing precautions were taken by the potters.

As stated earlier, the firing operation is a technique that is fraught with the spectre of failure. Because of this, among the aboriginal potters, it was probably an assiduously followed ritual which precluded any attempt at whimsical variation.

One possibility is that the site was occupied for a short period of time during a cooler season of the year, probably spring, and that the firing temperature was partly a function of the prevailing ambient temperature.

FUNCTION

A number of the rim and body sherds from the Wawa Site exhibited a considerable carbonaceous deposit on the interior surfaces. As previously mentioned, a test of this deposit indicated that its composition was definitely vegetal mixed with an unidentified carbonized material that was possibly faunal. This would strongly suggest that the occupants of the ClIf-8 site were preparing their food by boiling it in a ceramic vessel. It is unclear in what function the pots represented by sherds with clean interior surfaces were used for although simple storage would appear to be a valid possibility, as pointed out previously, it is also possible that the unsullied sherds represent vessels that were destroyed during the firing process. If the latter hypothesis is correct it means that the prehistoric potters suffered from a rather dismal success to failure ratio, a likely possibility considering the complexity of ceramic manufacture.

STYLE

The vessels from ClIf-8 are as heterogeneous a group as those from ClIf-2 bear a remarkable similarity. This difference is not only displayed by style but extends to size, decoration and to amount of temper as well.

The vessel form, as evidenced by the body sherds, is generally conoidal. No evidence of shouldering or collaring was found. The lips of the five analyzable vessels varied from out-sloping through straight to insloping with considerable differences in lip thickness to body thickness ratios. Base morphology was not determined as no basal sherds were discovered.

Such a small collection suggests that the site was occupied by an equally small group, possibly a nuclear family. This would imply that the number of practising potters was represented by a mother and her unmarried daughters. While this might explain the relative paucity of the collection, it neglects the problem of its stylistic and technological diversity, unless the time-depth of the site is considered. The aboriginal material from this site was located in levels two, three, four and to a lesser extent, five. Each level was excavated in arbitrary two inch increments meaning that the prehistoric occupation is represented by a total depth of eight inches. Since the north bank of the Michipicoten River apparently receives a very small annual deposition, an occupation horizon of eight inches may be perceived as representing an unknown but considerable time depth. The foregoing is mitigated to some degree by the coarseness of the soil below the turf. In this type of soil, which is in reality a very coarse sand, and due to differential frost-heaving during the intense winters of the Lake Superior region, it is quite possible for artifacts to migrate both vertically and horizontally over an appreciable distance (Innis, pers. com.). Evidence for this is suggested by the presence of a few European artifacts within the presumed aboriginal horizon.

The image that materializes from this sometimes contradictory pot-pourri of evidence is that of a geographically small but well protected campsite that has been occupied during a single season, probably early spring, for a few years, each time by a different nuclear family.

SUMMARY

The evidence gleaned from the six rims and the sixty-six body sherds from the Wawa Site must be placed in perspective. Any statistical or quantitative evidence based on such a small sample must be viewed with a degree of skepticism.

The chemical analysis of the clay and temper leave little doubt that both were local raw materials. This strongly suggests that the ceramic remains found on site represent a very small indigenous industry.

While the sherds were representative of the Laurel Culture the great diversity represented by morphology, size and decoration prohibits any suggestion that they were fabricated by the same artisan. It seems probable, in fact, that the six rims might represent as many as six potters. Such a situation on a small site with so few artifacutal remains suggests a very brief seasonal occupation for a few years by divers itinerant families who used this small but well protected campsite as a way station while replenishing supplies before moving on to summer residence.

LITHIC ANALYSIS OF THE WAWA SITE (ClIf-8)

INTRODUCTION

The lithic artifacts of the Wawa Site (ClIf-8) are strikingly similar to the Laurel Michipicoten Harbour Site in terms of the raw material utilized and the particular flaking technology involved which indicates a cultural uniformity between the two sites. There are, however, functional differences between the two lithic assemblages which may reflect differences in activities associated with each site.

DESCRIPTION

RAW MATERIAL

LOCALE

1b) Quartz and Quartzite

The locally abundant quartz and particularily the quartzite pebble-cobbles were utilized by the

Wawa people in making pebble-core tools.

1c) Slate

The slate material recovered is rather fragmentary and does not show signs of working but is included in the analysis because of its cultural association.

1d) Cobblestones

Their natural proximity to the site has resulted in a skeptical attitude toward some of the specimens recovered.

1e) Sandstone

Only two flakes of this brown coloured sandstone were recovered. It is thought to occur in the Wawa area.

IMPORTED

Similar chert types were being exploited by both the Wawa and Michipicoten Harbour peoples: however, major differences in distributions were noted.

2a) Hudson Bay Lowland Chert

This glacially derived pebble-cobble chert was used but not as extensively as in the case of ClIf-2.

There is a significant increase in the Southern Palaeozoic Cherts and a difference in their relative proportions between ClIf-2 and ClIf-8; that is, Manitoulin Island Chert is completely absent from the ClIf-8 collection while the utilization of Scott Quarry Chert is increased and new chert sources, possibly Bayport, were introduced.

3c) The Bayport chert nodules were formed in the Upper Grand Rapids

> or Bayport limestone formations (Dustin, 1935:466) with outcroppings in Arenac, Huron, and Tuscola Counties. The nodules are small with the vast majority being less than 4 inches in diameter...They are marked by a series of concentric lines of formation. Quartz inclusions occur and fossils are frequent.
>
> The Bayport chert is basically grey in colour but varies from a white chalky material found on the outer surface of the nodules, to a dense dark grey often found near the center of the nodules. (Fitting _et al_ 1966:18)

The particular specimen of what is thought to be Bayport Chert is so unique in its composition that it should be regarded as a distinctive chert category regardless of its certain identification.

Table 53 illustrates the particular distribution by weight of the lithic raw material utilized at ClIf-8.

TABLE 53: DISTRIBUTION BY WEIGHT OF LITHIC RESOURCES AT ClIf-8.

LOCALE	WT.	%
Quartz and Quartzite	21.41	1.9
Slate	26.46	2.4
Cobblestone	822.00	73.2
Sandstone	11.00	78.4
Sub Total	880.87	78.4
IMPORTED		
Unknown	44.16	3.9
Hudson Bay Lowland Chert	70.36	6.3
Southern Palaeozoic Chert	64.37	5.7
Scott Quarry Chert	16.33	1.5
Bayport Formation Chert	47.08	4.2
Lake Superior Agate	0.3	0.0
Total	1123.47	100.1

DESCRIPTION

ARTIFACTS RECOVERED

ClIf-8 lithic artifacts were classified in the same manner as those from ClIf-2, the Michipicoten Harbour Site (See Pages 209-210).

A: Conchoidally Fractured Material

Table 54 illustrates the frequency distribution by weight of all conchoidally fractured material from the Wawa Site (ClIf-8).

TABLE 54: THE FREQUENCY DISTRIBUTION BY WEIGHT OF ALL CONCHOIDALLY FRACTURED MATERIAL FROM THE WAWA SITE.

CLASSIFICATION	WT.	%
1a) Quartz and Quartzite	19.85	7.8
2a) Hudson Bay Lowland Chert (HBL)	62.85	24.6
3) Southern Palaeozoic Chert	64.37	25.1
3b) Scott Quarry Chert	16.43	6.4
3c) Bayport Chert	47.08	18.4
4) Lake Superior Agate	0.3	0.1
?) Unknown	44.96	17.5
Total	255.84	99.9

GROUP I: DETRITUS AND II: UTILIZED ARTIFACTS

The conchoidally-fractured artifacts were divided into two groups: detrital material and utilized artifacts. The frequency distribution by weight of the specific lithic resources utilized for these two groups is summarized in Table 55.

TABLE 55: THE FREQUENCY DISTRIBUTION BY WEIGHT OF RAW MATERIAL FOR GROUPS I AND II FROM THE WAWA SITE.

TYPE OF MATERIAL

CLASSIFICATION

	1a	2a	3	3b	3c	4	?	Total
Detritus	19.9	46.4	23.7	8.2	0.0	0.3	34.1	132.6
%	07.8	18.1	9.2	3.2	0.0	0.1	13.30	51.7
Utilized	0.00	16.5	40.7	8.2	47.1	0.0	10.8	123.3
%	0.00	6.4	15.9	3.20	18.4	0.0	4.20	48.1
Total	19.9	62.9	64.4	16.4	47.1	0.3	44.9	255.9
%	7.8	24.5	25.1	6.4	18.4	0.1	17.5	99.8

There is near equal distribution in terms of weight between the detritus and utilized categories. However, there is a major difference in distribution within the utilized category and type of material utilized. The majority of the material utilized was Southern Palaeozoic Cherts.

GROUP I: DETRITUS

Two distinctions based on artifact reduction were made on the detrital material: flakes, and cores. The frequency distribution by weight for each group is summarized in Table 56.

TABLE 56: THE FREQUENCY DISTRIBUTION BY WEIGHT AND RAW MATERIAL FOR GROUP I ARTIFACTS FOR THE WAWA SITE.

TYPE OF MATERIAL

CLASSIFICATION

	1a	2a	3	3b	4	?	Total
Flakes	0.4	24.1	17.9	8.2	0.3	33.9	84.8
%	0.3	18.1	13.5	6.2	0.2	25.6	63.9
Cores	19.4	22.3	5.8	0.0	0.0	0.3	47.8
%	14.7	16.9	4.3	0.0	0.0	0.2	36.1
Total	19.8	46.4	23.7	8.2	0.3	34.1	132.6
%	15.0	35.0	17.8	6.2	0.2	25.8	100.0

The distribution of detrital material is skewed towards the flake category. Within the flake category there is a near even distribution between Northern and Southern Palaeozoic Cherts while within the core category the bulk of the material is derived from Northern sources.

I: a) FLAKES

Flakes were divided into three types: pressure, secondary and primary percussion flakes.

I:a(i) PRESSURE

Since no specific analysis was carried out on this particular category only number, weight and type of material were recorded, the details of which are in Table 57.

TABLE 57: THE DISTRIBUTION BY NUMBER, WEIGHT AND RAW MATERIAL OF PRESSURE FLAKES FOR THE WAWA SITE.

	N	%	WT.(gm)	%	AV.WT.	TYPE OF MATERIAL
	1	1	.01	.1	0.01	00) Unknown
	5	7	.71	10	0.14	1a) Quartz and Quartzite
	9	13	.87	15	0.10	2a) H.B.L.
	4	6	.53	7	0.13	3) S. Palaeozoic
	48	72	6.06	68	0.13	3b) Scott Quarry
TOTAL	67	99	8.18	100.1	0.12	

I:a(ii) SECONDARY FLAKES

Intersite comparisons to detect similarities or differences in technology were based on this category.

In addition to listing the location number, seven variables including platform thickness, platform length, platform angle, maximum thickness, maximum width (perpendicular to length), length (axis of percussion), and weight were measured to the nearest .01 cm.,1.0 degree and .01 gram per flake. A sample of 96 flakes was selected for analysis. The reasons for selecting the variables and number will be discussed later.

Table 58 summarizes the total distribution both in terms of number and weight for the particular type of material used for this flake type.

TABLE 58: THE FREQUENCY DISTRIBUTION BY NUMBER, WEIGHT, RAW MATERIAL OF SECONDARY FLAKES FROM THE WAWA SITE.

	N	%	WT.(gm)	%	AV.WT.	TYPE
	66	48	27.81	40.0	.42	Unknown
	1	.7	.4	0.5	.4	1b
	25	18	17.31	25.0	.69	2a
	27	20	17.04	24.0	.63	3
	17	12	7.69	10.0	.45	3b
	1	.7	0.3	0.5	.3	4a
TOTAL	137	99.4	69.90	100	.51	

I:a(iii) PRIMARY FLAKES

Only 3 primary flakes, all derived from Hudson Bay Lowland Chert, were recovered from the site. Total weight for the three flakes is 6.03 gm.

I:b) CORES

Cores are classified into five different types; shatter fragments, core fragments, bipolar cores, cores, and exhausted cores.

I:b(i) SHATTER FRAGMENTS

Basically any fragments exhibiting angular structure without any characteristics of a platform or bulb of percussion were classified as shatter fragments. No attributes other than type of material, weight, and number were recorded.

TABLE 59: THE FREQUENCY BY WEIGHT AND NUMBER OF SHATTER FRAGMENTS ACCORDING TO TYPE OF MATERIAL FROM C1If-8.

	N	%	WT.	%	AV.WT.	MATERIAL
	4	66.6	3.43	84	0.86	2a
	1	16.5	0.40	10	0.40	3
	1	16.5	0.25	6	0.25	Unknown
TOTAL	6	99.6	4.08	100	0.68	

I:b(iii) REJUVENATED CORE FRAGMENTS

This category is defined as those fragments which have been removed from the core in an effort to prepare the core for further flake removal. The characteristics of this group are prepared platforms, dorsal flake scars (usually multi-directional) and a minimum thickness which does not permit further flake reduction.

Since there were only six fragments all are individually recorded in Table 60.

TABLE 60: BASIC VARIABLES AND ATTRIBUTES FOR REJUVENATED CORE FRAGMENTS FROM ClIf-8

#	267A	320A	17	132	131	303
BAG NO.	55	708	17	40	40	---
LOCATION	TR-1 L2	TR-1	B1 L3	A4 L5	A4 L5	TR-2
LENGTH	3.25	2.48	2.45	2.05	1.95	1.91
WIDTH	1.65	2.90	2.05	1.27	1.20	2.62
THICKNESS	1.00	0.87	0.63	0.50	0.43	0.74
WEIGHT	4.54	4.56	2.65	1.61	0.80	2.90
MATERIAL	Quartz 1a	3	2a	2a	3	2a
PLATFORM ANGLE=110^{o}	single faceted platform	$PL^{o}=30^{o}$	$PL^{o}=90^{o}$	$PL^{o}=90^{o}$	$PL^{o}=45^{o}$	$PL^{o}=45^{o}$
PLATFORM THICKNESS	Pth=0.6	Pth=1.02	Pth=0.19	Pth=0.50	Pth=0.25	Pth=0.63
COMMENTS	no indications of bipolar, may be block percussion.	the over-hanging lip platform angle type of material, indicate free-hand percussion technique.	dorsal surface covered with cortical material.		rotated 90^{o} probably derived from a biface.	flakes driven off dorsal surface, over hanging lip.

I:b(VI) BIPOLAR CORES

There were three bipolar cores exhibiting the following characteristics.

TABLE 61: VARIABLES AND ATTRIBUTES TAKEN FOR THREE BIPOLAR CORES FROM THE WAWA SITE.

#	--	61	311A
BAG NO.	46	29	707
LOCATION	A263	A263	TR-2
MAXIMUM LENGTH	2.15	3.20	3.70
MAXIMUM WIDTH	1.00	2.87	2.35
THICKNESS	0.52	1.35	1.30
WEIGHT	1.42	13.48	9.74
MATERIAL	Quartzite	Quartzite	2a
PLATFORM L^{0}=	90^{o}	90^{o}	90^{o}
" Thickness =	0.20	0.18	1.20
" Comment =	opposite surface crushed	opposite surface crushed	both surfaces crushed
GENERAL COMMENT=	difficult to discern side edge use or even possible use at polar surface.	difficult to discern utility.	similar to what McPherron describes as the split cobble type.

I:b(Vii) EXHAUSTED CORES

Morlan (1973:12) includes in this category those specimens in which "flaking on several faces may reduce a core to little more than a globular lump of stone which may not be subject to consistent orientation".

One such artifact was recovered from ClIf-8 with the following characteristics:

#	304A
BAG NO.	---
LOCATION	TR-2
MAXIMUM LENGTH	2.05
MAXIMUM WIDTH	1.55
MAXIMUM THICKNESS	0.90
WEIGHT	2.47
MATERIAL	2a

GROUP II: UTILIZED ARTIFACTS

All artifacts displaying any signs of utilization were assigned to one of two categories: unmodified flakes and retouched tools. The frequency distribution by weight and raw materials for these two categories is summarized in Table 62.

TABLE 62: THE FREQUENCY DISTRIBUTION BY WEIGHT AND RAW MATERIALS OF UNMODIFIED FLAKES AND RETOUCHED TOOLS FROM THE WAWA SITE.

CLASSIFICATION

	2a	3	3b	3c	?	Total
Unmodified	1.4	1.9	0.0	0.0	0.8	4.1
%	1.2	1.2			.6	3.0
Modified	15.0	38.8	8.2	47.1	10.0	119.1
%	12.2	31.4	6.7	38.2	8.1	96.6
Total	16.4	40.7	8.2	47.1	10.8	123.2
%	13.4	32.6	6.7	38.2	0.6	99.6

The distribution within the conchoidal categories is significant in that there is a dominance of Southern Palaeozoic material and conversely there is an absence of Northern Palaeozoic cherts for both categories.

Although function of tools will be discussed later, the near absence of unmodified flakes suggests that a "fine" cutting function for which unmodified flakes are best suited was an unimportant activity at ClIf-8 or another tool type not recovered was used.

II:a) UNMODIFIED FLAKES

(i) EDGE DETERIORATED FLAKES (UTILIZED FLAKES)

From the previous lithic analysis of ClIf-2 it was determined that there were several important attributes to be observed in this category. Since only three flakes were recovered all are described in Table 63.

TABLE 63: VARIABLES AND ATTRIBUTES RECORDED FOR EDGE DETERIORATED FLAKES FROM ClIf-8.

#	353A	352A	148
Bag No.	720	720	44
Location	TR2	TR2	04
Platform Thickness (cm)	0.25	0.20	0.17
Platform Angle°	60°	85°	45°
Max. Thickness	0.32	0.47	0.27
" Width	1.74	2.01	1.20
Length	2.07	2.53	3.00
Weight (gm)	1.42	1.93	0.80
Type of Material	2a	3	unknown
Location of Wear	right and distal	distal right side corners	left lateral edge
Length of Wear	R=1.9 D=0.9	DR=1.68 SC right=0.60 SC left = 0.62	LLE=2.77
Edge Angle (worn)	70°	20°	23°
Type of Wear	continuous step fractures	discontinuous	rip touch
Comments	there are slight scratch marks that are at a 45° angle at the edge, the face height is only 0.14 cm. which is rather significant since the above mentioned wear patterns have all the characteristics of a bevelled flake. This might lead to conclusion that face height is an unnecessary attribute, which may support the lack of significance between different wear patterns on bevelled flakes examined from ClIf-2.	marginal retouch, the side corner edges exhibit similar characteristics as graver-spurs found on some bevelled flakes.	no scratch marks evident.

II:b) RETOUCHED TOOLS

Any utilized tool exhibiting shape modification was assigned to one of five types: bevelled flakes; unifacial tools; preform-bifaces; points; and core tool. Table 64 summarizes the frequency distribution of all retouched tools by raw material.

TABLE 64: THE FREQUENCY DISTRIBUTION BY WEIGHT AND RAW MATERIAL OF THE RETOUCHED TOOLS FROM THE WAWA SITE.

RAW MATERIAL

CLASSIFICATION

	2a	3	3b	3c	?	Total
Bevelled	4.2	1.8	4.5	0.0	10.0	20.6
%	3.6	1.5	3.7	0.0	8.4	17.3
Unifacial	1.3	0.0	0.0	0.0	0.0	1.3
%	1.1	0.0	0.0	0.0	0.0	1.1
Preform-Biface	0.0	20.3	0.9	47.1	0.0	68.2
%	0.0	17.0	0.7	39.5	0.0	57.3
Points	0.0	16.7	2.8	0.0	0.0	19.65
%	0.0	14.1	2.4	0.0	0.0	16.4
Core Tool	9.5	0.0	0.0	0.0	0.0	9.5
%	7.9	0.0	0.0	0.0	0.0	7.9
Total	15.0	38.8	8.2	47.1	10.0	119.1
%	12.6	32.6	6.8	39.5	8.4	99.9

There is an overall dominance of Southern Palaeozoic cherts within each category and as would be expected preforms and bifaces comprise 68% of the material utilized.

II:b(i) UNIFACES

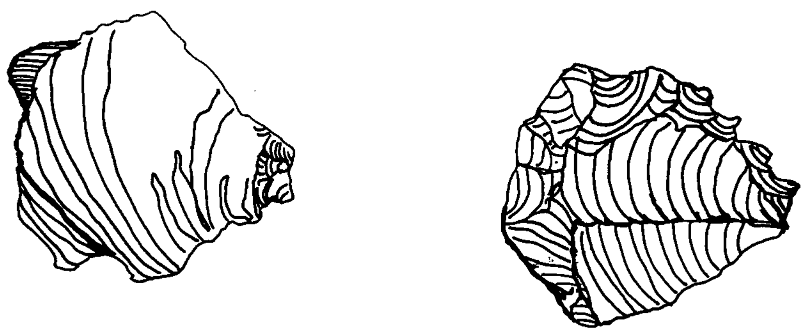
II:b(i)-1 BEVELLED FLAKES

In the specific analysis of ClIf-2 bevelled flakes it was noted that several important variables were not measured. Because of time restrictions the new attributes added to the list could not be incorporated with the ClIf-2 population.

It is hoped that through research further attributes will be added or redefined, with the final goal in mind of standardizing a complete attribute list for this particular category.

Since only six bevelled flakes were recovered all will be individually described in Table 65. (See Figure 36).

FIGURE 36: A BEVELLED FLAKE No. 335A, ClIf-8.



VENTRAL DORSAL

TABLE 65: SELECTED ATTRIBUTES OF SIX BEVELLED FLAKES FROM THE WAWA SITE.

NO.	283A	306A	235	335A	121	12
BAG NO.	702	706	114	714	37	17
LOCATION	TR1	TR2	C5 L2	TR2 SQ-2	A4 L3	B1 L3
PLATFORM THICKNESS (cm)	0.19	0.30	0.90	0.30	0.36	0.24
PLATFORM ANGLE	30°	30°	90°	80°	60°	45°
MAXIMUM THICKNESS	0.34	0.49	0.49	0.93	.67	0.77
MAXIMUM WIDTH	1.91	1.85	1.50	3.30	1.48	2.23
MAXIMUM LENGTH (Axis of percussion)	1.43	2.25	2.22	3.54	1.73	2.6
WEIGHT (gm)	0.89	1.91	1.78	10.04	1.70	4.24
TYPE OF MATERIAL	3b	3b	3	unknown	3b	2a
BEVELLED FACE LENGTH	2.10	1.90	1.70	3.90	0.90	2.50
" " HEIGHT	0.34	0.40	0.30	1.00	0.5	0.40
" " ANGLE	80o	60°	75°	90°	75°	80°
" " RADIUS	2.66	2.66	2.33	2.75	2.3	2.75
" " ARC	70°	80°	50°	120°	60°	80°
SIDE FACE JUNCTURE RE - ANGLE						
RIGHT	65°	70	112°	80°	110°	85°
LEFT	50°	110	115°	80°	90°	75°
FACE WEAR TYPE	focused	continuous	continuous	focused	focused	continuous
SIDE EDGE WEAR						
RIGHT	none	irregular marginal retouch	none	graver spur	irregular marginal retouch	continuous slight step fractures
LEFT	none	none	continuous marginal retouch	rip retouch	none	secondary retouch, continuous wear,
DORSAL SURFACE	one flake removed near platform	concave surface because of flake removal	platform area thinned	no flakes removed	no flakes removed	slight scratch marks on dorsal ridge.
VENTRAL SURFACE	one scratch mark on ventral surface at 30° angle to the face	no wear	no wear	no wear	no wear	no wear

II:b(i)-2 UNIFACIAL TOOL

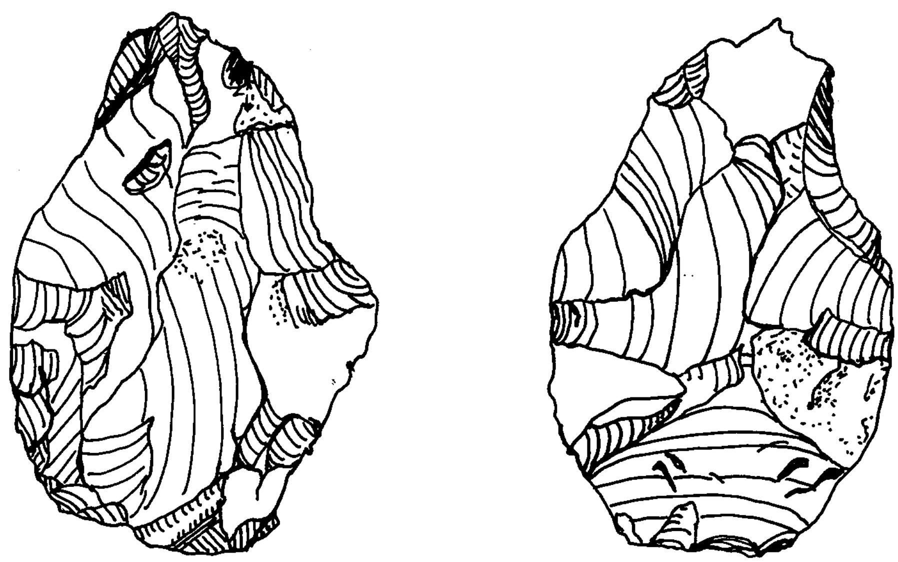
One broken unifacial tool was recovered from the site. The following data were obtained.

NO.	284
LOCATION	TR1
MAXIMUM LENGTH	1.95
MAXIMUM WIDTH	1.87
MAXIMUM THICKNESS	0.44
WEIGHT	1.32
MATERIAL	2a
WEAR LEFT SIDE LENGTH	1.65
WEAR LEFT SIDE ANGLE	55°
WEAR LEFT SIDE TYPE	stepping present at mid-section and slight stepping near tip.
WEAR RIGHT SIDE LENGTH	0.67
WEAR RIGHT SIDE ANGLE	45°
WEAR RIGHT SIDE TYPE	slight stepping at tip.
COMMENTS	Wear indicates tip was utilized, possibly for piercing, while left edge was slightly utilized possibly for a cutting, scraping function. However, the proximal end indicates that the tool was broken (snapped) during use.

II:b(ii)-1 BIFACES or PREFORMS

The two bifaces (See Figures 37 and 38) recovered are individually described in the following manner:

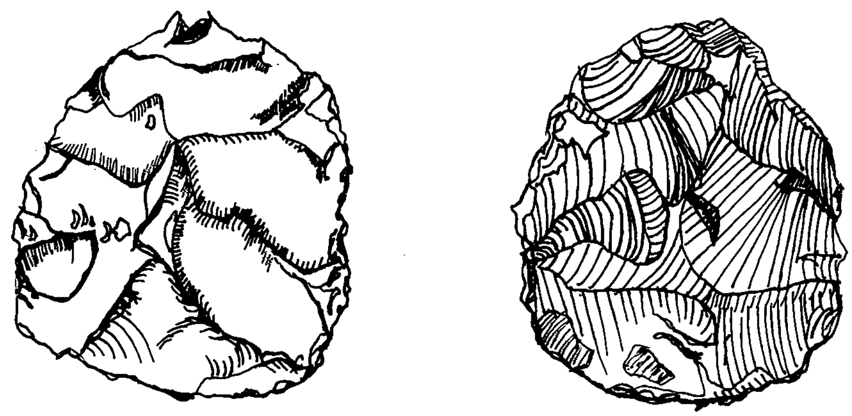
FIGURE 37: PREFORM No. 9, C1If-8.



VENTRAL DORSAL

NO.	9
BAG NO.	16
LOCATION	A3L2
MAXIMUM LENGTH	6.78
MAXIMUM WIDTH	4.64
MAXIMUM THICKNESS	1.68
WEIGHT	47.08
MATERIAL	Bayport?
PLATFORM ANGLE	NA
PLATFORM THICKNESS	NA
CORTEX	present
WEAR LENGTH	
WEAR ANGLE	
WEAR TYPE	Slight step fractures are associated with the marginal edges and may not indicate use but edge grinding for flake removal.
COMMENTS	One large flake removed from the distal ventral surface probably ruined the preform in terms of being further reduced because of a large concavity which remains. Efforts were made to reduce this area but were unsuccessful as evidenced by the thick platform area with no traces of hafting. It appears that the preform may have had prior use but the reshaping, or sharpening stage rendered it useless.

FIGURE 38: PREFORM No. 240, C1If-8.



VENTRAL DORSAL

NO.	240
BAG NO.	167
LOCATION	C1L3
MAXIMUM LENGTH	4.7 cm
MAXIMUM WIDTH	4.1 cm
MAXIMUM THICKNESS	0.89
WEIGHT	20.25
MATERIAL	3
PLATFORM THICKNESS	0.57
PLATFORM ANGLE	NA
CORTEX	absent
WEAR LENGTH (1)	2.7 cm
(2)	1.3 cm
WEAR ANGLE (1)	85°
(2)	45°
WEAR TYPE (1)	focused
(2)	slight step fracture found on both ventral and dorsal surfaces.
COMMENTS	One of the interesting features of this preform is the relatively flat ventral surface which has been extensively flaked and on which no wear (in the form of step fractures) is present. The plano-convex outline is intentional and probably reflects the knapper's desire to form a steep working edge.

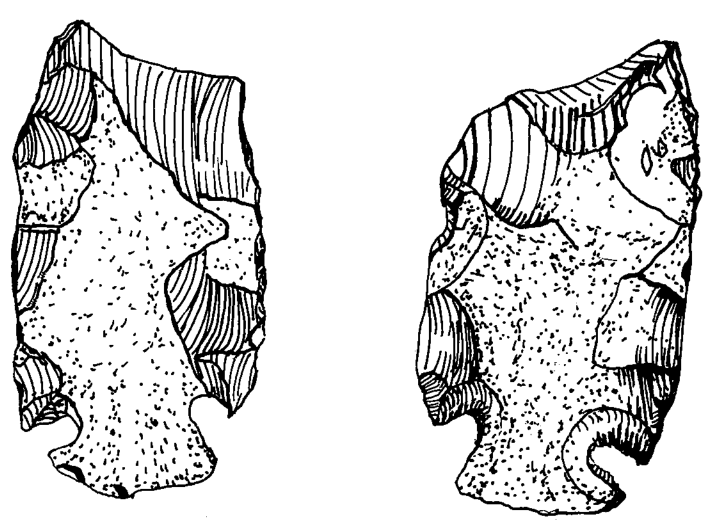
II:b(ii)-1 BIFACE FRAGMENT

One biface fragment derived from Scott Quarry Chert was recovered from Trench 2. Basic metrical data include: Length = 1.10 cm. Width = 1.75, Thickness = 0.47 cm. Weight = 0.9 gm.

II:b(ii)-2 POINTS

Two chert points (See Figure 39 and 40) one corner notched and the other stemmed, were recovered. Basic attributes for the corner notched point are recorded below.

FIGURE 39: CORNER NOTCHED POINT No. 218, ClIf-8.



VENTRAL DORSAL

NO.	218
LOCATION	B4L3
WEIGHT	16.74
MAXIMUM LENGTH	undetermined 5.90 cm.
MAXIMUM WIDTH	3.24
MAXIMUM THICKNESS	0.97
NECK WIDTH	1.43
NOTCH WIDTH RIGHT	0.41
NOTCH WIDTH LEFT	0.48
DEPTH OF NOTCH RIGHT	0.47
DEPTH OF NOTCH LEFT	-.40
DISTANCE OF NOTCH TO RIGHT	0.22
CORNER OF NOTCH TO LEFT	0.25
BASAL WIDTH	1.88
TYPE OF MATERIAL	3
CORTEX	present on both surfaces
FLAKING STYLE	indistinct
COMMENTS	Although the tip was broken, and no pressure or secondary retouch flakes were recovered from this particular artifact, a functional use is not indicated since there is a lack of wear found on the side notches and along the base. There is very slight marginal retouch on the side edges and cortical material is found on both surfaces. (The slight marginal retouch found on the edges may indicate edge grinding for flake removal). In summary, the point has seen little or no use.

FIGURE 40: STEMMED PROJECTILE POINT No. 308A, ClIf-8.

VENTRAL

DORSAL

Point No. 308A is a small stemmed point with the following characteristics.

LOCATION	TR2
MAXIMUM LENGTH	3.05
MAXIMUM WIDTH	1.60
MAXIMUM THICKNESS	2.81
MATERIAL	3b
NECK WIDTH	1.15
LENGTH TO BASE	0.48
BASAL WIDTH	0.98
CORTEX	absent
WEAR RIGHT EDGE	serrated edge with step fractures on both surfaces
WEAR LEFT EDGE	serrated edge with step fractures on both surfaces
WEAR STEM	Slight step fractures on right side, left side is notched. Step fractures are present at top of stem.
COMMENTS	The small size of this point may make it possible for use as either a dart point or arrow head.

II:iii) PEBBLE CORE TOOLS

Although there is a virtual absence of pebble-core tools, their presence on the site is indicated by the number of bipolar cores recovered. There was one "gouged-end" artifact (McPherron 1967:14) recovered which belongs to this class of artifacts. It exhibited the following characteristics:

NO.	320A
BAG NO.	708
LOCATION	TR1
MAXIMUM LENGTH	2.80
MAXIMUM WIDTH	2.62
MAXIMUM THICKNESS	1.23
WEIGHT	9.47
UTILIZED DISTAL EDGE	1.68
MATERIAL	2a
LENGTH	
HEIGHT	no secondary marginal flaking
ANGLE	35^{o}
PLATFORM	Secondary flakes removed to create bevelled face of a scraper, but lacks the characteristic step fractures along the face edge.
COMMENTS	This artifact is similar to those described by McPherron as "gouged-end" artifacts.

B) ROUGH STONE

Non-conchoidally fractured material was limited to two cobbelstones, two pieces of slate, 1 piece of mudstone, 2 pieces of siltstone.

BI) COBBLESTONES

The basaltic cobblestone, No. 59B is, disc-shaped. There are basically two types of wear associated with it: edge deterioration and dorsal pitting. The particular wear patterns and its association with several secondary flakes suggest that it was used in flake removal either as an anvil or hammerstone. Basic metrics are recorded in Table 66.

Cobblestone No. 242A is cigar shaped. Wear in the form of continuous edge deterioration is present along only one margin for approximately 7.0 cm. Basic metrical data are recorded in Table 66.

TABLE 66: METRICAL DATA FOR TWO COBBLESTONES FROM ClIf-8.

No.	59B	242A
Length (cm)	8.5	13.2
Width	7.5	5.9
Breadth	3.5	2.9
Weight (gm)	425	397

B2) SLATE

The two roughly rectangular pieces of slate show no signs of utilization. The weights of each piece are 1.88 grams and 15.0 grams respectively.

B3) SILTSTONE

The two brown pieces of siltstone show no signs of utilization but may represent flaked artifacts. The weight of each artifact is 6.69 grams and 4.31 grams respectively.

B4) MUDSTONE

This mudstone fragment, No. 75, weighs 9.6 gm., is 2.4 cm. in length, 3.8 cm. in width and 1.0 cm. in thickness. It has the appearance of a basal portion of a lanceolate biface. Slight edge deterioration is present.

ANALYSIS

SELECTION OF RAW MATERIAL

The ClIf-2 analysis stated that bifacial tools were derived from Southern Palaeozoic Cherts while Northern Palaeozoic Cherts and, in particular, Hudson Bay Lowland Chert were used in unifacial as well as bipolar core tool production. In Terminal Woodland Sites of the Northern Great Lakes Region this is the general rule of thumb. (Binford and Quimby 1963; McPherron 1967; Dawson 1974; Fox, personal communication). Since the same pattern holds true for the Wawa Site which belongs to the Initial Woodland Period, the particular selection of raw materials as defined above, is of great antiquity and this pattern occurs within a vaguely defined area. This would indicate a material uniformity that exists within a space/time continuum.

The specific mineral distribution of lithic raw materials for ClIf-8 is rather interesting.

Although the sample is exceptionally small for any valid statistical analysis, some general observations may allow certain inferences to be generated.

The first point is the presence of quartz and quartzites. They are locally available in the glacial till as cobbles and pebbles, resembling the Hudson Bay Lowland Chert in form, but from a cultural point of view are not as "desirable" in terms of controlled knapping and duration of use as the Hudson Bay Lowland Chert. As would be expected the same technology involved in Hudson Bay Lowland Chert reduction, the bipolar technique, is used to reduce this raw material into useful tool types.

The use of Hudson Bay Lowland Chert is of great antiquity as Fox (1975:38) has demonstrated with the Palaeo Lakehead Complex and indicates, as is the case with the Michipicoten Harbour Site, the selection of a raw material for a particular purpose. It is rather surprising that within the particular unifacial tool categories bevelled flakes and unifacial tool, for ClIf-8, H.B.L. chert is not the dominant chert type (the ratio is one to one between Southern and Northern Palaeozoic Cherts).

The third observation is the overall dominance of Southern Palaeozoic Cherts for the Wawa Site (See Table 54). The ratio of Southern Palaeozoic Chert to Northern Palaeozoic Chert for the two Initial Woodland Sites is completely reversed. At the Michipicoten Harbour Site, Southern Palaeozoic Cherts (SPC) comprise 25% of the sample, while at the Wawa Site SPC equal 50% of the conchoidal sample. The Northern Palaeozoic Chert (NPC) equals 42% of the sample for the Michipicoten Harbour Site, while NPC only 24.6% for the Wawa Site.

These observations lead to the conclusion that the Hudson Bay Lowland Chert was not generally available to the inhabitants of the Wawa Site.

TECHNOLOGY

MODEL

In the lithic analysis of ClIf-2, two techniques of core reduction were discerned; bipolar and freehand percussion. A general perusal of the descriptive categories from ClIf-8 revealed that these two techniques were also utilized. In order to determine technological similarity between the two sites, it is necessary to indicate the same underlying cognitive processes disclosed by the knapper's lithic approach from raw material to finished product. The cognitive processes involved in tool production will be the articulation of at least four basic factors: technology, function, style and random variation.

Bonnichsen (1974:1) has suggested four conceptual levels pertaining to the manufacture of stone tools:

1) The knapper's selection of raw materials.
2) The knapper's articulation of the input variables of force impactor, holding position and material, shape and torque.
3) The internal structuring of cores/tools in the process of flake removal involving such actions

as platform preparation and decisions concerning the direction and spacing of flaking.
4) The external structuring, as in blade or stem form or as described by artifact maximum dimensions.

Focusing on the technological aspect, level 2 of Bonnichsen's conceptual knapping process will have the greatest technological input.

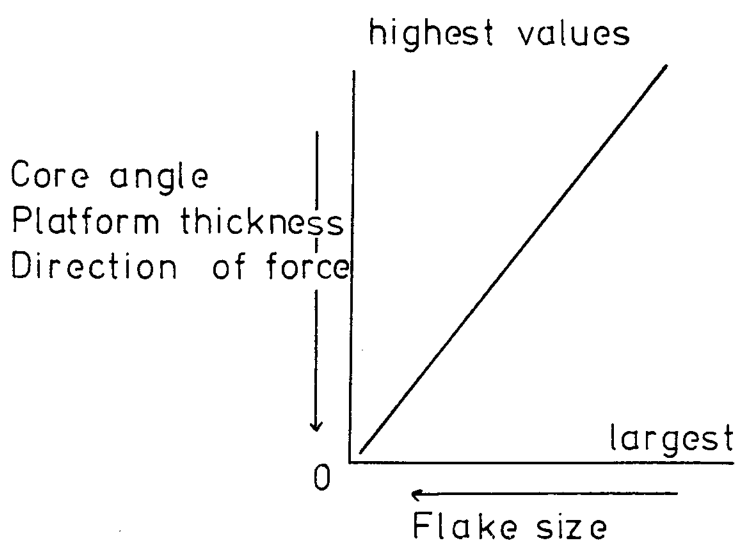
If this premise is accepted, what observations can be made that will disclose the technological process?

In order to assess which artifacts will have the greatest technological input, an examination of those artifacts which exhibit the least modification was conducted. Any modifications to an artifact result in the operation of other factors, for instance, function which may alter the degree of technological input and void any comparative analysis on that basis.

Obviously the category best suited to this type of analysis is unmodified flakes, not only for the above reason but also because of the known theoretical principles which can account for flake production and because these flakes occur usually in numbers large enough to permit statistical analysis.

Speth (1972) indicated that various attributes of flake size are highly and predictably interrelated. In order to enumerate these variables Wilmsen (1974:89) shows the interrelationship between core angle, platform thickness and direction of force as the controlling technological variables and further, demonstrates (Figure 41) the relationship of these variables to flake size.

FIGURE 41: THE RELATIONSHIP BETWEEN TECHNOLOGICAL VARIABLES AND FLAKE SIZE FROM WILMSEN 1974.



Wilmsen (1974) concluded that at least five variables, platform thickness (Pth), platform angle (PL^o), thickness (T), width (W) and length (L) would be accounted for by technological processes.

METHOD OF ANALYSIS

From the two Initial Woodland Sites, ClIf-2 and ClIf-8, samples of bifacial retouch flakes were chosen for comparative analysis because this is the only category which exhibits a high degree of technological input, and it is the only category with sufficient numbers to allow for statistical analysis.

A sample of 96 flakes from each site was selected on the basis of similar raw material. Not only were all of the analyzed flakes derived from Southern Palaeozoic Chert but Manitoulin Island Chert was omitted from the analysis since it did not occur in the ClIf-8 site. The number 96 represents the maximum number of flakes from each site that could be identified as being of similar lithic source.

A total of seven variables was selected: platform thickness (Pth), platform length (PL), platform angle (PL^o), maximum thickness (T), maximum width (W, perpendicular to length), length (L, measured along the axis of percussion) and weight (W). Platform length was added since it may indicate a difference in type of percussor utilized. Weight was selected since it may indicate a possible source of error in sample selection between both sites. Each variable was measured to the nearest 0.01 cm., 1.0 degree, 0.01 gm. for the appropriate category.

All measurements taken for each artifact were key punched on standard computer cards and by using a SPSS computer package each category was analyzed by means of a one way analysis of variance test.

SOURCES OF ERROR

There are two sources of error in the analysis:

sample size and sample selection. Although the sample is somewhat small (usually a minimum of 500 members per population is required) it is felt that 96 individuals will determine the strength of the relationship if not the exact degree to which it holds.

The sample selection is complicated by two factors: types of preform and stage of preform utility. The differences which may occur in bifacial flakes may be a result of functional or stylistic properties rather than technological ones.

RESULTS OF THE ANALYSIS

Table 67 is a summary of the analysis of a variance between each variable for the two Initial Woodland Sites, ClIf-2 and ClIf-8.

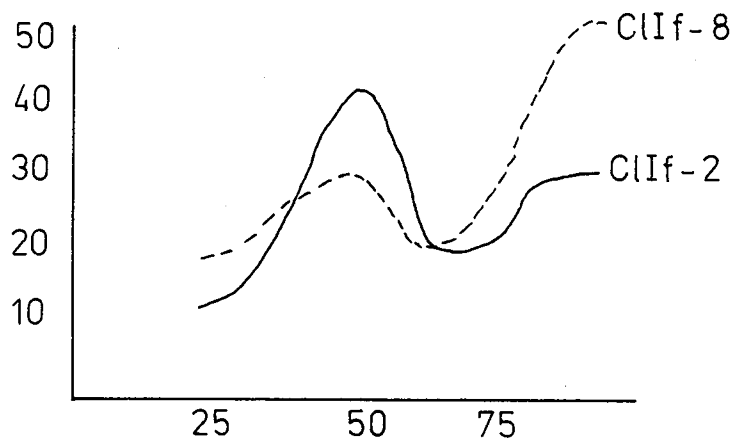
TABLE 67: SUMMARY OF ANALYSIS OF VARIANCE OF BIFACIAL FLAKE VARIABLES BETWEEN TWO INITIAL WOODLAND SITES

	Pth		Pe		PL°		T		W		L		WT	
	N	$\overline{X}$	N	$\overline{X}$	N	$\overline{X}$	N	$\overline{X}$	N	$\overline{X}$	N	$\overline{X}$	N	$\overline{X}$
ClIf-2	96	0.14	96	0.46	96	44°	96	0.22	96	1.30	96	1.41	96	0.37
ClIf-8	96	0.13	96	0.48	96	57°	96	0.24	96	1.39	96	1.53	96	0.52
Significance	NO		NO		YES		NO		NO		NO		YES	

The results indicate that of the seven variables, platform angle and weight could not be from the same population.

The frequency distribution of the angles of the platforms for the two sites were plotted on a graph. The difference between the two sites is readily illustrated below.

FIGURE 42: GRAPHIC REPRESENTATION OF THE FREQUENCY DISTRIBUTION OF PLATFORM ANGLES FOR TWO INITIAL WOODLAND SITES.



Both sites show a similar bimodal distribution but the platform angles from ClIf-2 cluster around the 30^{o} range, while the ClIf-8 angles cluster around the 80^{o} range.

In addition to this difference, the flakes themselves from ClIf-2 were significantly smaller than those from ClIf-8.

INTERPRETATION

It has been stated that one source of error which could skew the analysis is the result of two factors: the type of preform, and the stage of preform utility. What evidence there is indicates that these factors are the cause of the significance in the two variables, platform angle and weight.

First, there are significant differences between the sites in terms of the preforms recovered. The ClIf-2 preform is lanceolate-shaped and bifacial flaking achieved a convex-convex outline with edge angles ranging between 35-45 degrees. The ClIf-8 preform is ovate to rectangular-shaped and has a plano-convex outline. Edge angles range from 50-85°. Thus, the detaching of a flake to achieve the above mentioned shapes necessitates the holding of the preforms in a different position and probably a differently angled blow as well. This fact accounts for the differences in platform angles between the sites.

Further, one has to consider the stage of preform reduction. Frison (1968) demonstrates the many stages, or changes that a tool can undergo during its lifetime. The ClIf-2 preform may have reached a point where it could no longer be reduced for its prescribed function. In this case, flakes that were removed from it would be small and platform angles very acute. Conversely, if the prefrom was initially being reduced (as indicated at the ClIf-8 site by preform No. 9) then flakes would be larger. This would also account for the significant difference in platform angle and weight between the two sites.

The second point to consider is the similar bimodal distribution which occurs for both sites. The essential difference between the two sites is one of magnitude.

Thus, these two factors indicate that the significant differences in the variables of platform angles and weight for the two sites is a quantitative and not a qualitative difference.

If we accept the above premise, and couple this with the fact that no significance between the other variables was evinced, this evidence strongly indicates that regardless of the type of preform the reduction of a particular preform was carried out in the same manner at both sites. In other words, within the limits of our analysis their is no difference in terms of lithic technology for these two Initial Woodland Sites.

FUNCTIONAL INTERPRETATION

INTRODUCTION

Once a specific activity within the site has been defined it may be possible to determine whether this is a patterned activity by predicting its occurrence on the site. This is achieved through the recognition of certain comcepts, assumptions and hypotheses.

ACTIVITIES WITHIN THE SITE

METHOD

Ideally, any one of four traditional approaches, deduction, induction, association and comparison, should lead to a correct interpretation of the data. But, as is often the case in Northern Ontario archaeology, a scarcity of evidence demands that all four approaches be combined in order to confirm one's conclusion.

DEDUCTION

The deductive approach is:

> the process of reasoning in which a conclusion follows necessarily from the stated premise; inference by reasoning from the general to the specific (American Heritage Dictionary 1970)

If, in this instance, it is assumed that a particular food procurement system was utilized at the Wawa Site, it should be possible to deduce certain traits in the archaeological record which would reflect a particular subsistence pattern.

Within the general frame of reference, which procurement systems are possible for the Wawa Site?

For this time and area, Cleland (1966:93) states that:

> Sustenance was derived from a focal hunting and fishing economy for the Early Woodland and Middle Woodland Cultures (Initial Woodland).

Wright (1972:59) generally concurs with this point of view and adds:

> The Laurel peoples followed a way of life unchanged from that of their Archaic ancestors. One site...indicated that moose and beaver were the most important food animals....it can be expected that in other regions or at differenct seasons of the year other game animals or fish may have been more important.

Delta or river mouth locations are ideal biotic niches for the hunter-gatherer. Although only seasonally utilizable, they provide an abundant and varied food base which includes the hunting of game animals, fishing, fowling, and plant gathering.

The ideal technique using the deductive approach is to attempt to establish a universal tool characteristic that can be applied to a particular subsistence pattern. To establish a universal characteristic, if indeed this is possible, would require an extensive study of all possible food resources as well as the scope of cultural adaptions for each particular food type. It is possible to simplify the analysis by making numerous assumptions most of which cannot by justified at this time. In order to minimize the number of assumptions a second approach will be considered: induction.

INDUCTION

The inductive approach is:

> a principle of reasoning to a conclusion about all the members of a class from examination of only a few members of the class; broadly reasoning from the particular to the general (American Heritage Dictionary 1970:671).

With this style of analysis, attention is focused upon the tool kit on the assumption that specialization of function of a tool will infer a particular procurement system.

Since there can be considerable overlay in the utilization of a tool for different functions, it is necessary to consider only those tools that are highly specialized, and consequently may have a specific purpose.

In the analysis of lithic tools from ClIf-2, specialization of function regarding hunting has already been discussed. Similarily, for fishing, fowling and plant gathering, specialization of tools can be hypothesized to occur in the procurement or the processing of a particular food source. In order to simplify the number of observations, it is necessary to assume that all prehistoric artifacts are the result of a single occupation. What little evidence there is, such as the sporadic distribution and scarcity of artifacts, lack of features, as well as a poorly defined cultural horizon, supports the contention that the site was occupied for a limited time interval, perhaps not longer than one month.

Because of the limited size of the collection, no statistical analysis is possible, and thus the number of ways in which statements may be substantiated is limited.

SPECIALIZED TOOLS FROM THE WAWA SITE

1) PEBBLE-CORE TOOLS:

The definition of this class of artifacts was first conceived in this area by Binford and Quimby

(1963). In referring to this tool type, Wright (1968) coined the term "wedge" and hypothesized that these wedges were a multipurpose tool.

Within the Wawa collection wedges and a "gouge" (McPherron 1967) were manufactured primarily from quartzite rather than pebble-cobble chert usually used to manufacture these tools. In the analysis of raw materials, it was concluded that Hudson Bay Lowland Chert was not generally available to the local inhabitants. This implies that these pebble-core tools were a necessary part of the lithic tool kit.

2) PREFORMS-BIFACES

The bifacially flaked preforms that were recovered had the following functional attributes: a rectangular-ovate shape, a plano-convex profile, and edge angles that ranged from 55°-85°: Although preform No. 9 may have seen little use, preform No. 240 was used extensively as evidenced by the numerous and large step fractures localized on the bevelled face of the preform. Several attributes such as size, shape, angle of the working edge, and extensive edge wear suggest that it functioned in a scraping motion.

3) POINTS

Although point No. 218 was not utilized, its intended use may have been as a knife. This assumption is based on the external morphology. The point is assymetrical, that is, one side is parallel to the central axis while the other side is convex.

The small size of point No. 303A and the particular wear patterns of slight stepping along the base and stem (denoting hafting) as well as the step and pressure fractures along both ventral and dorsal sides of the margin of the point indicate that it had been used effectively, probably as a projectile point.

BEVELLED FLAKES

Six bevelled flakes were recovered and even though they were quite variable within the range of attributes recorded, they were similar to those flakes recovered from the Michipicoten Harbour Site (ClIf-2). Consequently, they are believed to have functioned in a similar manner as those from ClIf-2, that is, a hunting activity.

EDGE DETERIORATED FLAKES

It is inferred, from the particular attributes of the flakes that flake No. 353A had the same function as a bevelled flake; No. 352A was possibly used in an incising motion while No. 148 was used as a cutting edge.

If the principle of simplicity of explanation is followed, then of the four procurement systems deduced, a hunting activity would be the most reasonable choice. This is based on the probable activities inferred from the proposed use of the tools. The tools exhibit such primary functions as cutting, scraping and piercing, all of which are particularly necessary in a hunting activity.

If the assumption is correct, then the other two methods, association and comparison, will substantiate the conclusion.

ASSOCIATION

By association we can observe those contextual relationships which will support the hypothesis. For example, the faunal analysis of the site (Burns 1971) supports the contention of a hunting subsistence. Although some of the bone observed is presumed to be associated with the historical material, calcified bone material such as that of woodland caribou found in association with hearth material and lithic detritus adds strong support to the contention that the lithic artifacts reflect the procurement or the actual processing of an animal.

COMPARISON

Through intersite comparison, the hunting of game animals for this time period is well recognized (Wright 1972:52, Dawson 1975, Pollock 1976), and the particular sites involved display the same general lithic assemblage as the Wawa Site. A hunting subsistence is an expected conclusion.

It can be argued from negative evidence such as the absence of certain specialized tools usually associated with other procurement systems (net sinkers, bone harpoons, mortars, manos, pestles, etc), and by the absence of associated faunal material such as fish or bird bones, that the Wawa inhabitants were involved in a particular aspect of a hunting activity.

REGULARITIES OF THE SITE

It has been argued that the Wawa occupants were involved in a hunting activity. By using the concepts of seasonality and scheduling, it is possible to deduce a patterned activity based on the assumption that within the site certain "regularities" of culture do exist.

The site is assumed to have been seasonally occupied because of the following observations: the sporadic distribution and scarcity of artifacts, a lack of features, and a poorly defined cultural horizon. If the hunting of game animals is a scheduled activity, it should be possible to deduce when the activity is scheduled, whereupon this activity can be used as a basis for cultural explanation.

As stated previously, there are four basic procurement systems available in the Michipicoten River area: hunting, fishing, fowling and plant gathering. Food can be obtained on a yearly basis and it is assumed that the food resource relied upon at a particular time of the year will be the one that can be most easily exploited with the minimum amount of labour and the maximal reward.

Cleland (1966) has shown that an 'efficient' resource strategy for the four procurement systems would involve a seasonal adaptive pattern because of the particular abundance of a food type at a particular time of year.

The strategy can be simply stated in the following manner: hunting--all year round; fishing--spring to early summer and fall; fowling--spring to fall with a particular emphasis during the annual spring and fall migrations; plant gathering--year round with a particular emphasis in the summer when most edible fruits ripen.

It is important to note that the exploitation of any one of the four food systems is not an exclusive activity, and that the absence of one type of procurement does not necessarily preclude the fact that it was not utilized because it was not efficient. Other factors could account for its neglect. However, on a general level the above mentioned strategy for resource exploitation will be assumed to have merit.

If this premise is accepted, then when would the hypothesized hunting activity of the Wawa Site be scheduled?

Obviously, if hunting can be carried out effectively year round it may not be possible to deduce the seasonal occupation of the site. If the premise that given a choice a person will select the resource whose exploitation requires the least amount of labour is accepted, then it may be possible to suggest a time in which a hunting activity has the highest probability of occurring.

For Middle Woodland Times (Initial) Cleland (1966:62) states that there is a greater reliance on spring--fall fish spawns, which provide an abundant and easily obtainable food resource. Since fish were seemingly not exploited at the Wawa Site, it may indicate negative evidence that the site was not occupied during the spring--summer and fall when the fish were spawning. This would leave mid-summer, late fall, and winter seasons as probable times of occupation.

As mentioned in the climatic section of this report there are certain factors which preclude winter habitation in this area, so that mid-winter would be an unlikely time for occupation.

Thus the expected seasonal occupation of the site would be mid-summer, late fall or late winter or early spring.

Evidence which suggests a seasonal occupation of the site is indeed scant and is restricted to one artifact--the pedicle of a woodland caribou antler. Burns (1971) in his analysis of the faunal material suggests that the antler recovered could indicate a late winter-early spring occupation of the site.

The argument for a late winter-early spring occupation can be considered tenuous because of the probability statements made and the lack of substantial evidence. It must be remembered that quantifiable evidence usually does not occur in Northern Ontario sites so that much of the interpretation of data rests on making assumptions that presuppose an ordered set of relations.

SUMMARY AND CONCLUSIONS

Approximately 2,400 years ago a nuclear family or possibly an extended family group of probable Algonkian origin, camped on a small, well protected sandy beach overlooking the icy waters of Lake Superior.

The activities noted such as ceramic manufacture and hunting, in addition to the evidence gleaned from the archaeological record indicate that they had camped here during the spring months.

The vestiges of their material culture can be extrapolated back to a probable indigent occupation by Archaic forebears and forward to Terminal Woodland people, connoting a high degree of cultural conservatism among Algonkians. As an example, the lithic material used in manufacturing stone tools has remained relatively constant throughout two and one half millenia of Woodland habitation at Michipicoten. Although this collection of tools is small, it contains specimens of considerable significance. The corner notched knife (No. 218) for instance, may be derived from a Shield Archaic assemblage, while the two plano-convex bifaces (No. 9, No. 240) display a striking similarity, both in design and material used, to the Early Woodland Cultures of Northern Michigan (Fitting 1970:93). The end scrapers or bevelled flakes represent a universal tool characteristic that occurs even in Palaeo Cultures and continues to become exceedingly popular in Initial Woodland Times.

One of the problems yet to be resolved is the time depth of the site. Ceramic and strategraphic evidence indicates that the site was occupied for several seasons, while featural and lithic analyses delineate a single occupation. This dichotomy can only be resolved by a more thorough excavation of the site.

CHAPTER VII

INTRODUCTION

The Morrison Site (ClIf-6), named after local property owners, was discovered and excavated during the 1971 field season.

One late historic and three Terminal Woodland components were delineated in this stratified site. Historically the site was occupied around A.D. 1865 ± 20. Unfortunately the material could not be associated with any one group of people, although the general area in which the site was located was occupied by a small band of Indians in 1851 (Weiler 1973:29).

A comparison of artifact seriation and soil stratigraphy with the Michipicoten Site, dates the earliest Terminal Woodland component to the 14th or 15th century, while the poorly represented second component would probably be occupied within one hundred years of the earlier occupation. A date of A.D. 1500 to A.D. 1700 is suggested for the uppermost stratum.

The artifacts derived from Stratum II are described but the paucity of material recovered negated a thorough analysis of the assemblage.

Inasmuch as Strata I and III are separated in time by at least 200 years, there is very little difference in the basic aspects of the Algonkian material culture for both groups, because of the growing importance of the fur trade at the end of Terminal Woodland Period. The abundance of Iroquoian pottery and lithic material in Stratum I suggests the early arrival of Huron People preceeding the great expulsion of 1650.

THE SITE

Located about 350 metres from the river mouth, the Morrison Site lies on the northerly bank of the river and overlooks the stratified Michipicoten Site on the opposite shore. About a quarter of an acre in extent the Morrison Site is situated some 3 to 4.5 metres above the river on a south sloping terrace. (See Map 6.)

Thirty-seven five foot squares were opened and investigations showed that the site was stratified and that the majority of artifacts clustered around hearth features.

Unlike the south shore, aeolian deposition has accounted for the first 15 cm. of sandy soil whereas depths of up to 1.5 metres have been recorded on the southerly exposure. It is within the first 15 cm. of the sand lens which underlies the forest floor that cultural refuse pertaining to both the Late Historic and Terminal Woodland Periods was recovered. This lens is referred to as Stratum I.

Beneath this lens is a grey-brown sandy-gravel which varies in thickness from 10-20 cm. At the interface of this lens, a 15-20 cm. gravel soil, was a 2.5 cm. thick culture bearing horizon which was referred to as Stratum II.

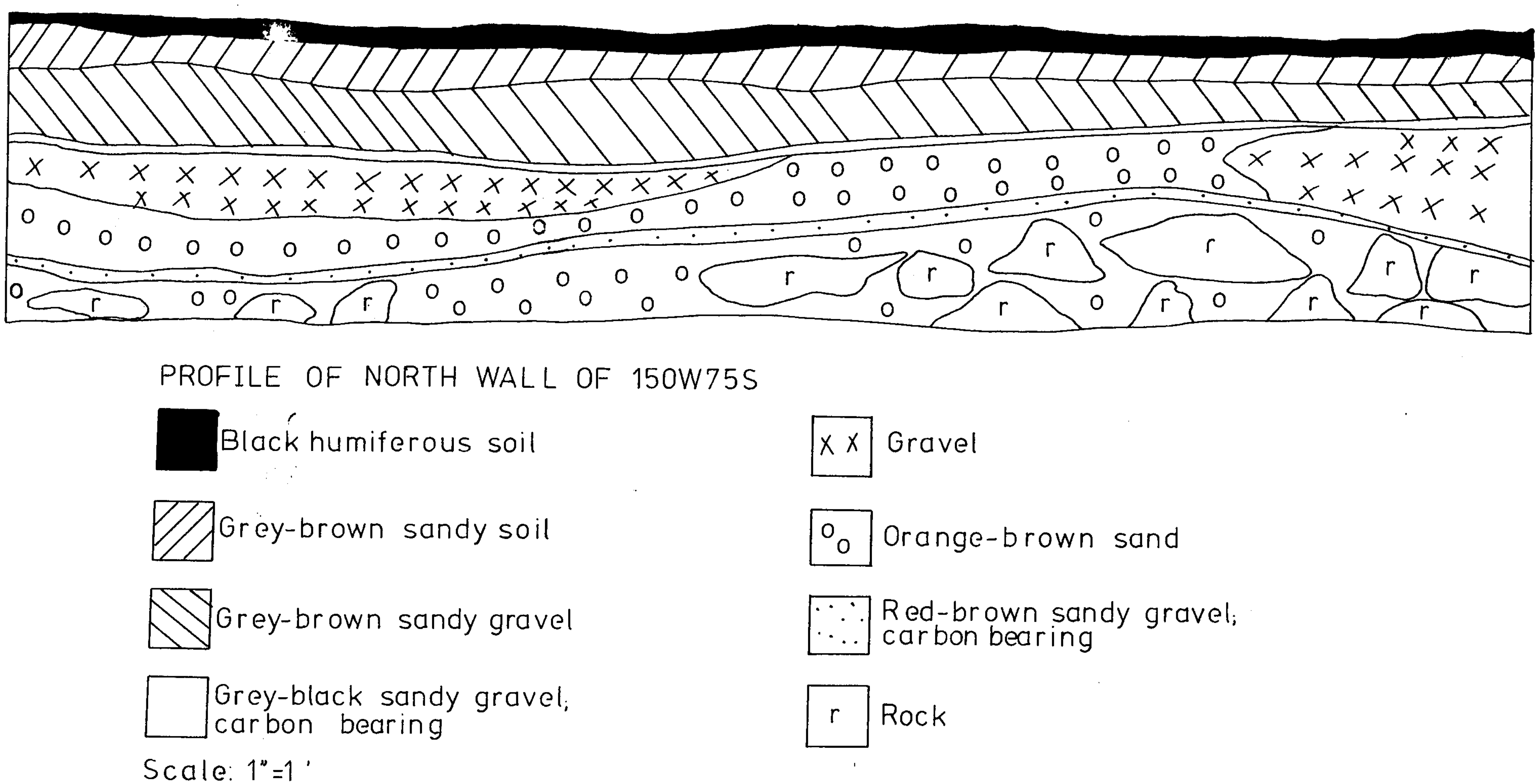
Sandwiched between the gravel lens and the glacial cobbles is an orange-brown sand matrix. It is within this sandy matrix that a 2.5 cm. band of cultural debris was excavated and subsequently noted as being derived from Stratum III. (See Figure 43.)

FEATURES

STRATUM I

A total of nine hearths and three refuse pits

FIGURE 43: GENERALIZED SOIL PROFILE OF THE MORRISON SITE, ClIf-6



were delineated for the most part. The hearths are characterized by an abundance of fire cracked rock, red stained soil and charcoal. In association and distributed near the hearths are concentrations of calcined bone, pottery sherds and lithic debris and tools.

It is probable that a number of activities centred around the hearths which functioned in cooking/heating operations. In addition red ochre was associated with the hearth located in square 150W85S.

No soil samples were collected from the pits which are situated near the hearths. The field-note descriptions such as, 'small and irregular shaped', 'filled with charcoal', suggest they were used as refuse or smudge pits.

STRATUM II

No features are described in Stratum II.

STRATUM III

Two hearths and two pits were defined. The hearths and pits have the same characteristics as those in Stratum I. Hematite or red ochre is associated with the hearth located in square 150W85S. It is assumed that there is no difference in the type of activities which centre around the hearth features for both strata.

The fact that most of the recoveries centered around the hearth features is not surprising, but what is interesting is the consistency in numbers of artifacts found per feature. For example six vessels were recovered near two features from the Wawa Site. Eleven vessels were distributed around five features for the Michipicoten Harbour Site, and fifteen vessels were associated with nine hearths from Stratum I of the Morrison Site. In other words the ratio of features to vessels is approximately I:2 or 1:3.

A similar examination of the lithic material indicates that 5 to 10 tools are located near a feature.

To translate these ratios into people, it would seem plausible that 3 to 7 people would be associated with each feature, or more probably a nuclear or extended family.

FAUNAL ANALYSIS

*The following report was written by James Burns and is presented here verbatim.

The Morrison Site yielded 489 portions of bone of which over 98% were mammalian; the remainder were avian and fish. The most common species was beaver with caribou and moose next. Muskrat and otter were not significant in number (See Tables 68 and 69).

The two cervid species are woodland animals while the three remaining identified species are found in areas where lakes, ponds and rivers are present, as around Wawa. None of the four fish-bones were easily referrable to sturgeon; one of the avian portions is probably from a duck and might be identified with appropriate reference material.

Of the total number of bones 89 (18.2%) are not burnt, including 86 mammalian, 1 avian, and 2 fish. This is a somewhat higher proportion than that found in the other Wawa area sites, and no explanation is available.

TABLE 68: FAUNAL ASSEMBLAGE AT THE MORRISON SITE (ClIf-6).

SPECIES	NO. of BONES
Beaver (*Castor canadensis*)	85
Muskrat (*Ondatra zibethicus*)	4
Otter (*Lutra canadensis*)	1
Moose (*Alces alces*)	10
Caribou (*Rangifer tarandus*)	12
Other Mammal	370
Avian	3
Fish	4
Total	482
Total Identified	112 (22.9%)

TABLE 69: PROPORTIONS OF VERTEBRATE CLASSES AT THE MORRISON SITE (ClIf-6).

CLASS	NO. OF BONES	% OF TOTAL
Mammal	482	98.6
Avian	3	0.2
Fish	4	0.2
Total	489	100.0

HISTORIC MATERIAL

INTRODUCTION

All historic material was recovered from Stratum I in association with native pottery and lithic material. Because the historic goods date to the late 1800's it is assumed that there is no relationship between the European and Native assemblages and that Stratum I is a mixed component.

ARTIFACTS RECOVERED

In order to arrive at an absolute date of the historic component all the artifacts recovered and summarized in Table 70 have been assigned two dates: the time range of manufacture and a probable date of occurrence on the site.

Through a comparative analysis with other sites, a probable date was derived based on the popularity of a particular artifact type. Although this approach can be erroneous, a probable date of occupation is reinforced by the reoccurrence of a particular date from each artifact type.

TABLE 70: HISTORIC TRADE GOODS RECOVERED FROM THE MORRISON SITE (ClIf-6).

ARTIFACT TYPE	N	TIME RANGE	PROBABLE TIME
Pipes	4	1755 - 1950	1860 ± 15
Beads	33	1660 - 1977	1850 ± 50
Buttons	7	1851 - 1950	1865 ± 15
Rings	2	1500 - 1900	1650 ± 100
Bottles	4	1700 - 1950	1870 ± 50
Window Glass	1	1816 - 1977	1860 ± 50
Earthenware	2	1850 - 1904	1875 ± 25
Crockery	1	1857 - 1930	1870 ± 20
Forks	2	1850 - 1950	1900 ± 50
Knives	2	1800 - 1950	1900 ± 50
Fish Gaffs and Hooks	4	1703 - 1904	1860 ± 20
Nails	32	1821 - 1950	1870 ± 50
Miscellaneous	4	1821 - 1950	1900 ± 70

PIPES (4)

Three bowls and two stems were excavated. Two of the bowls, although imcomplete, have the letters "TD" impressed on the bowl facing the smoker. "Although these bowl types were popular in the last century, the earliest bowl types appear to have been manufactured ca. 1755 by Thomas Dormer". (Walker 1971:31).

These bowls present a problem in dating because they were widely plagiarized due to their popularity. (Ibid.)

A "saintly" bearded face was cast on the third pipe bowl. A similar pipe bowl was recovered from the Ermatinger House in Sault Ste. Marie (Reid 1975:104). A corresponding range of dates from 1814 to 1900 seems appropriate for this artifact.

One stem was completely devoid of decoration, but on the other stem the letters, "Henders____" on one side and "Montreal" on the other, were impressed. Walker (1971:25) states:

> "There were more than one maker of this name (Henderson) in Montreal, but as manufacturers of clay pipes they all appear to fall in the period 1847 to 1876".

BEADS

Based on the mode of manufacture the beads are classified into two categories; drawn and wound.

There were 31 drawn beads and 2 wound beads. Beads that ranged from 1.5 to 4 mm. in diameter were classed as embroidery beads. All 29 beads were blue in colour. The remaining 2 drawn beads, which are identical, have a 6 mm. diameter and are blue in colour.

Of the two wound beads, one was a translucent emerald green colour while the other was opaque blue. Their diameters measured 9.5 and 5.5 mm. respectively.

No definitive date can be assigned to these beads type since they range in date from the Middle Historic (Quimby 1966:75) to the present.

BUTTONS

Of the seven buttons recovered, the two-holed black plastic button, held the most promise for dating the component. The following inscription is impressed on the front panel: "GOODYEAR'S P= T. 1851. N.R. and Co."

The second specimen, a plain white plastic, four-holed button, measured 1.1 cm. in diameter.

The third button, a decorative one with a soldered wire shank on the metal back, has a thistle design impressed on a plastic insert on the front surface. It is 1.4 cm. in diameter.

A fourth button, made of bone, has a twisted floral design embellishing the letters C.E. It is 1.65 cm. in diameter.

The sixth button is four-holed, metallic, with a concave face, and along the perimeter of the face is an incised border. It measures 1.4 cm. in diameter.

A wire shank was soldered to the back of the seventh button. The mushroom shaped metal button is 1.25 cm. in diameter.

A metallic trouser button measures 1.65 cm. in diameter but is too badly corroded to distinguish any designs.

A date of 1851 inscribed on button No. 1 and the presence of the plastic buttons would suggest a probable date of use between 1851 and 1900.

RINGS (2)

Two identical copper rings are problematic as to which assemblage, Native or European, they belong. In order to determine the source of the copper an X-ray florescence scan was run and the following elements were detected: major elements-copper, iron; minor elements-tin; trace elements-silver, lead, zinc, manganese.

The high percentage of iron (approximately 30%) would suggest that the copper was not native copper and indicates that the rings were manufactured from a refined metal.

One of the rings was recovered from Stratum 3, which by all indications would date to the 14th of 15th century. It is probably intrusive from

Stratum I. The native assemblage from Stratum I dates to the 16th or 17th century which may be an acceptable date for these rings.

On the loop of the ring by the side of the face are 3 incised lines, parallel to the face, The face of the ring is incised with 3 oblique lines that perhaps symbolize a human face.

BOTTLES (4)

Sixty-five fragments of dark green glass believed to be derived from a wine or spirits bottle were distributed over several squares. No decoration or design is present.

Impressed on the base of the second bottle are the numbers "604". The bottle is translucent and is comprised of two fragments. The extrapolated base size suggests it was a medicine bottle.

Four neck and shoulder fragments were derived from bottle number three. The glass is translucent and no distinguishing characteristics are present.

The fourth bottle is characterized by one "beer bottle brown" neck fragments.

Bottles were recovered from the late occupation (1821-1904) of the Michipicoten Hudson Bay Post (Forma 1971:67).

WINDOW PANE GLASS FRAGMENTS

Nine glass fragments from a window pane measured 0.24 cm. in thickness. Window pane fragments are also recorded at the Hudson Bay Post (Ibid.)

CERAMICS

One glazed earthenware mug is represented by 15 sherds. No decoration is present on any of the sherds.

A basal earthernware sherd, possibly representing a plate was decorated with an English coat of arms and was inscribed with the following letters:
"IRONSTONE CHIN"
C - MEA

Forma (1971) reports that a similar sherd recovered from the Post is assigned a date between 1850 and 1900.

One salt glazed crockery vessel was defined by three basal side sherds. The stone ware reported from the Hudson Bay Post dates from 1857 to 1887 (*Ibid.*)

FORKS (2)

Two three-tined forks, one of which is complete with a wooden handle and measures 17.3 cm. in length were recovered.

Impressed on the iron handle of the second fork are the letters "JR & Co." A black paint residue is also present on the handle. Total length of the fork is 19.0 cm. It is suggested that the forks were manufactured between 1850 and the present.

KNIVES (2)

One complete knife and the partial blade of a second were excavated. The complete knife measures 25.0 cm. in length. Five hafting holes were drilled into the shank. A corresponding date of 1900 A.D. ± 50 is suggested.

FISH GAFF (2) AND HOOKS (2)

Two identical iron gaffs, measure 30.5 cm. in length. The tip is barbed twice. The fish hooks, also of iron, have a single barb and measure 9.5 cm. and 7.0 cm. in length, respectively.

It may well be that these artifacts signify the commercial fishing industry in Michipicoten, which was well established as early as 1823, but after 1859 was gradually scaled down (Weiler 1973: 31-37).

NAILS (32)

All the nails are machine-made and are divided into four categories: rectangular, wire cut, spikes and tacks.

There are two rose head, nine flat head and two incomplete rectangular nails; the lone spike is rosehead while all of the wire cut nails and tacks are flat head. These nails are late in manufacture and would date from 1821 to 1950.

MISCELLANEOUS METALS

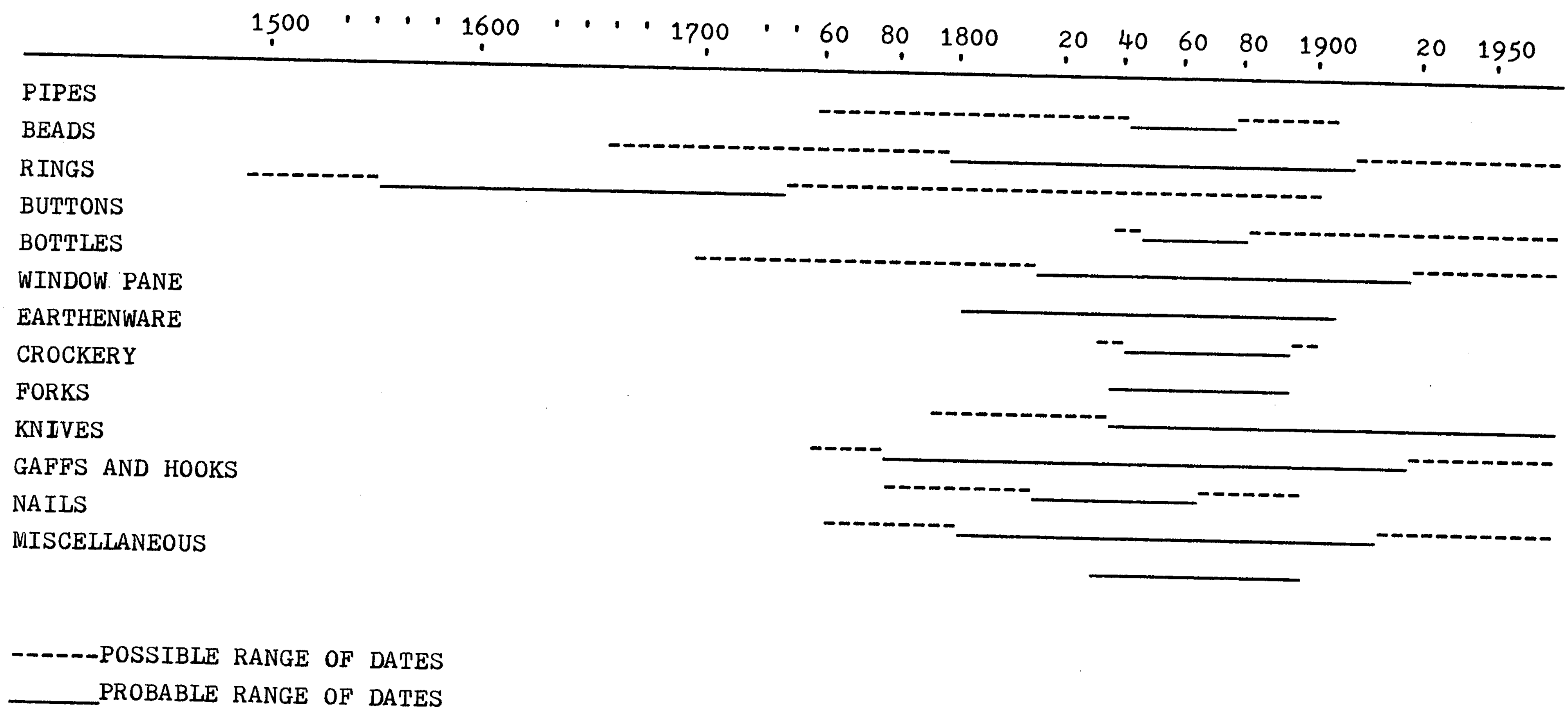
Included in the miscellaneous category are one tin lid, one wire staple, one flat head screw, and one piece of pewter. A range of dates between 1821 and 1904 is very likely for these artifacts.

DATE DERIVED FOR THE HISTORIC COMPONENT.

The temporal occurrence for each artifact type is schematically represented in Figure 44. The range of dates for all artifacts extends from A.D.

1500 to the present, with the majority of artifacts being manufactured in the 19th and 20th centuries. The probable dates derived for each artifact decrease the range considerably since the majority of artifacts were manufactured in the mid 1800's. It is inferred that the site was occupied between the 1851 and 1876.

FIGURE 44: SCHEMATIC PRESENTATION OF THE TEMPORAL OCCURRENCE OF EACH ARTIFACT TYPE FROM THE MORRSION SITE (C1If-6).



CERAMIC ANALYSIS OF THE MORRISON SITE? STRATUM I

VESSEL DESCRIPTION

It was possible to combine the 38 rim sherds into fifteen discrete vessels, thirteen of which were of sufficient size as to allow analysis. Several but not all of the forty decorated body sherds were assignable to these same vessels. The combination of 38 rims and 40 decorated body sherds represents 12.2% of the total ceramic assemblage recovered from Stratum One.

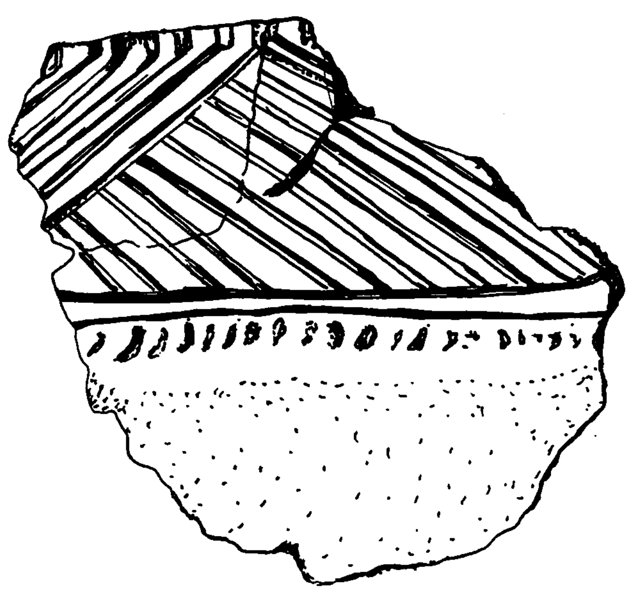
Four cultural traditions are represented by the thirteen vessels. These are the Northern division of the Huron-Petun branch, the widely scattered Peninsular Woodland grouping from Northeastern Michigan and Wisconsin, a variety of stamped vessels assignable to Northeastern Michigan and a single Oneota rim.

X-ray spectrographic analysis of clay from sherd samples indicated that the clay from all vessels is similar but not identifiable as local material.

Running counter to the clay, the temper, although ranging in amount from vessel to vessel, bears the same x-ray diffractometer analysis as the local beach sand adjacent to the site. These two pieces of evidence suggest that the potters of ClIf-6 had found or had been introduced to a preferable clay deposit at an unknown distance from Michipicoten and that they were bringing the raw clay back, mixing it with local temper and fabricating the vessels on-site.

VESSEL I

FIGURE 45: VESSEL ONE, STRATUM I, ClIf-6.

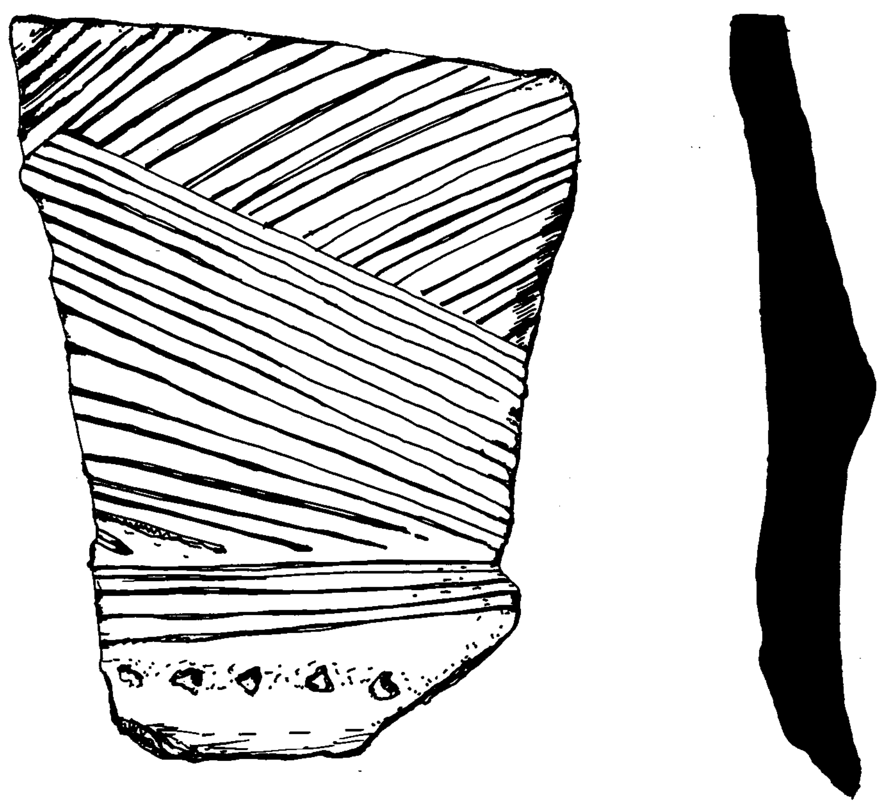


This vessel is represented by two rims and one large body sherd. It bears all of the overt characteristics of the Lalonde High Collar pottery type (Ridley 1952:2) of the Northern division of the Huron-Petun branch. Thickness is 6 mm. at the lip and 6.5 mm. at a distance of 15 mm. below the lip. The lip itself is smooth, undecorated and relatively unradiused on the internal and external edges. The internal surface is undecorated and does not appear to have been smoothed following fabrication. At the juncture of the lip and outside surface, short, vertical incising, spaced at 0.9 mm. with a mean length of 1.1 mm. surrounds the rim. Immediately below , a band of oblique, alternate left and right incising extends downward for 29 mm., ending at 2 horizontal incised lines which are just above the shoulder. Immediately below the shoulder is another row of short vertical incising of similar length and spacing as the first set.

The quality of workmanship evidenced in this vessel suggests that the potter was possibly a young novice at the art. The undecorated surfaces are not smoothed and the incising lacks the finesse and authority of the accomplished Huron potter. The temper content is estimated at ten percent with a grain size mean of 1.5-2 mm. External surface hardness is 3.5 on the Moh's scale and the Munsell colour is 7.5 YR6/4 (light brown).

VESSEL 2

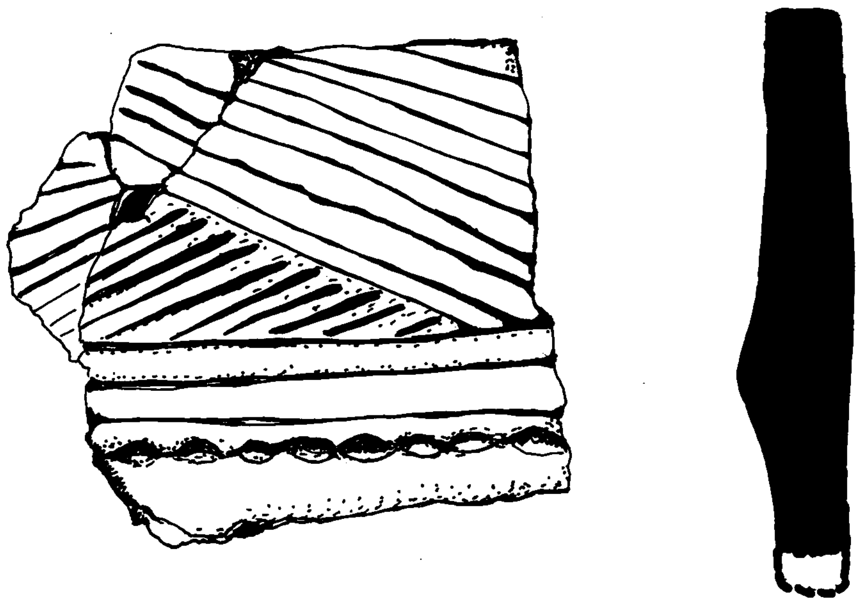
FIGURE 46: VESSEL TWO, STRATUM I, C1If-6.



Vessel Two is comprised of three large rims and three adjacent body sherds. The pot is a large and finely executed example of the Lalonde High Collar pottery type with a collar height of 82 mm. The lip is smooth, undecorated and sharp on interior and exterior edges. The interior surface has been carefully smoothed and an absence of surface temper particles suggests a degree of self-slipping. The decorative theme is composed of alternate blocks of vertical incising, which reach from rim to collar, and right to left oblique incising with three horizontal incised lines immediately above the shoulder. Just below the shoulder is a row of encircling punctates with a mean spacing of 10 mm. The rounded triangular to tear-drop shape of these impressions suggests that they were made by pressing the end of the incising stylus into the clay at an angle of approximately twenty degrees to the surface. Vessel exterior surface is smooth and undecorated below the punctates. Rim thickness is 9 mm. at the lip and 9.5 mm. at a distance of 15 mm. below the lip. Hardness is 3.5 and colour is 5YR6/4 (light reddish brown).

VESSEL 3

FIGURE 47: VESSEL THREE, STRATUM ONE, ClIf-6.



Vessel three is very similar, in most respects, to Vessel two except for size and degree of surface finish. The five rims and two adjoining body sherds exemplify the Lalonde High Collar pottery type. The interior surface is undecorated and smoothed but without evidence of self-slipping. Thickness at the lip is 10 mm. and is 11 mm. at a distance of 15 mm. below the lip. The lip itself, while generally smooth, flat and without radiusing has a shallow, sporadic decoration impressed into the surface, apparently with an irregularly-shaped, flat-ended stamp having a rough diameter of 4 mm. External decoration is in the form of alternate right and left oblique incising above three horizontal incised lines which girdle the vessel immediately above the collar. Collar height is 53 mm. Just below the collar is a single encircling row of tear-drop shaped punctates. Vessel surface below the punctates is smoothed. The specimens of this vessel displayed a distinct fissility--an indication that the vessel was probably fabricated by the paddle and anvil technique. Hardness is 3 and colour is 7.5YR6/4 (light brown). Temper content and particle size is similar to Vessel 1.

VESSEL 4

FIGURE 48: VESSEL FOUR, STRATUM ONE, C1If-6.

This vessel is represented by a single rimsherd of modest dimensions. Its cultural affinity is Ontario Iroquois and it closely resembles MacNeish's (1952:36) Black Necked, an "early Huron type, though it lingers on into historic times". The interior surface of the sherd is undecorated but carefully smoothed, lending an almost polished appearance. The lip, which is undecorated, smooth and with very slight radiusing, has a thickness of 5 mm. At a distance of 15 mm. below the lip the wall thickness is 7.5 mm. Collar height is 12 mm. The external decoration above the collar is composed primarily of right to left oblique incising, but with 2 strokes of left to right incising interposed periodically. Immediately below the collar is a row of tear-drop shaped encircling punctates with a long dimension of 3 mm. and a mean spacing of 3.5 mm. Just below the punctates is a row of left to right oblique incising which extends down the neck for an unknown distance. Temper content appears somewhat less than the previous vessels but particle size is similar. Hardness is 3.5 and colour is a 7.5YR3/0 to 3/2 (very dark grey to dark brown). This sherd does not appear fissile.

VESSEL 5

FIGURE 49: VESSEL FIVE, STRATUM ONE, C1If-6.

Although only a single undecorated sherd, the lip configuration would appear to place this vessel within the Peninsular Woodland tradition. The interior surface is undecorated and without apparent attempt at smoothing. Temper particles protrude noticeably from the surface. The lip is smooth and flat with interior and exterior corners exhibiting a radius of 3 mm. The procedure of flattening the lip has produced a collar-like protrusion on the exterior surface which extends below the lip for a distance of 10.5 mm. Lip thickness is 13.5 mm. and thickness 15 mm. below lip is 11.5 mm. The external surface has been superficially smoothed and is devoid of decoration. Temper content is estimated at between 15 and 20 percent with a grain size of up to 2.5 mm.

The appearance of a cross section indicates that the pot has been laminated from several layers of clay, probably using the paddle and anvil technique. The process of firing the vessel has caused differential contraction of the layers, thus promoting a tendency to fissility. Vessel hardness is 4 and the colour is 10YR3/2 (very dark greyish brown).

VESSEL 6

FIGURE 50 : VESSEL SIX, STRATUM ONE, C1If-6.

Vessel 6 is represented by a single sherd. The interior surface is undecorated but with some attempt at smoothing. The lip has been flattened in such a way that, in places, it appears as a fold, protruding both internally and externally. Lip flattening may have been done with a paddle covered with a rough textured fabric. Lip thickness is variable with a mean of 6 mm. Wall thickness 15 mm. below the lip is 5 mm. A very slight bulge in the exterior surface 20 mm. below the lip might possibly be an incipient collar. External surface treatment was produced by the same fabric covered paddle which was used on the lip.

This vessel is attributed to the Peninsular Woodland grouping based primarily on the lip treatment although the wall thickness seems unusually thin. Temper content is high, at approximately 20 percent and particle size varies up to a maximum of 4 mm. Fissility of the sherd suggests that the vessel was laminated from two layers. Hardness is slightly greater than 3 and colour is 5YR4/2 (dark reddish grey).

VESSEL 7

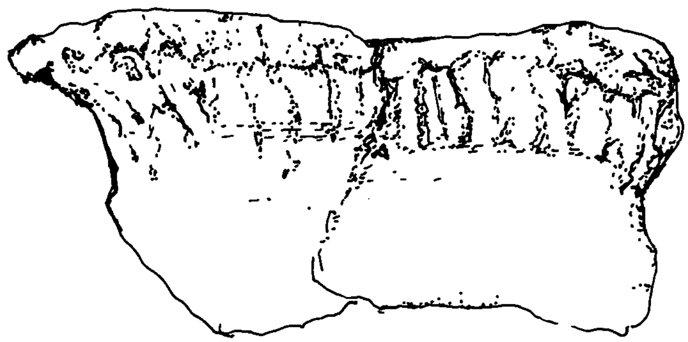
No cultural affinity has been attributed to the single sherd of Vessel 7. The interior surface is smooth and undecorated with a mottled reddish cast which suggests a red ochre wash but may simply be a function of the firing process. The ragged lip is very thin, having a thickness of 3 mm. This thickness expands gradually until, at a distance of 53 mm. from the lip the body thickness is 31 mm. a change in dimension of greater than ten times. The external surface has been fabric impressed for a distance of 20 mm. below the lip while the area below this has been smoothed, suggesting that the fabric impression is used, in this instance, as a form of decoration. Temper content is estimated at 10% and grain size varies up to 3 mm. Hardness of this vessel is 3 with a colour of 7.5YR7/4 (pink).

VESSEL 8

The characteristics of Vessel 8 are very similar to those of Vessel 5 in that the two rims which make up the sample are representative of the Peninsular Woodland tradition. The interior surface is undecorated and fairly smooth but without any apparent attempt at self-slipping. The rim has been flattened from the top and rolled very slightly to the outside in such a way that a slight collaring is effected. The external surface is smooth and undecorated. Lip thickness is 7 mm. and wall thickness 15 mm. below the lip is 9 mm. There is a 2.5 mm. radius on both inner and outer edges of the lip. The temper content is approximately 15 percent and particle size varies from 2 to 3.5 mm. The fissile character of these sherds indicates that the pot was probably fabricated using the paddle and anvil technique, with subsequent smoothing. Hardness is 3 with a colour of 7.5YR6/4 (light brown).

VESSEL 9

FIGURE 51: VESSEL NINE, STRATUM ONE, C1If-6.



Composed of seven adjoining rims, Vessel 9 bears many of the characteristics of McPherron's Mackinac Ware (McPherron 1967:86) with the exception of the overall cord-wrapped paddle surface treatment. The vessel is collarless with a grossly out-flaring rim which attains an angle of 10-15° from the horizontal. The inner surface is undecorated and smooth with the occasional reddish mottling noted for the interior of Vessel 7. It is difficult to say whether the apparent castellations are intentional or whether they are simply a function of the lip decoration. The lip has been flattened by impressing what appears to have been a cord wrapped object very firmly into the clay. In some places the impressions left by the cord with which the stick or paddle is wrapped appear of very small diameter whereas in other places on the rim the cord-marks seem much larger. This possibly indicates that the lip was differentially pinched as the exterior surface near the lip was paddled. The lip decoration was made by holding the cord-wrapped object perpendicular to the edge of the rim. Lip thickness is 11 mm. and wall thickness is 7 mm. at a distance of 15 mm. below the lip. The external surface has been smoothed with something that has left very fine, closely spaced striations. For an approximate distance of 25 mm. below the lip, the exterior surface has been horizontally paddled by a cord wrapped object whichhas imparted vertical markings to the surface of the vessel. These marks were subsequently smoothed so that in some places they were virtually obliterated. The temper content is approximatley 15% with a grain size of 2-3.5 mm. The hardness is 3.5 and the colour varies from a 5YR7/3 to a 5YR7/4 (pink).

VESSEL 10

This vessel is represented by one rim with a badly spalled exterior surface. What is left displays the characteristics of the Oneota Aspect of the Upper Mississippian phase of the Mississippian Pattern. The interior surface is superficially smoothed and is decorated with a row of sharp, narrow vertical impressions with a fixed length of 11.5 mm. The impressions are of a sufficient depth to indicate that the end of the tool rather than its edge was used to apply the decoration. The lip is narrow, having a thickness of 4-5 mm., with a scalloped surface. The scalloping is deep with peak to valley measurement of 4 mm. and a peak to peak distance of 16 mm. While much of the exterior surface is spalled, sufficient remains to identify at least two rows of impressions that are essentially similar to the interior decoration. Spacing between rows is 12 mm. and the upper row is approximately 4 mm. below the valleys of the scalloping. The temper content is judged to be about 10-15% with particle size ranging from 1 to 4 mm. Hardness of this vessel is 4 and the colour is 7.5YR6/2 (pinkish grey).

VESSEL 11

The collar and oblique incising of this single sherd designate it as being of the Black Necked category of the Ontario Iroquois tradition. Interior surface of this vessel has been superficially smoothed with no evidence of self-slipping or decoration. The lip surface is flat and smoothed with occasional, perhaps accidental, punctating. Lip thickness is 8 mm. with an interior radius of 2 mm. and a sharp, slightly overhanging external edge. The collar has a maximum height of 18 mm. and a thickness of 9 mm. at a distance of 15 mm. below the lip. The interior surface of the collar is not concave. The surface below the collar is smooth and undecorated. The decoration, which is solely on the collar is a rather broad, right to left oblique incising with a mean height of 14 mm., a width of 4 mm. and a mean spacing of 6.5 mm. Temper content is approximately 10% and particle size ranges up to 3 mm. Hardness of this rim is 3.5 and the colour is 10YR7/3 (very pale brown).

VESSEL 12

Vessel 12 is composed of three large adjoining rims of the tradition referred to by Wright (1968:15) as "stamped". The interior surface of the vessel is undecorated but has been carefully smoothed. The lip is smooth, flat and very slightly radiused inside and out with a thickness of 6 mm. The collar is short but quite distinct with a maximum height of 13 mm. and a thickness of 11.5 mm. at a distance of 15 mm. below the lip. The collar decoration is composed of an encircling row of right to left oblique linear stamping with a maximum height of 13 mm., a mean width of 3 mm. and a spacing of 6.5 mm. The stamped impressions indicate that the tool used might resemble a screwdriver blade with rounded edges. Immediately below the collar is a row of broad, trianguloid punctates with a spacing of approximately 11 mm. These punctates were apparantly produced by pressing the rounded end of a rod-shaped object into the clay at an approximate angle of 45^{o}.

It is interesting to note that the tool which was used for the punctating was not the same tool that was used for the stamping, unless the tool was perhaps double ended. This use of more than one decorating tool on a single vessel is most unusual, especially for Algonkian pottery.

The area below the punctates is smooth and undecorated. Temper content is high at approximately 20 percent and the particle size ranges up to 3.5 mm. Hardness of these sherds is 3 and the colour is 10YR6/4 (light yellowish brown).

VESSEL 13

The six small rim sherds which constitute this vessel are devoid of interior surfaces due to the fissile character of the pot. Because of this a description of these surfaces and measurements of the lip are impossible. The portion of the lip which remains is flat and smooth with small, narrow impressions which are perpendicular to the edge of the rim. The exterior surface has an incipient collar with a maximum depth of 21 mm. Stamped into the collar is a single encircling row of vertical impressions having a maximum length of 14 mm. a width of 3.5 mm. and a mean spacing of 7.5 mm. The area below the collar is smooth and undecorated. Temper content is a relatively low 5 to 10 percent but particle size compares with other vessels from this site at 2.5 to 3 mm. Vessel hardness is a relatively soft 2.5 and the colour is 10YR7/3 (very pale brown).

TABLE 71: SHERD DISTRIBUTION BY NUMBER AND WEIGHT FOR C1If-6, STRATUM 1.

SQUARE	NUMBER	WEIGHT in GRAMS	% by WEIGHT	SQUARE	NUMBER	WEIGHT in GRAMS	% by WEIGHT
150W65S	26	656.5	14.0	160W95S	4	29.2	0.6
155W70S	4	58.5	1.2	170W95S	2	5.15	0.1
160W70S	11	143.82	3.1	175W95S	3	10.25	0.2
165W70S	5	55.5	1.2	180W95S	4	65.37	1.4
170W70S	7	16.7	0.4	185W95S	1	3.65	0.07
150W75S	104	407.13	8.7	190W95S	13	40.53	0.8
155W75S	67	916.8	19.5	195W95S	20	115.48	9.5
160W75S	6	36.0	0.7	200W85S	98	445.53	9.5
170W75S	19	101.6	2.2	200W90S	35	112.26	2.4
175W75S	5	11.65	0.2	135W80S	6	13.1	0.3
180W75S	8	5.35	0.1	TC - 1	27	52.75	1.1
150W80S	19	58.35	1.2	TC - 4	29	85.57	1.8
155W80S	1	15.4	0.3	TC - 5	14	190.3	4.1
150W85S	83	898.04	19.2	TC - 6	6	25.52	0.5
150W90S	2	21.9	0.5	Surface	1	52.25	1.1
155W90S	1	2.3	0.04				
175W90S	10	59.14	1.2	TOTALS	641	4682.39	100.11

TABLE 72: HARDNESS OF FIVE SHERD SAMPLES FROM EACH EXCAVATED SQUARE, ClIf-6, STRATUM I.

SQUARE	1	2	3	4	5	$\overline{X}$	SQUARE	1	2	3	4	5	$\overline{X}$
150W65S	.4	3.5	3.5	3.5	3.5	3.6	160W95S	3	3	3	3	-	3
155W70S	.4	3.5	3.5	3.5	-	3.6	170W95S	2.5	3	-	-	-	2.7
160W70S	3.5	3.5	4.5	3	3.5	3.6	175W95S	3.5	3.5	3.5	-	-	3.5
165W70S	2.5	2.5	3	3	2.5	2.7	180W95S	2	3	3.5	-	-	2.8
170W70S	3	3.5	3.5	3.5	3	3.3	185W95S	2.5	-	-	-	-	2.5
150W75S	3.5	3	3.5	3	3	3.2	190W95S	2.5	2.5	2.5	2.5	2.5	2.5
155W75S	2.5	2.5	3	3.5	2.5	2.8	195W95S	4	4	3	5	5	4.2
160W75S	2.5	2.5	3	3.5	4	3.1	200W85S	.3	2.5	2.5	2.5	2.5	2.6
170W75S	3	3.5	3.5	4.0	4.0	3.6	200W90S	2.5	5	3.5	3	2.5	3.3
175W75S	4	3	3.5	3	-	3.4	135W80S	4	4	4	3.5	3.5	3.8
180W75S	2.5	2.5	2.5	3	3	2.7	TC - 1	3	4	3	4	3	3.4
150W80S	4	4	4.5	4	3	3.9	TC - 4	3.5	3	4	3	4.5	3.6
155W80S	3	-	-	-	-	3	TC - 5	3	3.5	3	3.5	3	3.2
150W90S	3.5	3.5	-	-	-	3.5	TC - 6	5	3	3	3.5	4	3.7
155W90S	3.5	-	-	-	-	3.5	Surface	3	-	-	-	-	3
175W90S	3.5	4	3.5	3.5	3.5	3.6							
150W85S	3	3.5	2.5	3.5	3	3.1							

Mean of Hardness for Stratum One = 3.25

TABLE 73: DISTRIBUTION OF RIMS AND DECORATED SHERDS, ClIf-6, STRATUM I.

SQUARE	NUMBER OF RIMS	%	NUMBER DEC.SHERD	%	SQUARE	NUMBER OF RIMS	%	NUMBER DEC.SHERD	%
150W65S	3	7.9	2	5	160W95S	-	-	-	-
155W70S	-	-	-	-	170W95S	-	-	-	-
160W70S	3	7.9	2	5	175W95S	-	-	-	-
165W70S	-	-	-	-	180W95S	-	-	1	2.5
170W70S	-	-	-	-	185W95S	-	-	-	-
150W75S	7	18.4	2	5	190W95S	6	15.8	2	5
155W75S	11	28.9	15	37.5	195W95S	2	5.3	-	-
160W75S	-	-	-	-	200W85S	-	-	-	-
170W75S	-	-	-	-	200W90S	-	-	-	-
175W75S	-	-	-	-	135W80S	-	-	-	-
180W75S	-	-	-	-	TC - 1	-	-	1	2.5
150W80S	-	-	1	2.5	TC - 4	2	5.3	6	15.0
155W80S	-	-	1	2.5	TC - 5	-	-	-	-
150W85S	3	7.9	6	15.0	TC - 6	1	2.6	-	-
150W90S	-	-	-	-	Surface	-	-	-	-
155W90S	-	-	-	-					
175W90S	-	-	1	2.5	TOTALS	38	100	40	100

CERAMIC ANALYSIS - STRATUM I

RAW MATERIAL

The clay used by the potters of ClIf-6, although having a slightly different chemical analysis, is very similar, physically, to the local clay. It is evident, however that the potters preferred to use a foreign clay, even though it meant travelling some distance, probably by water, to bring back a material which is difficult to transport due to its relatively high specific gravity. The reason for this preference probably lies in the workability of the clay, a term which implies plasticity, malleability and formability among others. The fact that all clay tested came from the same foreign site is a clear indication that it had unanimous acceptance by the potters in the band.

The temper, conversely, is virtually identical to the sandy subsoil found right on the site with the exception that a large portion of the black minerals, biotite and magnetite, had been selected out. As pointed out previously this was probably to ensure that the biotite, which is a black micaceous mineral, would not expand within the walls of a vessel which was being fired. Magnetite, another black mineral was also selected against although it does not possess biotite's thermal expansion characteristic.

The temper content of the vessels varies from 5 to 20 percent, with Iroquoian ceramics having a low percentage of temper, while Michigan and Peninsular Woodland ceramics have a temper content closer to 20%. It should be pointed out that there was a considerable variation in the temper content from the ceramics recovered from the Wawa Site which is defined as belonging to the Laurel Tradition. It will require further testing before suggesting that there is any correlation between temper quantity and cultural tradition.

MANUFACTURE

FABRICATION TECHNIQUE

The fissile characteristics of the many spalled sherds and almost total lack of horizontal breaks within the collection from Stratum One, strongly suggest that the technique of fabrication was universally paddle and anvil. This is interesting, and somewhat curious, in view of the fact that the differing cultural ceramic assemblages suggest that the potters may have come from as far south as the central Michigan area or from south central Ontario. If it is assumed that a female would not change her traditional fabrication technique to that predominating in her spouse's band, then the only hypothesis left is that by this late date (around the sixteenth century) the paddle and anvil technique had become universal, in the upper Great Lakes area. The evidence from the Laurel Culture sites in the area would suggest that this technique is the only ceramic fabrication technique to have been used since the inception of pottery at Michipicoten.

FIRING

Fifty three percent, by weight, of the vessel fragments excavated at ClIf-6 were found adjacent to three hearth-like features (See Table 73). This figure includes both clean and carbonized sherds, suggesting that the same hearths were used for cooking and firing of ceramics. The other 47% appears to be fairly evenly scattered over the whole of the excavated area, possibly indicating the absence of refuse pits, or perhaps indicating that refuse was carried off-site.

The mean hardness of sherds from Stratum One is 3.25 on the Moh's Scale, a figure high enough to suggest that the potters of this site did not have any problem with firing their ware to an adequate hardness (See Table 72).

From evidence similar to that described for ClIf-2 and ClIf-8 it appears that ClIf-6 ceramics were also being fired in the inverted position, a technique which has persisted in this area for close to two thousand years. There is no evidence to suggest that the "kiln" used for firing differed in any substantial way from the ones used by the women of the Michipicoten Harbour Site (ClIf-2) and the Wawa Site (ClIf-8). Construction of firing areas was probably part of a ritual which was scrupulously followed.

FUNCTION

A substantial number of sherds from Stratum One of ClIf-6 were found to have a carbonaceous deposit on the interior and/or exterior surface. The internal surface deposit, like the deposit on ClIf-8 sherds is composed of carbonized vegetal and possibly faunal material, again suggesting that food was boiled in ceramic vessels.

The external deposit was thinner and is considered to be carbonized from a typical low temperature cooking fire. The uncarbonized sherds are presumed to be from storage vessels or represent pots that failed the gauntlet of the firing process.

STYLE

As pointed out in the descriptive section, variation in decorative style is considerable, a common element on Terminal Woodland Algonkian sites. Such variation is strong positive evidence for exogamy and patrilocality and consequent mobility of the carriers of ceramic tradition. Daughters carry the decorative tradition of their mothers to wherever their spouses reside, and, in turn, pass this same practice on to their own daughters. Some geographic areas appear to be centres of certain ceramic traditions and this may be because exogamy is practised to a lesser degree in these areas, or that, some other form of residence rule applies. In areas where exogamy is rigorously exercised, a unique ceramic style will probably not evolve, since the local potters are constantly being exported and are being replaced by ones from, sometimes, widely separated areas. The abundant heterogeneity of ceramic traditions found at the Morrison Site (ClIf-6) suggests that the practise of exogamy in the Michipicoten area was the norm.

Vessel morphology, as determined by the available rim, shoulder and body sherds appears to be generally globular below the shoulder and no evidence of nippling was discovered. Shape above the shoulder varied according to the ceramic tradition that the individual pot represented. Reference should be made to the vessel descriptions for drawings of the rim profiles. No significance is attached to vessel morphology other than the observation that it is similar to many other Terminal Woodland pottery shapes from sites in the Northern Great Lakes area.

SUMMARY

The pottery from this site is made from an off-site clay and an on-site temper. Since the temper is from the Morrison Site however, it is much more likely that the ceramic ware was fabricated on site with a somewhat superior clay from another area. The proportion of temper to clay appears to vary with the cultural origin of the potter, but further testing is needed to prove this hypothesis. The grain size of the temper seems to reflect the personal preference of the potter.

Fabrication technique is paddle and anvil without apparent exception, probably suggesting the wide use of this technique during late Terminal Woodland times.

The hardness of 3.25 suggests that the potters in this group were able to operate a high temperature kiln without difficulty, an indication that they were able to pick and choose the fuel from a variety of hard and soft wood.

The number of analyzable vessels and the quantity of the ceramic assemblage from Stratum One of ClIf-6 indicate that there were probably between five and ten potters on the site. This number would suggest two or perhaps three families were utilizing the natural resources of the river-mouth area during the spring to fall months from year to year, much as their predecessors did in the same location nearly 2000 years earlier.

ClIf-6 STRATUM II

VESSEL DESCRIPTION

Stratum II of this site is represented by one rim, one decorated body sherd and 34 undecorated body sherds (See Tables 74 and 75). With such a small sample and especially with such a diminutive analyzable sample the chances of a meaningful analysis are exceedingly slim. The single rim and the decorated body sherd bear the characteristics of the Peninsular Woodland pottery, that is unusually thick walls, impressed decoration on upper surfaces and often on the lip, and usually no collar. This pottery is also characterized by the large particle size of the tempering material. The single rim and decorated sherd from Stratum II bear all of these characteristics.

The inside surface of the rim has been smoothed and the surface close to the lip is caked with carbonized vegetal matter and possible faunal matter. The lip which has a width of 10 mm. is radiused both internally and externally. The surface of the lip is impressed in such a manner as to produce a somewhat rounded saw-tooth appearance. This was accomplished by pressing the side and end of a tool into the lip at an approximate angle of 25 degrees to the horizontal surface. The tool would have had the general dimensions of a rather narrow "popsicle stick" but with a somewhat jagged end. The lip was carefully smoothed after the impressions were made. The external surface is decorated with an encircling row of right to left oblique impressions with a maximum length of 21 mm. and a vertical length of 13 mm. The oblique impressions were made by forcing the end of the same tool which was used to decorate the lip into the surface several times in a linear fashion so that the row produces a single line. The external surface is smooth below the decoration.

The surface has the rounded and vitrified appearance of a ceramic object which has been over-fired. This may be simply an individual case of overfiring because the other sherds do not have this appearance and the mean hardness of all sherds from this stratum is 2.9 (See Table 76).

TABLE 74: SHERD DISTRIBUTION BY NUMBER AND WEIGHT, ClIf-6, STRATUM TWO.

SQUARE	NUMBER	WEIGHT	% WEIGHT
150W75S	15	195.26	51.5
150W85S	15	154.15	40.7
135W80S	6	29.3	7.7
TOTALS	36	378.71	99.9

TABLE 75: DISTRIBUTION OF RIMS AND DECORATED SHERDS, ClIf-6, STRATUM TWO.

SQUARE	NUMBER OF RIMS	%	NUMBER OF DEC.SHERDS	%
150W75S	1	50	1	50
150W85S	1	50	1	50
135W80S	-	-	-	-
TOTALS	2	100	2	100

TABLE 76: HARDNESS OF FIVE SAMPLES FROM EACH SQUARE, C1If-6, STRATUM TWO.

SQUARE	1	2	3	4	5	Mean	
150W75S	3.5	3	3.5	3	2.5	3.1	Mean of hardness
150W85S	2	3	3	3	2.5	2.7	for Stratum Three
135W80S	3	3	3	3	3	3	= 2.9

C1If-6 STRATUM THREE

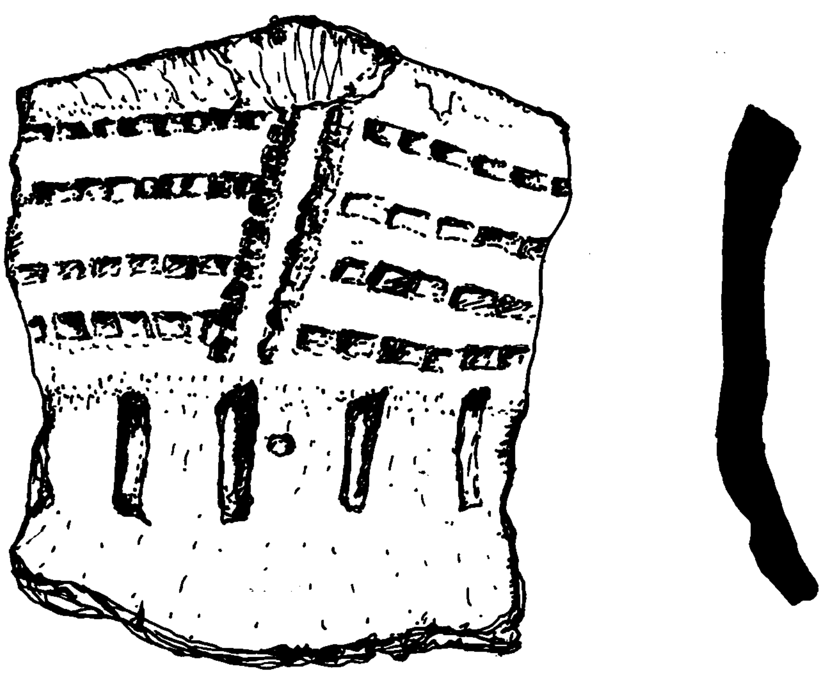
VESSEL DESCRIPTION

The lowest stratum of the Morrison Site contained 215 sherds, comprised of 199 undecorated body sherds, 8 decorated body sherds and 8 rims, only 7 of which were analyzable. Two of the rims are definitely "Juntunen Drag and Jab" type of Juntunen Ware (McPherron 1967:113 and Plate XXI), while a third can be ascribed to the same tradition. Three others are assignable to the Peninsular Woodland tradition while the last one has Oneota characteristcs. It is very interesting to note that these pottery styles all originate in Northern

Michigan and Eastern Wisconsin, suggesting the possibility that the people of Michipicoten traded extensively in that area at the time that Stratum III was occupied. It is also notable that Iroquoian ware is totally absent from the Stratum III sample with the concomitant suggestion that extensive relationships had not developed with the Hurons.

VESSEL ONE

FIGURE 52: VESSEL ONE, STRATUM III, ClIf-6.



The single large rim of Vessel One contains almost all of the characteristics described by McPherron for the Juntunen Drag and Jab type of his Juntunen Ware (McPherron 1967:113).

The interior surface is smooth and is decorated with a single row of push pull or "jab and drag" impressions. These impressions follow the undulations of the castellations at a distance of approximately seven mm. below the lip. The impressions were made with the side of a stamping tool with an approximate width of 3 mm. The tool was held in the right hand and its side was pressed into the clay at an approximate angle of 20° to the surface, producing an impression that is deep at its left hand end and tapering to the surface at the right hand end; at least the impression would taper to the surface except that a further impression is superimposed over the shallow end of its neighbour. This process is continued so that a long unbroken line of impressions progresses around the internal surface. The lip is flat, only slightly radiused and is decorated with a single row of rectangular punctates that were made with the same tool that produced the push-pull decoration.

After punctating, the lip appears to have been smoothed. Thickness at the lip is 8 mm. The external surface appears to be only moderately smoothed and presents a somewhat rippled appearance. The collar of this vessel has a maximum vertical dimension of 38 mm. between castellations. Extending at a very slight oblique angle below the castellation are two, parallel lines of push-pull impression, again made with the same tool that produced the internal decoration. The lines are spaced 8 mm. apart and have a length of 38 mm. Between these sets of vertical parallel lines are four horizontal lines of push-pull decoration which are spaced evenly between lip and collar base. Immediately below the collar is a single row of vertical impressions, apparently produced by a single application of the end of the same tool which was used for all other decoration on this vessel. These impressions have a vertical dimension of 13 mm. and a mean spacing of 15 mm. The area below the encircling row of impressions is undecorated. Vessel One has a hardness of 3 on the Moh's Scale and a colour of 5YR4/2 (dark reddish grey) on the Munsell Soil Colour Charts.

VESSEL TWO

Vessel Two is represented by one large rim sherd which extends well below the collar. Like Vessel One this pot also resembles Juntunen Stab and Drag except that it is not castellated. The finish of the internal surface is not possible to determine due to the heavy encrustation of carbonized food. The lip, which has a thickness of 10 mm. is rounded both internally and externally with a 2 mm. radius. The surface of the lip is punctated every 6 mm. with a rectangular ended tool. The external surface possesses a distinct collar which has a vertical dimension of 41 mm. and a maximum thickness at its base of 11 mm.

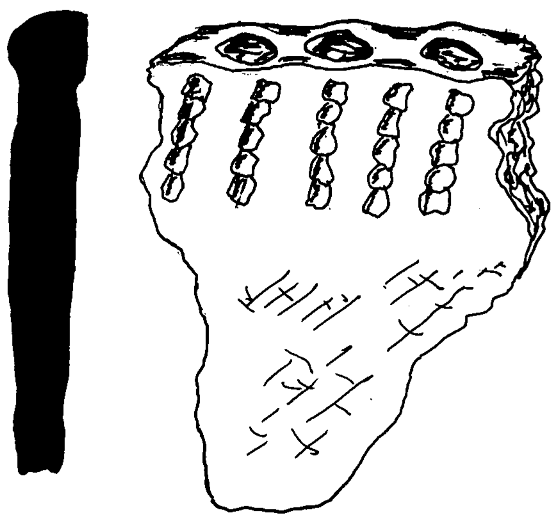
The decoration on the collar is composed of three horizontal rows of push-pull impression. Between the first and second row is a series of right to left oblique lines composed of push-pull impressions with a spacing between lines of 10 mm. and a maximum length of 15 mm. The spacing between the first and second horizontal row of push-pull impression is 19 mm. while the spacing between the second and third row is 9 mm. The decoration below the collar is composed of a row of encircling punctates with a spacing of 11 mm. above another row of encircling punctates with a spacing of 5 mm. which, in turn, is above another row of punctates with variable spacing. This last row tends to blur into push-pull in places. The spacing between the first and second row of punctates is 13 mm. and between the second and third row the spacing is 9 mm. The depth of penetration of the second and third rows of punctates is considerably less than that of the first row. In no case, however, do any of the punctates produce internal bosses. It is not known whether decoration extends any further down the external surface. Hardness of this vessel is 4 and the colour is 5YR4/2 (dark reddish grey).

VESSEL THREE

The single sherd of this vessel bears many of the characteristics of Juntunen Ware although the principle decoration is cord impressing, a technique that McPherron considers rare (McPherron 1967:114). The interior surface of this sherd is clean and well smoothed with only traces of cooking residue present and the lip, which is without castellations, has a thickness of 8 mm. and is rounded inside and out with 3 mm. radii. The lip surface is impressed with oblique impressions made with a stylus shaped tool held in the right hand. After the impressions were made, the lip was carefully smoothed, tending to obliterate the decoration partially. The external surface has been superficially smoothed giving it a smooth but somewhat "bumpy" appearance. The collar of this vessel has a height of 32 mm. and a thickness at its base of 10 mm. It should be mentioned that the collar of Vessel Three, although quite apparent, is not as well defined as the collars of the previous two vessels. The decoration on the collar consists of four evenly spaced rows of horizontal cord-impressing. Because of the heavy encrustation of carbonized food particles which have tended to fill the cord impressions, it is somewhat difficult to see whether it was produced with a single or double twisted cord. Immediately below the collar is a row of encircling punctates with a mean spacing of 9 mm. The punctates were produced by impressing the clay with a stylus which was held at an approximate angle of 70^{o} to the surface, producing a somewhat elliptical impression which did not produce interior bosses. The surface below the punctates is undecorated. The hardness of this vessel is 3.5 and the colour is 5YR4/3 (reddish brown) where the surface is not masked by the carbonized food deposit.

VESSEL FOUR

FIGURE 53: VESSEL FOUR, STRATUM III, C1If-6.



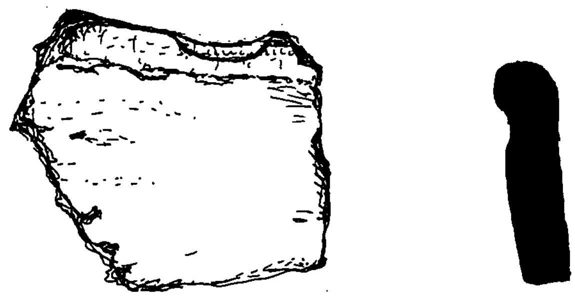
Vessel Four is represented by a single large rim that bears the characteristics of the Peninsular Woodland material culture. The internal surface is smooth but with many small craters. The reason for this appears in many places on the sherds surface. The individual who fabricated this pot did not remove the micaceous materials from the temper. As mentioned previously, mica contains much water of crystalization between its molecular platelets, which when the material is heated, expands the mica into a material called vermiculite which has a volume of up to 50 times the original. Any particles of mica trapped in the clay of a pot would expand causing spalling or cratering of the surface. Apparently this vessel did not succumb to a worse fate as there is evidence of food residue on the lip. The lip is relatively sharp on the interior corner but has a 3 mm. radius on the exterior corner. The surface of the lip is decorated with oval punctates which tend to produce interior and exterior splaying. The punctates have a mean spacing of 7.5 mm. The thickness of the lip is 11 mm. The exterior surface is quite rough and appears to have been paddled with a cord-wrapped paddle. Immediately below the lip is a single row of oblique impressions with a maximum length of 19 mm. Each impression is actually a short row of linear stamping performed with the somewhat rough and jagged end of a small bone. It is likely that the lip impressions were made with the same tool, held at a slightly different angle. Exterior surface below the row of impressions is undecorated. It should be noted that this vessel does not possess a collar, a characteristic of Peninsular Woodland pottery. The surface of this sherd has a glossy appearance and all edges are rounded, an indication that overfiring has taken place and the vitrification point has been well exceeded. The hardness of 4 is also an indication of high firing. Colour of this vessel is variable, from a 10YR8/4 (very pale brown) to 10YR4/2 (dark greyish brown).

VESSEL FIVE

The single small sherd of this vessel would place it in the Peninsular Woodland grouping due to its lip and upper rim attributes. The vessel is collarless but with a slightly expanded lip, probably due to flattening. The interior surface is carefully smoothed but undecorated. The lip is quite rounded with 3.5 mm. radiusing on both interior and exterior edges. The surface of the lip is carefully smoothed and blends into both inner and outer surfaces without perceptual junction. The undecorated but smooth exterior surface protrudes slightly for a short distance below the lip due to pressure on the lip during manufacture. The thickness of this vessel is a rather thick 14 mm. Hardness is 4 and colour is 10YR3/2 (very dark greyish brown).

VESSEL SIX

FIGURE 54: VESSEL SIX, STRATUM III, C1If-6.



Vessel Six, also of Peninsular Woodland tradition, is represented by a single, small rim. The interior surface is superficially smoothed and undecorated. The lip, which has a thickness of 8 mm. is completely rounded in section and splays over the exterior surface slightly. The lip surface has been decorated by pressing a cylindrical shaped tool with an approximate diameter of 5 mm. into the clay in an axial direction. This decoration has further splayed the lip over the exterior surface. The exterior surface appears to be unsmoothed and undecorated with some particles of temper protruding slightly from the surface. The hardness of this vessel is slightly greater than three and its colour is 7.5YR5/2 (brown).

VESSEL SEVEN

FIGURE 55: VESSEL SEVEN, STRATUM III, C1If-6.

The single sherd of this vessel bears some of the attributes of the notched-rim variety of grit-tempered Oneota pottery. The interior surface appears relatively unsmoothed with particles of temper protruding from the surface. The lip has been notched by pressing a chisel-shaped object into the surface every 8 to 12 mm. in such a way that the lip has the appearance of a saw-tooth edge. The notching has caused interior and exterior splaying of the lip which has been smoothed on the interior surface but apparently not on the exterior surface. The exterior surface is also unsmoothed and a single row of short, wide, shallow impressions encircle the vessel just below the lip. The impressions, which have a maximum vertical dimension of 11 mm. have been produced by pressing the slightly rounded side of a tool, possibly a bone, into the clay every 13 mm. around the rim of the vessel. It is not known how the rest of the surface below the portion described is treated. The hardness of this vessel is slightly greater than three and its colour is 10YR7/3 (very pale brown).

CERAMIC ANALYSIS, STRATUM 3, ClIf-6.

RAW MATERIAL

An analysis of the clay used by the potters of Stratum 3 of the Morrison Site is essentially similar to the analysis of the clays from the other two strata. It is inferred that the same clay source was utilized throughout the time span of approximately 300 years. The fact that the clay did not come from any one of the three local deposits suggests the possibility of experimentation with the clay, at least, on the part of the potters. It may also suggest that the local clay was not acceptable for some cultural reason which is not readily apparent.

The temper used by the people of Stratum 3 is identical in analysis to that used by the Wawa Site and the Michipicoten Harbour Site peoples. In addition it is almost identical to the beach sand at the river mouth and to the subsoil on the Morrison Site. The minor difference is in the removal of biotite and magnetite particles (Refer to Chapter 3).

Despite the assumed cultural differences suggested by the pottery for the ClIf-6 potters it is interesting to note that they all used the same clay and the same temper, and, with some latitude, in similar proportions. The foregoing suggests that the women of Stratum 3 had much in common, with reference to their ceramic technology. In terms of raw materials, this Stratum appears to be more homogeneous than Stratum 1. It has been submitted before, in this report, that the problems of ceramic technology would be virtually insurmountable unless a very rigid format were followed in the form of ritual practise. The pottery from Stratum 3 of this site offers support to this hypothesis.

MANUFACTURE

FABRICATION TECHNIQUE

Stratum 3 rims and body sherds indicate that the paddle and anvil technique was the only style of fabrication used during the occupation of this stratum, a similar situation to Strata 1 and 2.

FIRING

The distribution of sherds for this stratum closely follows that of Stratum I where a high percentage of the ceramic detritus was recovered near hearth features. The mean hardness of 3.1 indicates that a similar firing temperature to that used by the Stratum 1 potters was being realized. It appears quite likely that the technique of fabrication and firing used by the potters of all strata of the Morrison Site were similar and, in fact, represent a chronological, technological and cultural continuum.

FUNCTION

The evidence presented for use of ceramic vessels as cooking pots for Stratum 1 is also present in Stratum 3. Most rims and many body sherds are encrusted with analyzable food remains, either on the inner or outer and sometimes on both surfaces. In addition many body sherds are coated with a thin black carbonaceous deposit which is very probably the result of cooking over a relatively low-temperature fire.

STYLE

The seven analyzable vessels from this stratum represent three cultural entities, a fact which is reflected in the distinctive decorative style of these pots. The morphology of the vessels, however, seem to be essentially similar. The evidence of the body sherds suggest that all pots were of a generally globular form below the shoulders and no evidence of nippling was discovered.

SUMMARY

It is obvious that the bottom stratum of ClIf-6 is similar in most respects to the other two strata on this site, at least in terms of the ceramic collections.

The number of vessels and the size of the collection suggest that the population of the site was not greater than two families which occupied the site seasonally.

TABLE 77: SHERD DISTRIBUTION BY NUMBER AND WEIGHT, ClIf-6 Stratum 3.

SQUARE	NUMBER	WEIGHT	% WEIGHT
150W65S	2	84.8	14.2
150W75S	13	240.3	40.2
150W85S	142	152.7	25.5
150W95S	22	47.6	7.9
155W95S	37	72.5	12.1
TOTALS	215	597.9	99.9

TABLE 78: DISTRIBUTION OF RIMS AND DECORATED SHERDS, ClIf-6 Stratum 3.

SQUARE	NUMBER OF RIMS	%	NUMBER OF DEC. SHERDS	%
150W65S	2	.25	-	-
150W75S	5	62.5	-	-
150W85S	1	12.5	3	37.5
150W95S	-	-	-	-
155W95S	-	-	5	62.5
TOTALS	8	100	8	100

TABLE 79: HARDNESS OF FIVE SAMPLES FROM EACH SQUARE, ClIf-6 Stratum 3.

SQUARE	1	2	3	4	5	MEAN	
150W65S	4	-	-	-	-	4	Mean of Hardness
150W75S	4	2.5	3	3.5	4	3.4	for Stratum
150W85S	3	2	2	2.5	3	2.5	Three = 3.1
150W95S	2.5	2.5	2.5	3	3	2.7	
155W95S	3.5	3	3	2.5	3	3	

LITHIC ANALYSIS OF THE MORRISON SITE (ClIf-6)

INTRODUCTION

The Morrison Site is stratified consisting of four components: a historic component dating to the late 1800's and three Terminal Woodland components.

Since the historic goods are mixed with the protohistoric 16th century material, it is assumed that all lithic material recovered from Levels 1 and 2 belongs to the protohistoric occupation. A possible source of error in interpretation of material occurs because of mixing between strata either as a result of features from one stratum extending into the lower stratum or the lack of differentiation between strata when the lenses of each are in close contact.

The components of the site are comparatively rather than individually analysed because it is argued that the variability which exists between stratigraphic components represents two very important elements in Algonkian cultural development. The first is the very conservative nature of Algonkian culture. The second is the relationship between Huron and Algonkian Peoples.

DESCRIPTION

STRATUM 1.

RAW MATERIAL

LOCALE

1b) Quartz and Quartzites

The locally abundant quartz and quartzites occurred in significant quantities in this stratum.

1e) Greenstone

One piece of culturally altered greenstone was recovered.

IMPORTED

2a) Hudson Bay Lowland Chert

In addition to the blue-grey coloured pebble chert, a particular variety--a black, matte-like chert was identified as belonging to these Northern Palaeozoic Cherts (Dawson: personal communication 1976). Pollock (1974:13) indicates a possible source for this chert in the Hawley Lake vicinity (See Map 5).

3) Southern Palaeozoic Cherts

The principle identifiable sources for the Southern Palaeozoic Cherts are Scott Quarry (3b) previously mentioned, and Campbell Quarry.

3d) Campbell Quarry

Campbell Quarry, which is found in Michigan

(See Map 5) is part of the Dundee Formation. The chert is a white-grey colour, peppered with numerous small fossil inclusions.

4a) Lake Superior Agate

Although Fox (personal communication) indicates that Lake Superior Agate is probably derived from the Precambrian Osler Group of Formations at the Western end of Lake Superior, an alternate source may include "those agate-like pebbles derived...from the Hawley Lake beaches" (Pollock 1974:13).

5a) Jasper Taconite

Fox (personal communication 1976) states;

> Jasper taconite in the CIIf-6 collection is exciting; however, the source need not be in the Gunflint Formation in the Thunder Bay vicinity or the Biwabik Iron Formation in Minnesota. Its presence in tills in the Longlac

> area and the existence of Precambrian sedimentary formations in the Hudson Bay Lowlands (Bostock 1968), both suggest that jasper taconite pebbles/ cobbles could be distributed through the H.B.L. chert-producing tills to the north of your sites.

Certainly Douglas's (1970:62) statement;

> pebbles of chert, jasper and iron formation are reported to be more abundant in the Larder Lake Area than in the Timiskaming series of rocks further south in the Cobalt Area.

and Fox's latter contention, that Jasper taconite could be a part of the H.B.L. till would place the source area of the jasper taconite found on this site to be in north eastern Ontario.

5b) Taconite

Only one piece of taconite was recovered and it is probably derived from the same source location as the jasper taconite.

99) Thermally Altered Chert

Chert (coded 99) was thermally altered and could not be identified as to source location.

In summary, there are several areas from which raw material was imported to the site--the two most probable areas being Michigan and Northeastern Ontario; however, there is the remote possibility that some of the imported material originated at the western end of Lake Superior. Table 80 tabulates the distribution by weight of the lithic materials utilized at ClIf-6, Stratum 1.

TABLE 80: THE DISTRIBUTION BY WEIGHT OF THE LITHIC RESOURCES UTILIZED AT ClIf-6, Stratum I.

CLASSIFICATION	WT.	%
Local		
1b) Quartz and Quartzites	172.41	32.6
1e) Greenstone	83.3	15.7
Subtotal	255.71	48.3
1) Imported	31.16	5.9
00) Unknown	144.52	27.3
3) Southern Palaeozoic	30.03	5.7
3b) Scott Quarry	12.41	2.3
3d) Campbell Quarry	21.44	4.0
4a) Lake Superior Agate	5.52	1.0
5a) Jasper Taconite	14.89	2.8
5b) Taconite	3.6	0.7
99) Thermally Altered	9.65	1.8
Total	528.93	99.8

DESCRIPTION OF LITHIC ARTIFACTS

INTRODUCTION

In general the artifacts recovered can be separated into two families: conchoidally fractured material and non-conchoidally fractured material or rough stones.

A) <u>Conchoidally Fractured Material</u>

Both Precambrian and Palaeozoic materials were selected because of their specific fracturing characteristics. Table 81 illustrates the frequency distribution by weight of all conchoidally fractured material.

TABLE 81: THE FREQUENCY DISTRIBUTION BY WEIGHT OF ALL CONCHOIDALLY FRACTURED MATERIAL FROM THE MORRISON SITE, STRATUM I.

CLASSIFICATION	WT.	%
1a) Quartz and Quartzites	172.41	38.8
2a) H.B.L.	144.52	32.5
3) Southern Palaeozoic	30.03	6.8
3b) Scott Quarry	12.41	2.8
3d) Campbell Quarry	21.44	4.8
4a) Lake Superior Agate	5.52	1.2
5a) Jasper Taconite	14.89	3.4
5b) Taconite	2.07	0.5
?) Unknown	31.16	7.0
99) Thermally Altered	9.65	2.2
Total	444.10	100.0

The distribution of lithic resources is dominated by Northern Palaeozoic and Precambrian material.

GROUP I (DETRITUS) AND GROUP II (UTILIZED ARTIFACTS)

The conchoidally fractured artifacts were classified in two groups: detrital material and utilized artifacts. The frequency distribution by weight is summarized in Table 82 for these two groups.

TABLE 82: THE FREQUENCY DISTRIBUTION BY WEIGHT OF RAW MATERIAL FOR GROUPS I AND II FOR THE MORRISON SITE, STRATUM 1.

RAW MATERIAL CLASSIFICATION	?	1a	2a	3	3b	3d	4a	5a	5b	99	Total
Detritus	15.8	89.9	72.2	19.3	10.4	21.4	0.0	1.0	0.0	1.0	231.0
%	3.6	20.2	16.2	4.3	2.3	4.8	0.0	0.2	0.0	0.2	51.9
Utilized	15.4	82.5	32.3	10.8	2.0	0.0	5.5	13.9	2.1	8.6	213.1
%	3.6	18.6	16.2	2.4	0.4	0.0	1.2	3.1	0.5	1.9	48.1
Total	31.2	172.4	144.5	30.1	12.4	21.4	5.5	14.9	2.1	9.6	444.1
%	7.2	38.8	32.4	6.7	2.7	4.8	1.2	3.3	0.5	2.1	100.0

There is an equitable distribution in terms of raw material between the two groups, and as would be expected the distributions within each group are dominated by Northern Palaeozoic and Precambrian materials.

GROUP I: DETRITUS

Two distinctions based on artifact reduction were made on the detrital material: flakes and cores. The frequency distribution by weight for each group is summarized in Table 83.

TABLE 83: THE FREQUENCY DISTRIBUTION BY WEIGHT AND RAW MATERIAL FOR DETRITUS SPECIMENS FOR THE MORRISON SITE, STRATUM 1.

TYPE OF MATERIAL CLASSIFICATION	?	1a	2a	3	3b	3d	5a	99	Total
Flakes	13.7	2.7	17.1	5.6	3.7	2.5	1.0	0.0	46.5
%	6.0	1.2	7.4	2.5	1.6	1.1	0.4	0.0	20.1
Cores	2.0	87.1	55.0	13.5	6.7	18.9	0.0	1.0	184.4
%	0.8	37.7	23.8	5.9	2.9	8.6	0.0	0.4	79.0
Total	15.7	89.8	72.1	19.2	10.4	21.4	1.0	1.0	230.9
%	6.8	38.9	31.2	8.4	4.5	9.7	0.4	0.4	100.0

The detrital material is comprised mainly of core detritus, the majority of which is derived from northern sources.

I:a) Flakes

Flakes were divided into three types; pressure, secondary and primary percussion.

I:a(i) Pressure Flakes

Since no specific analysis was carried out on this particular category only number, weight and type of material were recorded, the details of which are tabulated in Table 84.

TABLE 84: THE DISTRIBUTION BY NUMBER, WEIGHT, AND RAW MATERIAL OF PRESSURE FLAKES FOR THE MORRISON SITE, STRATUM 1.

	N	%	WT.	%	AV.WT.	TYPE OF MATERIAL
	29	72.5	2.54	68.8	0.09	00) Unknown
	1	2.5	0.05	1.4	0.05	1a) Quartz(ite)
	7	17.5	.68	18.4	0.1	2a) H.B.L.
	2	5.0	.27	7.3	0.14	3) S. Palaeozoic
	1	2.5	.15	4.1	0.15	5a) Jasper Taconite
TOTAL	40	100.0	3.69	100.0	0.91	

I:a(ii) Secondary Flakes

Six variables including platform thickness, platform angle, maximum thickness, maximum width (perpendicular to length), length (along the axis of percussion), and weight were measured to the nearest 0.01 cm., 1.0 degree, and 0.01 gram per flake. These variables were not comparatively analyzed because of small sample size, but may prove useful in future analysis of the site if the sample size is increased. Table 85 summarizes the total distribution in terms of number, weight and raw material for this flake type.

TABLE 85: THE FREQUENCY DISTRIBUTION BY NUMBER, WEIGHT AND RAW MATERIAL OF SECONDARY FLAKES FOR THE MORRISON SITE, STRATUM 1.

	N	%	WT.	%	AV.WT.	TYPE OF MATERIAL
	13	41.9	5.46	37.4	0.42	00) Unknown
	5	16.1	2.60	17.8	0.52	2a) H.B.L.
	9	29.0	4.13	28.3	0.46	3) S. Palaeozoic
	1	3.2	0.6	4.1	0.6	3b) Scott Quarry
	1	3.2	0.95	6.5	0.95	3d) Campbell
	2	6.4	0.85	5.8	0.43	5a) Jasper Taconite
TOTAL	31	99.8	14.59	99.9	0.47	

I:a(iii) Primary Flakes

Those variables measured for secondary flakes were also recorded for primary flakes; however, the small sample size mitigated against a comparative analysis between these two categories. Table 86 is a summary of the frequency distribution by number, weight and raw material for this flake type.

TABLE 86: THE FREQUENCY DISTRIBUTION BY NUMBER, WEIGHT AND RAW MATERIAL OF PRIMARY FLAKES FOR THE MORRISON SITE, STRATUM 1.

	N	%	WT.	%	AV.WT.	TYPE OF MATERIAL
	3	20.0	5.77	20.0	1.92	00) Unknown
	1	6.7	2.68	9.3	2.68	1a) Quartzite
	7	46.7	13.79	47.9	1.97	2a) H.B.L.
	1	6.7	1.28	4.4	1.28	3) S. Palaeozoic
	2	13.4	3.71	12.9	1.86	3b) Scott Quarry
	1	6.7	1.58	5.5	1.58	3d) Campbell
TOTAL	15	100.0	28.81	100.0	1.92	

I:b) Cores

Included in the core group are shatter fragments, quartzite chips, core fragments, bipolar cores, cores and exhausted cores.

I:b(i) Shatter Fragments

Basically any fragment exhibiting an angular structure and lacking any characteristics of a platform or bulb of percussion was classified as shatter. No attributes other than number, weight and type of material for this category were recorded.

TABLE 87: THE FREQUENCY DISTRIBUTION OF SHATTER FRAGMENTS BY NUMBER, WEIGHT AND TYPE OF MATERIAL FOR THE MORRISON SITE, STRATUM 1.

	N	%	WT.	%	AV.WT.	TYPE OF MATERIAL
	3	20	1.15	24.5	0.38	00) Unknown
	3	20	0.46	9.8	0.15	1a) Quartzite
	4	30	0.60	12.8	0.15	2a) H.B.L.
	3	20	1.47	31.3	0.49	3) S. Palaeozoic
	2	10	1.02	21.7	0.51	99) Thermal
TOTAL	15	100	4.70	100.1	0.31	

I:b(ii) Chips

This type is defined as any artifact having the general outline of a flake, but not exhibiting any of the characteristics of a flake such as a platform, bulb of percussion, éraillure, etc.. Chips were derived from quartzite. In all there were 14 chips, with a total weight of 4.97 grams and an average weight of 0.36 gram.

I:(iv) Core Fragments

A sub-type, bipolar core fragments, was included in the total distribution. In addition to weight, platform thickness, platform angle, thickness, width, and length were recorded in Table 88.

TABLE 88: THE MEAN DISTRIBUTION OF SEVEN VARIABLES MEASURED FOR CORE FRAGMENTS FROM THE MORRISON SITE, STRATUM 1.

CLASSIFICATION	RAW MATERIAL	$\bar{X}$ WT (gm)	$\bar{X}$ Pt THIK	$\bar{X}$ Pt L°	$\overline{\text{THIK}}$	$\overline{\text{WIDTH}}$	$\overline{\text{LENGTH}}$
Regular	Unknown	2.73	0.0	0.0	0.90	1.90	2.70
	3) S. Palaeo	4.77	0.29	85°	0.72	1.81	2.78
Bipolar	2a	5.49	0.0	0.0	0.96	2.13	2.14
Total		4.24	0.29	85°	0.85	1.95	2.75

I:b(v) Cores

Six cores are individually described in Table 89.

TABLE 89: VARIABLES AND ATTRIBUTES MEASURED FOR SIX CORES FROM THE MORRISON SITE, STRATUM 1.

NO.	060A	265A	279A	251A	456A	251A	$\overline{X}$	X^2
location	155W085S	155W065S	150W085S	150W085S	150W085S	150W085S	-	-
length (cm)	3.1	3.2	2.8	4.9	4.8	2.7	3.6	1.0
width	2.9	3.0	2.9	2.5	3.0	3.9	3.0	0.47
thickness	1.3	2.5	1.0	1.0	2.8	1.0	1.6	0.85
weight (gm)	14.9	33.9	6.8	9.5	47.8	9.5	20.4	16.7
material	2a (H.B.L.)	1a (Quartzite)	2a	3d(Camp)	1a	3d		
comments	90° rotation	rotation on x,y,z axis	rotation 90° 360°					

I:b(vi) Bipolar Cores

There were only two bipolar cores and each is individually described in Table 90.

TABLE 90: VARIABLES AND ATTRIBUTES MEASURED FOR TWO BIPOLAR CORES FROM THE MORRSION SITE, STRATUM 1.

NO.	251A	009A
location	150W085S	150W095S
length (cm)	3.6	3.1
width	3.0	1.8
thickness	0.9	1.1
weight	10.5	10.2
material	2a (H.B.L.)	2a
comments	opposite surface crushed, difficult to discern utility.	opposite surface crushed, difficult to discern utility.

I:b(vii) Exhausted Cores

In addition to weight and raw material, length, width and thickness were measured to the nearest 0.01 cm. Each are individually described along with a summary of each variable in Table 91.

TABLE 91: VARIABLES AND ATTRIBUTES TAKEN FOR FIVE EXHAUSTED CORES FROM THE MORRISON SITE, STRATUM 1.

NO.	248A	251A	252A	457A	257A	$\overline{X}$	X^2
Location	150W085S	150W085S	150W085S	150W085S	150W085S		
Length (cm)	2.0	2.0	3.2	1.3	1.3	2.0	0.75
Width	2.0	2.2	2.3	2.4	1.5	2.	0.35
Thickness	0.8	1.3	1.2	0.6	0.3	0.8	0.39
Weight	3.0	4.7	5.9	2.0	0.7	3.3	2.07
Material	3 (S.Palaeo)	3b (Scott)	2a (H.B.L.)	3b	3		

Group II - Utilized Artifacts

All artifacts displaying any signs of utilization were assigned to one of two categories: unmodified flakes or retouched tools. The frequency distribution by weight of raw material for these two categories is summarized by Table 92.

TABLE 92: THE FREQUENCY DISTRIBUTION BY WEIGHT OF RAW MATERIAL OF UNMODIFIED AND RETOUCHED TOOLS FROM THE MORRISON SITE, STRATUM 1.

RAW MATERIAL CLASSIFICATION

	00	1a	2a	3	3b	4a	5a	5b	99	Total
Unmodified	5.0	2.1	15.0	9.2	1.9	2.6	13.9	2.0	0.0	52.0
%	2.4	1.0	7.0	4.3	0.9	1.2	6.5	1.0	0.0	24.4
Retouched	10.3	80.4	57.3	1.5	0.0	0.0	2.8	0.0	8.6	161.1
%	4.8	37.7	26.9	0.7	0.0	0.0	1.4	0.0	4.0	75.6
Total	15.3	82.5	72.3	10.7	1.9	2.6	16.7	2.0	8.6	213.1
%	7.2	38.7	33.9	5.0	0.9	1.2	7.9	1.0	4.0	100.0

The unmodified tools represent one-quarter of all the tools recovered, suggesting that cutting operations were emphasized.

The distribution within the conchoidally-fractured categories is significant in that there is a near absence of Southern Palaeozoic material or conversely, there is a complete dominance of Northern Palaeozoic and Precambrian material. Rather surprising is the fact that most of the Southern Palaeozoic material was utilized as unmodified flakes and not as bifacial tools.

II:a) Unmodified Flakes

An unmodified flake is defined as any flake which has been utilized but the original morphology or outline has not been purposefully changed by retouch.

II:a(i) Edge Deteriorated Flakes

A total of 24 edge deteriorated flakes were recovered from the site and all but four exhibited slight but continuous marginal retouch. Of the four, three were characterized by discontinuous step fractures and the fourth displayed a graver spur in addition to the marginal retouch. Table 93 is a summary distribution of the variables recorded for edge deteriorated flakes.

It is evident in Table 93 that there is a similarity in weight between Northern and Southern Palaeozoic cherts; however, the weight recorded for the Precambrian jasper taconite is significantly larger.

Edge angles of these flakes range from 25° to 78° with a mean of 34°. Edge wear lengths vary slightly from type of material to side of utilization.

TABLE 93: VARIABLES RECORDED FOR EDGE DETERIORATED FLAKES FROM THE MORRISON SITE, STRATUM 1

RAW MATERIAL	WT			PLATFORM THICKNESS			PLATFORM ANGLE			LENGTH			WIDTH			THICKNESS			EDGE ANGLE			EDGE LENGTH RIGHT			LEFT			DISTAL			PROXIMAL		
	N	$\bar{X}$	X^2	N	$\bar{X}$	X^2	N	$\bar{X}$	X^2	N	$\bar{X}$	X^2	N	$\bar{X}$	X^2	N	$\bar{X}$	X^2	N	$\bar{X}$	X^2	N	$\bar{X}$	X^2	N	$\bar{X}$	X^2	N	$\bar{X}$	X^2	N	$\bar{X}$	X
Unknown	2	2.6	2.7	1	0.7	0	1	135	0	2	2.2	.3	2	2.2	.6	2	.4	.3	2	46	6	0	0	0	1	1.5	0	1	3.1	0	0	0	0
Quartzite	2	2.3	.3	2	.4	.3	2	69	6	2	2.5	.3	2	1.8	.3	2	.6	.1	2	35	7	2	1.8	.3	1	2.2	0	0	0	0	0	0	0
H.B.L. Southern	8	1.8	1.2	4	.3	.1	4	38	12	8	2.1	.7	8	2.0	.6	8	.4	.1	7	33	9	5	1.5	.4	5	2.1	8	5	1.1	.5	0	0	0
Palaeozoic	6	1.7	1.6	1	.3	0	1	95	0	6	2.5	.9	6	1.7	.6	6	.5	.1	6	28	4	5	1.7	.9	4	1.9	.9	2	.8	.3	1	1.6	0
Scott Quarry	1	2.0	0	1	.2	0	1	72	0	1	2.4	0	1	1.7	0	1	.5	0	1	25	0	1	2.6	0	1	.9	0	1	1.2	0	0	0	0
Lake Superior Agate	2	1.3	1.0	2	.4	.1	2	68	14	2	1.3	.5	2	2.5	.5	2	.4	.2	2	54	34	1	1.1	0	1	2.5	0	1	2.0	0	0	0	0
Taconite	2	6.9	1.0	1	.5	0	1	145	0	2	4.9	.6	2	2.1	.1	2	.9	.0	2	35	0	2	3.3	1.3	2	3.6	7	0	0	0	0	0	0
Japser Taconite	1	2.1	0	0	0	0	0	0	0	1	1.3	0	1	2.7	0	1	.8	0	1	48	0	0	0	0	1	1.8	0	0	0	0	0	0	0
Total	24	2.3	1.9	12	.4	.1	12	73	37	24	2.4	1.1	24	2.0	.5	24	.5	.2	23	36	13	16	1.9	.9	16	2.1	.9	10	1.3	.78	1	1.6	0

II:b) Retouched Tools

Any tool exhibiting shape modification was assigned to one of five types: bevelled flakes, unifacial tools, preform-bifaces, points and core tools. Table 94 summarizes the frequency distribution by weight and raw material of all types of retouched tools.

TABLE 94: THE FREQUENCY DISTRIBUTION BY WEIGHT OF RAW MATERIALS FOR RETOUCHED TOOLS FROM THE MORRISON SITE, STRATUM 1.

RAW MATERIAL CLASSIFICATION

	00	1a	2a	3	4a	99	Total
Bevelled	0.0	0.0	2.5	0.6	0.0	8.6	11.7
%	0.0	0.0	1.5	0.3	0.0	5.4	7.2
Unifacial	0.6	0.0	30.6	0.4	0.0	0.0	31.6
%	0.3	0.0	19.0	0.3	0.0	0.0	19.6
Bifacial	1.3	0.0	0.0	0.0	0.0	0.0	1.3
%	0.8	0.0	0.0	0.0	0.0	0.0	0.8
Core Tools	9.7	79.0	24.2	0.5	2.8	0.0	117.2
%	6.0	49.1	15.0	0.3	1.8	0.0	72.6
Total	11.6	79.0	57.3	1.5	2.8	8.6	161.8
%	7.2	49.1	35.6	0.9	1.8	5.4	100.0

The tool types are dominated by pebble core tools. The majority of these tools were derived from quartzite, although this statistic could be misleading since weight rather than number is used.

II:b(i)-1 <u>Bevelled Flakes</u>

Five end scrapers were recovered from this stratum and each is individually described in Table 95 (See Figures 56 and 57). A sixth bevelled flake (No. 249A) derived from the black H.B.L. chert, is retouched along the side edge of the flake for a distance of 2.3 cm. The wear pattern along this face is characterized by continuous step fractures, and the angle of the worked face is unique in that the edge is concave or in-sloping rather than convex as is usually the case on end scrapers. Overall variables measured for this specimen include: length = 2.60 cm. width = 2.05, thickness = 0.81, platform thickness = 0.25, platform angle = 60°, weight = 4.12 gm.

FIGURE 56 BEVELLED FLAKE No. 340 A, STRATUM 1, ClIf-6.

FIGURE 57: BEVELLED FLAKE No. 360 A, STRATUM 1, ClIf-6.

TABLE 95: VARIABLES RECORDED FOR FIVE END SCRAPERS FROM THE MORRISON SITE, STRATUM 1.

NO.	559A	552A	340A	360A	7A	$\overline{X}$	X^2
LOCATION	200W090S	190W090S	170W070S	170W170S	150W085S	-	-
PL.THICKNESS (cm)	0.20	0.20	0.0	0.0	0.0	.2	0
PL. L^{o}	84	70	0.0	0.0	0.0	77	9.9
MAXIMUM THICKNESS (cm)	0.55	0.50	0.81	0.65	0.23	0.55	0.21
MAXIMUM WIDTH (cm)	2.00	1.95	2.60	2.05	1.94	2.11	0.28
MAXIMUM LENGTH (axis of percussion)cm	2.21	1.95	2.50	2.23	0.95	1.97	0.6
WEIGHT (gm)	2.69	1.51	5.35	3.28	0.55	2.68	1.83
TYPE OF MATERIAL	1a	3b	99	99	3b	-	-
BEVELLED FACE =							
length (cm)	1.80	1.90	2.40	2.30	1.70	2.02	0.3
height (cm)	0.24	0.45	0.81	0.65	0.21	0.47	0.26
angle (cm)	45	60	78	84	63	66	15
radius (cm)	2.00	3.5	4.25	3.25	4.0	3.4	0.88
arc^{o}	100	40	50	60	40	58	25
SIDE FACE JUNCTURE =							
right angle	110	100	90	90	70	92	15
left angle	70	090	105	105	90	92	14
FACE WEAR TYPE	marginal wear	continuous	focused	focused	continuous		
SIDE EDGE WEAR right	snapped		continuous step fractures	marginal re-touch contin-uous step fractures			
left	snapped		continuous step fractures	marginal wear			
DORSAL SURFACE	little dorsal thinning		platform removed	platform removed			
VENTRAL SURFACE							

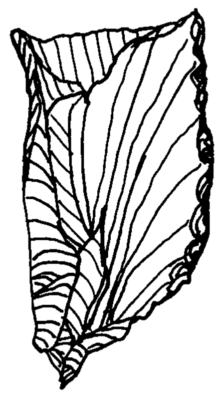
II:b(i)-2 Tools

Four unifacial tools (See Figure 58) were recovered and each is individually described in Table 96.

TABLE 96: VARIABLES RECORDED FOR UNIFACIAL TOOLS FROM THE MORRISON SITE, STRATUM 1.

NO.	436A	290A	263A	257A
Location	170W090S	150W085S	150W085S	150W085S
Type of Material	30 (S.Palaeo)	00(?)	2a (H.B.L.)	2a
Weight	0.42	0.56	29.75	0.88
Length	1.10	1.10	5.30	1.95
Width	1.05	1.43	4.70	1.00
Thickness	0.28	0.35	1.00	0.51
Wear Location and Angle	left length = 1.00 angle = 85^0 proximal L = 0.9 angle = 88^0		right length = 5.10 angle = 45^0 distal L. = 5.20 angle = 45^0	right length = .6 angle = 90^0 distal L. = 1.55 angle = 50^0
Type	step fractures	serrated edge	slight step fractures	step fractures
Comments	The edge angles and the associated wear suggest it was used in a scraping motion.		The lack of step fractures, the slightly serrated edge, and the relatively large size of the tool suggest that it was used as a knife.	The edge angles and the associated wear suggest it was used in a scraping motion.

FIGURE 58: UNIFACIAL TOOL No. 263A, STRATUM 1, ClIf-6.



BIFACIAL TOOLS

II:b(ii)-2 Point

One point derived from quartz was recovered from square 165W070S. Its weight is 1.35 gm. and it is 2.10 cm. long, 1.69 cm. wide and has a maximum thickness of 0.39 cm. There is little evidence of edge wear suggesting a lack of use.

II:b(iii) Pebble Core Tools

The pebble core tools are comprised of wedges, core fragments, cores and gouges.

II:b(iii)-1 Wedges

There was a total of nine wedges recovered from the site, and each is described in Table 97.

TABLE 97: VARIABLES RECORDED FOR WEDGES RECOVERED FROM THE MORRISON SITE, STRATUM 1.

RAW MATERIAL	WEIGHT			LENGTH			WIDTH			THICKNESS		
	N	$\bar{X}$	X^2	N	$\bar{X}$	X^2	N	$\bar{X}$	X^2	N	$\bar{X}$	X^2
Unknown	3	1.2	0.6	3	2.1	0.0	3	1.0		3	0.6	.0
H.B.L.	3	1.4	0.2	3	2.0	0.3	3	1.2	0.4	3	0.6	0.1
Southern Palaeozoic	1	0.5	0	1	1.5	0	1	1.5	0	1	0.3	0
Lake Superior Agate	2	1.4	0.1	2	2.3	0.1	2	1.3	0.1	2	0.6	0.1
Total	9	1.3	0.4	9	2.5	0.3	9	1.2	.3	9	0.5	0.1

II:b(iii)-2 Core Fragments

There were three core fragments recovered and each is described in Table 98.

TABLE 98: METRICAL DATA OF CORE FRAGMENTS, MORRISON SITE, STRATUM 1.

NO.	235A	13A	250A	$\bar{X}$	x^2
Location	155W085S	150W080S	150W085S		
Type of Material	2a	00	2a		
Weight	6.3	7.5	8.5	7.4	1.1
Length	3.1	4.3	3.2	3.5	0.6
Width	2.1	2.1	2.3	2.2	0.1
Thickness	0.8	0.8	1.0	0.8	0.1
Comments					

II:b(iii)-3 Cores

The two utilized cores are individually described in Table 99.

TABLE 99: METRICAL DATA OF UTILIZED CORES, MORRISON SITE, STRATUM 1.

NO.	320A	239A	$\bar{X}$	x^2
Location	175W075S	155W085S		
Type of Material	1a	2a		
Weight	45.5	5.3	25.4	28.4
Length	4.7	2.9	3.8	1.3
Width	3.8	1.8	2.8	1.4
Thickness	2.6	1.0	1.8	1.1
Comments				

B:I) <u>Rough Stone</u>

One piece of Greenstone was utilized:

L = 74.5 cm.
W = 40.5 "
T = 27.5 "
Wt.= 83.6 gm.

Flakes were removed from the side edges of the pyramid-shaped artifact to create a serrated edge.

STRATUM II

INTRODUCTION

Lithic remains in addition to other classes of artifacts from Stratum 2 were sparse. The entire lithic collection weighed 21.24 gm. Preliminary analysis indicates that Stratum 2 differs very little from either Stratum 1 or 3.

DESCRIPTION

A: CONCHOIDALLY FRACTURED MATERIAL

Table 100 illustrates the frequency distribution by weight of all conchoidally fractured material for Stratum 2.

TABLE 100: THE FREQUENCY DISTRIBUTION BY WEIGHT OF ALL CONCHOIDALLY FRACTURED ARTIFACTS RECOVERED FROM THE MORRISON SITE, STRATUM 2.

CLASSIFICATION	WT.	%
00) Unknown	3.7	17.5
1a) Quartzite	2.5	12.0
2a) H.B.L.	5.0	23.7
3) Southern Palaeozoic	3.5	16.7
3b) Scott Quarry	5.3	25.0
5a) Jasper Taconite	1.0	5.0
Total	21.2	99.9

There is an equal distribution between Northern Palaeozoic and Precambrian material to Southern Palaeozoic cherts.

GROUP I (DETRITUS) AND GROUP II (UTILIZED ARTIFACTS)

The conchoidally fractured specimens were divided into two groups--detrital material and utilized artifacts. The frequency distribution by weight of the specific lithic resources utilized is summarized in Table 101 for these two groups.

TABLE 101: THE FREQUENCY DISTRIBUTION BY WEIGHT OF RAW MATERIAL FOR DETRITAL AND UTILIZED ARTIFACTS FROM THE MORRISON SITE, STRATUM 2.

RAW MATERIAL

CLASSIFICATION

	00	1a	2a	3	3b	5a	Total
Detritus	3.7	0.0	1.9	1.2	5.3	0.0	12.1
%	17.5	0.0	9.0	5.9	25.0	0.0	57.4
Utilized	0.0	2.5	3.1	2.3	0.0	1.0	2.9
%	0.0	12.0	14.7	10.8	0.0	5.0	42.6
Total	3.7	2.5	5.0	3.5	5.3	1.0	21.0
%	17.5	12.0	23.7	16.7	25.0	5.0	100.0

The distribution is slightly skewed to the detrital category while the distribution between Southern Palaeozoic cherts and Northern Palaeozoic Precambrian material is almost equivalent. Most of the Southern Palaeozoic cherts were represented in the detrital categories.

GROUP 1: Detritus

Two distinctions based on artifact reduction were made--flakes and cores. The frequency distribution by weight for each group is summarized in Table 102.

TABLE 102: THE FREQUENCY DISTRIBUTION BY WEIGHT AND RAW MATERIAL FOR DETRITAL SPECIMENS FROM THE MORRISON SITE, STRATUM 2.

TYPE OF MATERIAL

CLASSIFICATION

	00	2a	3	3b	TOTAL
Flakes	0.5	0.0	0.7	0.5	1.1
%	4.4	0.0	6.5	4.5	15.4
Cores	3.1	1.9	0.4	4.7	10.1
%	26.1	15.7	3.8	39.0	84.6
Total	3.6	1.9	1.1	5.2	11.2
%	30.5	15.7	10.3	43.5	100.0

The distribution is dominated by core detritus and a majority of the material was derived from Southern Palaeozoic chert sources.

I:a) Flakes

I:a(ii) Secondary Flakes

The Secondary flakes were the only flake type recovered from the site including two flakes of unidentifiable chert weighing .54 grams and two flakes, one from a Southern Palaeozoic chert source and one from Scott Quarry, which weighed 0.79 gm. and 0.55 gm. respectively.

I:b) Cores

The core category was confined to shatter fragments, core fragments and exhausted cores.

I:b(i) Shatter Fragments

There were two shatter fragments. Number 298A weighed 0.45 grams and was derived from an unknown chert source, while number 294A weighed 0.64 gms. and was derived from a Southern Palaeozoic chert.

I:b(iv) Core Fragments

Two core fragments were recovered and each is individually described in Table 103.

TABLE 103: VARIABLES RECORDED FOR TWO CORE FRAGMENTS RECOVERED FROM THE MORRISON SITE, STRATUM 2.

NUMBER	294A	267A	$\bar{X}$	X^2
Location	150W085S	150W095S		
Length	2.7	3.4	3.0	0.4
Width	1.9	1.5	1.7	0.2
Thickness	0.9	1.0	0.9	0.1
Weight	2.7	4.7	3.7	1.4
Type of Material	00	3b		

I:b(vii) Exhausted Cores

One angular chert fragment (No. 593), exhibiting multidirectional flaking, was classified as an exhausted core. It weighed 1.92 gm. and was derived from H.B.L. chert. Maximum length, width, and thickness measurements are as follows: 1.6 mm. 2.0, 0.65 respectively.

II) Utilized Artifacts

The only utilized artifacts recovered were 4 unmodified flakes.

II;(i) Edge Deteriorated Flakes

Four edge deteriorated flakes are individually described in Table 104.

TABLE 104: VARIABLES RECORDED FOR FOUR EDGE DETERIORATED FLAKES FROM THE MORRISON SITE, STRATUM 2.

NUMBER	490A	293A	470A	268A	$\bar{X}$	x^2
Location	160W065S	150W085S	150W085S	150W085S		
Platform Thickness	0.4	0.6	0.2	0.5	0.4	0.1
Platform Angle	58	77	40	90	66	22
Length	1.9	2.3	1.4	2.2	1.9	0.4
Width	3.0	1.9	1.5	2.5	2.2	0.6
Thickness	0.4	0.6	0.5	0.6	0.5	0.1
Weight	2.3	2.5	1.0	3.1	2.2	0.8
Type of Material	30	1A	5A	2A		
Location of Wear						
right =	1.1	2.0	0.0	0.0	1.5	0.6
left =	0.0	0.0	0.6	0.0	0.6	0.0
distal=	0.0	0.0	0.0	1.5	1.5	0.0
proximal=	0.0	0.0	0.0	0.0	0.0	0.0
Angle of Wear	25	40	55	27	38	14
Type of Wear	marginal retouch	slight stepping	step fractures	marginal retouch		
Comments	The edge angle and type of wear suggest a cutting function.	The edge angle and type of wear suggest a scraping function.	The edge angle and type of wear suggest a scraping function.	The edge angle and type of wear suggest a cutting function.		

STRATUM 3

RAW MATERIAL

LOCALE

Ib) Quartz and Quartzites

Extensive use was not made of this local resource.

IMPORTED

NORTHERN PALAEOZOIC CHERTS

2a) Hudson Bay Lowland

The blue-grey pebble chert as well as the black-matte chert was present on the site.

3) Southern Palaeozoic Cherts

Four distinct chert types were recognized: Manitoulin Island, Scott Quarry, Campbell Quarry (all previously discussed), and Norwood Locality Chert.

3e) Norwood Locality

This white-grey alternate banded chert is derived from the Petoskey Formation in Michigan (See Map 5). The source location of this chert is near the Eastport Quarry which was utilized by the occupants of the Juntunen Site (McPherron 1967:124).

PRECAMBRIAN

5a) Jasper Taconite

Only a single flake of jasper taconite was recovered and because of its particular contextual setting may belong either to Stratum 1 or 2.

99) Thermally Altered Chert

A: Conchoidally Fractured Material

Table 105 illustrates the frequency distribution by weight of all conchoidally fractured material for Stratum 3.

TABLE 105: THE FREQUENCY DISTRIBUTION BY WEIGHT OF ALL CONCHOIDALLY FRACTURED MATERIAL RECOVERED FROM THE MORRISON SITE, STRATUM 3.

CLASSIFICATION	WEIGHT(gm)	%
00) Unknown	7.52	5.0
1a) Quartz and Quartzite	8.87	5.9
2a) H.B.L.	44.81	30.1
3) Southern Palaeozoic	33.66	22.6
3a) Manitoulin Island	4.06	2.7
3b) Scott Quarry	29.96	20.1
3e) Norwood Locality	2.71	1.8
3d) Campbell Quarry	14.29	9.6
5a) Jasper Taconite	0.83	0.6
99) Thermally Altered	2.40	1.6
TOTAL	149.11	100.0

The majority of the lithic material is comprised of imported cherts with an emphasis on Michigan cherts and to a lesser extent on Hudson Bay Lowland Chert.

GROUP I - DETRITUS AND GROUP II - UTILIZED ARTIFACTS

The conchoidally fractured specimens were again divided into two groups--detrital material and utilized artifacts. The frequency distribution by weight of the specifia lithic resources utilized is summarized in Table 106 for these two groups.

TABLE 106: THE FREQUENCY DISTRIBUTION BY WEIGHT OF RAW MATERIAL FOR DETRITAL AND UTILIZED ARTIFACTS FROM THE MORRISON SITE, STRATUM 3.

TYPE OF MATERIAL

CLASSIFICATION

	00	1a	2a	3	3a	3b	3d	3e	5a	99	TOTAL
Detritus	6.1	0.0	22.3	11.0	4.1	24.3	0.3	0.0	0.8	2.4	71.3
%	4.1	0.0	14.9	7.2	2.7	16.3	0.2	0.0	0.6	1.6	47.8
Utilized	1.4	8.9	22.5	22.7	0.0	5.7	14.0	2.7	0.0	0.0	77.9
%	1.0	5.9	15.1	15.2	0.0	3.8	9.4	1.8	0.0	0.0	52.2
Total	7.5	8.9	44.8	33.7	4.1	30.0	14.3	2.7	0.8	2.4	149.1
%	5.1	5.9	30.0	22.4	2.7	20.1	9.6	1.8	0.6	1.6	100.0

As in the previous site and strata analysis there is almost an even distribution between detritus and utilized material. Other then coincidence no explanation for this constant ratio presents itself.

A preference for Southern Palaeozoic cherts is manifested in this particular stratum.

GROUP I - Detritus

Two distinctions based on artifact reduction were made on the detrital material: flakes and cores. The frequency distribution by weight for each group is summarized in Table 107.

TABLE 107: THE FREQUENCY DISTRIBUTION BY WEIGHT OF RAW MATERIAL FOR DETRITUS FROM THE MORRISON SITE, STRATUM 3.

TYPE OF MATERIAL

CLASSIFICATION

	00	2a	3	3a	3b	3d	5a	99	TOTAL
Flakes	5.3	4.9	5.8	4.0	7.5	0.0	0.8	0.0	28.5
%	7.5	6.9	8.2	5.7	10.5	0.0	1.2	0.0	40.0
Cores	0.7	17.3	5.1	0.0	16.7	0.2	0.0	2.4	42.8
%	1.1	24.2	7.2	0.0	23.6	0.4	0.0	3.4	60.0
Total	6.0	22.2	10.1	4.0	24.2	0.2	0.8	2.4	71.3
%	8.6	31.3	15.4	5.7	24.1	0.4	1.2	3.4	100.0

Core detritus is more prominent than flake detritus. The majority of detrital material is comprised of Southern Palaeozoic cherts.

I:a Flakes

Flakes were divided into three types: pressure, secondary and primary percussion flakes.

I:a(i) Pressure

Since no specific analysis was carried out on this particular category only number, weight and type of material were recorded, the details of which are tabulated in Table 108.

TABLE 108: THE DISTRIBUTION BY NUMBER, WEIGHT AND RAW MATERIAL OF PRESSURE FLAKES FOR THE MORRISON SITE, STRATUM 3.

	N	%	WT.	%	AV.WT.	TYPE OF MATERIAL
	34	87.2	3.42	84.7	0.1	00
	1	2.6	0.12	3.0	0.12	30
	2	5.1	0.28	6.9	0.14	3a
	2	5.1	0.22	5.4	0.11	3b
TOTAL	39	100	4.04	100.0	0.1	

I:a(ii) Secondary Flakes

Six variables including platform thickness, platform angle, maximum thickness, width (perpendicular to length), length (along the axis of percussion), and weight were measured to the nearest .01 cm. 1.0 degree and .01 gm. per flake. These variables however, were not comparatively analyzed because of the small sample size. Table 109 summarizes the total distribution both in terms of number, weight and raw material for this flake type.

TABLE 109: THE FREQUENCY DISTRIBUTION BY NUMBER, WEIGHT AND RAW MATERIAL OF SECONDARY FLAKES FOR THE MORRISON SITE, STRATUM 3.

	N	%	WT.	%	AV.WT.	TYPE OF MATERIAL
	6	27.3	1.90	14.4	0.32	00
	2	9.1	1.09	8.3	0.55	2a
	8	36.4	3.52	26.6	0.44	30
	2	9.1	3.78	28.7	1.89	3a
	2	9.1	2.09	15.8	1.05	3b
	2	9.1	0.83	6.3	0.42	5a
TOTAL	22	100.0	13.21	100.0	0.6	

I:a(iii) Primary Flakes

Those variables measured for secondary flakes were also measured for primary flakes; the small sample size mitigated against a comparative analysis between these two categories. Table 110 is a summary of the frequency distribution by number, weight and raw material for each flake.

TABLE 110: THE FREQUENCY DISTRIBUTION BY NUMBER, WEIGHT AND RAW MATERIAL OF PRIMARY FLAKES FOR THE MORRISON SITE, STRATUM 3.

	N	%	WT.	%	AV.WT.	TYPE OF MATERIAL
	3	50	3.81	34.0	1.27	2a
	1	16.7	2.22	19.8	2.22	30
	2	33.3	5.19	46.2	2.60	3b
TOTAL	6	100.0	11.22	100.0	1.87	

I:b) Cores

Included in the core group are shatter fragments, core fragments, exhausted cores and cores.

I:b(i) Shatter Fragments

Basically any fragments exhibiting angular structure and lacking any characteristics of a platform or bulb of percussion were classified as shatter fragments. No attributes other than number, weight and type of material were recorded in Table 111.

TABLE 111: THE FREQUENCY DISTRIBUTION OF SHATTER FRAGMENTS BY NUMBER, WEIGHT AND TYPE OF MATERIAL FOR THE MORRISON SITE, STRATUM 3.

	N	%	WT.	%	AV.WT.	TYPE OF MATERIAL
	3	16.7	.79	8.7	0.26	00
	5	27.8	1.98	21.7	0.40	2a
	6	33.3	5.14	56.3	0.86	30
	1	5.6	0.39	4.3	0.39	3b
	1	5.6	0.28	3.1	0.28	3d
	2	11.1	0.55	6.0	0.28	99
TOTAL	18	100.0	9.13	100.0	1.51	

I:b(iv) Core Fragments

There were four core fragments, three derived from Scott Quarry chert with the fourth being thermally altered. The variables measured are recorded in Table 112.

TABLE 112: THE VARIABLES RECORDED FOR CORE FRAGMENTS RECOVERD FROM THE MORRISON SITE, STRATUM 3

TYPE OF MATERIAL	WEIGHT			THICKNESS			WIDTH			LENGTH		
	N	$\overline{X}$	X^2	N	$\overline{X}$	X^2	N	$\overline{X}$	X^2	N	$\overline{X}$	X^2
SCOTT QUARRY	3	2.8	1.3	3	0.9	0.2	3	1.4	0.2	3	2.4	0.7
THERMALLY ALTERED	1	1.8	0.0	1	0.7	0.0	1	1.7	0.0	1	2.1	0
TOTAL	4	2.5	1.1	4	0.8	0.2	4	1.5	0.2	4	2.3	0.6

I:b(v) Cores

The two cores recovered from the site are described in Table 113.

TABLE 113: VARIABLES RECORDED FOR CORES FROM THE MORRISON SITE, STRATUM 3.

NO.	301A	180W	$\bar{X}$	X^2
Location	155W095S	150W095S		
Length	2.5	2.2	2.4	0.2
Width	2.4	3.0	2.7	0.4
Thickness	1.4	0.8	1.1	0.4
Weight	7.5	3.7	5.6	2.7
Material	2A (H.B.L.)	3b		
Comments	flakes removed continuously around the core body.			

I:b(vii) Exhausted Cores

Basic measurements were recorded in Table 114 for five exhausted cores.

TABLE 114: VARIABLES RECORDED FOR EXHAUSTED CORES FROM THE MORRISON SITE, STRATUM 3.

TYPE OF MATERIAL	WEIGHT			THICKNESS			WIDTH			LENGTH		
	N	$\overline{X}$	X^2	N	$\overline{X}$	X^2	N	$\overline{X}$	X^2	N	$\overline{X}$	X^2
2a H.B.L.	3	2.5	0.6	3	0.8	0.1	3	1.4	0.4	3	2.0	0.2
SCOTT QUARRY	2	2.1	0.6	2	0.7	0.1	2	1.8	0.2	2	2.1	0.5
TOTAL	5	2.3	0.5	5	0.8	0.1	5	1.6	0.4	5	2.1	0.3

Group II

All artifacts displaying any signs of utilization are assigned to one of two categories: unmodified flakes and modified tools. The frequency distribution by weight of raw material for these two categories is summarized in Table 115.

TABLE 115: THE FREQUENCY DISTRIBUTION BY WEIGHT OF RAW MATERIAL OF UNMODIFIED FLAKES AND MODIFIED TOOLS FOR THE MORRISON SITE, STRATUM 3.

RAW MATERIAL

CLASSIFICATION

	00	1a	2a	3	3b	3d	3e	TOTAL
Unmodified	1.4	0.0	12.8	1.1	0.0	0.0	2.7	18.2
%	1.8	0.0	16.5	1.5	0.0	0.0	3.5	23.2
Modified	0.0	8.8	9.6	21.4	5.6	14.0	0.0	59.7
		11.4	12.4	27.6	7.3	18.0	0.0	76.7
Total	1.4	8.8	22.5	23.6	5.6	14.0	2.7	77.9
%	1.8	11.4	28.9	29.1	7.3	18.0	3.5	100.0

Approximately one-quarter of the tools utilized were edge deteriorated flakes which would indicate the importance of a cutting function at the site. This is a even distribution between Southern Palaeozoic cherts and Northern Palaeozoic/Precambrain material.

II:a(i) <u>Edge Deteriorated Flakes</u>

A total of seven flakes were recovered; all are characterized by marginal retouch, with an absence of step fractures. Table 116 is a summary distribution of the variables recorded for edge deteriorated flakes.

TABLE 116: VARIABLES RECORDED FOR EDGE DETERIORATED FLAKES FROM THE MORRISON SITE, STRATUM 3.

RAW MATERIALS	WEIGHT			PLATFORM THICKNESS			PLATFORM ANGLE			LENGTH			WIDTH		
	N	$\bar{X}$	X^2	N	$\bar{X}$	X^2	N	$\bar{X}$	X^2	N	$\bar{X}$	X^2	N	$\bar{X}$	X^2
Unknown	2	.7	.1	2	.4	.1	2	75	21	2	1.4	.3	2	1.6	.3
H.B.L.	3	4.3	3.1	2	.3	.1	2	48	4	3	2.8	1.4	3	2.8	.7
Southern Palaeozoic	1	1.2	0	1	.2	0	1	75	0	1	2.1	0	1	2.0	0
Norwood Locality	1	2.7	0	1	.2	0	1	70	0	1	1.6	0	1	2.4	0
Total	7	2.6	2.5	6	.31	.1	6	65	17	7	2.1	1.1	7	2.3	.7

RAW MATERIALS	THICKNESS			EDGE ANGLE			WEAR LENGTH RIGHT			LEFT			DISTAL			PROXIMAL		
	N	$\bar{X}$	X^2	N	$\bar{X}$	X^2	N	$\bar{X}$	X^2	N	$\bar{X}$	X^2	N	$\bar{X}$	X^2	N	$\bar{X}$	X^2
Unknown	2	.4	.1	2	25	7	0	0	0	1	0.6	0	2	.9	.6	0	0	0
H.B.L.	3	.6	.1	3	32	6	2	3.3	1.6	0	0	0	3	2.8	1.5	0	0	0
Southern Palaeozoic	1	.3	0	1	20	0	1	1.4	0	1	1.4	0	1	1.2	0	0	0	0
Norwood Locality	1	.7	0	1	35	0	1	1.4	0	1	.5	0	0	0	0	0	0	0
Total	7	.5	.2	7	29	7	4	2.4	1.4	3	.83	.49	6	1.9	1.4	0	0	0

II:b) Retouched Tools

Any utilized tool exhibiting shape modification was assigned to one of five types: bevelled flakes, unifacial tools, preforms-bifaces, points and core tools. Table 117 summarizes the frequency distribution of all modified tools by raw materials.

TABLE 117: THE FREQUENCY DISTRIBUTION BY WEIGHT AND RAW MATERIAL FOR MODIFIED TOOLS FROM THE MORRISON SITE, STRATUM 3.

RAW MATERIAL

CLASSIFICATION

	1a	2a	3	3b	3d	TOTAL
Bevelled	0.0	3.0	1.7	2.7	0.0	7.4
%	0.0	5.3	3.0	4.6	0.0	12.9
Unifacial	0.0	0.0	4.80	0.0	0.0	4.8
%	0.0	0.0	8.3	0.0	0.0	8.3
Core Tools	8.8	6.6	13.0	3.0	14.0	45.5
%	15.4	11.4	22.5	5.2	24.3	78.8
Total	8.8	9.6	21.4	5.7	14.0	57.7
%	15.4	16.8	37.2	9.8	24.3	100.0

The distribution is dominated by pebble-core tools with the majority of worked material derived from Southern Palaeozoic Cherts.

II:b(i)-1 Bevelled Flakes

Three end scrapers were recovered and each is individually described in Table 118.

TABLE 118: VARIABLES AND ATTRIBUTES RECORDED FOR END SCRAPERS FROM THE MORRISON SITE, STRATUM 3.

NUMBER	264A	366A	113A	$\overline{X}$	x^2
Location	155W095S	155W095S	150W095S		
Platform Thickness	0.0	0.0	0.0		
Platform Angle	0.0	0.0	0.0		
Thickness	0.5	0.7	0.9	0.7	0.2
Width	2.3	1.9	1.7	2.0	0.2
Length	2.5	1.2	1.7	1.8	0.6
Weight	2.6	1.7	3.0	2.4	0.6
Material	3b	3	2A		
Face: Length	1.9	0.8	1.9	1.5	0.6
Height	0.4	0.6	0.9	0.6	0.2
Angle	72°	68°	80°	73°	6.0
Radius	2.7	1.75	2.7	2.4	0.5
Arc°	60°	80°	60°	67°	12
Side Angle - right	75°	90°	60°	75°	15
- left	90°	90°	75°	85°	9
Type of Wear	continuous	none	focused		
Side Edge Wear - right	slight marginal retouch	none	none		
- left	slight marginal retouch	none	marginal retouch		
Dorsal Surface	platform thinning	platform snapped	thinned near platform area		
Ventral Surface	no scratch marks present.	no scratch marks present.	no scratch marks present.		

II:b(ii)-2 Unifacial Tools

There were two unifacial tools (See Figure 59) recovered and each is individually described in Table 119.

FIGURE 59: UNIFACIAL TOOL No. 326A, STRATUM 3, ClIf-6.

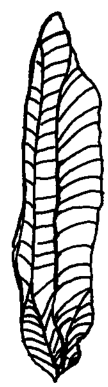


TABLE 119: DESCRIPTION OF TWO UNIFACIAL TOOLS FROM THE MORRISON SITE, STRATUM 3.

NUMBER		326A	394A	$\bar{X}$	X^2
Location		155W095S	150W085S		
Length		4.6	2.2	3.4	1.7
Width		1.1	1.1	1.1	0
Thickness		0.6	0.5	0.5	0
Weight		3.8	1.0	2.4	2.0
Material		3 (S.Palaeo)	3		
Wear: Type		continuous marginal re-touch	slight step fractures		
Length:	right	4.1	0.5.1		
	left	0.0	0.51		
Angle:	right	35°	28°		
	left		34°		
Comments		A blade tool effectively used as a knife.	Effectively used as a cutting tool.		

II:b(iii) Core Tools

Pebble-core tools were divided into four sub-types: wedges, core fragments, cores and gouges.

II:b(iii)-1 Wedges

Two wedges were recovered, one derived from H.B.L. chert and the other from Scott Quarry. The following data were obtained for each:

TABLE 120: METRICAL DATA OF TWO WEDGES FROM THE MORRISON SITE, STRATUM 3.

NUMBER	329A	178A	$\bar{X}$	X^2
Location	155W095S	150W095S		
Type of Material	2a	3b		
Weight	2.49	2.09	2.29	0.28
Length	1.17	2.4	1.79	0.87
Width	2.35	1.2	1.78	0.81
Thickness	0.68	0.91	0.80	0.16

II:b(iii)-2 Core Fragments

Four core fragments were recovered and each is described in the following manner.

TABLE 121: METRICAL DATA OF FOUR CORE FRAGMENTS FROM THE MORRISON SITE, STRATUM 3.

NUMBER	288A	328A	392A	389A	$\bar{X}$	X^2
Location	155W095S	155W095S	150W085S	150W085S		
Type of Material	30	3d	3B	1A		
Weight	2.60	14.01	0.92	2.0	4.88	6.12
Length	2.5	4.35	1.10	2.30	2.56	1.34
Width	1.55	3.05	1.70	1.25	1.89	0.8
Thickness	0.88	1.0	0.65	0.71	0.81	0.16

II:b(iii)-3 Utilized Cores

Two utilized cores were recovered from the site with the following characteristics recorded for each.

TABLE 122: METRICAL DATA FOR TWO UTILIZED CORES FROM THE MORRISON SITE, STRATUM 3.

NUMBER	502A	475A	$\bar{X}$	X^2
Location	150W075S	150W085S		
Weight	4.12	8.21	6.17	2.9
Length	3.25	3.00	3.13	0.17
Width	2.05	2.45	2.25	0.28
Thickness	0.80	1.0	0.9	0.14
Type	2A	3.0		

II:b(iii)-4 Gouge

One gouge derived from local quartzite was recovered and the following data were obtained.

NUMBER	389A
Location	150W085S
Weight	6.87
Length	3.00
Width	1.89
Thickness	1.03
Type	1A

LITHIC ANALYSIS OF THE MORRISON SITE (ClIf-6)

INTRODUCTION

The lithic components of the site are analyzed comparatively rather than individually because it is argued that the variability which exists between stratigraphic components represents two very important elements in Algonkian cultural evolution. The first is the very conservative nature of Algonkian culture. The second is relationship between Huron and Algonkian People.

Bonnichsen (1974:68) has deduced various levels or stages in which decisions are required for the completion of a finished tool. If comparisons are to be made, "specimens must reflect the same classes of information at all levels of organization in the decision model". Thus, those individuals who make the same decision at all levels of organization belong to a single group.

The samples from each component are small so that a valid statistical analysis for each decision involved in each of Bonnichsen's organizational levels is not possible. The analysis is, therefore, directed towards qualitative differences that occur on two decision levels: the selection of raw material, and how the materials were used.

The sample from Stratum 2 is qualitatively and quantitatively insignificant and will be omitted from the analysis.

SELECTION AND FUNCTION OF RAW MATERIAL

There are major qualitative and quantitative differences noted in the selection of raw material between Strata 1 and 3. This is believed to represent the range of resources available to a single cultural group as well as the incursion of Huron traders or immigrants.

The majority of the lithic material imported to the Morrison Site originated in Michigan while the remainder came from Manitoulin Island and various glacial tills located around Ontario. It is believed that the minor amounts of Lake Superior agate and jasper in Strata 1 and 3 originated in the eastern Lake Superior region but it is possible that both were derived from formations situated at the western end of Lake Superior.

The inhabitants of Strata 1 and 3 imported material from all of these areas but there are significant differences between the amounts of material utilized. In Stratum 1, there is a dominance of Northern Palaeozoic Chert and Precambrian quartzite and jasper taconite, while in Stratum 3 there is a preference for Southern Palaeozoic cherts.

The selection of Palaeozoic chert has not dramatically changed in 2000 years. The Initial Woodland occupants of the Michipicoten Harbour and Wawa Sites chose the same lithic sources on a qualitative basis. The difference, therefore, between Strata 1 and 3 is the utilization of quartz and quartzite.

To suggest the occupation of Stratum 1 by two distinct groups because of this difference is optimistic and when one includes the ceramic assemblage in this comparison the difference is striking. In Stratum 3, Palaeozoic cherts are associated with Michigan and Penninsular Woodland ceramics, while in Stratum 1, Palaeozoic cherts and quartzites are found in association with Penninsular Woodland and Northern Huron ceramics. If Palaeozoic chert and Algonkian ceramics are synonmous in the context of the site, it follows that quartzite and Huron ceramics are equivalent. On this basis it is inferred that Stratum 1 was occupied simultaneously by Hurons and Algonkians, while Stratum 3 was occupied by Algonkian speakers. This is corroborated to some extent by Noble's (1968:260) statement that quartz and quartzite tools characterize Northern Huron sites.

Stratum 1 has been tentatively dated at A.D. 1500 which is significant since it marks a beginning date of intense Huron-Algonkian contact that is established throughout Northern Ontario (Wright 1968:50). To establish what the relationship is between these two culturally distinct groups, attention will be focused upon the various seasonal activities.

It is argued that there is a nonfunctional difference between Strata 1 and 3 and this may imply that the Northern Huron were not traders but early immigrants preceding the great expulsion of 1650.

Even though comparisons are limited to small samples a degree of confidence is maintained for the two strata by the closeness of fit which exists for the artifacts. For example, eleven variables from edge deteriorated flakes were selected for comparison (See Table 123). It is assumed that differences which exist between strata will be reflected by differences which occur in the mean and standard deviation for some if not all the variables measured. Table 123 indicates that there is a close statistical agreement for most of variables measured with some difference occurring in the lengths of the worn edges. The wear variables can be expected to deviate considerably both within and between strata because of the numerous uncontrolled factors impinging on the lithic process. One such factor is whether the tool was held with the right or left hand.

TABLE 123: COMPARISON OF VARIABLES MEASURED FOR EDGE DETERIORATED FLAKES FROM THE MORRISON SITE.

	VARIABLES NUMBER	WEIGHT		PLATFORM THICKNESS		PLATFORM ANGLE	
		$\bar{X}$	X^2	$\bar{X}$	X^2	$\bar{X}$	X^2
Stratum 3	7	2.6	2.5	0.3	.1	65	17
Stratum 1	24	2.3	1.9	0.4	.1	73	37

	VARIABLES NUMBERS	LENGTH		WIDTH		THICKNESS	
		$\bar{X}$	X^2	$\bar{X}$	X^2	$\bar{X}$	X^2
Stratum 3	7	2.1	1.1	2.3	0.7	.5	.2
Stratum 1	24	2.4	1.1	2.0	0.5	.5	.2

	VARIABLES NUMBERS	EDGE ANGLE		WEAR LENGTH RIGHT		LEFT		DISTAL		PROXIMAL	
		$\bar{X}$	X^2	$\bar{X}$	X^2	$\bar{X}$	X^2	$\bar{X}$	X^2	$\bar{X}$	X^2
Stratum 3	7	29	7	2.4	1.4	0.8	0.5	1.9	1.4	0	0
Stratum 1	24	36	13	1.9	0.9	2.1	0.9	1.3	0.8	1.6	0

The similarity in design of utilized flakes for both populations correlates closely with the similarity in the type of wear. The wear is consistent and is characterized by small but continuous marginal flake scars. This suggests that there is no significant difference between strata for this tool type.

The only other tool category which allows for a comparison of variables is pebble-core tools. Although there are many sub-types (wedges, core fragments, and cores) all are grouped together since no functional difference can be discerned between each sub-type. The variation in functional attributes such as type of wear, angle of the working edge and size suggest a multiplicity of uses for all of the tools. On this basis it is expected that within the population large deviations from the mean will occur, while between populations the mean of each variable will be similar. As Table 124 illustrates, this is precisely the case.

TABLE 124: COMPARISON OF VARIABLES FOR PEBBLE CORE TOOLS FROM THE MORRISON SITE.

	VARIABLES	LENGTH		WIDTH		THICKNESS		WEIGHT	
	NUMBERS	$\bar{X}$	X^2	$\bar{X}$	X^2	$\bar{X}$	X^2	$\bar{X}$	X^2
Stratum 3	8	2.6	0.8	1.6	0.5	0.8	0.5	6.0	8.6
Stratum 1	14	2.5	0.5	2.0	0.2	0.8	0.1	4.6	1.5

This small thread of evidence implies a functional correlation between strata; however, the strength of the relationship is enhanced by the similarity in distribution among the various tool types.

The distribution of the various tools is plotted on a histogram (Figure 4) where the frequency of weight for each tool type is used as the measure, variable. Indeed, the similarity between strata is striking, especially, when compared with artifact distributions from the Wawa Site and Michipicoten Harbour Site. Both Strata 1 and 3 show a dominance of pebble-core tools, with a minor emphasis on edge deteriorated flakes.

In the Michipicoten Harbour Site, the collection of tools is dominated by unifacial tools while at the Wawa Site bifacial tools are preferred.

To what can the similarity in type and distribution of tools for Strata 1 and 3 be attributed?

In the case of both Laurel Sites, type and distribution of the tools was a function of the seasonal activities, and is assumed to be responsible for the resemblance of assemblages between strata. To explain the inventory of artifacts it is now necessary to demonstrate what these activities were and when they would be scheduled.

A subsistence strategy directed towards the exploitation of fur bearing animals is expressed by the dominance of mammal bones over all other faunal remains. The four fish bones, three from Stratum 1 and one from Stratum 3 place a seasonal restriction of spring to fall on their procurement. Thus fur bearing animals were chosen as the primary subsistence base but not to the exclusion of alternate food sources.

Are the activities which one associates with hunting reflected in the tool kit?

The pebble-core tools which dominate the tool types imply a number of functions such as gouging, chiselling, graving, and cutting (Wright 1968:18). These activities are related indirectly to the procurement of animals in the related processing fields, of working bone or wood to make implements or to fashion various leather goods.

This is an expected conclusion since the summer does not restrict a group to procurement-specific activities as is the case in winter but rather provides time in which general activities similar to those mentioned above, can be scheduled, allowing for the replenishment of supplies such as tools and clothing.

These activities which are consistent through time do not display any overt emphasis towards the growing importance of the fur trade. It is inferred, since both Huron and Algonkians are participating in the same types of activities recorded 200 years earlier by Algonkians in Stratum 3, that this represents a Huron acculturation process to an Algonkian lifestyle.

SUMMARY AND CONCLUSIONS

Located near the mouth of the Michipicoten River the Morrison Site (ClIf-6) overlooks the Michipicoten Site (ClIf-1)(Wright 1968) on the south bank of the river and the adjacent Nyman Site (ClIf-11)(Dawson 1977). Each of the three sites are stratified and it is believed that the sites if not occupied simultaneously were occupied seasonally by the same people.

Four separate components have been distinguished in the site analysis. The historic component has been dated to A.D. 1865 ± 20; Strata 1, 2 and 3 of the Terminal Woodland Period have been dated to A.D. 1600 ± 100, A.D. 1400 ± 50, A.D. 1300 ± 100 respectively. Comprehensive analysis was possible on Strata 1 and 3 because of the sizable samples. As noted in the previous site analysis seasonal activities centred around hearths and other features which would imply a nuclear or extended family grouping. A seasonal occupation from spring to fall is indicated by stratigraphic, faunal, ceramic and lithic evidence, and that a general procurement system was pursued.

Strata 1 and 3 demonstrate two very important elements in Algonkian development--its very conservative nature, and the Huron acculturation process to an Algonkian lifestyle.

SUMMARY AND CONCLUSIONS

Throughout the analysis of the Michipicoten Harbour, the Wawa, and the Morrison Sites, several examples have established that a relationship exists between certain aspects of the material culture for all three sites. By assuming that the cause of this regularity reflects a single evolving Algonkian culture rather than different cultural groups, the following comparisons illustrate a high degree of cultural conservatism, a dynamic interacting cultural system and a seasonal round among Algonkian people.

For comparisons that display a high degree of cultural conservatism, it is necessary to demonstrate alternative modes of actions, whereupon the acceptance of only one choice over a number of others that are equally pausible through time is presumed to be the defining characteristic of a conservative cultural tradition. There are, however, a number of problems that tend to obscure the decision making process. For example, constraints are placed on the amount of temper that can be added to clay. Similarily in bifacial reduction a number of parameters-angle, impactor, force - are dependent upon the fracturing properties of the material.

In addition, the small artifact samples which characterize most Algonkian sites add another crease to the already incomplete picture since statistical analysis need not be an important comparative technique. The argument for a conservative tradition rests upon the number of qualitative and not necessarily quantitative similarities made.

Further, changes can be expected to occur through time. The causes of these changes are innumerable but all demonstrate the adaptability of Algonkian culture. These changes are realized in the material culture when it is demonstrated that a new course of action is preferred over an established tradition.

To this end the following comparisons of the material culture argue for a conservative Algonkian culture as well as a dynamic interacting cultural system.

CERAMICS

Throughout the manufacture of a ceramic container an empirical understanding of the processes involved is necessary for the successful completion of a vessel. The potter must be familiar with the properties of both clay and temper, critical temperatures in drying and firing and must possess the skill to combine both artistic ability and creative ingeniuty under the rubric of a known design.

A chemical analysis (X-ray florescence) of the ceramics has proven that the initial potters of the Michipicoten area chose a source of clay that was near the sites, while the Terminal Woodland potters selected a clay some distance away from the Michipicoten River mouth.

Although the evidence does not overwhelmingly allow for the specific pattern to be generalized over time and across space, the change which has occurred may suggest the following: the early dates of 740 B.C. and 535 B.C. for the two Laurel Sites (Michipicoten Harbour and Wawa) suggest that ceramic technology was a recently acquired trait of the people inhabiting the Michipicoten Area. If this is the case, then known sources of excellent clays would be undiscovered as yet thereby forcing the potters to use whatever clays were available. Second, once an excellent source of clay was discovered, there is no apparent reason why it would not be acted upon by all potters who so desired.

By similar chemical analysis (X-ray diffraction) of the temper, if was inferred that local deposits of beach sand were used. This is hardly surprising considering the pragmatic characteristic of the material for temper. The interesting feature in its utility is the selection of only some of the constituent minerals. Both quartzite and the feldspathic minerals, microcline and plagioclase, were selected, but biotite and magnetite were consistently discarded. It is suggested that the thermal expansion properties of biotite and magnetite's similar appearance to biotite were the criteria in excluding these minerals as tempering agents. Was this knowledge passed on by tradition or was the selection the result of independent empirical tests? The former answer is more convincing, not only for simplicity in explanation, but also it helps explain why the mineral microcline is preferred over plagioclase even though plagioclase is more substantial in the fluvial and aeolian deposits.

Once the ratio of clay to temper was decided upon, the next step is to form or mould the vessel to a preconceived design. Ethnographically there are a number of fabrication techniques known, but at Michipicoten, the only technique practised was paddle and anvil.

The final phase in vessel construction is the firing stage. What is interesting in the Michipicoten kiln operations is that a majority of the vessels were fired in an inverted position. No apparent advantage can be singled out to explain why these vessels were so fired.

One pragmatic reason may be that the nipple-based early Laurel vessels necessitated the use of the inverted position because of problems in firing such as balance, and that the orifice would distribute the weight of the conical vessel evenly without collapsing. In this manner the round bottomed vessels of the Terminal Woodland era, which could have been fired vertically, support the contention of a continuity of culture in that the firing procedure was practised in the form of a ritual or habit.

It is interesting to speculate why the morphology changed from the nipple based Laurel vessels to the round bottomed Terminal Woodland vessels. Many factors may have contributed to the change but it is reasoned that the two most important are function and design mechanics.

Various experiments have been conducted on the encrustations found on the interior surfaces on the pots by Dr. B. Trevor-Deutsch, and C.M. Young, Laurentian University. They (personal communication) have concluded that vegetal remains such as seeds and fibrous plant material, and possibly faunal remains were the constituent components of the carbonized material. Very simply, those vessels bearing encrustations were used in cooking a stew.

The advantage of cooking a stew in a round bottomed vessel as opposed to conical vessels, aside from an increase in volume, is the 'broiler effect'. A movement is created when heat is applied, so that there is a constant circulation of the contents around the globular interior surface of the vessel. The net result of this circulation is a gruel that is palatable.

LITHICS

Lithic Tool-making has been a universal characteristic of man and it is interesting to see how groups of people faced with differing problems in survival arrive at different procedures in manufacturing stone tools. By isolating the steps involved in this lithic process, comparisons can be made that will allow for the archaeological establishemnt of cultural groups and provide a framework within which changes can be monitored. To this end Bonnichsen (1974) has outlined four cognitive levels at which the lithic artisan must make several decisions. A similar procedure has been followed in this manuscript, but is limited to three levels of decision: the selection of raw materials, technology and function.

For the most part the selection of raw material is directed towards Palaeozoic Cherts. The chert deposits are not available locally and are probably lodged a minimum distance of 100 miles away from Michipicoten by water. Leisure time and mobility characterized Algonkian life during the appropriate seasons so that this distance would present no significant problems in the acquistion of the needed supplies.

The types of chert that were selected are subdivided into two categories-Northern and Southern Palaeozoic cherts. The Northern Palaeozoic Cherts are referred to as Hudson Bay Lowland Chert and are distributed in Ontario in various glacial tills. These cherts were originally derived from the Severn, Ekwan and Stooping River Formations. Descriptively the chert covers the spectrum in terms of colour, inclusions and lustre. It varies in size, as well, from boulder to pebble, with primary utilization centring around the pebble-cobble range.

The Southern Palaeozoic cherts are derived from Fossil Hill, Cordell, Bayport and Dundee Formations with outcrops extending from Northern Michigan to Manitoulin Island. Identification of these chert types is facilitated to some extent by macroscopic characteristics. It must be cautioned though that these traits range from distinctive to obscure and that a large comparative sample is necessary for positive identification.

A pattern has been established in the utilization of the chert categories and is defined by the following: bifacial tools were derived from Southern Palaeozoic cherts while Northern Palaeozoic cherts were used in unifacial as well as bipolar-core tool production. Physical properties of the chert, such as size of the core and flaking characteristics would account for the pattern.

The manner in which the cores were reduced leads to Bonnichsen's second cognitive level--flaking technology. It concerns "the knapper's articulation of the input variables of force, impactor, holding position and the materials shape and torque".

The steps involved in core reduction were limited to two techniques: bipolar and freehand percussion. Bipolar percussion is necessary in reducing the small chert pebble-cobbles into a functional tool design. The pebble-core tools which are characterized by diametrically opposed crushed platforms can be utilized for such purposes as cutting, graving, gouging or incising. Although small sample sizes mitigated against any reliable statistical tests between sites, no attribute or variable could be discerned that would indicate technological differences between sites.

Freehand percussion, as the name implies, is striking a core or preform that is held in the hand with a billet or hammerstone. Tools manufactured by this technique are referred to as either unifaces or bifaces. In an effort to determine technological similarity between sites, a statistical analysis was conducted on bifacial flakes.

This class was isolated for analysis because the bifacial flakes have a high degree of technological input, theoretical principles can account for flake production and they usually occur in numbers large enough to permit statistical analysis. Unfortunately the tests were limited to the Initial Woodland Sites and it was concluded that within the limits of the analysis that there is no difference in terms of lithic technology for the Michipicoten Harbour and Wawa Sites.

Functional attributes have been for the most part largely neglected in report writing and yet subtle differences in a wear pattern may provide the necessary information to determine if a point, for example, had been used as a knife or a projectile.

Wear patterns, edge angles and lengths, and the overall design of the tool were the deciding factors in assigning a particular usage to a tool. Based on the type and frequency of tools various activities were inferred. For the Michipicoten Harbour Site skinning and tanning various leather goods were important activities, while for the Wawa Site, butchering a woodland caribou preoccupied the inhabitants. For Strata 1 and 3 of the Morrison Site it was inferred that the people were pursuing a general food procurement system. Since these activities were scheduled at different times of the year, by collapsing the time differential between the sites, a seasonal round can be proposed.

Ethnographic models of the Algonkians (Speck (1925), Jenness (1963), Rogers (1962) and Smith (1973), and Steinbring (1966), substantiate the archaeological record where overlay occurs, and provides the necessary information to fill the gaps not covered by the discrete cultural units.

Based on ethnographic and climatic evidence it is proposed that a small family group would return to the Michipicoten River Mouth area during the spring after wintering in an area outside the snow belt region (Map 1). The small number and size of the sites implies that the people's return was not consistent yearly, and it is presumed that they would have probably travelled to other river mouth locations. Subsistence during the late winter--early spring was directed towards game animals and plant foods. By spring time the small groups would have merged and camped near strategic locations on the river to take advantage of the fish runs. If these areas (falls, rapids, etc.) were near the river mouth, it is unlikely they would have moved, but the ecological potential of the river mouth was the motivating factor in selecting it as a summer campsite. At this time a general food procurement system was enacted. By August, however, the people's thoughts would have turned to the harsh realities of winter. To prepare for the extreme weather skins would have to be tanned and cured so that these furs could be fabricated into warm clothing and shelter. It appears that these activities were carried out by the nuclear family. No autumn sites have been delineated at Michipicoten. It is probable that the Algonkian People would have taken advantage of the fall rutting habits of the woodland caribou, moose or deer if a conflict arose between the large mammals and the fall fish spawns.

A change in Algonkian development is indicated by the presence of Iroquoian ceramic and lithic material from A.D. 1500 to A.D. 1700 at which time ceramic and lithic manufacture gradually is discontinued. Several factors may have initiated this Iroquoian incursion into an Algonkian area, but, it is suggested that initially, the northern Huron and Petun emigrated to Northern

Ontario and were acculturated into an Algonkian lifestyle. The argument is based on the following reasons:

1) the Northern Huron groups were motivated to disperse in the late 1500's from their homeland.
2) the artifacts recovered from the Terminal Woodland Sites are characteristic of both Algonkian and Iroquoian assemblages.
3) the activities delineated at these sites are similar to those practised centuries earlier by Algonkian People.

To understand why small groups of Huron and Petun were motivated to move, Noble (1968:315) states:

> Beginning in the late prehistoric the southern Huron of the Humber and Trent River Valleys moved into Northern Huronia. That this movement was not entirely peaceable or compatible is reflected in the use of cannibalism in the north during this period, and the traditional accounts of "cruel wars" between the Huron and Petun. Wright (1966:80) postulates that the incorporation of the southern Huron did not meet with the approval of all the northern Huron, with the result that the northern Huron Wolf and Deer clans separated to become the Petun Tribe.

The artifacts recovered from Northern Ontario Sites, such as Morrison, indicate that the incursion of Iroquois was initiated between the dates of A.D. 1500 - A.D. 1700 and is most readily identifiable with Northern Huron-Petun groups. This is based on the frequency of identifiable ceramic vessels and lithic detritus and tools. The ceramic vessels are assignable to various types, Lalonde High Collar, Black Neck, Ontario Horizontal that are traditionally recovered from Northern Huron Sites. Further, throughout two and a half millenia of lithic workmanship, Palaeozoic cherts were selectively utilized. Suddenly by A.D. 1600 quartz and quartzite dominate the materials employed. This change is attributed to Northern Huron men since quartz and quartzite characterize their lithic assemblage.

In comparing the tool types from Strata 1 and 3 of the Morrison Site, there was a striking similarity not only in the tools used but also in their frequency distribution. Both strata show a dominance of pebble-core tools, with a minor emphasis on edge-deteriorated flakes. Seasonal activities were assumed to be responsible for this correlation. This argument is strengthened by a similarity in faunal remains for both strata and further suggests that these activities, such as working bone or wood to make implements or to fashion various leather goods, were scheduled during the summer months. These activities which are consistent through time do not display any overt emphasis towards the growing importance of the fur trade. It is inferred since both Huron and Algonkians are participating in the same types of activities recorded 200 years earlier by Algonkians in Stratum 3, that this represents a Huron acculturation process to an Algonkian lifestyle.

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