SILPOT: A CLUSTER ANALYSIS STUDY OF POTTERY FROM SOUTHERN INDIAN LAKE, MANITOBA

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ABSTRACT

A review of the ceramic classifications now in use for the forest regions of central Canada shows archaeologists have emphasized categorization as the principle on which classes are defined. In this study of a sample of ceramic vessels from Southern Indian Lake, Manitoba, an alternative approach is proposed and implemented. The sample is investigated for taxonomic correlations of attributes in categories of morphological and decorative variation. Difficulties were encountered resulting from incompleteness of vessel reconstruction and analysis distortion caused by logical correlation and almost invariant valuation of some attributes. Cluster analysis procedures applied to the data were successful in recognizing groups in both categories of variation, but except in one instance, the results were not stable, suggesting additional analysis will be required to establish the nature of formal ceramic variation for the Late Prehistoric of the region.

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And now the question:"Mom, is Dad finished his thesis yet? Mom what's a thesis anyway?" can finally be answered: "It's a book and yes, at last he's really finished!" I dedicate this thesis to my wife, Leslie, and my children, P.B., Kate, and the Boo who lived with it for such a long time.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER I

INTRODUCTION

In all areas of North America where pottery forms a component of the archaeological record it has been the subject of intense study. Brew once said about the American Southwest:

> Largely because potsherds are relatively undestructible... and because they are such sensitive indicators of time and place, pottery has been described and analyzed more than all of the other products of prehistoric Southwestern arts and crafts put together (Brew 1946:245).

For the same reasons expressed by Brew, pottery recoveries from the forest regions of central Canada have been accorded a similar intensity of study which has resulted in a series of ceramic classifications used to ascertain geographical and temporal distributions of prehistoric populations. In more recent years several studies have appeared (Dawson 1973, 1977; Hlady 1970, 1971) which use pottery to distinguish among localized semi-autonomous hunting bands. There has been, as it will be shown in the following chapters, a one-sided approach in devising the ceramic classifications which forms the basis for these studies. As a consequence, archaeologists have a biased understanding of the nature of formal variation in ceramics from these areas.

In this study, an alternative to the conventional approach is described and implemented using a predominantly Late Woodland pottery sample from the Southern Indian Lake Region of northern Manitoba. The main objective is to ascertain if one or more classes of vessels can be found in recognized categories of formal ceramic variation.

Characteristics of vessel morphology and decoration were distinguished and analyzed independently using various methods of cluster analysis. These are multivariate mathematical techniques which generate classifications from measures of similarity among objects in a group. They attempt to operationalize a concept of "natural" classification, which is discussed in detail in Chapter III.

A number of difficulties were encountered in implementing this objective. Some of these resulted from the fact that no vessels were whole, and complete restorations have not been possible. Another source of difficulty arose from a necessity to modify the attribute lists after the data had been compiled. These problems will be elaborated upon in discussion of the analysis results.

In outline of the presentation to follow, Chapter II summarizes the regional environment and archaeology, and Chapter III analyzes the conventional approaches to ceramic classification and discusses an alternative. Details of the sample, data, and analytical methods are given in Chapter IV. Results and discussion of the analyses and the conclusions occupy Chapters V and VI.

CHAPTER II

SOUTHERN INDIAN LAKE: ENVIRONMENT AND ARCHAEOLOGY

The Southern Indian Lake region (Fig. 1) in north central Manitoba encompasses over 7000 km^2 of the Churchill River watershed from Leaf Rapids to Missi Falls and includes both Lake Opachuanau and Southern Indian Lake. Numerous small streams supplement the 4 major tributaries which join the Churchill as it flows to the northeast. Southern Indian and Opachuanau pool in shallow, narrow ice-scoured basins gouged from Precambrian Shield bedrock by Pleistocene glaciers. The mean depth of Southern Indian prior to flooding in 1975 was approximately 9 m and it attained a maximum depth of 37 m (Cleugh, Ayles and Baxter 1974). Opachuanau was slightly shallower. Elevation of the lakes was 254 m above sea level and ranged from 256 m in July to 253 m in February. The combined water area of both lakes was 2000 km^2 and shoreline distance nearly 3700 km. Before flooding there were approximately 1400 islands. Distance by water from Leaf Rapids to the north end of Southern Indian Lake is almost 200 km, and the lake is 25 km at its widest point.

The region has a Humid Microthermal Subarctic climate (Trewartha 1954) which is characterized by long cold winters and short cool summers. Twenty-two years of weather records kept at Brochet, 190 km northeast of Southern Indian Lake, show a mean annual temperature of -5.1°C; January and July monthly means range from -29.0°C to 15.3°C respectively (Beke, Veldhuis and Thie 1923:19-23). Mean annual precipitation is 426mm in a summer dominant pattern. A pollen diagram taken from Lynn Lake 150 km west of Southern Indian Lake (Nichols 1967) suggests that no significant climatic

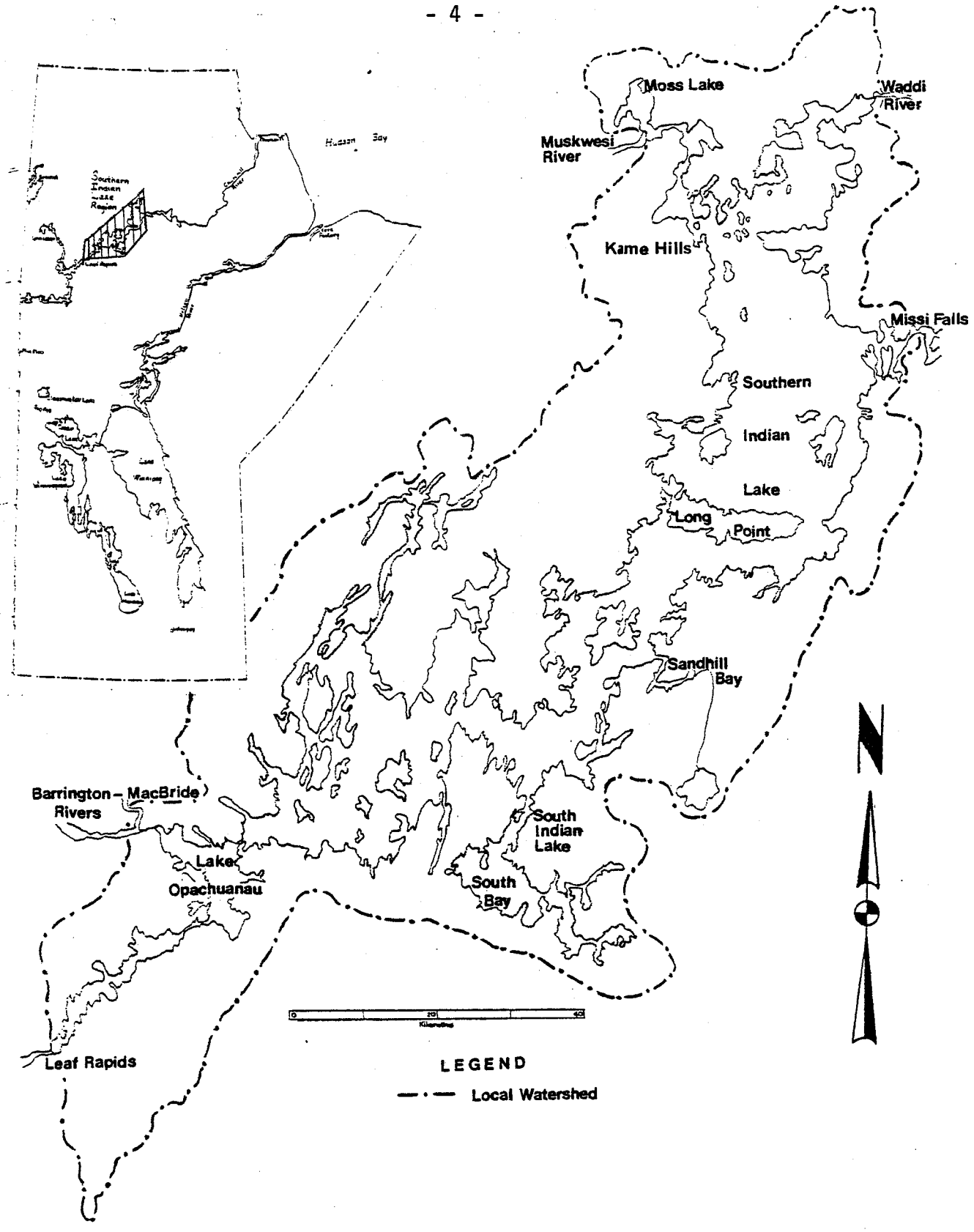

Fig. 1. The Southern Indian Lake Region

change has occurred since deglaciation, although there is evidence of episodic warming and cooling. Winter ice forms in sheltered bays about October 15 and covers the lakes by November 15, although there are a few places where open water leads remain throughout the entire winter (Penner 1974). Break-up starts about May 15 and is complete around June 15.

Geologically the region lies in the Churchill Province of the Canadian Shield (Davies and others 1962). This province is composed of Precambrian metamorphic and metasedimentary rocks. Outcrops consist of undifferentiated series of gneisses, granites, quartz, and related rocks. Quartz appears in the regional archaeological sites as the most common raw material for manufactured lithic tools. The region was covered by continental glaciers during much of the Pleistocene epoch. During the last advance the ice front is believed to have been approximately 300 km south of Southern Indian Lake (Falconer and others 1965). Upon deglaciation, beginning about 8000 years ago, the basin was inundated by a glacial lake (McInnes 1913; Elson 1967:39). Transformation of this lake, recently named Glacial Lake Churchill, into the present-day river basin lakes occurred about 6000 years ago (Ringrose: pers. comm.). Isostatic rebound has continued at decreasing rates since deglaciation and, as a consequence, Southern Indian has undergone changes in pool elevations and alterations of shoreline morphology, which in turn has had an effect on the preservation of archaeological sites in the region (Pettipas 1976:63-65).

The regional landscape is generally low in relief ranging between 250 m and 300 m above sea level (Manitoba Department of Mines, Resources and Environmental Management 1974). It includes Glacio-fluvial features such

as eskers and kames, together with calcareous clay till and lacustrine clay deposits. Soil development is slight. Cryic fibrisol, a near permanently frozen mat of decomposing coarse organic material accumulated on bedrock or mineral deposits, is the most widespread soil type. Cryic luvisols and brunisols also occur (Beke, Veldhuis, and Thie 1973:23-32; Clayton and others 1977). Brown (1970, Fig. 1) shows the region to be in the zone of discontinuous permafrost.

Two major forest types are found around Southern Indian Lake (Rowe 1972). In the south is found the Northern Coniferous forest, dominated by closed stands of black spruce. The Northwestern Transition, an open Black Spruce forest, dominates the north. This latter type, which characteristically includes some tundra plant species, represents an ecotone between the boreal forest and the tundra.

Of the 341 vascular plants native to the region (Ritchie 1962) 21 (Table 1) are known to have been used for food by native groups in the Upper Great Lakes (Yarnell 1964). Another 12 (Table 1) had other economic importance. Whether these plants were utilized prehistorically at Southern Indian remains to be fully documented. Hanna's (1975) report of the recovery of pin cherry seeds in a hearth with Late Woodland ceramics at SIL 257 can be considered indicative evidence.

Animal life is abundant but limited in variety. Modern inventories and checklists (Webb 1974, Hecky and Ayles 1974, Wrigley pers. com.) indicate there are some 25 species of ducks, swans, geese and loons, 3 species of grouse, 7 species of mammals, and 10 species of fish (Table 2) which are edible. The relative abundance of these animals can vary not

TABLE 1. Economic plant species of the Southern Indian Lake region; species after Ritchie (1962); use, season, and habitat after Yarnell (1964).

Species Name	Common Name	Use	Season	Habitat
Scripus validus	Great Bulrush	Tubers-starch food Stems-weaving	Autumn & early spring June-July	Shallow protected Littoral
Caltha palustris	Marsh Marigold, Cowslip	Edible greens	Late spring	Damp muskeg
Heracleum maximum	Cow Parsnip Masterwort	Greens & root food	Late spring/ early summer	Lake shore
Populus tremuloides	Quaking Aspen	Sap-syrup Bark/fiber-weaving, matting	Early summer	Upland Successional Forest
Fragaria virginiana	Wild Strawberry	Low food value fruit	Early summer (preservable)	Dry open Uplands
Nymphaea odorata	Pond Lily	Flowers Buds	Summer June - September	Protected Littoral
Maianthemum canadense	Two-Leaved Solomon's Seal	Berries	Summer	Clearings-Open forest
Ribes triste	Red Currant	Berries	July-August	Forest, muskeg
R. hudsonianum	Currant	Berries	July-August	Muskeg, rock slopes
R. oxyacanthoides	Northern Gooseberry	Berries	July-August	Low ground
Rubus pubescens	Dwarf Raspberry	Berries	July-August	Slope & rocky shores

TABLE 1. (continued)

Species Name	Common Name	Use	Season	Habitat
Rubus strigosis	Raspberry	Berries	July-August	Forest fringes Clearings, early fire succession
Prunus pensylvanica	Pin Cherry	Berries	July-August	Dry clearings, burns, openings
Vaccinium oxycoccos	Small Cranberry	Berries	August-winter	Sphagnum muskeg
Gaultheria hispidula	Creeping Snowberry	Berries	August-September	Mossy forest
Arctostaphylos uva-ursi	Bearberry	Berries	July-October	Exposed rock sand clearings
Cornus canadensis	Dwarf Cornel	Berries	August-October	Muskeg
Lathyrus palustris	Marsh Vetchling	Pea seeds	Late summer	Littoral marshes
Viburnum edule	Mooseberry	Berries	August-September	Forest
Empetrum nigrum	Black Crowberry	Berries	July-November	Open rock
Sagittaria cuneata	Arrowhead	Tuber-food Dried for winter	Late Autumn	Protected littoral
Ledum groenlandicum	Labrador Tea	Leaves-Beverage, Dye, medicine	Spring-Autumn	Muskeg

TABLE 1. (continued)

Species Name	Common Name	Use	Season	Habitat
Andromeda glaucophylla	Bog Rosemary	Leaves-beverage	Spring-Autumn	Muskeg
Abies balsamea	Balsalm Fir	Pitch	Early Summer	Well drained slopes
Larix laricina	Larch	Roots-sewing	Summer	Dry Uplands
Pinus banksiana	Jack Pine	Roots-sewing	Summer	Dry sandy uplands
Juniperus communis	Juniper	Bark-matting	Summer	Rocky soil
Typha latifolia	Cattail	Leaves-matting thatch	Summer	Marshes
Hierochloe odorata	Sweet Grass	sewing, weaving	Mid-July-September	Littoral
Salix interior	Sandbar Willow	weaving	Summer	Sandy beaches
Betula papyrifera	Paper Birch	Bark-canoes, containers	June-early July	Stream, lake muskeg borders
Urtica gracilis	Nettle	Fiber-sewing twine	August-September	Damp clearings

TABLE 2 . Utilizable animal species of the Southern Indian Lake region after Webb (1974), Wrigley (pers. comm.), and Ayles and Koshinsky (1974).

Resource Type	Species Name	Common Name	Use	Seasonality	Location
Water	*Gavia immer*	Common Loon	Food from meat and eggs	Summer and Fall; slight increase in density at staging for migration	Any sheltered inlet or shore area; particularly in the north end of South Indian Lake
	Branta canadensis	Canada Goose			
	Anas platyrhynchos	Mallard Duck			
	Anas rubripes	Black Duck			
	Anas acuta	Pintail Duck			
	Anas carolinensis	Green-winged Teal			
	Anas discors	Blue-winged Teal			
	Mareca americana	American Widgeon			
	Spatula clypeata	Shoveler			
	Aythya collaris	Ring-necked Duck			
	Aythya affinis	Lesser Scaup			
	Bucephala clangula	Common Goldeye			
	Bucephala albeola	Buffelhead			
	Melanitta deglandi	White-winged Scoter			
	Melanitta perspicillata	Surf Scoter			
	Mergus merganser	Common Merganser			

TABLE 2 . (continued)

Resource Type	Species Name	Common Name	Use	Seasonality	Location
	Larus argentatus	Herring Gull	Eggs	Summer	Open Lake Islands
	Larus philadelphia	Bonaparte's Gull			
	Sterna hirundo	Common Tern			
Land Birds	*Canachites canadensis*	Spruce Grouse	Meat	Year Round	Any forest area
	Bonasa umbellus	Ruffed Grouse			
	Pedioecetes phasianellus	Sharp-tailed Grouse			
Land Mammals	*Rangifer tarandus*	Barrenground Caribou	Multiple: Food, clothing shelter covers, bone & antler tools	Nov. & early Dec.	Open forests, northwest region
	Alces alces	Moose		Year round	Throughout region (modern densities 0.5/mi^2)
	Euarctos americanus	Black Bear	Food, Clothing		Throughout region
	Lepus americanus	Hare	Food		
	Erethizon dorsatum	Porcupine			Southern range
	Castor canadensis	Beaver	Food and Fur		Throughout region, increased in south

TABLE 2. (continued)

Resource Type	Species Name	Common Name	Use	Seasonality	Location
	Ondatra zibethicus	Muskrat			Throughout region.
Fish	*Stizostedion viterum viterum*	Yellow Walleye	Food	Open water Peak at spawning in early spring	Lake and inlets, shallow streams during spawning
	Stizostedion canadensis	Sauger		Open water Peak densities spring spawn	Open lake
	Percia fluviatilis	Yellow Perch		Open water	Lake
	Esox lucius	Northern Pike			Inlets
	Hidon alosoides	Goldeye			Lake
	Catostomus catostomus	Longnose Sucker			Lake & inlets
	Catostomus commersoni	White Sucker			Lake & inlets
	Lota lota	Burbot			Deep water
	Coregonus clupeaformis	Lake Whitefish		Open water, Peak densities fall spawning	Lake & inlets Peak density north end spawning
	Coregonus artedii	Cisco		Open water	Lake & inlets

only seasonally but also in cycles over a period of years (Feit 1969). Evidence for use of some of these species during the prehistoric period comes from analysis of 3 faunal assemblages (Dickson 1975a:63-66, Hanna 1975:69-96). Species common to the 3 assemblages are caribou, moose, beaver, muskrat and northern pike.

Archaeological research in the last decade (Wright 1968; Dickson 1972, 1975a, 1975b; Hanna 1975; Kelly 1975; Wood 1975) shows a sequence of occupation ranging from the present day to perhaps 5000 B.C. Eight different cultural traditions are recognized for the prehistoric period which ends approximately A.D. 1700. Occupation appears to have been sporadic until the Late Prehistoric which is represented by Clearwater Lake Phase (Hlady 1970, 1971) materials. A few diagnostic artifacts mixed with Clearwater Lake materials in several sites are the main evidence for earlier occupation. Three of the recognized cultural traditions, Laurel, Blackduck and Clearwater Lake contain ceramics. Laurel (Stoltman 1973) has been dated at SIL54 to 1290 ± 150 B.P. (A.D. 660) (Dickson 1976:13).

Almost all of the 177 recorded sites have materials relating to the Clearwater Lake Phase. Sites range from a few waterworn potsherds and lithic tools collected along cobble or sand beaches to *in situ* material culture scatter stretching a thousand meters along the shore, and several hundred meters into the forest interior. On these sites the distribution of cultural materials is not uniform, but usually exhibits clumped patterns. Aside from the pottery most other artifacts are lithic tools and debris. Chipped tools include a variety of triangular

and side-notched projectile points, large biface knives, bifacially flaked adzes, uniface end scrapers, wedges, and a variety of utilized flakes. Also observed in some assemblages were granite cobbles with damaged ends suggesting their use as hammers or anvils. A few bone and antler tools including a harpoon or a lance point (Hanna 1975) have also been recovered. Evidence of cordage and netting is provided by the impressions on the ceramics. Hearths which are frequently associated with fire-cracked rock were the only features recorded.

Twelve radiocarbon dates have been obtained from bone and charcoal samples in association with Clearwater Lake materials (Dickson 1976). The earliest of these is 1010 ± 95 B.P. (A.D. 940) and the latest 300 ± 170 B.P. (A.D. 1650) suggesting an occupation span of about 7 centuries. Historical records researched by Wright (1968:20-21) indicate the residents of Southern Indian Lake at the time of first contacts with Anglo-Europeans in the early 1700's were a semi-isolated band of Cree calling themselves *mishinneppe*.

CHAPTER III

CONVENTIONAL CERAMIC CLASSIFICATION AND AN ALTERNATIVE APPROACH

To date Southern Indian Lake ceramics have been assigned to existing classifications (Wright 1968, Wiersum and Riddle 1971; Hanna 1975; Dickson 1972, 1975a). Four wares with associated types and subtypes are commonly recognized. The most frequently occurring of these is Winnipeg Fabric-impressed ware. MacNeish (1958) first recognized this ware in a sample of about 8,500 sherds recovered in surface collections and excavation of 9 sites in southeastern Manitoba. He considered it diagnostic of the Selkirk Focus which was inferred to represent late prehistoric and early historic Western Cree during a period commencing A.D. k350. The ware was characterized by crushed quartz or quartzite tempered pottery with poor paste consistency and laminated vessel walls. Surface finish was "marked by a series of small ovoid impressions, spaced fairly close together" (MacNeish 1958:163) and, frequently, smoothing of the surface after impressioning. Two methods were inferred to produce the impressions:

1. A babiche fabric was laid on a damp pot and pressed by hand.
2. A babiche fabric was wrapped around a paddle used to beat a damp pot.

Flat lips, out-flaring rims, accentuated right-angled necks, and squat sub-conical to globular bodies characterized vessel morphology.

Three types were differentiated within Winnipeg Fabric-impressed Ware: Alexander Fabric-impressed, Sturgeon Falls Fabric-impressed, and

Sturgeon Punctate. Alexander Fabric-impressed was defined as an undecorated type but with all the ware characteristics. Sturgeon Falls Fabric-impressed type exhibited cord-wrapped paddle edge decoration on the lip and upper rim. Decoration of the rim and upper neck with ovoid, crescentic, rectangular, or round punctates in 1 to 3 rows separated Sturgeon Punctate from the other 2 types. MacNeish observed that while all 3 types were found throughout the Late Prehistoric Period in southeastern Manitoba, the 6 components assigned by him to the Selkirk Focus exhibited a trend for Alexander Fabric-impressed to increase in frequency toward the Historic Period and Sturgeon Falls Fabric-impressed to diminish. Sturgeon Punctate exhibited no trend and in fact, MacNeish noted that this type was rare in southeastern Manitoba, but common in northern Manitoba and Saskatchewan. He also noted that Alexander Fabric-impressed appeared occasionally in northern Manitoba.

Hlady (1970:111-112) established an additional type, Clearwater Lake Punctate, within Winnipeg Fabric-impressed ware. At the same time the Grass River Fabric-impressed type was also described but was not included within Winnipeg Fabric-impressed ware (Hlady 1970:118-120). He later elevated this type to ware status (Hlady 1971:28-29). The Clearwater Lake Punctate type was established from the analysis of 2,013 sherds collected from the Clearwater Lake Site (UN-7) near The Pas, Manitoba. Characteristic of the type was a single row of punctates. Except for high incidences of non-flattened and decorated lips and crushed granite temper, the type description coincides with that of Winnipeg Fabric-impressed ware. Hlady (1971:17-18)

cited 2 reasons for establishing the type. Sturgeon Punctate was characterized as having 1 to 3 rows of punctation. MacNeish (1958:172-173) illustrated single row Sturgeon Punctate sherds but captioned them "aberrant". The second reason was the apparent restricted geographic distribution of the type. Hlady (1970:121) concluded that the Clearwater Lake Phase, of which the single row punctate pottery is diagnostic, represents a Woodland Cree occupation in northern Manitoba and Saskatchewan dating between A.D. 1200 to 1750.

Grass River Fabric-impressed was established on the basis of a sample of 733 sherds recovered from 4 sites found in the Lower Grass River and Upper Nelson River area of Manitoba (Hlady 1971:28). These ceramics are also decorated with a single row of punctates near the vessel rim like Clearwater Lake Punctate. The attribute distinguishing Grass River from Winnipeg Fabric-impressed is the treatment of the exterior vessel surface with a ribbed fabric resulting in a distinctive surface texture. Hlady (1970:117-120; 1971:28-29) considered Grass River Fabric-impressed ware/type diagnostic of the Grass River Phase discrete in geographical distribution from the Clearwater Lake Phase and Selkirk Focus. The Grass River Phase, he inferred, represented a movement to and occupation of north central Manitoba by Swampy Cree from A.D. 1500 to 1800.

Hlady extended his classifactory work of Clearwater Lake Fabric-impressed pottery by devising a series of modes based on certain decorative characteristics of the 312 rimsherds from the Clearwater Lake site. He defined the basic mode as: