

THE UNIVERSITY OF MANITOBA

THE ASCHKIBOKAHN SITE (FbMb-1) OF WEST-CENTRAL MANITOBA:

THE ROLE OF THE NORTHERN MARSH
IN THE SUBSISTENCE OF LATE WOODLAND PEOPLES.

by

Jan Signe Snortland-Coles

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES
IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE
OF MASTER OF ARTS

ANTHROPOLOGY DEPARTMENT

WINNIPEG, MANITOBA

April 1979

THE ASCHKIBOKAHN SITE (FbMb-1) OF WEST-CENTRAL MANITOBA:

THE ROLE OF THE NORTHERN MARSH

IN THE SUBSISTENCE OF LATE WOODLAND PEOPLES

BY

JAN SIGNE SNORTLAND-COLES

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

MASTER OF ARTS

© 1979

Permission has been granted to the LIBRARY OF THE UNIVERSITY OF MANITOBA to lend or sell copies of this dissertation, to the NATIONAL LIBRARY OF CANADA to microfilm this dissertation and to lend or sell copies of the film, and UNIVERSITY MICROFILMS to publish an abstract of this dissertation.

The author reserves other publication rights, and neither the dissertation nor extensive extracts from it may be printed or otherwise reproduced without the author's written permission.



ABSTRACT

This thesis seeks to 1) describe the excavated artifacts and features of the Aschkibokahn Site (FbMb-1); 2) examine the period and seasons of occupation of the site, and 3) present a hypothetical reconstruction of the subsistence activities of the inhabitants, including evaluation of the resource potential of the northern marsh habitat and the extent to which its resources were exploited at this site.

Ceramic and lithic artifacts were divided into morphological types, but bone tools, historic artifacts, and features were grouped into functional categories and briefly described. Radiocarbon dating of charcoal samples recovered from hearths, a projectile point chronology, and comparison of Aschkibokahn ceramics with wares from the stratified Smith Site were used to investigate the period of site occupation. The seasons of occupation and subsistence activities of the occupants were examined through comparison of a list of plant and animal foods, which were potentially seasonally available in four local habitats, with the faunal and floral remains preserved in the archaeological record.

Two ceramic wares, Blackduck and Duck Bay; primarily three projectile point types, Prairie Side-Notched, Plains Side-Notched and Plains Triangular; and a variety of drills, knives, and scrapers were recovered. Bone artifacts consisted mainly of tools associated with fishing or leather working, while historic artifacts were scarce and

generally of recent origin. A majority of features were hearths which produced carbon samples dating to the fifth and eleventh centuries. Analysis of the animal remains showed a reliance on moose, Spring spawning fish, and migratory birds for food. Few plant remains were found.

The site appears to have been occupied in the Spring, Fall, and possibly Summer during the Late Woodland Period. The occupants relied upon the open water and marsh habitats for food and harvested spawning fish and nesting birds during the Spring, and possibly moose, migratory birds, beaver, and whitefish in the Fall. Harvested fish were cleaned and then smoked and dried over the hearths, while moose were skinned, butchered, and their bones processed for grease.

ACKNOWLEDGEMENTS

The Duck Bay Project was funded by the Historic Resources Branch of the Department of Tourism, Recreation, and Cultural Affairs of the Province of Manitoba, and was administered by Leo Pettipas, who devoted many hours to insuring its success. This project would not have been possible without the assistance of a number of people. Margaret Hanna supervised the field work and directed the crew which was composed of Juliette Bell, Sherry Marcynuk, Audrey Tanasichuk, Rose Marie Dryden, Don Porter, Gordon Rowe (all Work Study students), Dennis Tellier (Work Study Tutor), Cliff Huot, Peter Walker, and Dana Mae Grainger. During laboratory analysis Peter Walker, Greg McClure, Brian Ross, and Leigh Hambly catalogued the recovered materials. Dana Mae Grainger analyzed the faunal remains, Don Slater the pollen, Richard Callaghan the seeds, John Pelleck, some of the lithic detritus, and Rose Mary Vyvyan measured bone tools. The artifacts were photographed by Peter Beech of the Department of Consumer, Cooperate and Internal Services, Province of Manitoba.

A special note of appreciation must be extended to my Thesis Advisor, Dr. C. Thomas Shay, and to my committee Dr. E. Leigh Syms and Dr. Gregory Monks, who provided words of criticism and encouragement. Leo Pettipas and Patricia Franke edited drafts of my thesis, for which I am thankful. Above all, I am truly grateful to my mother who typed and edited, and to my husband who understood and helped in every possible way.

TABLE OF CONTENTS

	Page
Abstract	iii
Acknowledgements	v
Table of Contents	vi
List of Tables	ix
List of Figures	xi
List of Plates	xii
 Chapter	
1. Introduction	1
Ecological Approach	1
The Setting	2
An Overview	3
2. The Site: Excavation and Sampling	5
Introduction	5
Excavation Strategy	6
Excavation Techniques	9
Faunal Material	10
Samples	11
Problems and Evaluation	12
3. Structure of the Site	13
Introduction	13
Stratigraphy	13
Features	14
Summary	22

Chapter	Page
4. Ceramics	24
Introduction	24
Duck Bay Ware	25
Summary of the Ware	28
Duck Bay Punctate Type	31
Duck Bay Decorated Lip	38
Blackduck Ware	40
Summary of the Ware	40
Comparison of the Wares	44
Miscellaneous Vessels	46
Ceramic Pipe Fragments	48
Spatial - Temporal Distribution	48
Summary and Discussion	58
5. Lithics	60
Introduction	60
Lithic Materials	62
Lithic Tools	64
Bifaces	64
Projectile Points	64
Drill Bases	72
Knives	72
Unifaces	73
End Scrapers	73
Side Scrapers	74
Utilized Flakes	74
Material	74
Size	74
Ground Stone	75
Distribution of Lithic Artifacts	75
6. Historic Artifacts and Bone Tools	83
Introduction	83
Historic Artifacts	83
Bone Tools	85
Distribution of Bone Tools	91
Summary	91
7. The Environmental Setting and Potential Resources	93
The Regional Environment	93
The Local Environment	97
Past Environments	102
Potential Resources	103
Seasonal Resource Exploitation	109
Short Term Resource Fluctuations	121
Summary	123

Chapter	Page
8. Plant and Animal Remains	126
Introduction	126
Methods	126
Results	129
Plant Remains	129
Animal Remains	129
Seasonal Indicators	135
Hypothetical Reconstruction of Procurement Activities.	139
Summary and Discussion	142
9. Summary and Conclusions	146
Recommendations for Further Work	149
Appendices	151
Literature Cited	271

LIST OF TABLES

Table	Description	Page
1.	Aschkibokahn Site Features	18
2.	Horizontal and Vertical Distribution of Features	23
3.	Ceramic Typology	25
4.	Surface Treatment Frequency and Vertical Distribution of Bodysherd Types	45
5.	Condition and Number of Analyzed Bodysherds	45
6.	Pipe Fragment Data	48
7.	Aschkibokahn Lithic Artifacts	61
8.	Lithic Materials Recovered in the Ochre River - Duck River Region and the Aschkibokahn Site	63
9.	Vertical Distribution of Lithic Artifacts	78
10.	Horizontal Distribution of Lithic Artifacts	80
11.	Horizontal Distribution of Historic Artifacts	84
12a.	Dimensions of Bone Awls	87
12b.	Dimensions of Bird Bone Beads and Tubes	87
13.	Horizontal Distribution of Bone Tools	92
14.	Vertical Distribution of Bone Tools	92
15.	Mammals of Major Importance Found in the Manitoba Lowlands and Their Habitat Preference	107
16.	Traditional Game Birds and Larger Non-Game Birds Breeding in the Lake Winnipegosis Area	110
17.	Seasonal Availability of a Sample of Resources Based Upon Species Behaviour and Ethnographic Accounts	114
18.	Spawning Schedule and Location	119
19.	Identification of Animal Remains	130
20.	Average Meat Yield of Aschkibokahn Species	134

List of Tables-Continued

<u>Table</u>	<u>Description</u>	<u>Page</u>
21.	Seasonal Availability of Exploited Resources Based Upon Species Behaviour and Ethnographic Accounts	137
22.	Hypothetical Reconstruction of Procurement Activities .	140

LIST OF FIGURES

Figure	Description	Page
1.	Contour Map of the Aschkibokahn Site (FbMb-1), West-Central Manitoba	8
2.	Stratigraphy of the Aschkibokahn Site (FbMb-1), East and West Wall Profile of Unit 14N8W	16
3.	Profile of Features 3 and 4	20
4.	An Illustration of Terms Used to Designate Portions of a Vessel	30
5.	Lip Shapes	33
6.	Ceramic Modes	36
7.	Horizontal Distribution of Vessel Frequency Per Excavation Unit	50
8.	Graphs of the Vertical Distribution of Wares in the Aschkibokahn Site	53
9.	Distribution of Duck Bay and Blackduck Wares	55
10.	Utilized Flakes Descriptive Statistics and Size Frequency Histogram.	77
11.	Biotic Communities of Manitoba	96
12.	Aschkibokahn Island and Surrounding Terrain	99
13.	Schematic Drawing of Habitats Around the Site	101
14.	Seasonal Exploitation Cycles	113

LIST OF PLATES

Plate	Description	Page
1.	View of the Site	188
2.	Aerial Photo of the Aschkibokahn Site	190
3.	Crew Laying a Grid Over the Study Area	192
4.	Crew Waterscreening	194
5.	Sampling Units Used in the Recovery of Macrofossils	196
6.	East Wall Profile of Unit 14N8W	198
7.	North Wall Profile of Unit 10N22W	200
8.	North-South Profile of Feature 4, a Hearth in Unit 14N8W	202
9.	Planview of Feature 6 in Unit 22N22W	204
10.	Type A, Mode 1 Rims. Rim Profiles are Stylized	206
11.	Type A, Mode 1 Rims	208
12.	Type A, Mode 2 Rims	210
13.	Type A, Mode 2 Rims	212
14.	Type A, Modes 3 - 5 Rims	214
15.	Type B, Mode 6 Rims	216
16.	Type B, Mode 7 Rims	218
17.	Type B, Mode 8 Rims	220
18.	Type B, Mode 9 Rims	222
19.	Five of Evans' Types of Blackduck Ware	224
20.	Blackduck Ware, Modes "A"(D), "C"(C), "D"(B), "E"(A)	226
21.	Blackduck Ware, Mode B Rim	228
22.	Miscellaneous Vessels	230
23.	Miscellaneous Vessels	232

LIST OF PLATES-Continued

Plate	Description	Page
24.	Clay Pipe Fragments	234
25.	Projectile Points	236
26.	Projectile Point Tips	238
27.	Drill Bases	240
28.	Knives	242
29.	Scrapers	244
30.	Ground Stone	246
31.	Cast Whitemetal Button, <i>circa</i> 1750-1812	248
32.	Bone Awls	250
33.	Bird Bone Beads or Tubes	252
34.	Bird Bone Tube with Scalloped Edge	254
35.	Bone Chisels, Spatula, and Miscellaneous Bone Tools	256
36.	Antler Handles	258
37.	Antler Harpoons	260
38.	Bone Needles or Leister Tines	262
39.	Bone Wedge.	264
40.	Unidentified Bone Tool	266
41.	Articulated Fish Rays. Small Arrow Points to the Subject	268
42.	Bone and Pottery Concentration	270

1. INTRODUCTION

The purpose of this thesis is threefold: 1) to describe the excavated artifacts and features of the Aschkibokahn Site (FbMb-1); 2) to examine the period and seasons of occupation of the site, and 3) to present a hypothetical reconstruction of the subsistence activities of the inhabitants, including evaluation of the resource potential of a northern marsh habitat and the extent to which its resources were exploited at this site.

Ecological Approach

The general approach used is cultural ecology, which examines the place of human populations within their environment. As Cleland (1966) has suggested, "To understand culture we must investigate it in an environmental matrix viewing both external stimuli and the adaptive responses which they invoke" (p.1). This is not a new or novel approach. Several researchers working in a variety of geographical areas and environments have used it, such as Vayda and Rappaport (1967), Rappaport (1969), and Shay (1971). Extensive archaeological projects utilizing this approach have been undertaken by Struever and Flannery. Struever (1968b), in particular, has developed models that seek to explain changes in Early and Middle Woodland subsistence systems in the Lower Illinois Valley. In Mesoamerica Flannery and Coe (1968) and Flannery (1968, 1971, 1976) have applied systems theory to the study of early prehistoric periods.

Recently Syms (1976, 1977) has developed the Co-Influence Sphere

Model to explain prehistoric ceramic variability in Southwestern Manitoba. In contrast to the Chronological Model previously utilized in Manitoba, the Co-Influence Sphere Model is a dynamic model in which core, secondary, and tertiary subsistence-settlement areas are defined for groups. In this study relevant variables used for interpreting the region are defined. These include "mobility of populations, resource potential fluctuations, environmental change, trade, and the impact of cultural changes in nearby areas" (Syms 1977:1). Syms' (1976, 1977) model provides direction for ecological studies in Manitoba and surrounding regions. It gives a broad review of the culture history and environment of the area. Using Syms' overview, this thesis will examine one site in its ecological setting.

The Setting

Syms (1976, 1977) has explored the seasonal resource potential of the prairies and forests of Southwestern Manitoba. The study area of this thesis lies farther north and east of Syms' research area. The Aschkibokahn Site is situated in the Manitoba Lowlands, a poorly drained forested area dominated by three large shallow lakes lying in a transition zone between the Southern Boreal Forest to the north and the Aspen Parkland to the south (Rowe 1972). Potential plant and animal resources in this area fluctuate seasonally and annually due to factors such as climatic change and migration (Syms 1977:2). For example, resource potential in the Aspen Parkland was high in the spring, autumn and winter, but low in the summer (ibid.). Certain historic peoples of Manitoba exploited the two major biomes and the intervening ecotone on a cyclical basis following seasonally changing resources (Ray 1974).

Other groups, such as the Cree and Ojibwa, remained within a single biome exploiting a variety of habitats (Syms 1976:41).

Many historic groups occupied parts of Manitoba as core, secondary, or tertiary areas. These include the Assiniboine, Plains Bungi, Sioux, Hidatsa, Mandan, Cheyenne, Suhtai, Ponca, Omaha, Santee, Western Cree, and Western Ojibwa (Saulteaux or Chippewa) (ibid.:39-41). "Fifteen components, horizons, and other archaeological expressions, representing possibly fourteen different groups, are known from Manitoba during The Late Woodland Stage" (ibid.:141).

An Overview

The Aschkibokahn Site is important for a variety of reasons. First, it is located in a region whose prehistory is relatively unknown, and it is surrounded by a marsh, a potentially rich but underestimated habitat. Secondly, preservation of animal bones in the site is unusually good. Finally, the site contains a concentration of Duck Bay ceramics, a ware which previously has been found only in small quantities and been given limited consideration.

The following chapters describe the excavation and analysis of the Aschkibokahn Site and explore the possible ways in which the environment was exploited. This thesis begins by discussing the location of the site and techniques used in excavation and analysis (Chap. 2), and examines the structure of the site including its stratigraphy and features (Chap. 3). The next three chapters describe the ceramic, lithic, bone and historic artifacts recovered from the site. In Chapter 7 the past and present regional and local environments are described and the resource potential of each habitat assessed with emphasis placed upon the previously underestimated marsh habitat.

This chapter is located near the end in order to compare data with the following chapter in which the list of potential resources and their seasons of availability are compared with archaeological evidence of plant and animal foods harvested and processed at the site. This comparative data and the recovered tool assemblage are then used to build a hypothetical reconstruction of resource procurement activities which occurred at the site.

2. THE SITE: EXCAVATION AND SAMPLING

Introduction

The site is located in Township 37 north and Range 21 east in the NE $\frac{1}{4}$ NE $\frac{1}{4}$ NE $\frac{1}{4}$ of Section 13 and the SE $\frac{1}{4}$ SE $\frac{1}{4}$ SE $\frac{1}{4}$ of Section 24. It is on Aschikibokahn Island near Duck Bay, Manitoba, which is situated near the marshy western shore of Lake Winnipegosis in the Boreal Forest/Aspen Parkland Transition Zone in west-central Manitoba. The island is isolated from the mainland by the Drake River to the west, the Duck River on the south, and Lake Winnipegosis to the north and east (Fig. 1). The mouth of the Duck River is adjacent to the southeastern tip of the island, while the northwestern corner lies beside the mouth of the Drake River.

The island is small and measures approximately $\frac{1}{2}$ mile from east-west and 1 mile from north-south. The site extends over much, if not all, of the island (Hanna, personal communication 1978), but two concentrations are apparent: one at the northern end and a larger one which covers the southern tip. During the summer of 1976, excavations were limited to the southern area.

The site was first discovered in May of 1968 by Joe Robertson, President of the Dauphin Chapter of the Manitoba Archaeological Society. Portions of the site had been bulldozed by the Department of Mines, Resources and Environmental Management (Nicholson 1978:4). Construction activity had exposed a dense concentration of fish bone and artifacts. Mr. Robertson later returned to the site with the Dauphin Boy Scouts to

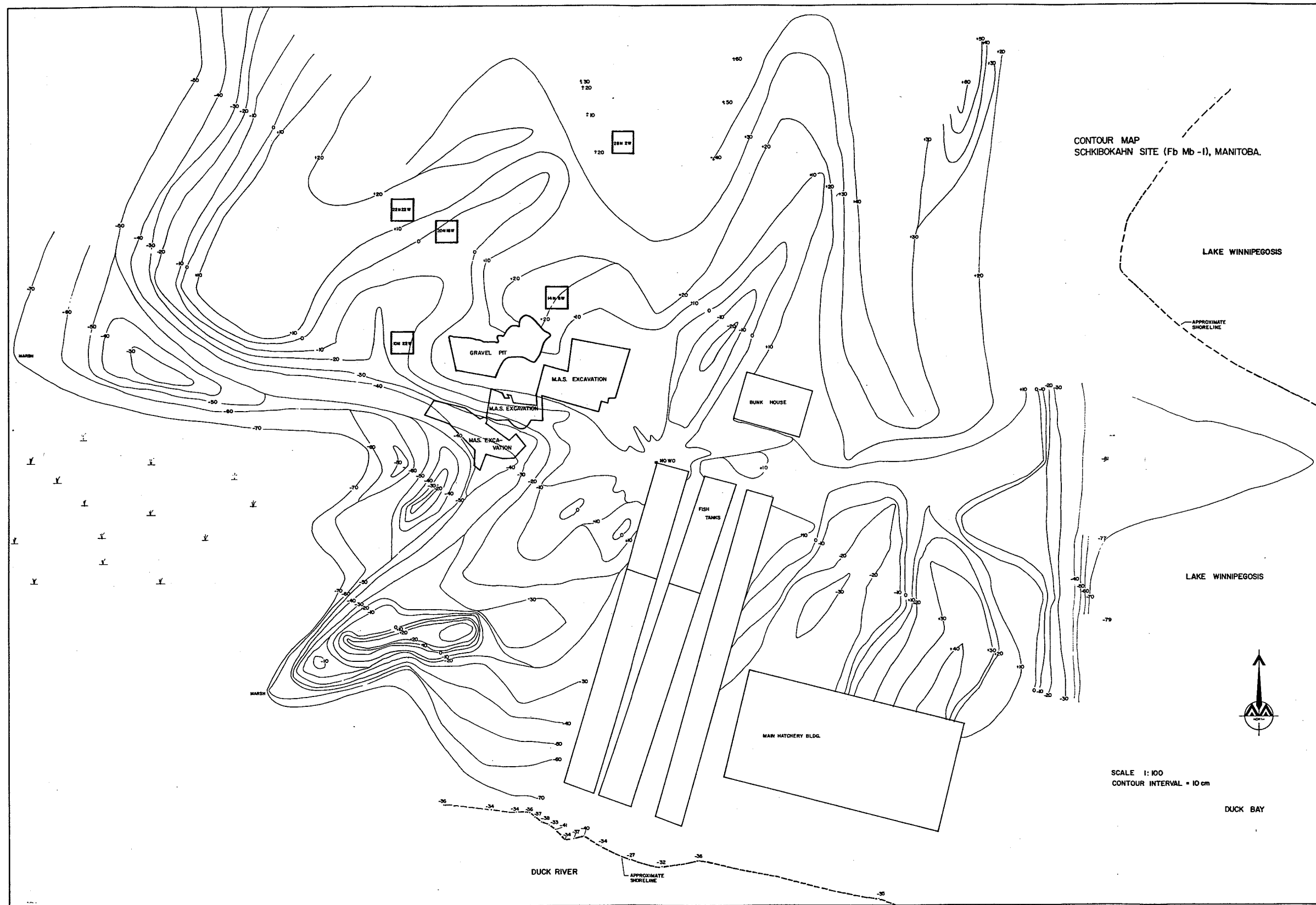
conduct salvage operations. During salvage, backdirt was screened through a 1" mesh screen. In general, fish bone was discarded, and only artifacts and a limited amount of faunal material were recovered. This operation was continued in 1971 and 1972 by the Dauphin Chapter of the Manitoba Archaeological Society and persisted until professional assistance was requested in 1975 (Joe Robertson personal communication, 1978).

In 1976, Margaret Hanna, then Anthropology Laboratory Supervisor at the University of Manitoba, was contracted by the Department of Tourism, Recreation, and Cultural Affairs of the Province of Manitoba to conduct archaeological investigations at the site. I was hired as Assistant Field Supervisor, and later received the contract for laboratory analysis of artifacts and plant and animal remains recovered during the 1976 field season.

Excavation Strategy

The 1976 season began with an attempt to define site boundaries. Surface survey provided little information because of dense vegetation which obscured the ground (Plate 1). Excavation of garbage pits, underground cooler, and tilling of a garden revealed artifacts and faunal material in every area, suggesting that the entire island was occupied. However, concentrations seemed to be most dense in the south near the Duck River. In defining the study area, all existing structures had to be avoided because of regulations of the Department of Mines, Resources and Environmental Management who maintain a hatchery on the island. Standing structures included the main hatchery building situated near the mouth of the Duck River, nine fish tanks west of the hatchery, a small bunkhouse (Fig. 1), and three privies north of the

Figure 1. Contour map of the Aschkibokahn Site (FbMb-1),
west-central Manitoba.



other buildings (Plate 2). The foundations of older structures no longer standing were also observed. Several burned buildings were found in the northern portion of the island. A central meadow in which we camped, contained the foundation of a log house, a fairly large depression, and a garbage pit containing recent (*circa* 1950) trash. Following the advice of local amateurs, combined with our own findings, the study area was designated to be in the meadow west of the hatchery buildings, south of the trees, east of the marsh, and as near the Duck River as possible (plate 2).

Using the northwestern corner of the western-most fish tank as datum, we laid a 30 x 30 m grid over the area (Plate 3). A 10% random sample was generated to determine the location of 2 x 2 m excavation units within the grid. Previous excavations and a large gravel pit within the grid area were eliminated from selection. Of the projected 10% sample, only five units were completed during the course of the summer; a total of 2.3%. These units were well separated, giving good overall coverage of the study area.

Excavation Techniques

Horizontal and vertical control was achieved using a variety of techniques. Units were troweled down in arbitrary 2 cm levels. At first each level of the 2 x 2 m units was subdivided into one hundred 20 x 20 cm subunits. These small subunits soon proved to be too time consuming as provenience or collecting units so were used only as a macrofossil sampling device. Thereafter levels were divided into twenty-five 40 x 40 cm subunits. These were numbered consecutively, starting at the south-east corner. Unidentifiable bone and other non-artifactual debris was recorded and packaged by the larger subunits.

All excavated soil from each subunit was screened separately whenever possible, soil was dry-screened through 1/16 inch hardware cloth. Wet soil was water-screened also through 1/16 inch mesh (Plate 4).

Data were recorded in a variety of ways. During excavation, all artifactual material discovered *in situ* was recorded in three dimensions using the southeast corner of the unit as datum. University of Manitoba excavation level forms were filled out by the excavator upon completion of every level, and information from features was recorded on university feature forms. At the completion of a unit, all walls were profiled and photographed.

Faunal Material

Faunal material received special consideration. Chaplin (1971:21) suggested that pre-excavation planning should consider the amount of on-site work requiring a faunal analyst, field routines and requirements, and include costs of faunal analysis in the budget. These guidelines were followed as closely as possible. First, Dana Mae Grainger, a faunal analyst, worked with us in the field and later identified a sample of bone. During excavation all identifiable bone, as designated by Ms. Grainger, was treated as if it were artifactual material. At first exact three dimensional provenience was recorded for every *in situ*, identifiable bone, and each bone was then placed in a protective vial, labeled, and tagged by subunit and level. In deeper levels where the quantity of bone increased, the recording of three dimensional provenience was discontinued and all specimens were bagged by subunit and level. Recovered fish scales were sealed in vials containing glycerine, to aid in preservation. The location of unidentifiable bone was recorded on a scattergram. The precision

devoted to material location was used later in reconstructing subsistence and defining activity areas.

Samples

Pollen

During excavation pollen samples were collected from each stratum of all excavated units. Samples were also taken from the bases of all hearths. Sampling consisted of scraping a fresh surface and then pushing a sterile glass vial into the designated stratum or hearth base. Each vial was then labeled, sealed and returned to the laboratory for processing. These samples were then correlated with the corresponding stratigraphic profile.

Macrofossils

Because of the importance of plant remains in this study, a concerted effort was made to recover botanical specimens. Flotation was used to achieve this aim. In our study, all feature fill and 10% of the level fill was floated. Each level of every unit was independently sampled. Ten of the one hundred 20 x 20 cm subunits were selected through the use of a table of random numbers. Corners of the ten subunits were pegged with nails, encircled with string, and the subunits were pedestalled (Plate 5). Upon completion of each level the matrix was collected and usually floated immediately. Those samples which were too wet to float were bagged and returned to the laboratory for processing. Floating in the field was similar to the process described by Struever (1968a). For those samples which were returned to the laboratory, a machine, as outlined by Watson (1976), was built. Those laboratory floated samples did not equal the

cleanliness of field floated samples, and the process proved more difficult and time consuming.

Problems and Evaluation

The major setback suffered during the field season was the weather. Working in a marsh can be damp enough in itself without continual drizzle. Much of June, when the crew was composed of five, saw virtually endless days of rain. With the arrival of additional crew members in July, the weather improved sufficiently to allow work under temporary shelters. August brought two weeks of sunshine and a flurry of activity, resulting in completion of the open units.

One major advantage and several disadvantages can be considered with regard to the excavation technique of dividing levels into one hundred subunits. Using small units such as these is useful in random sampling, but as a control technique it is clumsy and time consuming. A 20 x 20 cm subunit is too small to conveniently work in and requires considerable labeling and paperwork. Unless the excavator constantly measures distance north and west from datum, it is difficult to determine which subunit is actually being excavated. Quadrupling the size 40 x 40 cm proved more workable. This size proved successful in the latter part of the summer.

3. STRUCTURE OF THE SITE

Introduction

The stratigraphy of the Aschkibokahn Site was complex, and the features were lacking in distinct boundaries. A total of ten features were excavated, most of which were hearths or ash concentrations. Some of these were characterized by complex inner stratigraphy, and all contained little or no charcoal. The strata and features will be described and possible causes of their complexities discussed.

Stratigraphy

Collapsed stratigraphy (non-separation of cultural levels) and complex stratigraphy characterizes the Aschkibokahn Site. This problem is far from unique to this site, and indeed, may be a regional problem. Syms (1977) is careful to point out that the stacked chronology utilized by researchers in Manitoba, is based upon data from sites with slow soil accumulation.

The poor stratigraphy observed in this site probably may be attributed to three factors: slow soil development, repeated short term occupation, and natural disturbances. The most important agencies of deposition would have been through accumulation of cultural material, the development of marsh soils, and in low areas, the deposition of flood materials (C. T. Shay, personal communication. If occupations of the island were short in duration (seasonal) and repeated over many

years, cultural strata would be thin and poorly separated. This appears to be the case at Aschkibokahn. Soils probably were eroded by wave action on the lake side of the island but may have been deposited on the western and southern edges during the Spring floods.

Profiles which were drawn of every wall of every unit, differ in some aspect, and it was often difficult to connect strata from adjoining walls. Many strata are no more than lenses. Figure 2 displays east and west wall profiles from unit 14N8W, and Plate 6 is a photograph of the east profile. In general, stratigraphy can be described as follows: I) sod (2-4 cm surface depth), II) dark humus (6-10 cm S.D.), III) leached loam, sand, and cultural material, IV) sand lens, and V) gravel. Natural levels III-V vary in depth and thickness to such a degree that averages hold little meaning. Cultural material was sparse in natural levels I and II, dense in III, sparse in IV, and nearly non-existent in V. In some units, such as 10N22W, only three natural levels could be defined: I) sod, II) humus, and V) gravel (Plate 7).

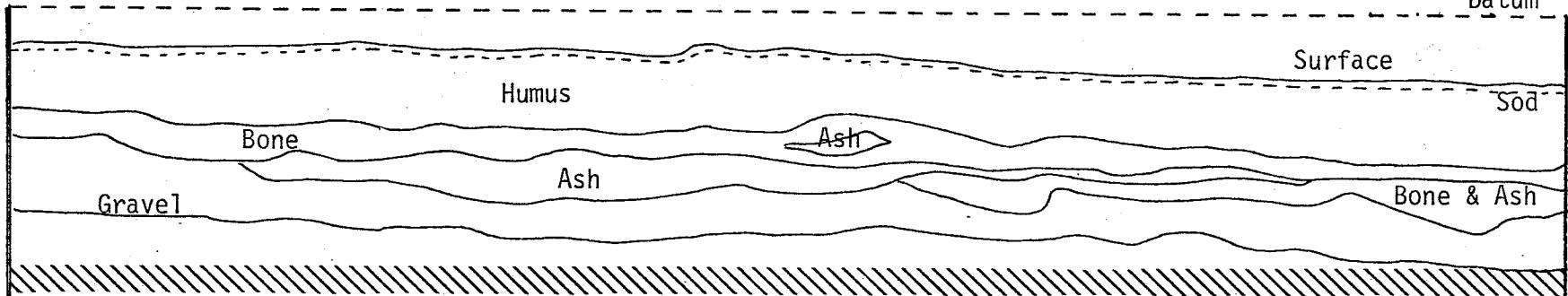
Features

The word "feature" is usually used by archaeologists with reference to man-made things which cannot be transported back to the laboratory for analysis. It is also used to "denote those material and visible items in or about archaeological sites that are either atypical of the general run of the deposit or not frequently encountered on the surface or in the vicinity of an aboriginal habitation" (Hester et al., 1975:131). A standard "rule of thumb" applied at this site utilized boundaries. When an unusual concentration or deposit was noted, if boundaries could be defined, the item was recorded as a feature.

Figure 2. Stratigraphy of the Aschkibokahn Site (FbMb-1).
East and west wall profile of unit 14N8W.

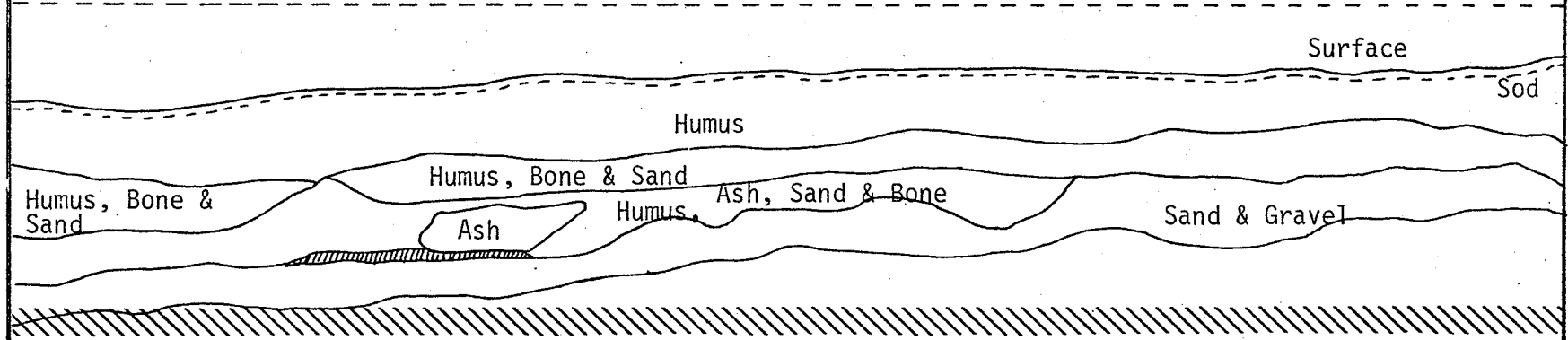
14N8W EAST WALL PROFILE



Datum



14N8W WEST WALL PROFILE

Datum



 = Charcoal Lens
 = Depth of Excavation

10 cm.

Horizontal & Vertical Scale

Table 1 summarizes locational and descriptive data of Aschkibokahn Site features. Strictly speaking, feature 1 was not a feature because its boundaries extended beyond the unit and could not be determined. When it was first exposed in level 2, it was given a feature number, but in lower levels the entire unit was found to contain a dense concentration of fish bone. The other nine features can be described as six hearths, two ash concentrations, and a pottery concentration. Ash concentrations are distinguished from hearths by a total lack of charcoal and fire-cracked rock.

Pottery occurred frequently, but it was usually widely scattered and intermixed with bone fragments. Pot sherds from the same vessel were often widely separated vertically and horizontally. Thus a deposit of sherds from the same vessel which was concentrated in a restricted area was designated as a feature. Specimens associated with feature 7 were primarily bird bone with a scattering of fish bone and a mammal bone.

Hearths varied in size and in associated materials. Some hearths, such as features 6 and 8, nearly encompassed entire units, while feature 10 was restricted in size. Direct associations were generally either with another overlapping hearth, as in the cases of features 3 and 4 (Fig. 3) and 5 and 9, or with faunal material within the hearth. Of the six hearths, four were associated with fish bone, four with mammal bone, and one with bird bone. Three hearths contained pottery. Because of the small sample size, no correlations could be drawn between hearth size and type of faunal material, but based on observations, large well-defined hearths and dense concentrations of

TABLE 1. Aschkibokahn Site Features

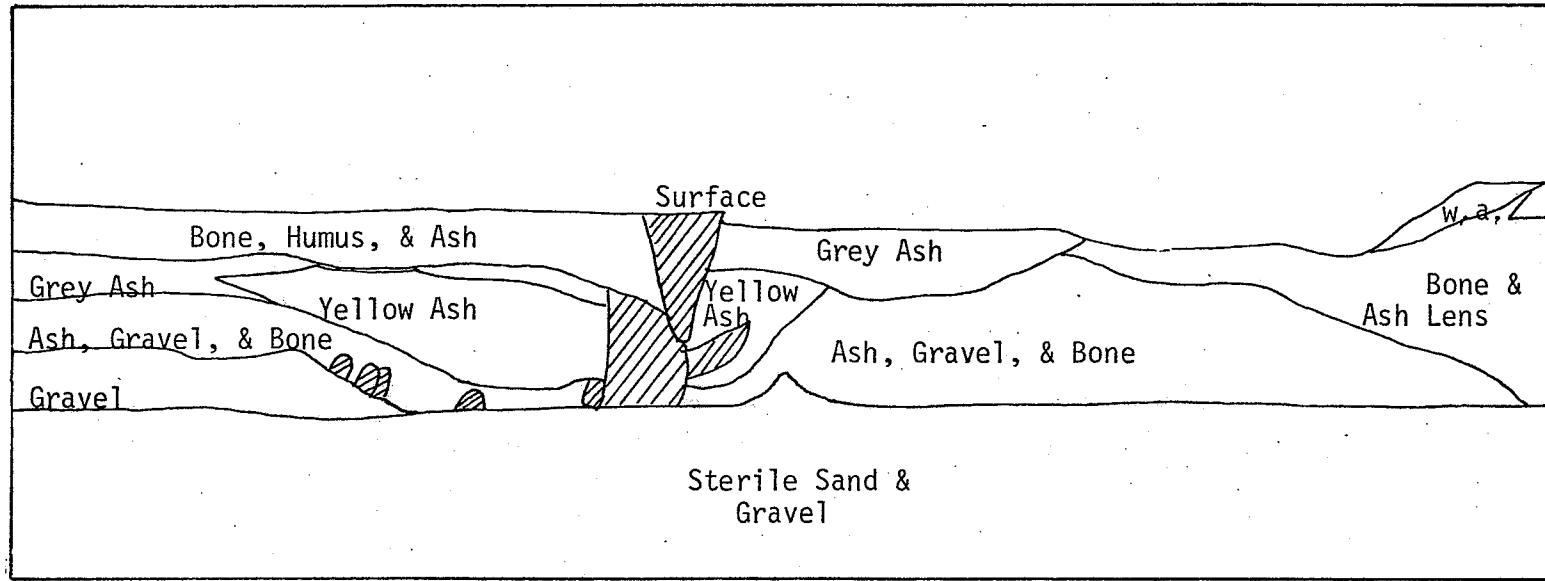
#	Definition	Unit	Datum (Depth Below Surface at SE Corner)	Maximum ₁ Length	Maximum ₁ Thickness	Maximum ₁ Width	Associations
1	Bone Concentration	14N8W	3.4-4	20(N-S) ³	.6	10(E-W)	
2.	Hearth Profile	22N22W	0-8.0	60(N-S)	8.0	Unknown	
3.	Hearth	14N8W	6-17.5	60(NE-SW)	11.5	45(NW-SE)	Fishbone, <i>Castor Canadensis</i> femor, Feature 4
4.	Hearth	14N8W	5-16	33(NW-SE)	11.0	27(E-W)	Fishbone & pottery Feature 3
5.	Ash concentration	28N2W	12-15.5	38(SW-NE)	3.5	24(NW-SE)	Feature 9
6.	Hearth	22N22W	7.5-19.5	115(N-S)	12.0	97(E-W)	Mammal & fish bone
7.	Pottery concentration	20N18W	16-18.5	27(E-W)	2.5	14(N-S)	Bird bones
8.	Hearth	14N8W	11.5-17S.D. ²	100(N-S)	5.5	50(E-W)	Pottery & mammal bone fragments
9.	Ash concentration	28N2W	20-22.5	75(NE-SW)	2.5	26(SE-NW)	1 large mammal bone Feature 5
10.	Hearth	20N18W	20-28	80(N-S)	8.0	8(E-W)	Bone & pottery


1. measurements in centimeters.

2. depth below surface.

3. figures apply only to level 1 dimensions. Boundaries indeterminate in lower levels.

Figure 3. Profile of Unit 14N8W showing complex layers of ash and bone in features 3 and 4.



 = Rock

w.a. = White Ash

Scale:
0 5 10 cm.

fish bone appeared to be associated. Future studies may support this correlation.

The nature or composition of these hearths is complex. Figure 3, a profile of features 3 and 4, illustrates the intricate layering of white, gray, and yellow ash, gravel, bone, and fire-cracked rocks that compose these features. Other hearths are less complex. As can be seen in Plate 8, the ash lens is dense and well defined. The hearths all rest directly on sand and gravel, and there are no indications that the builders of the fire prepared a basin in which to contain the fire. From above (Plate 9) these hearths appear indistinct. Charcoal is seldom a component.

The paucity of charcoal may reflect a specialized type of fire; one that was carefully tended to maximize combustion. Another factor which may have minimized charcoal is the type of wood burned. During our stay on the island, driftwood was very plentiful and was used extensively for campfires. These fires resulted in ash deposits with little charcoal. Further study and experimentation are required to resolve the question.

The function of the hearths and ash concentrations may have been the smoking and drying of harvested fish. Dense concentrations of fish scales and bones around and in the features strongly suggest that the hearths were used in some manner in the processing of fish. Most of the fish remains were not charred, indicating that the fish were not in direct contact with the fire and that fires were not merely used in the disposal of skins or discarded bones. The drying of fish by suspending fillets or whole fish on a rack constructed over a hearth was a common

practice of fishing peoples (Rostlund 1952). Pollock (1978) shows that fish drying hearths currently in use in the Clearwater River area in Alberta are large and oblong in shape, and thereby similar to Aschkibokahn hearths. The complex layering observed in some hearths may be attributed to reuse during successive occupations.

Horizontal and Vertical Distribution

All units except for 10N22W contained at least one hearth. Excavation of unit 14N8W exposed three large hearths whose boundaries merged to the extent that ash covered most of level 7. As is apparent in Table 2, not only were hearths widely distributed on the horizontal plane; they occurred in all excavated levels. Despite the collapsed stratigraphy which characterized the site, it is clear that the hearths do not appear to be contemporaneous. Such splayed vertical distribution suggests repeated occupation over an extended time span.

Summary

Although natural strata in the Aschkibokahn Site could be discerned, there were no clear separations between cultural levels with intervening sterile strata. This stratigraphy suggests repeated short term occupations over a period of time. This is further supported by the features which overlapped one another. These features are primarily hearths or ash concentrations which were probably used in the processing of fish.

TABLE 2. Horizontal and Vertical Distribution of Features.

		<u>Unit</u>				
		10NW22	14NW8	20NW18	22NW22	28NW2
<u>Level</u>	1				Feat.2	
	2		Feat.1		↓	
	3				↓	
	4				Feat.6	
	5				↓	Feat.5
	6		Feat.3		↓	↓
	7		Feat.8	Feat.4	↓	Feat.9
	8		↓	↓	↓	↓
	9				Feat.7+10	
	10		↓	↓	↓	

4. CERAMICS

Introduction

The ceramics recovered during the 1976 excavations at the Aschkibokahn Site can be divided primarily into two wares: "Blackduck" and "Duck Bay". Although the former ware has been discussed by many researchers including MacNeish (1958), Evans (1961a, 1961b), Dawson (1974), Lugenbeal (1976), and Carmichael (1977); the latter has received only brief consideration in print by Gibson (1976). Dr. E. Leigh Syms, several Brandon University students, and Pat Badertscher, University of Manitoba, have analyzed ceramics from the site, but have not yet published their results. Despite the fact that Duck Bay pottery has appeared in various sites (Syms, Hanna, and Badertscher, personal communication) it has never been found in sufficient quantity for it to be recognized as a separate ware. It has often been referred to as aberrant Blackduck or classified as "Sturgeon Punctate" or "Winnipeg Fabric Impressed" Ware (cf. Mayer-Oakes 1970, Meyer 1978). Aschkibokahn can be considered as the type site for this ware, since it is the first site in which a large sample has been found. I shall provide a preliminary description of Duck Bay Ware, and also briefly survey the Blackduck ceramics found in association with it. The analyzable sherds recovered from the site represent approximately ninety-three vessels. Sixty-two of these are classified as Duck Bay Ware, and twenty-six are Blackduck Ware (Table 3). This report does not presume to be definitive but merely sets the stage for further research.

TABLE 3.
CERAMIC TYPOLOGY

Classification	Number of Vessels		
Duck Bay Ware	62		
Type A. Duck Bay Punctate		39	
Mode 1			14
Mode 2			21
Mode 3			1
Mode 4			2
Mode 5			1
Type B. Duck Bay Decorated Lip		23	
Mode 6			12
Mode 7			3
Mode 8			7
Mode 9			1
Blackduck Ware	26		
Mode A			1
Mode B			1
Mode C			1
Mode D			1
Mode E			1
Schocker Horizontal Cord ¹			1
Waskish Vertical Cord and Punctate ¹			1
Mud Lake Punctate ¹			1
Nett Lake Cord and Punctate ¹			1
Nett Lake Vertical Cord ¹			1
Unclassified Blackduck		16	
Unclassified Vessels	5		

¹As described in Evans 1961a and 1961b.

Methods

The techniques used in the analysis followed those suggested in Evans (1961a) and McPherron (1967). Analysis was by vessel and was concerned with the following groups of attributes: vessel form and size; thickness of lip, rim, and body; surface treatment; temper and paste; (approximate) colour; presence of encrustations; and decoration. Hardness of sherds was not considered because of difficulties involved in measurement. For similar reasons, standardized colour chips were not used to estimate colour of rims. Extreme variability in colour was noted in rims which came from the same vessel, and therefore only the categories of grey white, grey black, dark brown, light brown, and sandy orange were used. Attributes of analyzed vessels are on file with the Historic Resources Branch of the Department of Tourism, Recreation, and Cultural Affairs in Winnipeg, Manitoba. Those used in ceramic analysis are in Appendix A-1.

Some of the terms used in description of the ceramics require definition. Many of those used in this chapter were defined by the Plains Conference Committee on Nomenclature (Spaulding 1952):

Type - A type is determined by the totality of characteristics which make any given ceramic group different from all others. Common criteria for the determination of type are: color, surface texture and finish, method of handling the clay, paste, form, temper (if the difference is not due to environment), rim form, method of embellishment, and styles of design.

Ware - Ware is a group of pottery types, which has a majority of the above features in common (p. 79).

In the taxonomic hierarchy, ware is the most general category in terms of time and space. "A ware is not a diagnostic for any short chronological period or for any restricted region." (ibid., 79). Types compose a ware and are second in the hierarchy. In this classificatory

system, types contain decorative modes as defined by Dawson (1974).

Most of the descriptive terms used here need not be defined because they are either self-explanatory or are in common use in the archaeological literature of the region. One term, however, may result in some confusion. The term "brushing" has been commonly used to describe Middle Missouri vessels that bear light, horizontal lines which are not necessarily parallel and appear to have been caused by drawing a bundle of grass across the moist surface of an unfired vessel. The resulting marks are usually shallow, horizontal, and can occur on either the vessel exterior or interior or on both. In contrast, some researchers have used the same term in describing Woodland vessels which have deep, vertical, parallel scratches on the exterior (cf. MacNeish 1958). The former definition of the term will be used here.

In the analysis of surface treatment, the terms of "cord-wrapped paddle", "vertical mesh", and "cord-roughened" were not utilized. It was extremely difficult to accurately identify the textile impressions, since they had been obliterated to varying degrees. As Quimby (1961:428) observed after considerable experimentation, "I can only conclude that I still cannot tell with certainty the difference between some kinds of cord marking and some kinds of fabric impressing". This problem was further complicated in both Blackduck and Duck Bay Wares by the smoothing of the vessel surface after manufacture and before firing. Therefore, to avoid misclassification, the general term of "fabric impressed" served to describe surfaces which have been treated in some manner with either cords or fabric.

In most Woodland Wares, decoration is restricted to the lip, rim,

and neck portions of vessels (Fig. 4). Following Evans' example (1961:34), any sherd which lacked a lip but was decorated was called a "near rim". Undecorated sherds lacking rims or the distinctive curves or angles of neck and shoulder sherds were classed as "body sherds". Sherds which were smaller than 2.5 cm in diameter were termed "crumbs" and merely counted. Of the 3,918 sherds recovered there were 110 rims and near rims, eleven shoulder, fifteen neck, 469 body, and 3,313 crumbs.

Duck Bay Ware

The only published description is by Gibson in his recent report on the Winnipegosis Site. He stated:

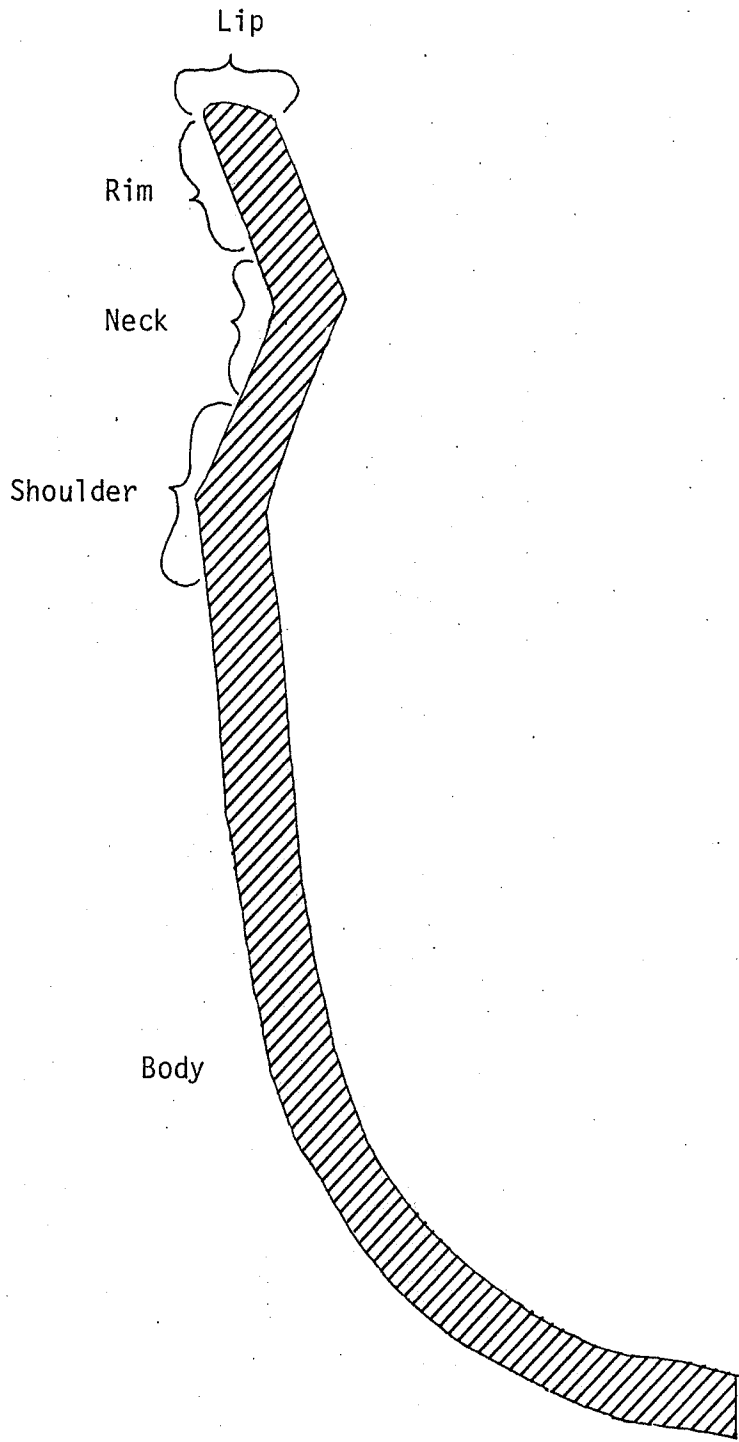
The vessel shape of this ware is much like that of Blackduck and Winnipeg Fabric-impressed pots, possessing a rounded base widening out in the body which collapses to a constricted neck with slightly flaring rims. However, the former two wares are characterized by rounded shoulders, while Duck Bay vessels exhibit shoulders which curve slightly up from the body and then angle sharply in to the neck. This trait occurs in at least one vessel from Winnipegosis... The bodies of the ware are fabric-impressed and the rims in most cases are decorated with multiple rows of ovate, circular, or semi-circular punctates. The lips may be smooth, notched on the inner surface, or marked with longitudinal rows of small, shallow punctates (1976:9-10).

Data generated from the Aschkibokahn ceramics support this definition only in part, because Gibson's description was based upon the analysis of only five sherds. This study is based upon a much larger sample of ninety-three vessels. The following format was borrowed from McPherron (1967).

Summary of the Ware

No adequately reconstructable vessels were discovered in 1976. During previous amateur excavations a partially reconstructable vessel with a globular shape and no distinct shoulder was recovered. Only vessels recovered in 1976 will be described here. These vessels display

Figure 4. An illustration of terms used to designate portions of a vessel.



rims that are straight to slightly S-shaped descending to a sharply angled neck. Shoulders of these vessels tend to be also sharply angled, unlike those of Blackduck vessels. Surfaces are fabric impressed and have been smoothed prior to decoration partially obliterating surface treatment. Decoration is found on lips, rims, and, occasionally on shoulders. This ware is divided into two types on the basis of decoration: Duck Bay Punctate and Duck Bay Decorated Lip. It is further sub-divided into modes on the basis of variations in decoration (Syms, personal communication).

Duck Bay Punctate Type

Sample Size

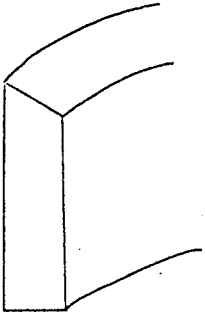
Fifty-six rims representing thirty-nine vessels.

Formal Attributes

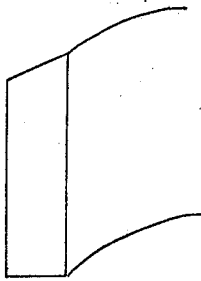
Vessel Shape and Size. As was stated previously, it is probable that all these vessels are globular in shape. Lips are moderately thin averaging 7 mm and rims are generally straight, although two are shallow S-shaped and three are excurvate. The average ratio of lip thickness to rim thickness is nearly one being 6.6:6.4. Lips are often flat and beveled inward or rectangular (Fig. 5). Seven are splayed. Rims are fairly short, ranging from 21 mm to 32 mm in height. The mean neck angle is 125° but ranges from near perpendicular 100° to a more obtuse 150°. Shoulders range from an exterior angle of 130° to 140°. Interior shoulder angles are more obtuse; they have a mean of 150°.

The diameter of the lip is based upon the measurement of a single vessel; all other rims were too small to be used. This vessel is 110 mm in diameter, which would place it among the "small vessels" in Evans' (1961a:41) classification scheme of Blackduck ceramics since it

Figure 5. Lip shapes.



Flat and bevelled inward



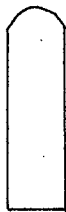
bevelled outward



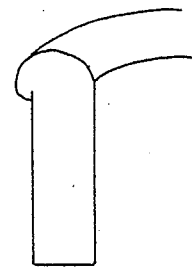
splayed



rectangular



convex



rolled

is less than 200 mm in diameter.

Surface Treatment. Most of the rims of this type have been fabric impressed and then the surface has been smoothed. A few had the appearance of having been roughened or scraped. Surface treatment could not be determined for eight of the rims.

Manufacturing Details. No coil breaks were observed. Many sherds show evidence of lamination. They may have been made by the paddle and anvil technique or built inside a container. Syms' studies of reconstructed Blackduck vessels indicated that a textile container was probably used as a mold, and clay was smeared over the interior to form the vessel. The application of clay may have been gradual, forming layers (Syms, personal communication). It appears that this pottery was fired in a reducing atmosphere because a majority of rims are gray in colour. Also, many of the rims have a dark gray core, indicating some combination of a poor draft, short firing time, or low firing temperature (Shepard 1965:104).

Temper is primarily composed of crushed grit and no examples of shell temper were noted. Eighteen percent of the vessels have fine sand temper (1/4-1/8 mm in diameter), 52% have fine grit (1/2-1 mm), 25% have medium grit (approximately 1 mm), and 5% have coarse grit (2-4 mm). The sherds are also characterized by frequent longitudinal splits probably due to laminated construction and poor firing. Paste is generally homogenous with little temper protruding into the surface of the vessel.

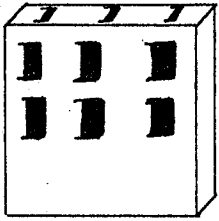
Decoration. This type has been divided into five descriptive modes (Fig. 6). For ease of description each decorative motif has been stylized and drawn on a block.

Figure 6. Ceramic modes.

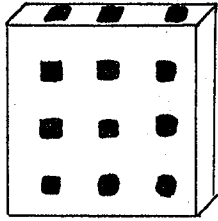
CERAMIC MODES

DUCK BAY WARE

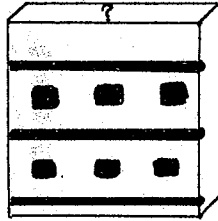
Type A. Duck Bay Punctate



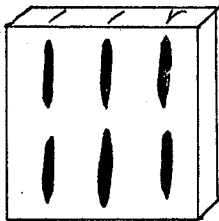
1.



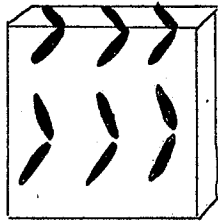
2.



3.

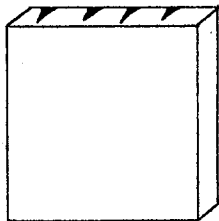


4.

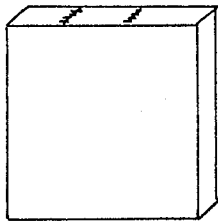


5.

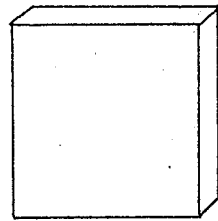
Type B. Duck Bay Decorated Lip



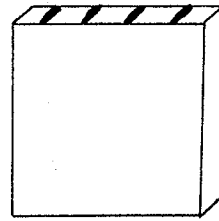
6.



7.

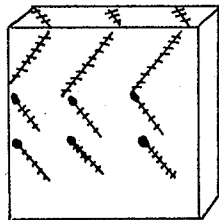


8.

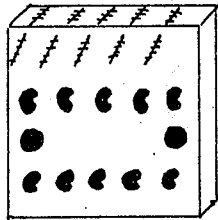


9.

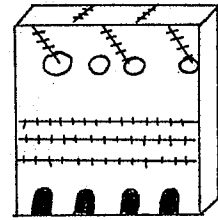
BLACKDUCK WARE



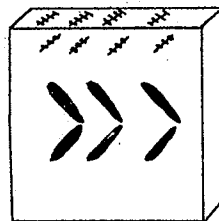
A.



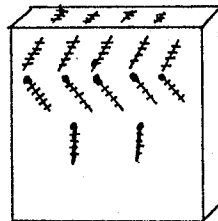
B.



C.



D.



E.

Mode 1: Fourteen vessels fall into this category. They are characterized by two or more rows of drag-jab impressions spaced about 5 mm apart on the exterior rim. These impressions are usually shallow, but in four cases they result in interior bosses. The shape of the drag-jab impressions often resembles an elongated rectangle which sometimes becomes crescent or L-shaped because of accentuated drag lines. The instrument used to create most of the impressions may have been a flat-ended bone or twig. In one case, a cord-wrapped object appears to have served as the decorative tool. Lip decoration found on Mode 1 rims consists of either punctates or drag-jab impressions. The latter are more common (Plates 10 and 11).

Mode 2: This is a category containing twenty-one vessels which are characterized by two or more rows of shallow punctates on the exterior rim and lip. Punctates fall into three shape categories: oval to circular, square to rectangular, and crescentic. Lip decoration often matches the rim decoration. Two vessels of this mode have punctates on the interior which match the exterior rim decoration (Plates 12 and 13).

Mode 3: One near rim comprises the sample. The vessel is characterized by two horizontal rows of oval punctates with incised lines above and below. The punctates are deep, resulting in an interior boss. A stick or bone fragment may have served as a decorative tool (Plate 14a).

Mode 4: This mode is similar to Mode 2 in that it is characterized by at least two horizontal rows of shallow elongate punctates on the exterior rim. It differs because the lip is not punctated but rather has been scratched or lightly incised. The marks run obliquely across the lip above and below the punctates. It is

typical of only two vessels (Plate 14b and c).

Mode 5: This mode is also found on only one rim. The design is reminiscent of that appearing on the "Manitoba Herringbone" Type (MacNeish 1958:159) but differs in that the herringbone design is formed by shallow elongate punctates, rather than by cord-wrapped stick impressions. The punctates are rectangular, spaced 3 mm apart, and arranged in three rows on the exterior rim and one on the lip (Plate 14d).

Duck Bay Decorated Lip

Sample Size

Twenty-nine rims representing twenty-three nonrestorable vessels.

Formal Attributes

Vessel Shape and Size. The shape is presumably similar to that of Duck Bay Punctate ceramics. Lips are usually flat and/or rectangular, but a minority are beveled in, convex, or splayed (Fig. 5). Only two have rounded lips, and one possesses a flat lip which is beveled out rather than in. Unlike Blackduck specimens, lips are generally thinned rather than thickened. The mean thickness of the lip is 6 mm, the mean of the rim is 6 mm giving a lip to rim ratio of 1:1. Nine rims are straight, but six are shallow S-shaped. The angle at the neck is as sharp as in Duck Bay Punctate, but possibly more obtuse, although the sample is extremely small, consisting of only four rims with reconstructable neck fragments. No shoulders could be positively associated with this type.

Only two vessels were reconstructed sufficiently to allow the measurement of diameter at the lip. The estimation of size of one vessel ranged from 250 mm to 270 mm and the other was 150 mm across the mouth. Under Evans' (1961a:40-41) classification scheme, the

former would be termed a "large vessel" and the latter a "small vessel".

Surface Treatment. Surfaces are obliterated fabric impressed with only four vessels showing signs of polishing. The surface treatment on one vessel could not be determined.

Manufacturing Details. Duck Bay Decorated Lip does not differ from Duck Bay Punctate. Temper was very similar. It can be broken down into 21% sand temper, 70% fine grit, and 9% medium grit on the basis of inspection. No rims displayed coarse grit temper. Fewer cases of exfoliation were noted in this type.

Decoration. Decoration found on this type of pottery has been tentatively divided into four modes (Fig. 6).

Mode 6: This mode has the largest representation. Twelve vessels had brushed interior and occasionally exterior rims, and distinct V-shaped notches on the interior lip. These notches were spaced an average of 3 mm apart, and could be termed shallow, as they did not intrude past the horizontal centerline of the lip (Plate 15).

Mode 7: Closely-spaced cord-wrapped stick impressions on the lip describes this mode. Three vessels from the site fit this description (Plate 16).

Mode 8: Seven vessels recovered during the 1976 season lack decoration. Three of the vessels show brushing on the interior, and two have brush marks on the exterior rims (Plate 17).

Mode 9: This is a category that contains only a single vessel. This representative is characterized by exterior brush marks, and is unique in that it combines an unmodified surface with a series of individual punctates decorating the lip (Plate 18).

Blackduck Ware

Summary of the Ware

Evans (1961b) described Blackduck Ware as follows:

The vessels have a globular form with a rounded base. The neck constricts slightly and the rim flares outward, usually not beyond the width of the shoulder. The lip is thickened, usually 2 or 3 mm thicker than the body. The body is generally marked with cord wrapped paddle but may be net or fabric impressed. About 84% of the body sherds have cord wrapped paddle treatment while the remaining 16% is about equally divided between net and fabric impressed. The decoration occurs on the neck, rim, and lip, and occasionally the interior of the rim. The decorative elements are, as indicated above, cord wrapped stick and punctates. The design may be applied over a smoothed, cord wrapped paddle, combed, or brushed surface (pp. 34-5).

The sample of Blackduck conforms in general to the above definition. I shall proceed with a brief description of the sample and consider a few new decorative motifs.

Sample Size

Thirty-four rims comprise twenty-six vessels, of which only one has been partially reconstructed.

Formal Attributes

Vessel Shape and Size

Vessel shape follows the above definition. Lips are generally flat (38%) and beveled inward (21%) or splayed (21%), but a minority are rectangular (9%), convex (9%), or beveled out (3%) (Fig. 5). They are 8 mm thick on the average, whereas rims are generally thinner having a mean thickness of 7.5 mm. Both lips and complete rims are thicker than bodysherds. Lugenbeal (1976:196) attributes the slight thickening of the lip to the "flattening effect of lip decoration with a cord-wrapped stick". Necks have a mean height of 43 mm. Neck angles average 130° and the junction is characterized by a smooth curve.

Only two vessels possessed sufficient rim length to allow the

estimation of vessel size. Due to warping, one vessel varied from 210 mm to 250 mm in estimated diameter at the lip. The other rim section measured 250 mm in predicted lip diameter. Both were large vessels, but the encrustations on the former vessel's interior rim and lip indicate that it served as a cooking implement, which is contrary to Evans' (1961a:40-41) observation that only small vessels were used for cooking.

Surface Treatment

Fifty-six percent of the rims show evidence of obliterated fabric impressing, 27% have been polished or smoothed prior to decoration, and 16% were of indeterminate surface treatment.

Manufacturing Details

A discussion of the manufacturing techniques from a study of Blackduck sherds from Minnesota can be found in Evans (*ibid.*:45). No discernable coil breaks were observed in Aschkibokahn Blackduck sherds. Rim colour is as follows: 8% gray white, 46% gray black, 23% light brown, 15% dark brown, 8% sandy orange. Dark gray cores in rims are also frequent, indicating low firing temperatures plus possibly a poor draft or short firing time (Shepard 1965:104).

Decoration

Evans (1961a and 1961b) based his typology on decorative attributes, and derived eight types of Blackduck Ware. One vessel each of five of these were recovered from the Aschkibokahn Site. These are: "Schocker Horizontal Cord" (Plate 19), "Waskish Vertical Cord and Punctate" (Plate 19c), "Mud Lake Punctate" (Plate 19e), "Nett Lake Cord and Punctate" (Plate 19a), and possibly "Nett Lake Vertical Cord" (Plate 19d) (based on an incomplete rim fragment).

Decoration consists of oblique cord-wrapped stick impressions applied to the lip and upper rim. Below this single row lies a row of closely-spaced crescentic punctates, followed by a row of widely-spaced circular punctates, and underlain once again by a row of crescentic punctates (Plate 21).

Mode C: Of all the Blackduck rims recovered, this is without a doubt the most striking. The lip appears scalloped due to a cord-wrapped stick which was deeply pressed in an alternating pattern along the interior and exterior lip. Those imprints intersect with deep oval punctates which preceded the lip decoration. Below the row of punctates lie three encircling bands of cord impressions followed by another row of oval punctates (Plate 20c).

Mode D: Represented by a single rim, this motif is given distinction by a band of punctates arranged in a chevron which underscore a row of oblique imprints. These obliques rise from lower left to upper right and were created by a cord-wrapped object. The lip is also characterized by a cord-wrapped stick design obliquely paralleling those imprints on the exterior rim (Plate 20b).

Mode E. This category is represented by one rim. The lip and upper rim decoration are the same as is found in Modes B and D, and below this are two rows of short cord-wrapped stick impressions. The first of these is formed by closely-spaced cord-wrapped stick impressions which slant at an angle opposite to the above row giving the design of a chevron. The second was created by the same decorative tool but the imprints are more widely spaced and perpendicular to the lip (Plate 20e).



Other vessels excavated which did not fit in Evans' classification will be briefly described. Most of these would be termed "Blackduck Banded" by McPherron (1967:103-4) who claims that evidence is insufficient to support Evans' numerous types. These motifs are illustrated in Figure 6, a through e, and are described below.

Mode A: This mode is characterized by oblique cord-wrapped paddle impressions crossing the lip from upper left (interior) to lower right (exterior). On the upper exterior rim, cord-wrapped object impressions form a chevron with the lip pattern as they angle from lower left to upper right. Underlying this are two bands of oblique cord-wrapped stick imprints which parallel the lip pattern. The rim exhibiting this motif is notable due to a slight S-shaped rim profile which contrasts with the expected excurvate profile typical of Blackduck (Plate 20d).

Mode B: The most complete reconstruction of a Blackduck rim section in our sample belongs to this mode. It is very similar to the Blackduck Brushed type as defined by MacNeish (1958:159-162).

The vessel's flat lip is bevelled inward and is 10 mm in thickness. The straight to excurvate rim ranges in thickness from 9 mm to 10mm and constricts 50 mm below the lip, where the neck curves at a 110° angle. Measurements taken at the lip suggest that the vessel was large; the mouth was 210 to 250 mm in diameter. Encrustations observed on the lip and rim suggest that this particular pot was used for cooking.

The exterior surface provides evidence of fabric impressions while the interior exhibits brush marks. The rim was smoothed before decoration was applied. Paste is homogeneous, and the clay was tempered with medium grit.

Comparison of the Wares

Physical Characteristics

A comparison of continuous variable attributes of Duck Bay and Blackduck Wares reveals that, generally, the thickness of lips on Duck Bay vessels is either equal to or slightly thinner than the thickness of the rim. In contrast, Blackduck vessels are noted for thickened lips. Necks are shorter on Duck Bay pottery, being about two-thirds the height of Blackduck necks. Though necks of Duck Bay ceramics have sharp angles at the junction of rim and body, on the average, they are no more acute. They often appear more acute because the junction is sharper in Duck Bay. Because the measurable sample is small, it is difficult to determine vessel size, but in this sample Duck Bay vessels were smaller at the lip orifice than were Blackduck vessels.

Concerning qualitative variables, the two wares are similar in colour, manufacturing techniques, temper, and surface treatment. Bodysherds belonging to the two wares are indistinguishable on the basis of surface treatment, temper, or manufacture. Table 4 expresses the frequencies of bodysherds categorized by surface treatment. The majority of sherds are obliterated fabric-impressed (67%) and/or brushed (23%). Twenty-one percent exhibit interior encrustations, 10% appear polished or smoothed, and a mere 7% display non-obliterated fabric impressions. Forty out of the 434 sherds analyzed were of indeterminate surface treatment due to exfoliation or weathering. A large number of sherds, 3,054, were too small to determine the surface treatment (Table 5).

Differences do exist in areas such as rim profile, presence of encrustations, brushing, and decoration. While Blackduck rims tend to

TABLE 4. Surface Treatment Frequency and Vertical Distribution of Body sherd Types, Duck Bay and Blackduck Wares (Levels are 2 cm Thick)

	Fabric Impressed	Obliteratered Fabric Impressed	Polished/Smooth	Brushed	Indeterminate	% in Level
Level 1						1%
Level 2		6		1		3%
Level 3	2	17	1	6	2	10%
Level 4	7	20	4	7	6	12%
Level 5	8	69	25	35	9	24%
Level 6	5	89	6	31	7	24%
Level 7	3	39	4	12	8	12%
Level 8	1	30	3	6	7	8%
Level 9	2	10	1	1		3%
Level 10		9			1	2%
Level 11	1					.05%
Level 12						.02%
Total	29	289	44	99	40	
Total %	6%	57%	9%	20%	8%	

TABLE 5. Condition and Number of Analyzed Body Sherds

Condition of Sherds	Number
Exfoliations	82
Encrustations	89
Total Analyzable Sherds	434
Crumbs	3054

exhibit straight to excurvate profiles, Duck Bay rims are straight to slightly S-shaped or incurvate. Brushing can be observed on 32% of the interiors and on 18% of the exteriors of Duck Bay rims, but on only 12% of Blackduck rim interiors and 4% of the exteriors. Encrustations cake 19% of the lips and 32% of the interior rims of Duck Bay Ware, whereas this situation is observable in only 15% of the lips and interior rims of Blackduck. Briefly, Blackduck vessels are characterized by cord-wrapped object impressions, occasionally in combination with punctates. Duck Bay vessels have multiple rows of punctates or drag-jab impressions, or possess undecorated, obliterated fabric impressed interior rims with plain, notched, or punctated lips.

Miscellaneous Vessels

Three unclassified rims and one decorated, unclassified bodysherd were also recovered. Though two of the rims may belong to the Duck Bay Decorated Lip Type, they differ enough to be considered separately at present.

The single decorated, gray black bodysherd (Plate 22d) is 4 mm thick, tempered with coarse grit, and has a polished surface which is incised with three broad lines. The two lower lines run parallel to one another but are on an intersecting course with an upper oblique line. Encrustations cover a third of the exterior surface.

A light brown rimsherd (Plate 23a) discovered in unit 14N8W, level 5, is made unique by a deeply incised line down the center of its lip which is slightly beveled inward. The surface retains evidence of vertical cord impressions, though erratic brush marks partially obscure this. The lip is thinner than the rim (6 mm compared to 6.5 mm), and the rim profile is slightly S-shaped. This fine grit-tempered vessel,

if complete, would be the largest recovered from this site, being 270 mm in estimated diameter at the lip.

Another vessel (Plate 23b) is unusual in more than one way. The most striking difference is the presence of at least two small castellations which protrude upward and slightly outward from the lip of the vessel. The base of one castellation is still attached to the rolled lip of the rim. A second broken castellation (Plate 22a) matches the attached one. Both have a fabric-impressed surface. In profile, the castellations tilt outward from the rim at an angle of 130° . Three rectangular impressions with parallel, paired ridges decorate the beveled surface of the castellations' lips. The impressions are 2 mm deep, 4 mm wide with a gap of 2 mm between each, and were probably made with a flat, grooved tool. When these were put in, they thickened the lip. The castellation would stand 12 mm above the imagined vessel lip and be 30 mm wide. The rim with the attached castellation has a lip width of 6 mm expanding to a rim thickness of 9 mm and stretches 39 mm to a broken neck. Vertical cord marks indicate a fabric-impressed surface treatment which is barely obscured with deep exterior brush marks. Fine grit tempers the straight, light brown rim and encrustations on lip and interior rim point to former use as a cooking implement.

The final vessel (Plate 22b and c) is represented by two rims and is even more unusual in that it is collared. The convex lip is 4-5 mm thick and decorated with parallel cord-wrapped paddle impressions which are perpendicular to the rim's surface. The neck is short, a mere 24 mm high, and has an angle of 140° . The collar is well defined and is 10 mm in height. Though the surface of one rim is polished, the other has weathered, and surface treatment is obscured. Decoration consists of

three rows of rectangular punctates on the collar and rim as well as a single row of interior punctates.

Ceramic Pipe Fragments

A pipe was represented by three sandy brown fragments (Plate 24). An apparent stem section is curved and undecorated. The bowl may have been formed by the other two fragments. Both are decorated with incised wavy lines. Of these, one has a shoulder. The following table lists measurements of the fragments.

TABLE 6. Pipe Fragment Data

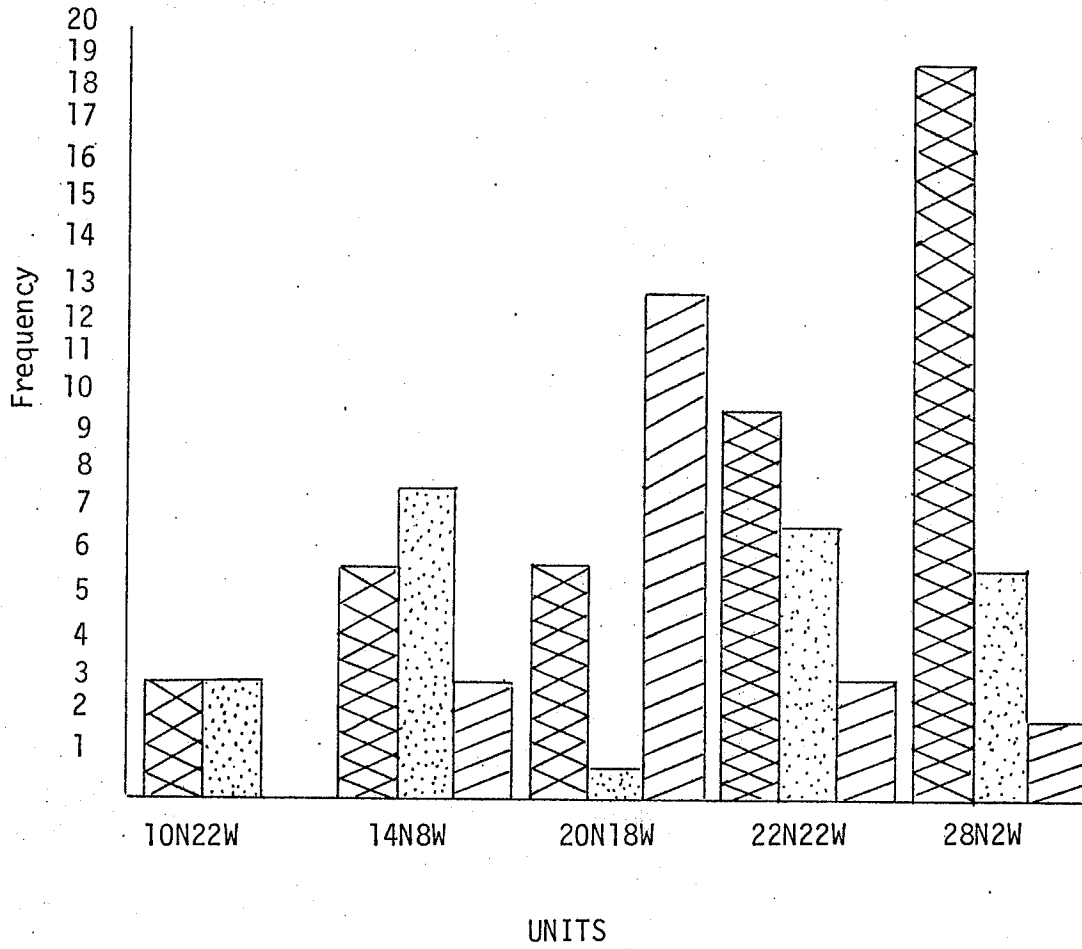
Fragment	Maximum Length (mm)	Maximum Width (mm)	Maximum Thickness (mm)
Stem:	24.7	9.8	5.1
Shoulder fragment:	6.4	24.0	4.0
Bowl fragment:	25.7	20.0	4.0




Spatial-Temporal Distribution

Intra-site

Examination of the horizontal and vertical intra-site distribution of the wares may reveal some trends. Figure 7 is a bar graph of the frequency of the different types of ceramics in the five units. Although Duck Bay Decorated Lip is fairly evenly spread, Duck Bay Punctate Type increases in frequency as distance to the north away from the Duck River increases. Blackduck shows a peak frequency in unit 20N18W, yet is relatively sparse in the adjacent unit, 22N22W. However, insufficient data was recovered to determine trends. Observation of the vertical distribution of both wares reveals a tendency for

Figure 7. Horizontal distribution of vessel frequency per excavation unit. (Excavation units ordered according to increasing distance from Duck River from left to right).



 Duck Bay Punctate Type
 Duck Bay Decorated Lip
 Blackduck Ware

Blackduck to occur in the lower levels (Fig. 8). This may indicate that Duck Bay is later than Blackduck, but it does appear that both wares are concentrated in level 6.

Geographical Range

Blackduck Ware

Blackduck or "Manitoba Ware" (MacNeish 1958) has a wide distribution:

An overview of the distribution of the Blackduck Horizon indicates that sites with more than one or two vessels are confined to the southern and western portions of the Boreal Forest from the western portion of Lake Superior to the western fringes of Manitoba. Evidence of Blackduck in Manitoba is insignificant north of Lake Winnipeg. The southern boundaries include the Boreal Forest portions of northern Minnesota and the Whiteshell region of eastern Manitoba, the Aspen Parkland of the lower Red River Valley, the Pembina Valley and the Assiniboine River Valley, and the grassland portions of south-western Manitoba. The sites span three biomes (Syms 1977:103).

This distribution is outlined in Figure 9, a map which compares the geographical spread of both wares.

Duck Bay Ware

The geographical range of this ware closely parallels that of Blackduck. Northern boundaries include the Drinking Falls Site (Meyer and Smailes 1975), the Pas (Syms 1977, personal communication), P.A.H.-5 (Gibson 1976), and several sites found in the Tailrace Bay survey; i.e. GRS-1, GRS-8, GRS-16, GRS-27, GRS-34, GRS-37, GRS-38, and GRS-39. Sites containing this ware which are scattered to the east and south are: Bird River Site (Syms 1977, personal communication), McKinstry Mounds (Hanna 1978), Smith Site (Lugenbeal 1976), McCluskey Site (Dawson 1974), Duck Bay Site (Pollock 1975), and Valentine River Site (Hanna 1978). Syms (1977, personal communication) reported the discovery of several sherds from the Horner Site on the east shore of

Figure 8. Graphs of the vertical distribution of wares in the Aschkibokahn Site.

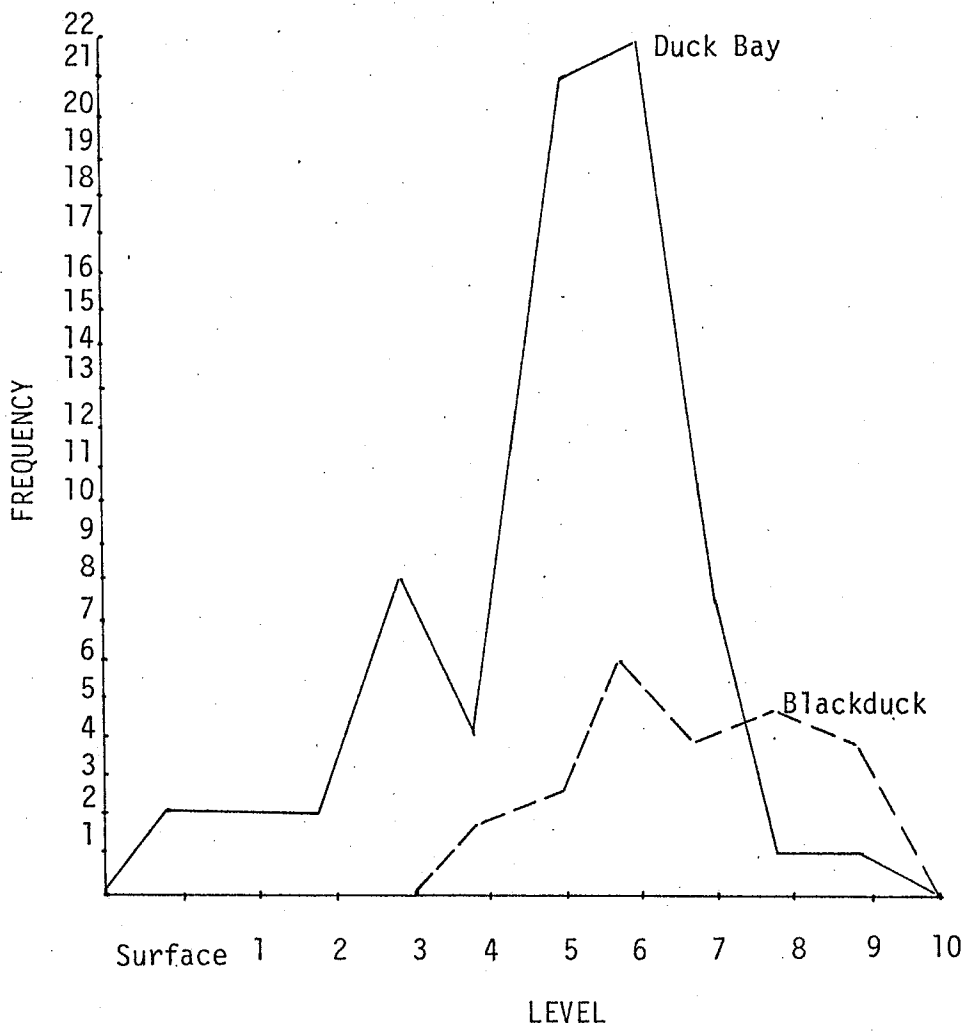
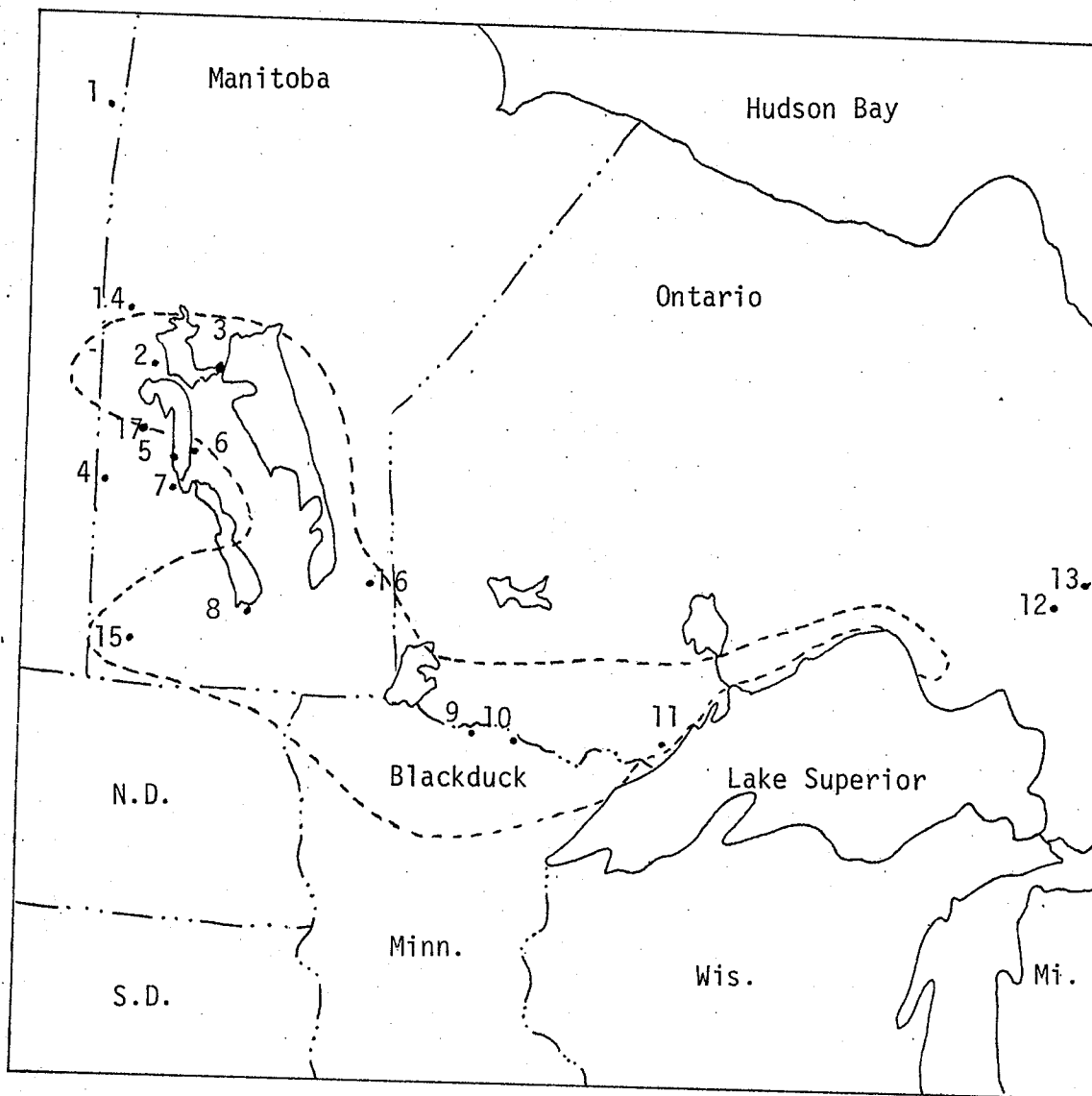


Figure 9. Distribution of Duck Bay and Blackduck Wares
(after Hanna 1978 and Syms 1977:98).

-----Blackduck



LEGEND

Sites containing Duck Bay ceramics

- | | | | |
|----|--|-----|------------------|
| 1. | Drinking Falls | 9. | McKinstry Mounds |
| 2. | Oscar Point (P.A.H.-5) | 10. | Smith |
| 3. | Tailrace Bay | 11. | McCluskey |
| 4. | Swan River Valley (L.A.S.-127 & L.A.S.-43) | 12. | Duck Bay |
| 5. | Aschibokahn | 13. | Valentine River |
| 6. | Skownan | 14. | The Pas |
| 7. | Winnipegosis | 15. | Horner |
| 8. | Bell | 16. | Bird River |
| | | 17. | Swan Lake |

Oak Lake. Several Duck Bay Decorated Lip rims, a castellation, and a Duck Bay Punctate Mode 1 rim were recovered during a test of L.A.S. 127 in the Swan River Valley (Hill 1965:21). Another site in this valley which contained a Duck Bay rim was L.A.S. 43 (Gryba 1977), and Duck Bay sherds were found near the valley at the Swan Lake Site (C. T. Shay, personal communication). Other sites on the shores of Lake Winnipegosis and Manitoba are Skownan (Kroker, personal communication), Winnipegosis (Gibson 1976), and Bell (Shay 1971a).

Although Duck Bay rims have been found in all of the above, they comprise a minority of the ceramic component in most of these sites. Only sites in the Lake Winnipegosis Region contain more than a trace of this ware. In all but one case this ware was mixed with Blackduck ceramics. Only L.A.S. 127 contains a single Duck Bay Ware ceramic component, but has been inadequately tested.

Temporal Range

Blackduck Ware

The earliest dates for the Blackduck Horizon come from the Martin Bird Site on Whitefish Lake. These dates; A.D. 200 \pm 205, A.D. 680 \pm 85, and A.D. 480 \pm 115; predate the previously established beginning of the Horizon. If they are substantiated, "the beginning of the Blackduck Horizon approximates the beginning of the Laurel Horizon in western Ontario" (Dawson 1974, personal communication quoted in Syms 1977:101). Syms' (1977) reassessment of the Blackduck Complex maintains that the Horizon began in the late eighth century and continued until A.D. 1400 in Manitoba and Minnesota.

Radiocarbon dates from the 1976 excavation of the Aschkibokahn Site are from the middle levels and are early for Blackduck. They are

A.D. 680 \pm 275 (Dic 845) and A.D. 690 \pm 285 (Dic. 846). Because of the early dates from the Martin Bird Site, they cannot be easily rejected. However, radiocarbon dates from lower levels of the site recovered in 1977 excavations are much later. They are A.D. 1255 \pm 175 and A.D. 1180 \pm 110 (Pat Badertscher, personal communication). It is possible that the early dates were a reflection of the small size of the carbon samples (less than 10 grams) and the fact that the radioisotope laboratory which processed the samples suffered two power reductions necessitating recalibration of the equipment (Irene Stehli, personal communication). Comparison of Aschkibokahn Blackduck vessels with descriptions of ceramic vessels from the stratified Smith Site shows a closer affinity with the Late Blackduck rather than Early Blackduck decorative attributes, and two radiocarbon dates, A.D. 1280 \pm 60 and A.D. 1175 \pm 55, from Late Blackduck levels (Lugenbeal 1976) coincide with the late Aschkibokahn dates.

The upper limit for Blackduck in Manitoba may be historic contact. The latest dates associated with Blackduck in Manitoba; A.D. 1460 \pm 85 (S-1080) and A.D. 1485 \pm 65 (S-1076); are from UNR-48 on Waskwatina Lake in Northern Manitoba (Dickson 1976:43). However Syms (1977:101) maintains, "Evidence for historic continuity of Blackduck exists only in western Ontario, north and west of Lake Superior".

Duck Bay Ware

Most of the sites containing Duck Bay pottery have not been dated. Rims similar to Duck Bay in the Smith Site were found only in the upper component in the Late Blackduck Phase (Lugenbeal 1976). The Harbour Bay Ceramic Site (GRS-1) and GRS-8 are interpreted as Late Prehistoric (Mayer-Oakes 1970:14).

One Duck Bay Decorated Lip rim section demonstrates clear evidence of patching. Two holes drilled just below the lip on either side of a crack were presumably threaded with a leather thong, sinew, or plant fiber to prevent further splitting. Another isolated body sherd is perforated by a large punch drilled after the vessel had been fired. The punch is larger on the exterior side measuring 7.5 mm by 7 mm and narrows as it penetrates 3 mm to the exterior, where it assumes the dimensions of 5 mm by 3 mm. Possibly this is one of a pair of punches which straddled a crack in an attempt to prevent further breakage in a season when replacement was not possible.

Summary and Discussion

The two wares found at the site, Blackduck and Duck Bay, are both Late Woodland manifestations. Although they are similar in surface treatment, colour, temper, size, globular shape, and possibly manufacture, they differ in decorative motifs, the angle at the junction of shoulder and neck, brushing, the ratio of lip to rim thickness, and rim profile. This combination of basic similarities yet obvious differences may be explained by one or more of the following hypotheses: 1) The wares may have been made by the same group but served different functions; 2) Differences may reflect change through time, or 3) They may have been manufactured by two different groups.

Evidence as to the function of vessels is provided only by the presence or absence of encrustations. Evans (1961:40-41) hypothesized that large Blackduck vessels were used for storage and small vessels for cooking. The Aschkibokahn sample does not support this. Regardless of size nearly twice as many Duck Bay as Blackduck rims have encrustations. This may reflect a difference in function. Some of the vessels of

both wares probably served in cooking fish, plant, or other foods.

The differences may be temporal. Blackduck appears to be more frequent in the lower levels of the site, but the complex stratigraphy prevents clear determination. Evidence from the Stratified Smith Site shows that decorative punctates become more common in late Blackduck (Lugenbeal 1976). This may indicate that Duck Bay pottery developed out of Blackduck and was made by the same group, becoming more common later in the Late Woodland Period. Following this line of reasoning, the complex stratigraphy might be attributed to one group returning several times to the site. Over time the frequency of Duck Bay Ware may have increased while the more traditional Blackduck decreased.

On the other hand, the wares may have been manufactured by different groups that occupied the island either contemporaneously or separately. Hanna (1978:5) suggested that:

Duck Bay ceramics represent a small social unit centred in the Lake Winnipegosis region and having some relationship (be it kin or otherwise) with the Blackduck population. Duck Bay ceramics found outside this region represent forays into outside territory for as yet undetermined reasons.

Her hypothesis is based upon the fact that the sites containing large proportions of Duck Bay ceramics are located in the Manitoba Lowlands. Sites outside of this area contain smaller percentages of this ware. Using Syms' (1976, 1977) Co-Influence Sphere Model, the Manitoba Lowlands may have been the "core" area of the makers of Duck Bay pottery while sites outside of this region represent seasonal (or other) movements into tertiary or secondary territories.

5. LITHICS

Introduction

Of the one hundred and twenty-five stone artifacts recovered from the Aschkibokahn Site, nearly one quarter (thirty-one) were projectile points. Twenty-five are scrapers, and five appear to be broken knives. A single edge of a wedge-shaped ground stone tool, four possible drill bases, and fifty-nine utilized flakes compose the remainder (Table 7). The materials that composed the lithic tools came from source areas in three different environmental zones and may be possibly shown to reflect the annual seasonal round.

The time period represented by the lithic tool assemblage and historic artifacts spans several hundred years. The projectile points show occupations during the Terminal or Late Woodland Period indicated by numerous side-notched and triangular projectile points. However, an earlier occupation is suggested by the occurrence of a McKean point in level 5.

Lithic artifacts were analyzed using a series of metric and non-metric attributes which are listed in Appendices A-2, A-3, and A-4. Attributes selected for analysis were those used by Binford (1963), Nicholson (1976 a and b), and Stan Saylor (personal communication). Raw data generated by analysis is on file with the Historic Resources Branch of the Department of Tourism, Recreation and Cultural Affairs in Winnipeg. Although the functional terms of "projectile point", "scraper", "drill", and "knife" appear in this report, microscopic

TABLE 7. Aschkibokahn Lithic Artifacts

Projectile Points - Total	31
McKean	1
Prairie Side-Notched Projectile Points - Total	6
Lewis Narrow Rounded Base Variety	1
Tompkins Side-Corner Notched Variety	1
Nanton Wide Rounded Base Variety	2
Other	2
Plains Side-Notched Projectile Points - Total	4
Paskapoo Variety	1
Emigrant Basal-Notched Variety	1
Other	2
Eastern or Plains Triangular	8
NT-1 Variety	4
NT-2 Variety	1
NT-3 Variety	3
Unclassified	12
Drill Bases	4
Knives	5
Scrapers	25
End	17
Side	5
Both	1
Indeterminate	2
Utilized Flakes	59
Ground Stone	1
Total	125

examination of edges to determine wear was not undertaken. The application of these terms was motivated by descriptive convenience. The historic artifacts will be briefly described.

Lithic Materials

Archaeological frequency of the material types within the Ochre River-Duck River Region is dominated by locally available Swan River Chert. Ninety percent of workshop debris and 85% of late projectile points are made from Swan River Chert. Knife River Flint from Dunn County, North Dakota, composes 6% of the late points. Other material types, "Limestone Chert", "Grey Chert", Quartz, Petrified Wood, Bakers Narrows Chert, and Slate, are present in lesser quantities (Leonoff 1970).

In comparison, lithic detritus by weight from the Aschkibokahn Site is 57% Swan River Chert, 26% Cathead Chert, 16% Selkirk Chert, and 1% Knife River Flint. Siltstone, Quartzite, Petrified Wood, and Quartz were minimumly represented (Table 8). Of the projectile points, 61% are made of Swan River Chert, 16% are of Selkirk Chert, and 16% are of Cathead Chert. No Knife River Flint projectile points were recovered. Also present was a single ground stone artifact of slate.

Lithic Detritus

Analysis of lithic detritus was limited to the compilation of numbers of flakes, shatter, and micro-flakes (less than 5 mm in length); calculation of their respective weights; and identification of material types. The four major lithic materials are Swan River Chert, Selkirk Chert, Cathead Chert, and Knife River Flint.

Sources for the lithic materials are poorly known but appear to span three environmental zones. Swan River Chert is found in the Swan

TABLE 8. Lithic materials recovered in the Ochre River-Duck River Region and the Aschkibokahn Site. Data for the region is from Leonoff (1970).

	Ochre River-Duck River Region		Aschkibokahn Site	
	Debris	Late Prehistoric Projectile Points	Debris	Projectile Points
Cathead Chert			26%	16%
Knife River Flint	trace	6%	1%	0%
Selkirk Chert			16%	16%
Swan River Chert	90%	85%	57%	61%
Grey Chert	trace	9%	trace	
Quartz	trace		trace	

River Valley in the Mixed Woods. Cathead Chert is available along the western shore of Lake Winnipeg in the Manitoba Lowlands. Selkirk Chert occurs on the shoreline of Lake Winnipeg and along the Red River from Winnipeg to Selkirk in the Manitoba Lowlands (Leonoff 1970, Syms 1977:28-29). The most distant source is that of Knife River Flint which was quarried in Dunn and Mercer Counties in North Dakota (Clayton et al. 1970). These materials may have been obtained by trade, but it is plausible that they were gathered by nomadic people following the seasonal cycle of resources. Syms (1977:27) has suggested that lithic materials would be most easily obtained during the late summer and autumn when the source was not covered by high water during floods or winter snow and ice.

Lithic Tools

Bifaces

Projectile Points

A total of thirty-one projectile points were discovered in 1976. Using the criteria delineated by MacNeish (1958) and by Kehoe (1966), the ten side-notched projectile points were separated into two types (Table 7): "Plains Side-Notched" (four specimens), and "Prairie Side-Notched" (six specimens). Another type of projectile point, "Eastern Triangular" was represented by eight specimens. A single "McKean" point was also recovered. These projectile points and the seven unclassified ones, will be described in the following sections using a format established by Kehoe (1967).

Analysis was conducted using a series of metric and non-metric attributes similar to those used by Nicholson (1976b). The attributes utilized in this study and data derived from Aschkibokahn projectile

points are listed in Appendix A-2. All measurements are in millimeters.

Plains Side-Notched

At the Aschkibokahn Site, 13% of the projectile points recovered were of this type. Kehoe (1966:832) defined this type as having,

a well-defined outline with sharp angles at base and notches. Symmetry was valued...The flaking is usually well executed. ...Notches are small, deep, and narrow, an acute U in shape, placed fairly high on the blade....The base is [as wide] or wider than the proximal end of the blade.

Sample. Two complete and three incomplete (Plate 25a-d & h).

Material. Two are made of Swan River Chert, and three are Cathead Chert.

Flaking. Points exhibit well-executed bifacial flaking, except when poor quality material obscures technique. Primary flaking is bifacially massive extending beyond the mid-section. Flakes scars are lamellar and flat. Small, continuous marginal retouch is also evident, except in the neck area.

Base. Straight to slightly convex bases are exhibited by points from Aschkibokahn. Kehoe, in his 1966 study of Plains Side-Notched points, did not include points with convex bases in this type, but their other characteristics fit the type description. Another discrepancy can be noted in the proportions of one point (Plate 25b) which has a basal width less than the width of the proximal end of the blade. Half of the bases demonstrate basal grinding.

Notches. In all the specimens of this type, notches are distinctly defined by sharp angles at the shoulder and upper base, yet are shallow and fairly narrow. Notch height averages 3.2 mm and notch depth has a mean of 1.8 mm. In three cases, notches are located high on the blade, as is typical of this type.

Size: The three complete specimens measure 24.9, 26.9, and 29.3 mm in length. Compared to Kehoe's (1966) sample, these specimens are small. Other size data are listed in Appendix A-2.

Transverse Section. Biconvex.

Longitudinal Section. Biconvex.

Shape. Sides are straight to convex. The blade is triangular in one case, ovate (elongated) in another, and subconvex in the third.

Varieties. "Paskapoo Square-Ground Base" and "Emigrant Basal Notched", as defined by Kehoe (1966:832), are the only recognized varieties present in this collection. Only one of each variety was recovered.

Plains or Eastern Triangular

Twenty-seven percent of the projectile points excavated are of the "Eastern Triangular" Type as defined by MacNeish:

These points are isosceles triangular in outline with slightly convex lateral edges and have from straight to slightly convex bases. They range in length from 9 to 32 mm, in width from 11 to 21 mm, and in thickness from 1 to 6 mm. The average is about 24 mm long, 16 mm wide, and 3 mm thick...These points are, for the most part, made from thin flakes fashioned into shape by pressure flaking along their edges. Only a few have pressure flaking on their surfaces (1958:103).

Sample. Three complete and five incomplete (Plate 25 n-u).

Material. Five are made of Swan River Chert and three are Cathead Chert.

Flaking. Extreme variance in the quality of flaking and overall execution. This may be attributed to the variability in available raw material. Primary flaking is either lacking or obscured. Secondary flaking is normally restricted to the margins, and flakes often terminate in step fractures. One exception (Plate 25s) is well made with

bifacially deep, massive, lamellar scars running obliquely across either face. On one face, scars terminate abruptly in step scars. The base displays short lamellar scars which are perpendicular to the basal edge.

Base. Slightly concave, straight or convex. Thirty-eight percent are basally ground.

Size. Overall length runs from 17.4 to 23.4 mm with a mean of 20.7 mm. The projectile points are slightly smaller than the side-notched types.

Transverse Section. Two are biconvex, three are biplano, one is asymmetrically biconvex, one is plano-convex, and one is convexo-triangular.

Longitudinal Section. Longitudinally, these artifacts are diverse. Two are biconvex, and two are asymmetrically ovate. The remaining four are concavo-convex, asymmetrically biconvex, plano-convex, or excurvate.

Shape. Mayer-Oakes (1970:131-132) observed three shape varieties in the collection from the Tailrace Bay Site. The shapes are "equilateral", "isosceles" and "tear drop".



Equilateral



Isosceles



Tear Drop

The Aschkibokahn sample does not readily fit into these categories. One point is isosceles in contour, but the sides are slightly convex rather than straight, and the base concave (due to a hinge fracture). In the remaining seven, basal widths tend to be restricted, expanding into convex midsections, as in the tear drop

shape, but bases are not limited to the concave shape.



Typical Aschkibokahn Shape

Varieties. Unfortunately, a rigorous definition of Eastern or Plains Triangular varieties has yet to be realized. Mayer-Oakes (1970) divided his sample of eleven into three varieties based upon shape. Application of this method to the Aschkibokahn sample proved unsatisfactory. None of the specimens resembled Mayer-Oakes' variety descriptions.

Nicholson (1976b) also suggested three subdivisions of the type based upon flaking, blank selection, and basal characteristics. This system proved to be more satisfactory when applied to the Aschkibokahn sample. Fifty percent of the points from Aschkibokahn were found to be of the NT-1 variety, 38% are NT-2, and 13% are NT-3 (Nicholson 1976b:68).

Prairie Side-Notched.

Kehoe (1966:830) defines this type as follows:

Comparatively irregular in outline, with poorly defined angles, the Prairie Side-Notched points bear very mediocre bifacial flaking that often leaves portions of the original surface of the blank unretouched. Flake scars are broad and conchoidal, with numerous lumps, rough areas, and hinge fractures. The poor quality flaking and lack of symmetry are distinguishing characteristics of the Prairie Side-Notched Type...Large, wide, shallow V- to U-shaped side notches are sometimes so low on the blade that they would ordinarily be classified as corner notches... [The base is] predominantly narrower than the proximal end of the blade, although it may be equal to or wider than the blade in some specimens.

Sample. Two complete and four incomplete (Plate 25e, f, j, l, and i).

Material. Three are Swan River Chert, one is Selkirk Chert, and one is composed of an unidentified material.

Flaking. Irregular, expanding scars typify these points. Coarse textured material often also contributes to obscuring flaking patterns. Central blade portions are unworked and often bulge with lumps and hinge fractures.

Base. Straight to slightly convex. Thirty-three percent show signs of basal grinding.

Notches. Notch height is fairly consistent. Range: 3.2-4.6 mm; mean: 3.7 mm. Notches tend to be shallow in depth. Range: .9-3.2 mm; mean: 1.7 mm.

Size. Length ranges from 15.9 to 23.2 mm with a mean of 19.2 mm. Maximum width varies from 10.5 to 18.9 mm, and has a mean of 13.9 mm.

Transverse Section. Of a sample of five, three are biconvex, one is convexo-triangular, and one is asymmetrically biconvex.

Longitudinal Section. The five specimens show a range of longitudinal sections. One of each are asymmetrically biconvex, asymmetrically concavo-convex, concavo-convex, biplano, and biconvex.

Shape. Blade shape is triangular in a single case, incurvate on one, ovate on two, and excurvate on two. All exhibit varying degrees of asymmetry. Sides are straight to slightly convex.

Varieties. Two points fit the "Tompkins Side/Corner-Notched", and two the "Nanton Wide Rounded Base" and the "Lewis Narrow Round Base" Variety (Kehoe 1966:831).

McKean.

The McKean Complex in the Province of Manitoba has been discussed by Syms (1969, 1970). He describes the McKean Type as being,

narrow, medium sized, lanceolate points with concave bases. The range of lengths is 25-60.5 mm (*circa* 1-2½ in) with most specimens being under 50 mm...The sides may be curved or parallel but tend to converge towards the base...Lateral grinding is confined to the stem and shoulders of the Duncan and Hanna variants, and to the basal end of the McKean Lanceolate variant (Syms 1970:123-125).

Sample. One incomplete (Plate 25v).

Flaking. Flaking is partially obscured by the material. The blade is thick; only a minor attempt at thinning is evident. Bifacial, irregular marginal flaking along the lateral and basal edges, and hinge scars along alternating faces were observed.

Sides. There is evidence of lateral grinding along one of the slightly excurvate edges.

Base. It has a concave, eared base with a thinned base typical of the McKean Type. The base appears to have been ground.

Size. Undetermined length due to a missing tip. Maximum width is 15 mm.

Transverse Section. Biconvex.

Longitudinal Section. Biconvex.

Shape. Parallel ovate with evidence of lateral grinding along one of the slightly excurvate edges.

Varieties. The McKean Type is separated into three varieties: Duncan, Hanna, and McKean Lanceolate (Syms 1969). This point is of the latter variety.

Unclassified Projectile Points.

Eleven projectile points are listed in Appendix A-2 as unclassified either because they were broken (eight) or they did not fit established categories (three).

Specimen one (Plate 25w) is complete except for an absent tip and

base segment. It has an excurvate blade, an asymmetrically biconvex transverse section, a biplano longitudinal section, and is composed of brownish gray Cathead Chert. No evidence of grinding or polishing was observed. Primary flaking is massive, though irregular on one face, and marginal secondary retouch is crude. It is poorly made, being asymmetrical in shape. Though it appears to be stemmed, part of the base is missing. This point may be an asymmetrical "Oxbow" Type or possibly a reworked Late Prehistoric point.

Projectile point two (Plate 25k) is characterized by an excurvate-incurvate blade, a blunted tip, an unground subconvex base, an asymmetrically biconvex transverse section, an excurvate longitudinal section, and is made of gray Swan River Chert. Flaking is irregular and is obscured by the coarse nature of the material. The center portion of the blade is unworked. Though the low quality of manufacture suggests the Prairie Side-Notched Type, the rounded base is distinctly wider than the proximal end of the blade which is diagnostic of the Plains Side-Notched Type.

The third specimen (Plate 25m) is distinguished by the poor flaking of a Prairie Side-Notched Type, but once again the width of the proximal end of the blade is less than that of the base. The blade of this point is asymmetrically triangular, the base is unground subconvex, the transverse section is biconvex, and the longitudinal section is biplano. Cathead Chert was utilized in its manufacture.

Plate 26a-e shows five projectile point tips. Notable is the location of the breaks which separated tips from the missing bases. All broke at approximately the same point in the blade just above the base. None of these tips could be matched to bases, but a majority of Eastern

Triangular projectile points were missing tips. Possibly the hafting of this type of point combined with its form contributed to the frequency of breaks separating tips from bases (Leo Pettipas, personal communication).

Drill Bases

Of the four, one is fractured above the abrupt constriction to the shaft of the drill bit (Plate 27b). The base is rectangular in shape, transversely biconvex, and longitudinally excurvate. Irregular expanding primary flake scars extend to the centerline, while deep, irregular secondary flake scars occasionally terminate in hinge fractures.

The remaining three are considered as possible drill bases (Pettipas, personal communication). Their rectangular outline and manufacture resemble the drill base discussed above, but they may instead be knife bases. None of these artifacts display grinding or polishing.

Maximum length: indeterminate.

Width: Range 1.5-13.2 mm; Mean 5.5 mm.

Thickness: Range 3.1-6.0 mm; Mean 4.3 mm.

Knives

Shape of the tools and quality of workmanship vary widely in these six specimens. All are incomplete, but two were utilized after breakage. One is a biface tip which shows wear on both lateral edges and along the midline break (Plate 28c). The other (Plate 28b) is well made; lamellar scars extend beyond the blade midpoint on one side, while the other side displays shorter expanding scars and secondary conchoidal scars. Tertiary flaking was observed on all edges including

those along the fracture. Attributes are listed in Appendix A-3.

Maximum length: indeterminate.

Width: Range 27.1-46.2 mm; Mean 34.12 mm.

Thickness: Range 5.6-13.5 mm; Mean 12.98 mm.

Unifaces

End Scrapers

Eighteen specimens comprise the 1976 sample (Plate 29); fifteen are complete. Uniface attributes are listed in appendix A-4. In planview, shape is most commonly triangular (39%) or rectangular (39%). Examination of the transverse section reveals that the most common configuration is biplano (34%), closely followed by asymmetrically biconvex (28%), and plano-triangular (22%). Asymmetrically ovate (50%) is by far the most common longitudinal section.

The majority of the end scrapers are composed of Swan River Chert (61%). Twenty-eight percent are of Cathead Chert, and 11% are of Selkirk Chert.

Striking platforms were observed on 50% of the specimens. Angles of the distal working edge averaged 60°. Wear, as indicated by diminutive ovate scars, is generally restricted to the distal end (44%), or the distal end and right lateral edge (22%). A smaller percentage (17%) show wear on both laterals as well as the distal end. A minority (5%) bear signs of utilization on all edges.

Length: Range 15.7-41.1 mm; Mean 23.8 mm.

Width, distal end: Range 15.7-41.1 mm; Mean 23.6 mm.

Width, proximal end: Range 2-24.2 mm; Mean 21.6 mm.

Width, midsection: Range 11.1-30 mm; Mean 19.8 mm.

Maximum thickness: Range 4.0-13.5 mm; Mean 6.8 mm.

Side Scrapers

Out of a small sample of five, three are complete (Plate 29). Unlike the end scrapers, shape is extremely variable. The complete specimens differ both in transverse and longitudinal sections. Lithic materials used in tool manufacture are divided between Swan River Chert (40%), and Cathead Chert (10%). Wear is restricted to the lateral margins except in one case, where the distal edge shows polish and tertiary flaking. In three cases, striking platforms are present. The average angle of the distal working edge on side scrapers is less than that found on end scrapers; it is 40°.

Length: Range 17.5-44.2 mm; Mean 30.9 mm.

Maximum width: Range 11.7-28.1 mm; Mean 19.9 mm.

Maximum thickness: Range 3.4-6.7 mm; Mean 4.0 mm.

Utilized Flakes

Material

Of a total of fifty-nine utilized flakes, thirty-four are made of Swan River Chert, eleven are of Cathead Chert, six are of Selkirk Chert, four are of Knife River Flint, and four are made of unidentified lithic materials.

Size

Casual visual inspection of the utilized flakes appeared to indicate that they could not be easily grouped into size categories. If size groups could be determined it might indicate that the users may have deliberately selected a certain size range. If so, these flakes may have then been mounted in handles and used as tools.

In order to test this observation, measurements of each item were processed using an APL Assorted Routines Program which calculated

the area of each flake. Descriptive statistics and a frequency histogram were requested. The sample of fifty-nine was divided into ten classes at intervals of 200 mm². The resulting histogram (Fig.10) was unimodal and demonstrated a positive skewness. The relative frequency distribution of the areas of the utilized flakes showed a preference for flakes 400 mm² in size.

Ground Stone

A single ground stone artifact was recovered (Plate 30). This wedge-shaped fragment appears to be the edge of a larger tool. The tapered edges are smooth while the butt end is rough as if broken. Longitudinally, it is biplano in shape and is asymmetrically plano-triangular in transverse section. The lithic material seems to be slate.

Length: 70 mm.

Width: 17.5 mm.

Thickness: 9 mm.

Distribution of Lithic Artifacts

The vertical distribution of lithic artifacts is summarized in Table 9. Isolated Plains Side-Notched points were recovered from levels 3 and 5, and three were found in level 7. Vertical distribution of Eastern or Plains Triangular points include levels 4, 5, 6 and 7 with a tendency towards the middle levels. Prairie Side-Notched points appeared to be scattered randomly. They were found in levels 1, and 4 through 7. An isolated McKean point was found in level 5. Of the end scrapers, most were concentrated in the middle levels 5-8, while side scrapers appeared to be widely distributed. Miscellaneous befaces were found in levels 6, 7, 10, and 11 and 12. Drills appeared in the

Figure 10. Utilized flakes descriptive statistics and size frequency histogram.

HISTOGRAM (Frequencies)

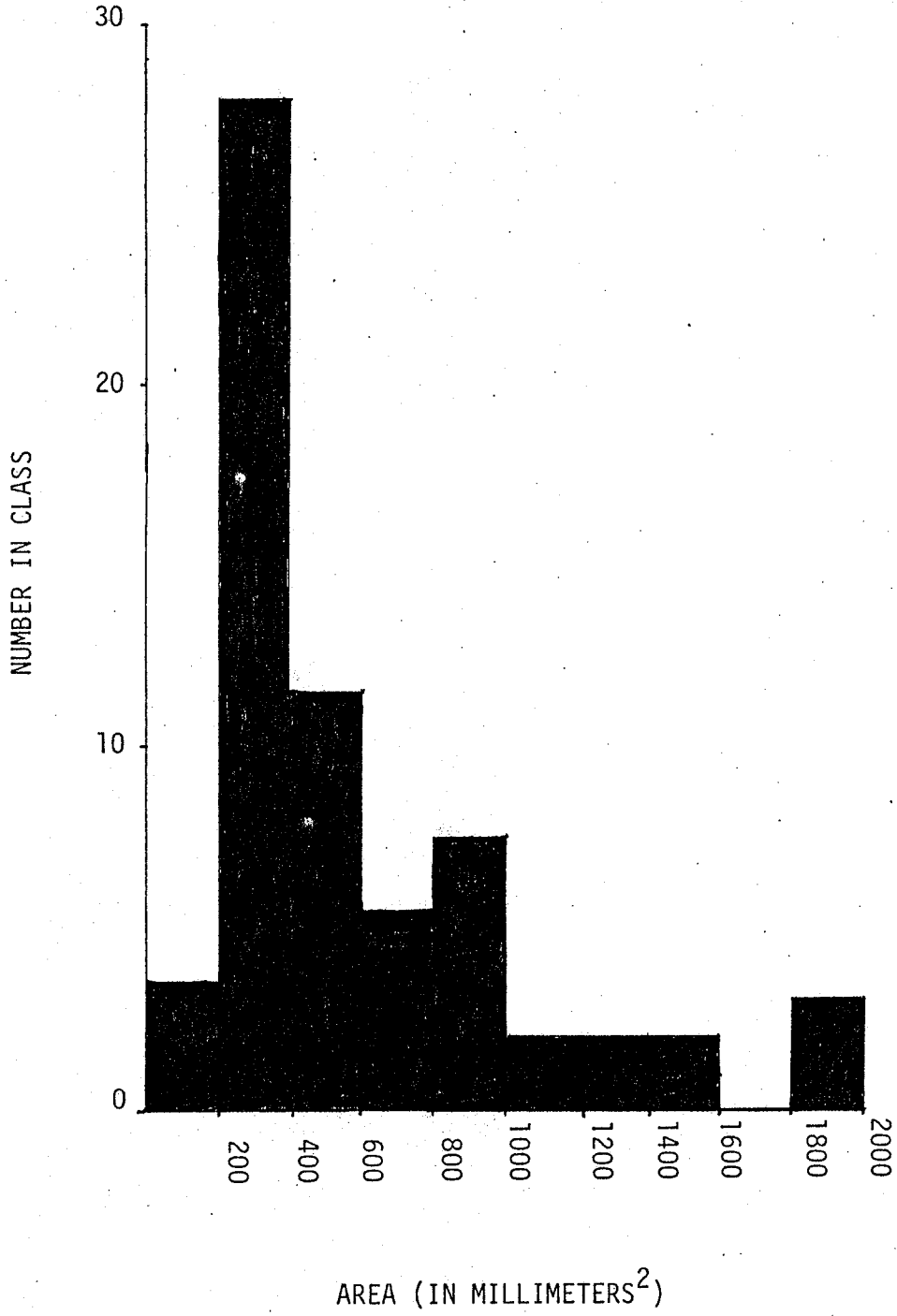


TABLE 9. VERTICAL DISTRIBUTION OF LITHIC ARTIFACTS

	Projectile Points				End-Scrapers	Side-Scrapers	Misc. Biface	Drills	Ground Stone	Utilized Flakes	Total
	P	Pr	T	M							
Surface						1				1	2
1		1								1	2
2										3	3
3	1	1								0	2
4		1	1		1					6	9
5	1	1	2	1	5	1		1	1	11	24
6		2	2		4		1	2		8	19
7	3	2	1		5	1	3	1		10	26
8		1			2					9	12
9					1	1				2	4
10							1			0	1
11&12							1			3	4

P = Plains Side-Notched Type
 Pr = Prairie Side-Notched Type
 T = Eastern or Plains Triangular Type
 M = McKean Type

central levels. The single ground stone fragment was located in level 5. Utilized flakes appeared in all levels except 3 and 10, but were more frequent in levels 4-8.

The horizontal distribution of lithic artifacts is illustrated in Table 10. Projectile points, end scrapers, drills, and utilized flakes were widely scattered. All of the side scrapers were found in unit 22N22W, and miscellaneous bifaces came from the western units. Of interest is the fact that few lithic tools, with the exception of utilized flakes, were found in unit 14N8W. This unit contained large amounts of fish bone. This may indicate an activity in which utilized flakes were used for butchering.

Lithic detritus occurred most frequently in the middle levels, following the trend observed in lithic artifact distribution, but differed in that in several units, 10N22W, 28N2W, and 20N18W, there is an apparent decrease and then an increase of frequency in the lower levels. This is not paralleled in artifact distribution. Horizontal distribution of lithic detritus is similar to that displayed by lithic artifacts. Lithic detritus is more frequent in units 22N22W, 20N18W, and 10N22W, and less frequent in units 14N8W and 28N2W.

Summary and Discussion

The lithic tool assemblage of the Aschkibokahn Site features a predominance of projectile points, scrapers, and utilized flakes. A minority are knives and possible drill bases. A single ground stone tool was recovered.

The projectile points are divided into four types: Plains Side-Notched, Eastern or Plains Triangular, and McKean. The side-notched and triangular points comprise the majority with a slight predominance

TABLE 10. HORIZONTAL DISTRIBUTION OF LITHIC ARTIFACTS

	14N8W	10N22W	20N18W	22N22W	28N2W
Projectile Points	3	6	6	6	9
End-scrapers	3		5	7	3
Side-scrapers				4	
Miscellaneous Bifaces		2	3	2	
Drills		1	1	1	1
Ground Stone				1	
Utilized Flakes	16	5	7	14	13
Total	22	14	22	35	26

of Prairie Side-Notched projectile points. Comparison of these points with Kehoe's (1973:50) Small Side-Notched Point System indicates that this type was in use in the Northern Plains from about A.D. 730 \pm 80 until A.D. 1250 \pm 80, but that Aschkibokahn points resemble the late varieties dating from A.D. 785 \pm 80 until A.D. 1250 \pm 80. The Plains Side-Notched points from Aschkibokahn display characteristics similar to the earlier varieties of this type, i.e. notches are shallow and more "U"-shaped than rectangular and base shapes are compatible to early Plains Side-Notched. The early varieties have been dated *circa* A.D. 1590 \pm 150. Unfortunately such a rigorous, dated typology is not available for triangular points, but these are usually regarded as Late Prehistoric (MacNeish 1954). The presence of a single Middle Period point, a McKean, may represent a short term early occupation, or it may have been introduced by a Late Prehistoric collector. Thus, a chronology of site occupations based upon projectile point typology indicates that occupations occurred primarily during the Late Woodland Period. This chronology is supported by the 1977 radiocarbon dates of A.D. 1255 \pm 175 and A.D. 1180 \pm 110.

Although the faunal assemblage contains a large quantity of fish bones, few lithic tools associated with fishing were recovered. For instance, no net sinkers were found. This may indicate that other means of exploiting this resource were employed. Furthermore, the question is raised as to what tools were used in butchering and processing fish? The unexpected scarcity of bifacial knives in a site where fish processing was undoubtedly a major activity may indicate that utilized flakes were also used in butchering. The lithic assemblage is dominated by projectile points which are generally regarded as hunting tools.

Of the processing tools, end scrapers are the most plentiful. These are believed to have functioned in the processing of animal hides.

6. HISTORIC ARTIFACTS AND BONE TOOLS

Introduction

No separate historic component was observed during the 1976 Aschkibokahn Site excavations, although a few historic artifacts were recovered from the upper levels of three units. However, bone tools were numerous and some were used in resource exploitation. Bone tools from the 1976 excavations include twelve awls, eight bird bone beads or tubes, two chisels, two antler handles, two harpoons, two needles, a spatula, a wedge or flesher, and four miscellaneous tools. The historic artifacts and bone tools will be described and their functions briefly discussed.

Historic Artifacts

The historic component in the study area is extremely limited, despite the fact that local villagers report that the island was occupied up until 1950, and is visited every Spring by employees of the Provincial hatchery. Apparently recent occupations are limited to the northern and central areas of the island. Excavation of the upper three levels of units 14N8W, 22N22W, and 28N2W (Table 11 and Appendix E) in the study area on the southern tip produced the following artifacts: two small fragments of brown bottle glass, one lead pellet, three small fragments of clear glass, several unidentifiable fragments of rusted metal, a 22 caliber shell in good condition, a small, green "seed" bead, and a plain, cast whitemetal button (Plate 31). Most of the historic materials appear to have been

TABLE 11. HORIZONTAL DISTRIBUTION OF HISTORIC ARTIFACTS

	14N8W	10N22W	20N18W	22N22W	28N2W
Bead	1				
Lead pellet				1	
Button				1	
22 caliber shell					1
Clear glass					3
Square nail					1
Brown glass					2
Total	1	0	0	2	7

discarded recently with the exception of the seed bead, possibly the lead pellet, and the button which dates *circa* A.D. 1750-1812 (Olsen 1963:552).

Bone Tools

The analysis of the bone tools began by identification of the species and element used in tool manufacture. The artifacts were measured and the degree of modification described. Tools were then grouped into general functional categories for descriptive purposes.

Awls

The term "awl" means a tool which was presumedly utilized for piercing. This use is implied by a pointed end exhibiting polish or some other sign of wear on and near the tip of the points. Of the twelve awls recovered, three (Plate 32f-h) were constructed from the proximal half of the right or left femur of adult muskrats (*Ondatra zibethicus*). The shafts of these femurs have been broken at an angle, the broken edges of which show considerable wear and polish. They are 24 mm in maximum length but vary in width.

Most of the awls were manufactured from splinters of long bone cortex fragments from medium to large mammals. A pelvic bone of a large bird provided the material for a flattened, tapered trianguloid tool with polish on the tip (Plate 32e). Typical awls made from shortened and polished accessory carpals of moose (*Alces alces*) were also present. One is complete (Plate 32d), but the distal end is missing from the second (Plate 32c). The final awl displays a sharp break on one end and a polished, faceted fan-shaped area on the opposite end which narrows to a single sharp point (Plate 32a). Longitudinal facets have been removed from one side which is also characterized by

chatter marks. A cortex fragment, probably from the posterior cranial lateral portion of a large mammal metatarsal, was used to create this tool. Table 12a gives the dimensions of these artifacts.

Bird Bone Beads or Tubes

Eight specimens fall into this category; five of which have been completed (Plate 33a-e), and three show signs of partial manufacture (Plate 33f-h). The raw materials for these artifacts were long bone shafts from medium, large (goose-sized) birds. Following the removal of the distal and proximal ends of the long bone by a series of transverse cuts, the resulting rough edges were polished and the bead or tube complete. The dimensions of the four completed beads and one tube are listed in Table 12b.

Of the three partially completed artifacts, one (Plate 33f) is a section of a shaft from a medium to large bird unaltered except for a series of light transverse cuts near the break on one end. The second (Plate 33e) is from a similar source, but the cut, successfully achieved only on one end, is partially smoothed. The third (Plate 34), also from a similar source, is characterized by a partially scalloped edge, while the other end displays a jagged break.

Chisels

Two beaver incisors (*Castor canadensis*) have apparently been modified to form chisels. One (Plate 35a) shows possible alteration on the anterior 5 mm of the lingual surface of the tooth where polish is evident and the enamel has been narrowed to a width of 4 mm. This incisor is split longitudinally. Another specimen (Plate 35b) shows more drastic alteration. The dentine has been cut away almost to the level of the enamel, thinning the tool to 3.5 mm and reducing the

TABLE 12a

DIMENSIONS OF BONE AWLS IN MILLIMETERS				
Catalogue Numbers	Maximum Length	Maximum Breadth	Maximum Thickness	Plate
MDI-2	160	12		32a
MDI-706	38	11		-
MDI-4177	102	15	7	32d
MDI-4495	49	9		-
MDI-6089	71	25		32e
MDI-6103	25	6		-
MDI-8932	58	7		32b
MDI-10125	59	11		-
MDI-10299	72	11	8	32c

TABLE 12b
DIMENSIONS OF BIRD BONE BEADS AND TUBES

Catalogue Numbers	Maximum Length	Maximum Breadth	Hollow Centre Diameter	Plate
MDI-3966	50	5	4	33h
MDI-4388	27	6	3	33d
MDI-6402	28		5	33e
MDI-7380	89	9	5	33f
MDI-7430	49	8		34
MDI-7624	13	8		33c
MDI-8242	12	14		33b
MDI-10952	13	7		33a

occlusal surface angle. Only 18.5 mm of the incisor's tip remains, as the rest of the tooth has been removed. The resulting surface is concave, possibly more a reflection of use rather than manufacture. The lateral edges are unmodified, and the tool's maximum breadth is 8 mm.

Antler Handles

The first specimen (Plate 36b) is a split moose (*Alces alces*) antler which has been sawn at both ends and the sides flattened. Running longitudinally down the center of the convex surface is a groove 3 mm deep and 8.5 mm wide, also with flattened bevelled sides. No attempt was made to smooth either the surfaces or ends of the handle, but the groove has been polished lightly. The artifact is 132 mm in maximum length and 31 mm in maximum breadth. Another moose antler was similarly modified but lacks the central groove. The antler is not split but once again lacks any evidence of surface smoothing. It (Plate 36a) is 143 mm in maximum length and 28 mm in maximum breadth. It appears that these artifacts, when completed, were intended to function as handles for knives or scrapers as is pictured in Miles (1963:79).

Harpoons

Material evidence of fishing from the 1976 excavations is represented by one complete antler harpoon (Plate 37a), and one long bone cortex harpoon base (Plate 37b). Using MacNeish's (1958:129-133) terminology, the former would be classified as a "unilateral pointed barbed antler point", whereas the latter is the base of a "unilateral square-barbed...point". Four barbs protrude from one face, and the body is highly polished with longitudinal striations on one side. It narrows to a point at one end and terminates in 87 mm in an oblique

flat edge. Cut marks are visible in the grooves between barbs. It is well made, 17 mm in breadth, 7 mm thick, and complete except for the lack of drilled line hole typical of most harpoons. The second specimen also lacks a perforation but displays a notched base. A single squared barb has been carved in one face. The tip and mid-sections are missing. It is 51 mm in maximum length, 17 mm in maximum breadth, and 5 mm thick. Previous amateur excavations recovered approximately two harpoons per unit. All but one of these were pierced below the lowest barb, had thinned bases, and were unilaterally barbed (Syms, personal communication).

Bone Needles or Leisters

Two cortex fragments of bird or mammal bones have been carved to a desired thinness, tapered at one end, and flattened at the other to form bone needles or leisters. One (Plate 38b) demonstrates uniform polish, but the other (Plate 38c) still exhibits the longitudinal facets of manufacture. Neither of these needles has been pierced to form "eyes". Another (Plate 38a) flattened cortex fragment has been biconically bored and may represent an "eyed" needle. The two complete specimens have the same dimensions: length of 39 mm, and breadth of 4 mm, and the possible "eyed" needle is 35 mm in length and 5 mm in breadth. These may have also been leisters used in catching fish.

Spatula-shaped Tools

A burned cortex long bone fragment (Plate 35c) has been flattened and slightly tapered to a rounded end. The opposite end terminates in a sharp break. Oblique striations on the external surface are partially obliterated by polishing. Several transverse striations are also visible on this surface. This specimen is 75 mm long and 17 mm in

breadth.

Wedge or Flesher

Due to the intensive wear which blunted the working edge and the sharp break that removed the handle or the hafted end, it is difficult to state the function of this wedge-shaped artifact with any degree of confidence (Plate 39). It was manufactured from the anterior distal shaft of a metatarsal, possibly that of a moose (*Alces alces*). The edges are tapered rather than flattened and the exterior surface polished. The dimensions are 101 mm in maximum length, 32 mm in maximum breadth across the broken end, and 20 mm across the tapered end.

Miscellaneous Bone Tools

One end of this specimen (Plate 40) is rounded by a series of faceted cuts, and the other tapers to a gentle flat-nosed hook. The center section has been flattened on the same plane as the hook, has a minimum thickness of 5 mm, and expands to 16.5 mm in thickness at the rounded end. All sides have been faceted to give it a distinctive shape, and many cut marks are visible on all surfaces particularly on the under-surface of the hook. The entire artifact has been smoothed, but polish is most notable on the upper side of the hook. The maximum length is 97 mm, and the maximum breadth is 15 mm. Suggested functions of this artifact include pottery decorator, pestle for pounding vegetable matter, and net maker.

Three bone fragments (Plate 35d-f) display unnatural serrated breaks on at least one edge. Though no wear is evident, it is speculated that these edges could have served as pottery decorators, as the bone fragments were too small to be used as scrapers.

Distribution of Bone Tools

Bone tools were widely distributed over four of the units but were sparse in unit 10N22W, the unit nearest the marsh (Table 13). Awls and miscellaneous tools were found most often in 20N18W, beads in 28N2W, and the others occurred generally in 14N8W or 22N22W. Vertical distribution (Table 14) of bone tools tended towards the middle levels, 5, 6, and 7; a trend concurrent with most of the other artifacts.

Summary

The historic tools are few in number, limited to the upper three levels, and generally of recent origin. A single artifact, the button, indicates that possibly the island was visited or briefly occupied during the late sixteenth or early seventeenth century.

Bone tools recovered during the 1976 excavations include awls, bird bone beads or tubes, chisels, antler handles, harpoons, needles or leister tines, a spatula, a wedge or flesher, and several unidentified tools. Several of these served in resource exploitation. Harpoons and leister tines were undoubtedly used in either the harvest of fish or medium mammals, or possibly both. Scrapers or knives were probably hafted in antler handles and used in processing foods.

TABLE 13. HORIZONTAL DISTRIBUTION OF BONE TOOLS

	10N22W	14N8W	Unit 20N18W	22N22W	28N2W	N.P. ¹	Total
Awls		2	4	2	1	3	12
Beads or Tubes	1	2		1	4		8
Chisels		1		1			2
Antler Handles		1		1			2
Harpoons			1	1			2
Needles or Leisters		1		1			2
Spatulas	1						1
Wedge or Flesher					1		1
Miscellaneous		1	3				4
Total	2	8	8	7	6	3	34

TABLE 14. VERTICAL DISTRIBUTION OF BONE TOOLS

	1	2	3	4	5	Levels 6 7 8			9	10	11&12	N.P. ¹	Total
Awls	1				1	3	1		2		1	3	12
Beads or Tubes			1	1	1	1	4						8
Chisels					2								2
Antler Handles					1	1							2
Harpoons					1			1					2
Needles or Leisters					1	1							2
Spatula							1						1
Wedge or Flesher						1							1
Miscellaneous						1	1		2				4
Total	1	0	1	1	7	8	7	3	2	0	1	3	34

1. No provenience

7. THE ENVIRONMENTAL SETTING AND POTENTIAL RESOURCES

The Regional Environment

Physiography and Soils

The Aschkibokahn Site is situated in the Manitoba Lowlands in the low-lying basin of former Glacial Lake Agassiz. This area lies in the Interior Plains physiographic region on the first prairie steppe at an elevation of about 230 m above sea level (Rowe 1972:157). It is bounded on the west by the Porcupine, Duck, Riding, and Pembina Mountains which form the eastern face of the Manitoba Escarpment (Simpson 1970:139). To the north and east is the "mantled rock outcrop of the Precambrian Shield (Rowe 1972:31). Lakes Winnipegosis, Manitoba, and Winnipeg cover much of the Lowlands. This region is flat, poorly drained, and is characterized by numerous lakes and marshes.

The most striking topographic feature of the lacustrine deposits is a series of long, narrow ridges trending northwest parallel to the front of Duck Mountain. These are beach ridges formed along the shores of an ancient lake. The beaches have the effect of diverting in places the stream drainage and act as dams behind which the water is ponded and swamps are formed (Johnston 1921:4).

Soils in the Interior Plains follow distinct geographical zones. In the Lowlands, soils are predominantly black and gray wooded or soils of that association (Ehrlich et al. 1959). These deposits are underlain by Palaeozoic limestone bedrock (Rowe 1972:31).

Vegetation and Climate




The Manitoba Lowlands lie in a dry, subhumid region

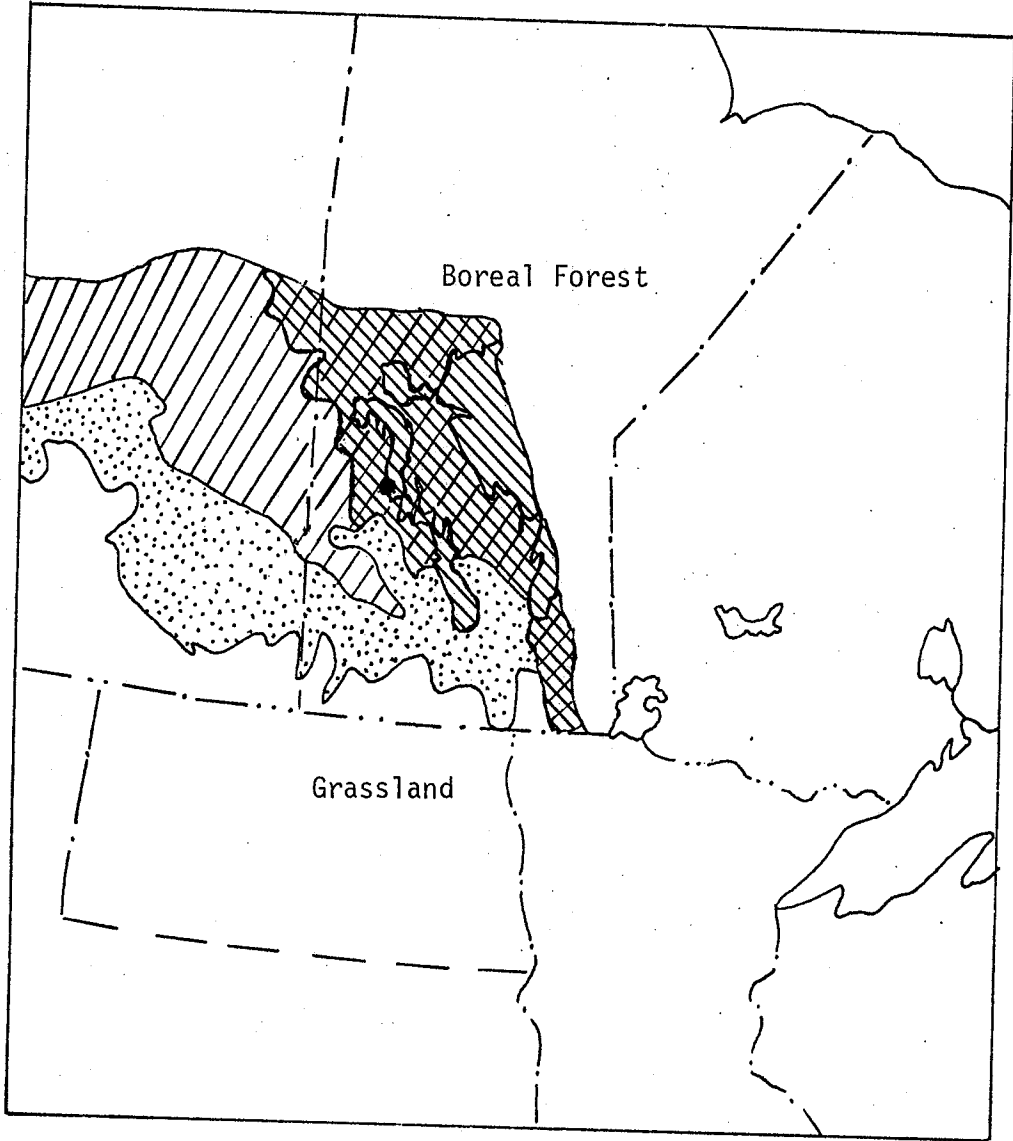
where moisture falls primarily in early summer (Rowe 1972:155, Bird 1930:365). At a typical station, The Pas, the mean annual precipitation is 18 inches. Temperatures range from an average maximum of 75° F in July to an average minimum of -16° F in January, and have a mean of 31° F at The Pas. The annual length of the growing season is 160 days (Rowe 1972:141,156).

The Manitoba Lowlands together with the Mixedwoods to the west form a transition zone between the Southern Boreal Forest to the north and the Aspen Parklands to the south (Kiel et al. 1972:28) (Fig. 11). The Boreal Forest is primarily coniferous; white (*Picea glauca*) and black spruce (*Picea mariana*) are the characteristic species (Rowe 1972:6). The Aspen Parkland, a transitional belt between the Boreal Forest and southern Grasslands, consists of groves of deciduous trees dominated by aspen (*Populus tremuloides*) in a matrix of prairie (Bird 1961). Vegetation in the ecotonal Mixedwoods and Manitoba Lowlands is a blend of the Boreal Forest and Aspen Parkland. The Mixedwoods are well-drained uplands containing a forest association of "a mixture in varying proportions of trembling aspen and balsam poplar, white and Alaska birches, white spruce and balsam fir" (Rowe 1972:36). Nutrients from the uplands are washed into the lowlands which enrich the soils and waters. The prevailing vegetation of the Manitoba Lowlands consists of,

black spruce and tamarack, with intervening swamps and meadows. Good stands of white spruce, trembling aspen and balsam poplar, sometimes in mixture with balsam fir and white birch, occur on the better-drained alluvial strips bordering rivers and creeks. In the central interlake area, the effects of repeated fires and poor sites (shallow, limestone soils) are reflected in stands of scrubby, worthless aspen...Also present locally are white elm, green ash, Manitoba maple and eastern white cedar (ibid.:31).

Figure 11. Biotic communities of Manitoba (after Kiel et al. 1972:28, and Rowe 1972).

-  Mixedwood
-  Aspen Parkland
-  Manitoba Lowlands
- Aschikibokahn Site



The Local Environment

Physiography and Soils

Aschkibokahn Island, on which the site is located, is part of a marshy delta at the mouth of the Duck and Drake Rivers (Fig. 12). It is near the marshy western shore of Lake Winnipegosis in the relative shelter of Duck Bay. The area immediately surrounding the island is characterized by a linear pattern of ancient ridges and depressions aligned on a north northeast - south southwest axis. These ridges are separated by linear, shallow, interconnected lakes and marshes. The land rises gradually to the west.

Soils are poorly developed and consist of organic, marsh deposits (C. T. Shay, personal communication). On the island they are underlain by glacial lake gravels and coarse sand with occasional Devonian limestone outcrops (Johnston 1921).

Vegetation

The island is partially forested with elm, black spruce, and other Lowlands trees. Berry bushes, such as high bush cranberry and chokecherry, as well as wild strawberries are scattered throughout. The western edge of the island is marsh (Fig. 12). Both the northern and southern tips are bare of trees. The north is rocky while the south is vegetated with sedges, grasses, aster, and species such as pigweed that are characteristic of disturbed sites. Bulrushes and other marsh plants dominate the shoreline.

Four habitats are found in the immediate vicinity of the site: marsh, open water, meadow, and forest (Fig. 13). Marsh composes most of the island and surrounding terrain. Open water includes the main channels of the shallow Duck and Drake rivers and Lake Winnipegosis. Manitoba

Figure 12. Aschkibokahn Island and surrounding terrain.
(Surveys and Mapping Branch, 1: 50,000 Duck Bay
topographic map).

✻ Marsh

--- Village

⊗ Land

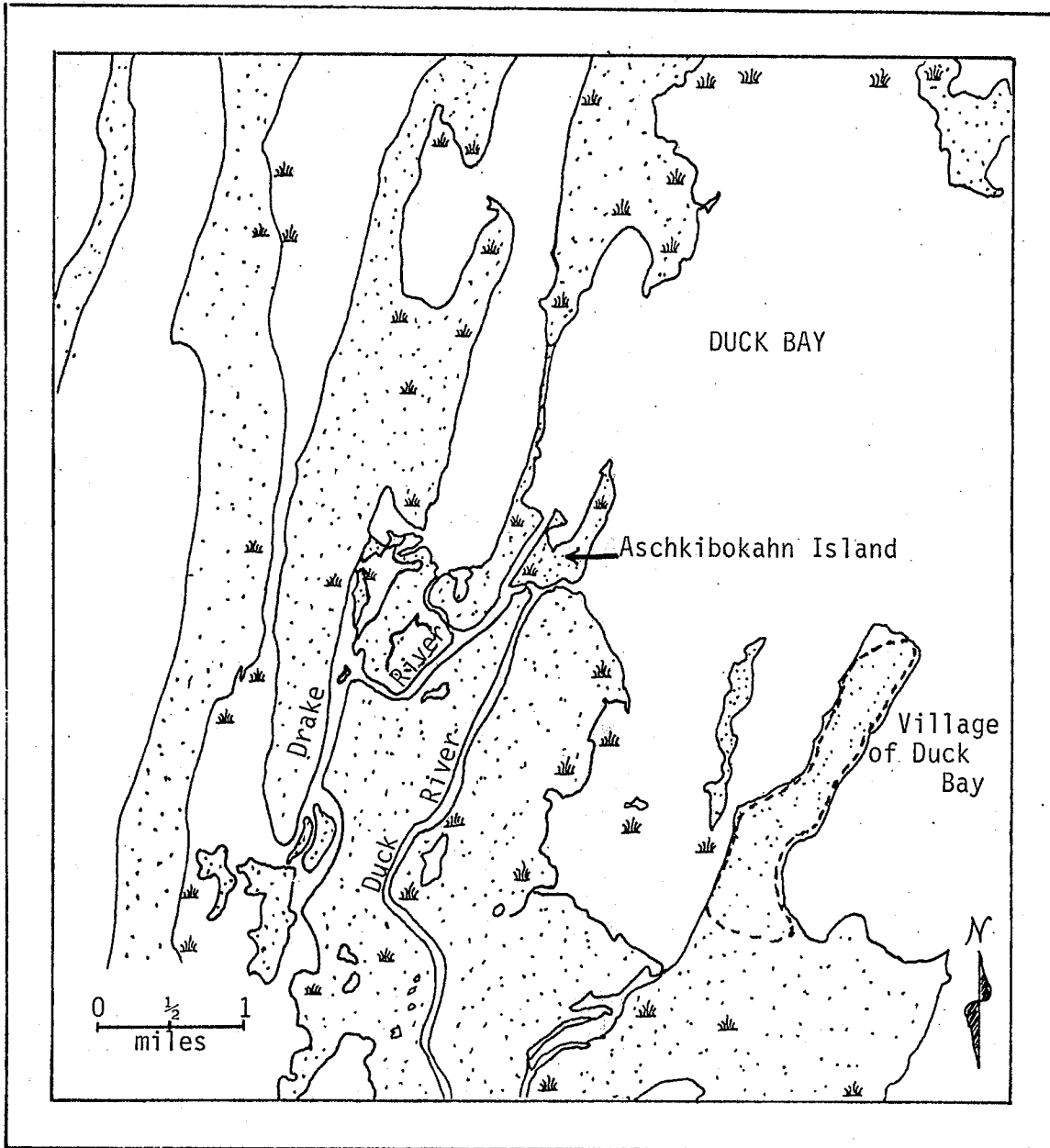
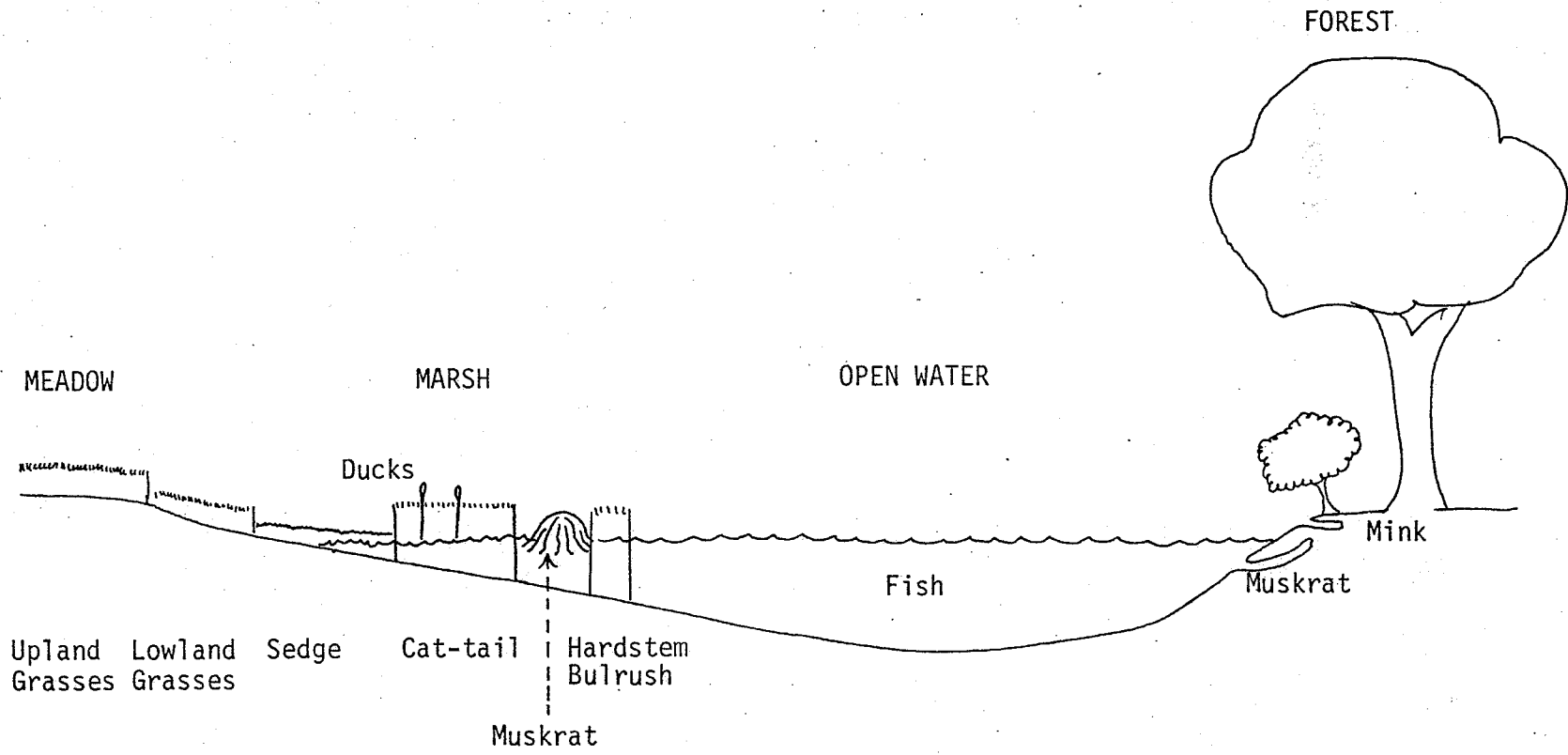


Figure 13. Schematic drawing of habitats around a typical marsh
(after Weller 1978:269).



Lowland forest is represented on the island and on high ground northwest and west of the island. Open areas in the forest are primarily meadow.

The marsh habitat has been defined using different criteria. In this study northern marshes are differentiated from their southern counterparts by their glacial origin. Jeglum et al. (1974) defined marsh as follows:

Marshes are grassy wet areas, periodically inundated up to a depth of 2 meters or less with standing or slowly moving water. Surface water levels may fluctuate seasonally, with declining levels exposing drawdown zones of matted vegetation or mud flats. Marshes are subject to a gravitational water table but water remains within the rooting zone of plants during at least part of the growing season. The substratum usually consists of mineral or organic soils with a high mineral content, but there is little peat accumulation. Waters are usually circumneutral to alkaline, and there is a relatively high oxygen saturation. Marshes characteristically show zonal or mosaic surface patterns of vegetation, comprised of unconsolidated grass and sedge sods, frequently interspersed with channels or pools of open water. Marshes may be bordered by peripheral bands of trees and shrubs, but the predominant vegetation consists of a variety of emergent nonwoody plants such as rushes, reeds, reedgrasses and sedges. Where open water areas occur, a variety of submerged and floating aquatic plants flourish (Appendix A).

This study will place emphasis upon the marsh habitat for several reasons. Most of the area surrounding the site is marsh; it is the predominant and also the most productive of the habitats. "Marshes...have a net primary and edible productivity probably greater than any other sector or zone" (Clarke 1976:464). Despite its overall resource potential, northern marshes have been largely ignored by North American archaeologists as a focus for settlement.

Past Environments

The nearest pollen core is in the Riding Mountain area 150 kilometers to the west. Absolute pollen frequencies combined with carbon-14 dating of the sediments indicate the regional vegetation

pattern during site occupation was similar to the present:

The boreal forest in its present form (dominated by spruce, birch, and aspen, with local occurrences of pine, fir, larch and oak, returned at 2500 B.P., presumably in response to a deterioration in climate (cooler and (or) wetter) (Ritchie 1969:1345).

Pollen studies of Aschkibokahn soil samples concur with Ritchie's findings. Analysis of the pollen samples by Donald S. Slater (Appendix B) suggests that surrounding forests were composed of coniferous and deciduous trees in a mixture similar to that of the present. Meadow and marsh habitats are also indicated and there is evidence of disturbance (Slater 1977:15-16).

Both regional and local studies indicate that the vegetation during the Terminal Woodland Period was essentially the same as present. Presumably, most of the resources available today would thus have been available then.

Potential Resources

In order to understand prehistoric hunter-gatherer subsistence and settlement, one must determine the basic principles underlying their decision making and subsistence patterning. These principles have been outlined by Jochim (1976) in a model applicable to the Aschkibokahn Site. In this model it is assumed that economic behaviour is a result of deliberate, rational, conscious choices that seek to minimize effort and maximize return, and that the choice will tend towards a mixed strategy solution. Decisions are made that minimize risks; therefore, the gathering of food, a low risk, high return operation, is preferred to hunting which often results in high risks and low returns. Settlements are located in areas where a variety of resources can be exploited. The determination of which

foods are to be harvested is based upon criteria such as, the non-food yields (i.e. bones used for tools), ease of exploitation, weight of the food, density of distribution, degree of aggregation of the species, mobility of the resource, and fat content. Many of these attributes vary by season as most animal foods are more desirable or exploitable during certain times of the year, and plants are generally not available for harvest in the winter. Thus archaeological evidence of the resources actually exploited by a group of hunter-gatherers can be used to examine not only the season of occupation of the site and techniques used in exploitation, but also the reasons for settlement location (Jochim 1970).

In order to examine the season or seasons Aschkibokahn was occupied, and to reconstruct procurement activities, a list of plants and animals potentially available at the site is compared with the archaeological evidence of the resources actually exploited. For outlining the potential major foods in the four local habitats, this study relies primarily upon ethnohistorical and ethnographic data drawn from a variety of sources. Lists of major plants utilized by aboriginal peoples were cross-checked with Walker (1965), Hotchkiss (1972), Scoggan (1957), and J. Shay (personal communication) to determine habitat and whether they were native to Manitoba. The source of botanical nomenclature is Scoggan (1957). A similar process was followed for major animal resources using Syms (1976), Shay (1971), Hall and Kelson (1959), and Godfrey (1966). The source of animal nomenclature is Hall and Kelson (1959).

Plant Resources

Appendix C-1 lists potential plant resources, their habitat, and pertinent data for each species. The list is not exhaustive, but contains most of the edible or utilitarian wild plants that are often referred to in the ethnographic literature. Most of the sixty-three listed plants (thirty-three) can be found in the marsh or river, some (sixteen) grow in forested areas, a minority (nine) prefer meadow habitats, and five grow in more than one habitat. Marshes and associated rivers, however, provide a concentrated source of resources.

Altogether, the edible productivity of the water related plant communities is remarkable: ranging from the reed, water-lily, [and] watercress,...(*Scirpus*, *Typha*, *Phragmites*, *Nuphar*...) to the long list of edible waterside grass, clover and herb associations (Clarke 1976:465).

Obviously, not all of these plants were of equal significance. There are three that warrant brief discussion because of frequent reference in the literature. Wild rice (*Zizania palustris*) was extremely important to many woodland groups. It is native to Manitoba Lowlands, but is not known to occur in Lake Winnipegosis (Dore 1969). There is considerable evidence that duck potato (*Sagittaria latifolia*) and cat-tail (*Typha latifolia*) were also valuable. Brief consideration will be given to these important plants.

Wild rice provided some historic and prehistoric groups in the Upper Great Lakes region with important food supply. Other groups harvested it whenever possible (Jenks 1898, Densmore 1928, MacNeish 1958, Jenness 1963). Father Gavriel Marset said of the Cree and the Assiniboine,

They are always wanderers and vagabonds, living by hunting and fishing. Nevertheless, in summer they assemble near the lakes, where they remain two or three months; and afterwards they go to

gather wild oats, of which they lay in a great store (*Jesuit Relations* Vol. 66: 107-109 quoted in Ray 1971:64).

Duck potato may not have been as widely used as wild rice, but it must have been important to the people who camped on Aschikibokahn Island. According to Edward Chartrand, local native informant, the Cree word for the island is *Askipwahkan* (correct spelling of the island name), which means "potato digging" or "potato gathering" (Snortland-Coles 1977:22). Other Duck Bay residents stated that even now, some of them spend their summers gathering wild potatoes on neighbouring islands.

Cat-tails served a variety of purposes. Cat-tail down was used as baby diapers and as burn dressing. The roots were peeled and eaten, while the stalk itself was woven into mats or used in thatching wigwams. This plant was considered useful by the Iroquois, and others living in the Boreal Forest (Gilmore 1919, Fenton 1968, Johnston 1969, Yarnell 1970).

Animal Resources

Only those species historically used for food and utilitarian purposes are considered here. Small rodents, insectivores, bats, insects, reptiles, the avian order of Passeriformes (i.e. sparrows, warblers, and finches), appear not to have been important sources of food. Attention will be turned to game birds, fishes, mammals, and larger game animals native to the area. Because the mobility of most game animals allows them to utilize a variety of habitats, they will be discussed in a group.

Twenty-four mammals of major importance in the Lowlands are listed in Table 15. They are listed in order by weight (Syms 1976).

TABLE 15

MAMMALS OF MAJOR IMPORTANCE FOUND IN THE MANITOBA LOWLANDS
AND THEIR HABITAT PREFERENCE (AFTER SYMS 1976; APPENDIX A-4)^a

Species		Habitat Preference			
Common Name	Scientific Name	Marsh	Aquatic	Open Meadow	Forest
I. Large Mammals					
A. Artiodactyla					
Bison	<i>Bison bison</i>			X	X
Moose	<i>Alces alces</i>	X	X		
Wapiti (Elk)	<i>Cervus canadensis</i>			X	X
Caribou	<i>Rangifer tarandus</i>				X
Mule Deer	<i>Dama hemionus</i>				X
B. Carnivora					
Grizzly Bear	<i>Ursus horribilis</i>				X
Black Bear	<i>Ursus americanus</i>				X
Wolf	<i>Canis lupus</i>		near streams X	X	X
II. Medium-sized Mammals					
A. Carnivora					
Coyote	<i>Canis latrans</i>			X	X
Lynx	<i>Lynx canadensis</i>				X
Bobcat	<i>Lynx rufus</i>				X
Wolverine	<i>Gulo luscus</i>				X
Raccoon	<i>Procyon lotor</i>			X	X
River Otter	<i>Lutra canadensis</i>		X	X	
Red Fox	<i>Vulpes fulva</i>			X	X

TABLE 15 Continued

MAMMALS OF MAJOR IMPORTANCE FOUND IN THE MANITOBA LOWLANDS
AND THEIR HABITAT PREFERENCE (AFTER SYMS 1976: APPENDIX A-4)^a

Species ^b		Habitat Preference			
Common Name	Scientific Name	Marsh	Aquatic	Meadow	Forest
B. Rodentia					
Beaver	<i>Castor canadensis</i>	X	X		
Porcupine	<i>Erethizon dorsatum</i>				X
III. Small Mammals					
A. Carnivora					
Marten	<i>Martes americana</i>				X
Fisher	<i>Martes pennanti</i>				X
Mink	<i>Mustela vison</i>	X	X		
Ermine	<i>Mustela erminea</i>				X
Striped skunk	<i>Mephitis mephitis</i>		Near streams X		X
B. Lagomorpha					
C. Rodentia					
Muskrat	<i>Ondatra zibethicus</i>	X	X		

^aData from Syms (1976), Hall and Kelson (1959), and Cleland (1966).

^bListed by family in order of weight. Species with the greatest weight listed first (Syms 1976).

Although many species utilize a variety of habitats, many demonstrate preferences for certain habitats which are also listed. Those species which inhabit "edges" between habitats are included in both.

Numerous birds breed in the Lake Winnipegosis area. They are listed in Table 16. Some are available year round, but the most significant food source, waterfowl, are present only on a seasonal basis.

Fish native to Manitoba lakes and rivers include representatives of twenty-six families and numerous species. Eleven species are native to Lake Winnipegosis. They are: Northern Pike (*Esox lucius*), Walleye (*Stizostedion vitreum*), Sauger (*Stizostedion canadense*), Common Sucker (*Catostomus commersonii*), Silver Redhorse (*Moxostoma anisurum*), Shorthead Redhorse (*Moxostoma macrolepidotum*), Lake Herring or "Tullibee" (*Coregonus artedii*), Blackfin Cisco (*Coregonus nigripinnis*), Lake Whitefish (*Coregonus clupeaformis*), Yellow Perch (*Perca flavescens*), and Channel Catfish (*Ictalurus punctatus*) (Bill Crossman 1973).

Seasonal Resource Exploitation

Although the Manitoba Lowlands habitats are rich in resources, most of these are exploitable during certain times of the year. This seasonal availability had a profound effect upon the prehistoric people in the area. Groups harvested plants as they ripened and hunted animals as it became economically feasible. As Jenness (1963:47) said, "No tribe in Canada escaped the seasonal movements in quest of food." Historically, the Assiniboine and Cree followed well established cycles of exploitation that crosscut ecological zones. The Cree spent the

TABLE 16. TRADITIONAL GAME BIRDS AND LARGER NON-GAME BIRDS
BREEDING IN THE LAKE WINNIPEGOSIS AREA (GODFREY 1966).

Common Name	Scientific Name
Common loon	<i>Gavia immer</i>
Red-necked grebe	<i>Podiceps grisegena</i>
Horned grebe	<i>Podiceps auritus</i>
Western grebe	<i>Aechmophorus occidentalis</i>
Pied-billed grebe	<i>Podilymbus podiceps</i>
White pelican	<i>Pelecanus erythrorhynchos</i>
Double-breasted cormorant	<i>Phalacrocorax auritus</i>
Great blue heron	<i>Ardea herodias</i>
American bittern	<i>Botaurus lentiginosus</i>
Canada goose	<i>Branta canadensis</i>
Mallard	<i>Anas platyrhynchos</i>
Gadwell	<i>Anas strepera</i>
Pintail	<i>Anas acuta</i>
Green-winged teal	<i>Anas carolinensis</i>
Blue-winged teal	<i>Anas discors</i>
American widgeon	<i>Mareca americana</i>
Shoveler	<i>Spatula clypeata</i>
Redhead	<i>Aythya americana</i>
Ring-necked duck	<i>Aythya collaris</i>
Canvasback	<i>Aythya valisineria</i>
Lesser scaub	<i>Aythya affinis</i>
Common goldeneye	<i>Bucephala clangula</i>
Bufflehead	<i>Bucephala albeola</i>
White-winged scoter	<i>Melanitta deglandi</i>
Ruddy duck	<i>Oxyura jamaicensis</i>
Hooded merganser	<i>Lophodytes cucullatus</i>
Common merganser	<i>Mergus merganser</i>
Goshawk	<i>Accipiter gentilis</i>
Sharp-shinned hawk	<i>Accipiter striatus</i>
Red-tailed hawk	<i>Buteo jamaicensis</i>
Broad-winged hawk	<i>Buteo platypterus</i>
Bald eagle	<i>Haliaeetus leucocephalus</i>
Marsh hawk	<i>Circus cyaneus</i>
Pigeon hawk	<i>Falco columbarius</i>
Sparrow hawk	<i>Falco sparverius</i>
Ruffed grouse	<i>Bonasa umbellus</i>
Sharp-tailed grouse	<i>Pedioecetes phasianellus</i>
American coot	<i>Fulica americana</i>
Herring gull	<i>Larus argentatus</i>
Ring-billed gull	<i>Larus delawarensis</i>
Franklin's gull	<i>Larus pipixcan</i>
Bonaparte's gull	<i>Larus Philadelphia</i>
Great horned owl	<i>Bubo virginianus</i>
Long-eared owl	<i>Asio otus</i>
Short-eared owl	<i>Asio flammeus</i>
Saw-whet owl	<i>Aegolius acadicus</i>

Summer in the Boreal Forest fishing and hunting, and then in the Winter moved into the Aspen Parkland to hunt bison (Fig. 14). During the Fall movement from the Boreal Forest to the Aspen Parkland and back again in the Spring, the Cree would have passed through the Manitoba Lowlands. The Assiniboine also wintered in the Parklands hunting bison, and then followed them south to the Grasslands for the Summer (Ray 1974:82-83).

Table 17 lists selected plants and animals and the season in which they were harvested according to ethnographic accounts. Most plants were harvestable during specific times of the year. In the exploitation of plants, different parts (buds or flowers, stems, roots, and seeds) were gathered as they became available. On the other hand, many of the animals may have been present in edible form throughout the year, but it was more economically feasible to harvest during restricted periods when biologically determined cycles or habitat limitations induced vulnerability.

Yarnell (1970:144) summarized the seasonal availability of plant resources to aboriginal peoples by dividing plant foods into eight categories and proposing a generalized time of collection. Sap and cambium are usually utilized in the early Spring, bulbs and tubers in the Spring and late Fall, plant greens in the late Spring, nuts in the Fall, and lichens in the Winter. Depending on the species, flowers and buds, fleshy fruits, and seeds are available from Spring until Fall. One of the most important seeds, wild rice, matures in late August and September (Jenks 1898:1026).

As was previously stated, animals are also most harvestable near

Figure 14. Seasonal exploitation cycles (after Ray 1974:47).

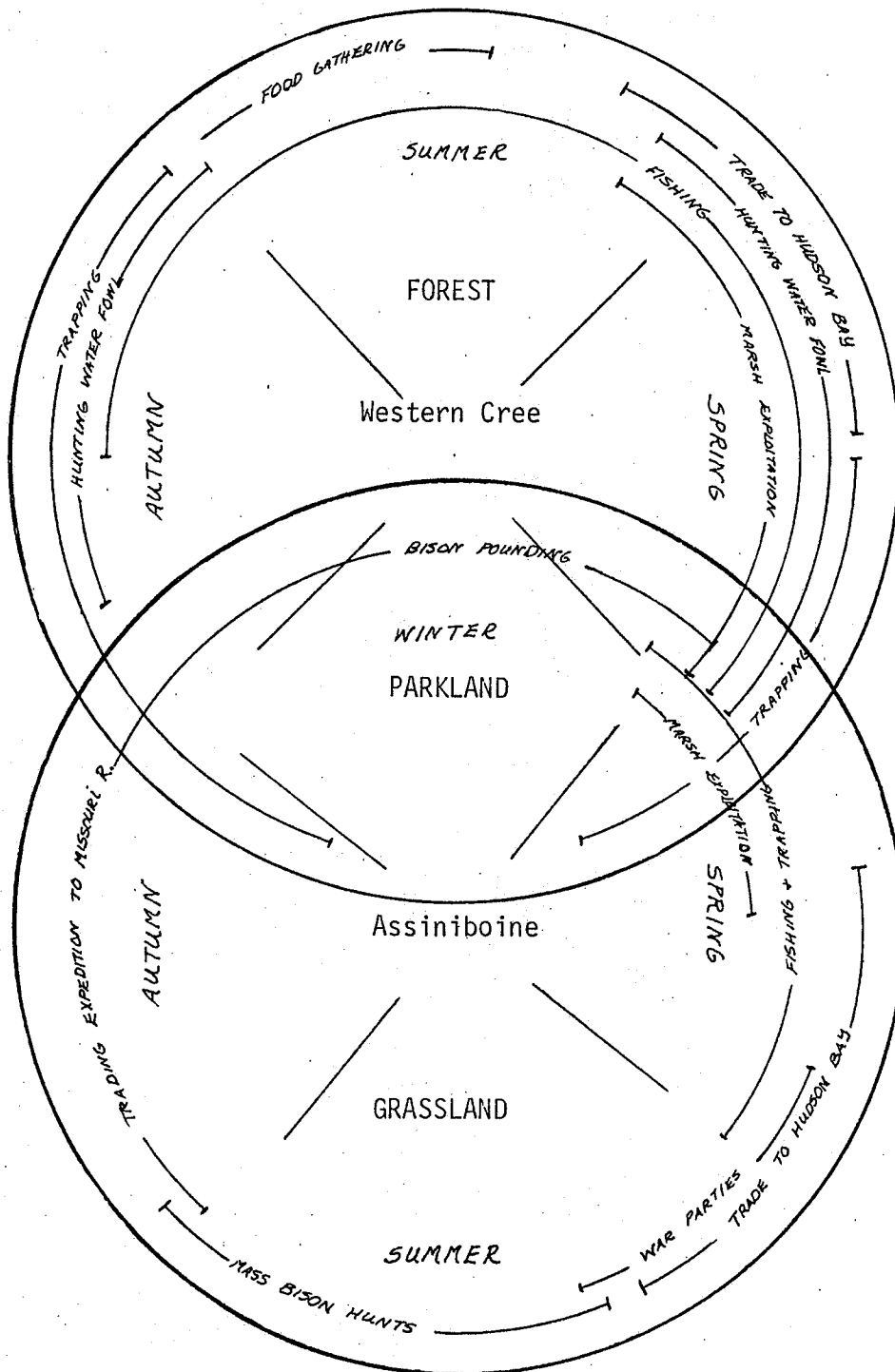


TABLE 17

SEASONAL AVAILABILITY OF A SAMPLE OF RESOURCES
BASED UPON SPECIES BEHAVIOUR AND ETHNOGRAPHIC ACCOUNTS

Resource	Season			
	Spring	Summer	Fall	Winter
Plants:				
Bulrush	X		X	
Bur Oak			X	
Cat-tail	X		X	
Marsh-Marigold	X			
Duck Potato	X		X	
Marsh Vetchling		X		
Pigweed		X	X	
Rose			X	
Sedge			X	
Swamp Milkweed	X			
Yellow Pond Lily	X		X	
Bulbs and Tubers	X		X	
Fluts and Seeds		X	X	
Plant Greens	X			
Sap and Cambium	X			
Lichens				X
Birds:				
Cormorant	X	X	X	
Duck	X	X	X	
Eagle	X	X	X	X
Falcon	X	X	X	
Geese	X	X	X	
Grebe	X	X	X	
Grouse	X	X	X	X
Hawk	X	X	X	
Heron	X	X	X	
Loon	X	X	X	
Merganser	X		X	
Owl	X	X	X	X
Pelican	X	X	X	
Trumpeter Swan	X	X	X	
Whistling Swan	X		X	
Mammals:				
Bison (marginal)				X
Moose	X	X	X	
Wapiti	X	X	X	X
Caribou	X	X	X	X
Mule Deer	X	X	X	X

TABLE 17-Continued

Resource	Season			
	Spring	Summer	Fall	Winter
Mammals-Cont.				
Bear	X	X	X	X
Wolf	X	X	X	X
Coyote	X	X	X	X
Lynx	X	X	X	X
Bobcat	X	X	X	X
Wolverine	X	X	X	X
Raccoon	X	X	X	X
River Otter	X	X	X	
Red Fox	X	X	X	X
Beaver			X	
Porcupine	X	X	X	X
Marten	X	X	X	X
Fisher	X	X	X	X
Mink	X	X	X	
Ermine	X	X	X	X
Striped Skunk	X	X	X	X
Lagomorpha				X
Muskrat				X
Fish:				
Northern Pike	X			
Walleye	X			
Common Sucker	X			
Sauger	X			
Redhorse	X			
Lake Herring			X	
Lake Whitefish			X	
Yellow Perch	X			
Blackfin Cisco			X	
Channel Catfish	X			

Sources: Plants: Fenton (1968), Gilmore (1919), Jenks (1898), Johnston (1969), Yarnell (1970).

Animals: Cleland (1966), Coues (1897), Janzen (1968:93), Jenks (1898:1099), Jenness (1963:46), Hall and Kelson (1959), MacNeish (1958), Meyer (1973), Syms (1976), Waugh (1916:131), Wright (1972:52).

the site during certain times of the year due to behavioural and environmental factors. Moose, for instance, browse on aquatic vegetation in the Summer but retreat into the Forest during the Winter. Rabbits and hares are easier to hunt during the Winter when their runways are visible in the snow, but beaver are most easily captured when the ice is thin in late Autumn (Jenness 1963:46). Bison could only have been harvested near the site in the Winter, because the herds migrated south for the Summer (Ray 1974). Early Winter was also the season of the "rat hunt" (muskrat) for the Red Earth Cree (Meyer 1973:147).

Migratory birds that use the Lowlands can be divided into two groups on the basis of their migratory patterns.

- a) birds that arrived in spring, nested during the summer, and migrated in the fall, and
- b) birds that stopped during the spring and autumn on their flights north to their summer nesting grounds and south to their wintering grounds (Syms 1976:70).

Pattern "a" is the one followed by hawks, falcons, herons, and most of the waterfowl using the area. Pattern "b" is typical only of geese, mergansers, and the Whistling Swan; however a local colony of geese was observed near the site throughout the Summer. Eagles, grouse, and owls are permanent residents (Godfrey 1976).

Waterfowl usually are concentrated in wetlands during their stay, because marshes are an important breeding ground for migratory waterfowl. For instance, in 1969, 530 miles of shoreline along Netley Marsh supported 12,300 breeding pairs of ducks (Parlour et al. 1972:48). In all, wetlands are the breeding grounds for 70-80% of present day hunter's favorite ducks (Mallard and Pintail). It is also

the only significant breeding area for the Ruddy Duck, Canvasback, and the Redhead (Munro 1969:263). Most important of all, these wetlands are notable "as concentration areas for moulting birds and staging areas for migrants" (ibid.:265). Some of these species are easy to harvest because, "after the nesting season the postnuptial molt results in the males assuming a drab plumage...While this molt is in progress the flight feathers of the wings are shed so rapidly that for a while the birds may be incapable of flying" (Orr 1971:144).

Aboriginal peoples were well aware of this situation as is well illustrated within the pages of Alexander Henry's journal. In 1806 he passed by Delta marsh on the southern shore of Lake Manitoba and made the following observations of the Indians of Fort Dauphin:

Their principal resource has been along the shores of Lake Maninthonobank [sic-Manitoba], where wild fowl breed in prodigious numbers. Round the S. [southern] end of this lake, and as far N. [north] as the Straits, a low, broken, marshy country extends from one to three miles before we come to *terra firma* - these extensive morasses being the great resort for wild fowl of all kinds. At the season when swans and other birds shed their feathers, the Indians destroy great numbers by pursuing them in canoes and killing them with sticks. Eggs of all sorts they also collect in abundance--even canoe-loads. Muskrats are likewise very plentiful in these marais (Coues 1897:291).

Seasonal resources were often harvested together. Exploitation of the predator-prey relationship was an effective maximization of return with a minimum of effort (Monks 1977). For example, a classic case of this occurred in the late Summer, early Fall when migrating ducks stopped to fatten up on ripe wild rice fields prior to their southern migration. Historically while the women harvested the ripened grain, the men netted the feeding ducks taking as many as fifty in one night (Jenks 1898:1099). In fact, this was so important an event that many tribes named a month after it (ibid., 1090).

Another interesting double exploitation situation was practiced by several groups. Muskrats exhibit preferences similar to humans for certain marsh plants. Their diet includes cat-tails, hardstem and softstem bulrush, marsh smartweed, waterlily, sedges, arrowhead or duck potato, reeds, and wild rice (Bellrose 1950:303-305). These foods are stored in lodges, and it is reported that various groups broke open muskrat homes and took their food (Fenton 1968:107).

The greatest concentration of animal resources near the site undoubtedly occurred during fish spawning. Fish which are normally dispersed throughout the year gather together in large numbers during spawning. Many species are river spawners and accumulate near the mouths of rivers where they are easily trapped. Lake spawners, normally dispersed in the deeper parts of the lake, gather in the shallows to lay their eggs and can be effectively captured in nets or harpooned. Just before spawning, fish weight is at its highest (Rostlund 1952) bringing together three important factors: ease of exploitation, weight, and aggregation.

Table 18 lists the species native to Lake Winnipegosis, the time at which they spawn, and spawning location. Spawning data on the Shorthead Redhorse, Blackfin Cisco, and the Channel Catfish is less accurate because of lack of published information. Of the others, the early Spring spawners include, in order of spawning schedule, Northern Pike, Common Sucker, and Walleye. Sauger and Silver Redhorse deposit their eggs in early June. They all spawn in rivers near Aschikibokahn Island. Perch also spawn in the Spring, but unlike the others, usually prefer shallow areas in the lake. The Fall spawners, Lake Herring and

TABLE 18. Spawning Schedule and Location (Bill Howard, Personal Communication, 1977, Scott and Crossman 1973).

Species	Time	Location
Northern pike	April - early May	Mouth Duck River
Walleye	April - end of June	Drake River backwater near Aschkibokahn Island
Common sucker	Early May - early June	Rivers
Sauger	Last week in May First week in June	Rivers or lakes
Shorthead redhorse	May - early June	River
Silver redhorse	Early June	River
Lake herring	Fall	Lake
Lake whitefish	Fall	Lake
Yellow perch	April 15 - May	Lake, sometimes rivers
Blackfin cisco	Nov. - Jan.	Lake
Channel cat-fish	Late spring or summer	River

Lake Whitefish, spawn only in the lake (Scott and Crossman 1973).

In terms of exploitation, river spawners are easier to trap than lake spawners and some are noted for their "homing instinct": like salmon they return to a predictable location. Although not Spring spawners, whitefish are easily caught in early Spring and Fall. During the warm Summer months they seek the cool depths of the lake.

Historic records in Ontario report the spawning fish were exploited during the Spring and early Summer. Present inhabitants of the village of Duck Bay recall that the "old ones" set up weirs in the mouth of the Duck River to entrap spawning fish (Margaret Hanna, personal communication, 1978). Historically the Assiniboines "in the Spring of the year...often set up fish weirs along the principal rivers of the parklands (Ray 1974:46). Backwater areas and oxbows west of the site (Fig. 12) also could support a high biomass of fish where fish could be efficiently trapped with even the most primitive techniques (cf. Limp and Reidhead 1978).

In summary, foods are most easily exploitable near the site in Spring, Summer and Fall. River and lake resources are also most efficiently harvested in the Spring and Fall. Unfortunately, not all of these resources can be expected to be preserved in the archaeological record. Most of the food plants; sap, cambium, bulbs, tubers, and greens; would probably not be preserved except for carbonized seeds, nuts, and shells. Under the right conditions, mammal, bird, and fish remains, on the other hand, would be preserved to indicate the season(s) of prehistoric occupations.

Short Term Resource Fluctuations

Not only were resources seasonally restricted in availability, but yearly production levels also varied. In order to simplify matters, limiting factors of production will be considered on a very general level. The two primary categories which shall be considered are climate and natural enemies, including predators and disease.

Climate is a difficult category to consider in general terms due to the large number of variables involved. In this study concern will be directed towards the extremes rather than the means. These variables whose extremes most effect wetlands are the amount of precipitation and moisture stress (Eisenlohr 1969), although the situation is much more complex than this.

"Water is the life-blood of a marsh but there can be too little as well as too much" (Bossonmaier et al. 1968:48). A certain amount of fluctuation is necessary, for constant water levels result in more rapid succession with a consequential decrease in usable resources, but extreme short term or long term fluctuations have adverse effects upon both the plant and animal life of a marsh (ibid.). Recent records of mean monthly levels of Lake Manitoba and Lake Winnipegosis and mean annual flows of Manitoba rivers, indicate numerous small fluctuations and several major ones.

Lake level data for Lake Winnipegosis (provided by the Manitoba Water Control and Conservation Branch) show that since 1913 there have been numerous departures from the long-term average. These departures lasted from 2-6 years, and records indicate five periods with levels greater than 0.6 m above the average and two periods with levels 0.6 m below. Levels rose as high as 1 m above and dropped as low as 1.6 m.

Undoubtedly these fluctuations also occurred in the past.

The effects of long and short term fluctuations in water levels would affect resources. Breeding ducks are especially sensitive to falling water levels and short term fluctuations. Nests may be flooded in high water, or toppled during low water periods (Wolf 1955:16-17). Because northern wetlands are a primary breeding area for many ducks, the ramifications of changing water levels could be felt far beyond the boundaries of the area.

Wild rice is also highly sensitive to water levels, especially during the earliest part of the growing season. It is also destroyed by muskrats, blackbirds, sparrows, insects, and fungi. Dore (1969) hypothesizes that "the periodic famines suffered in the historic past by the Indian tribes in the Minnesota area, as recorded by Jenks (1898), were likely caused by severe insect depredation of wild rice. Steves (1952) stated that in Manitoba whole beds have been wiped out by insect attack" (Dore 1969:58).

Fauna also suffer from diseases which result in drastic drops in population. Ducks, for instance, suffer from botulism which is caused by the bacterium *Clostridium botulinum* and acts as a population depressant (Munro 1969). Muskrats are beset by hemorrhagic or Errington's disease. Both beaver and muskrats suffer from tularemia which is believed to be indirectly caused by increased water temperature as water levels drop (Ray 1975:53). These diseases are capable of all but annihilating populations and keeping them reduced for years even on a regional scale (Errington 1961:83). Another killer of muskrats is low water levels in their pond or marsh. Low water levels result in complete freezing of their environment forcing them

out into the open to freeze and die (Errington 1961:21).

It is evident that marsh resources are not as readily available in some years as others. Years of reduced production of flora and fauna in northern marshes would presumably have had their effect upon prehistoric native peoples, although documentation is difficult to obtain. The best documented cases are those concerning failures of the wild rice crops. La Verendrye made a brief observation, "The heavy rains of the spring, which had been incessant and had done great harm to the wild oats on which we were counting, put us in a difficult position..." (Burpee 1927:141).

Assuming that resource fluctuations during Late Woodland times were similar in frequency and magnitude, this variability of resources must have affected those people who depended upon them. In order to minimize the effects, marshes bordering upon lakes may have been favored over other marshes. Water levels in these marshes are more stable than those which are isolated from a major water source, and therefore were probably utilized more frequently.

Summary

The site is located in the Manitoba Lowlands forest region which is typified by numerous marshes that surround three large lakes, remnants of former Glacial Lake Agassiz. This region is an ecotone between the Boreal Forest and the Aspen Parkland and contains plant and animal species native to both. The island, on which the site is situated, is a marshy delta at the mouth of two rivers. Pollen studies indicate that the past environment was similar to the present. The island and the area surrounding can be divided into four habitats: marsh, aquatic (rivers and Lake Winnipegosis), meadow, and forest.

Numerous resources, which were important to historic groups, were potentially available in these habitats, especially the marsh. Of the sixty-four listed plants (Appendix C) the historically most important were the marsh plants wild rice, duck potato, and cat-tail. Probably the animals in the area most economically feasible to harvest were spawning fish. Nearly all of these resources were available or more easily harvested in certain seasons and in certain years. The seasons in which most resources were potentially available were Spring, Summer, and Fall.

The environmental setting and potentially available plant and animal foods, with their season(s) of availability, are outlined here. In the next chapter the potential resources are compared with the foods actually harvested at the site, as evidenced by the archaeological record. If the site were occupied during the Spring we would expect to find remains of Spring spawners; pike, walleye, sucker, redhorse, perch, and catfish; migratory birds, some mammals, and if preservation permitted, duck potato, cat-tail, and other bulbs and tubers, plant greens, and cambium. A Summer occupation could provide remains of marsh vetchling, nuts and seeds, pattern "a" birds (i.e. not geese, mergansers, or Whistling Swan), a variety of mammals, and few fish. An occupation during the Fall might be evidenced by remains of duck potato, pigweed, rose, cat-tail, and other bulbs and tubers, nuts and seeds, some pattern "a" and "b" birds, a variety of mammals (especially beaver), and the lake spawners: herring, whitefish, and Blackfin Cisco. If the site were only occupied during the Winter, we would expect to find evidence of only lichens, eagle, grouse, owl, bison, rabbits and hares, muskrat, or other mammals. Unfortunately, if the site were

occupied during more than one season, the archaeological record would become more complex. Furthermore, it is likely that not all potential resources were exploited, and that some would not be preserved in the archaeological record.

8. PLANT AND ANIMAL REMAINS

In Chapter 7, I discussed the plants and major animals available for exploitation in northern marsh, lake, and river habitats near the Aschkibokahn Site. These resources composed the "potential" faunal and floral archaeological record; i.e., these were the edible plants and animals available and, therefore, their remains were anticipated in the site. In this chapter, the list of potential resources will be compared with the actual archaeological remains. Differences between the potential and actual frequencies will be discussed in terms of natural and possibly cultural phenomena. Consideration will also be given to tools used in resource exploitation and the hearths which may have been used to preserve harvested fish. Using ethnographical, ethnohistorical, and archaeological data, a hypothetical reconstruction will be presented of resource procurement activities which may have occurred at the site.

Methods

The preservation of faunal material in the site was excellent. This was revealed by deposits of articulated fish rays (Plate 41), fish scales and bird skull fragments. These deposits were dense and contained large quantities of bone. Approximately 300 cubic meters of bone was recovered from 8,000 cubic meters of matrix. Economic necessity precluded analysis of all of the bone so only a sample was identified by the faunal analyst, Dana Mae Grainger. In brief, volume was the criteria used to sample bone from every level of every unit.

The samples from each level were selected in the same proportion as the amount of bone from each level was to the total amount of recovered bone. The resulting proportions from each unit are as follows: 12/36 of the total volume came from 14N8W, 8/36 from 22N22W, 7/36 from 20N18W, 5/36 from 28N2W, and 4/36 from 10N22W. By level, 1/5 was randomly drawn from levels 1 through 3, 3/5 of the total sample was randomly selected from levels 4 through 7, 1/5 from 8 through 12. Later, with additional time and money, 5 bags of bone were selected at random. These were included in the sample along with all the specimens from level 6 of 14N8W. All feature material was then identified. In all, approximately 26% of the recovered mammal and bird bone was identified (Grainger 1977).

Identification of bones was accomplished by comparison with the faunal collection at the Manitoba Museum of Man and Nature. Bones were identified to species whenever possible. Examples of three forms used are in Appendix D. Form #1 was used for those items of mammal, bird, or shell that could only be identified to class. Form #2 was used when a mammal or bird bone or a shell could be identified as to family or species. A separate sheet, form #3, was used for fish bone (Grainger 1977). During analysis a variety of problems was encountered. Difficulties in bird identification can be attributed to an incomplete comparative collection. This was also a problem in fish identification. Although all necessary fish species were represented by at least one specimen, a full range of sizes was needed for each species. Unlike mammal bones, fish bones continue to increase in size throughout the life of an individual (Casteel 1972). Therefore, comparison of a bone from a small fish with a bone from a large fish of the same species may

show misleading differences. Thus, to aid in the analysis of fish bones Ms. Grainger selected eleven distinctive bones to identify the fish remains (form #3, Appendix D). This was later increased to thirteen. These were not the only identifiable bones for each species but were the ones most easily identifiable. This was because these elements were well represented in the fish comparative collection and they were the ones which had the best documentation (Grainger 1977), however the result was that less than 26% of fish bone was identified.

The concept of minimum number of individuals (MIND) was first introduced into the archaeological literature as a statistical unit of analysis by White (1953). He described his procedure as follows:

Separate the most abundant element of the species found (usually the distal end of the tibia) into right and left components and use the greater number as the unit of calculation (ibid.:397).

It has since been modified or redefined by several archaeologists (cf. Cleland 1966, Flannery 1967, Bökönyi 1970, Grayson 1973).

Thus, it has become necessary to be very specific about the technique used in calculating MIND for a particular study. In this study, MIND was calculated by separating elements into age classes, sex (for bird bone only), and left and right components and using the greatest number for computation.

MIND can be maximized by calculating a separate set of figures for each level of every unit and then combining for a final total. Conversely, it can be minimized by calculating from the entire sample. It is most accurately calculated by natural strata (Grayson 1973:434); however, no cultural strata were discerned in the structure of the site. The maximizing (Max. MIND) method was applied by determining MIND for each level of every unit, and separately for every feature. The

minimizing (Min. MIND) was calculated by grouping all the units and levels together and excluding features. The results are listed in Table 19. Feature material was not included in the calculation of Min. MIND. Because several species were represented only in the feature matrix, some of the Min. MIND totals equal zero.

Results

Plant Remains

The list of major plants potentially available in habitats surrounding the site includes sixty-two species and one family (Appendix C). Plant remains recovered from Aschkibokahn hearths and flotation samples consisted only of uncharred seeds. Approximately one hundred seeds from three species were recovered. These were identified as pigweed (*Chenopodium* sp.), sedge (*Carex* sp.), and wild rose (*Rosa* sp.) by Richard Callaghan. The control sample, taken from outside the study area yielded primarily uncharred sedge. All of these species were observed growing on the site and may not have been introduced by man. Rodent activity, mixing of deposits, and frequent flooding may explain their presence in the cultural levels.

Animal Remains

The identification of animal remains generated much more data than could be included in its entirety here. The raw data is on file with the Historic Resources Branch of the Department of Tourism, Recreation, and Cultural Affairs in Winnipeg. A summary of the Max. and Min. MIND is listed in Table 19. Remains from a total of ten mammals, ten birds, five fish, and three invertebrate taxa were identified in the sample. The group present in the greatest number was fish, especially the species of walleye, sucker and pike. Second

TABLE 19.

Identification of Animal Remains

List of Mammals Identified			
	Max. ¹ MIND	Min. ² MIND	Common Name
Artiodactyla			
Cervidae			
<i>Alces alces</i>	12	1	Moose
<i>Rangifer</i> spp.	2	1	Caribou
Carnivora			
Ursidae			
			Bears
<i>Ursus americanus</i>	2	1	Black bear
Mustelidae			
			Weasels, etc.
<i>Mustela vison</i>	2	1	Mink
<i>Mephitis mephitis</i>	2	1	Striped skunk
Canidae (5) ³	4		Dog, wolves, etc.
Lagomorpha			
			Rabbits and hares
<i>Lepus americanus</i>	8	2	Snowshoe hare
<i>Lepus americanus</i> / <i>Sylvilagus floridanus</i>	3	0	Eastern cottontail
Rodentia			
Castoridae			
			Beavers
<i>Castor canadensis</i>	33	3	Beaver
Cricetidae			
			Mice, rats, etc.
<i>Peromyscus maniculatus</i>	1	1	Deer mouse
<i>Ondatra zibethicus</i>	24	0	Muskrat

TABLE 19-Continued
List of Fish Identified

Fish	Max. ¹ MIND	Min. ² MIND	Common Name
<i>Esox lucius</i>	65	24 (dentary)	Pike
<i>Stizostedion vitreum</i>	181	74 (dentary)	Walleye
<i>Catostomus commersoni</i>	90	26 (operculum)	Sucker (white)
<i>Perca flavescens</i>	3	1	Perch
<i>Coregonus clupeaformis</i>	10	3 (post temporal)	Whitefish

List of Shells Identified

Shell	Max. ¹ MIND	Min. ² MIND
Shell	3 fragments ³	2 fragments ³
Pelecypoda (Bivalves)	46 fragments ³	43 fragments ³
Unionidae (<i>Anodonta grandis</i> <i>simpsonianus</i>)	7	7
Gastropoda (Snails)	10 fragments ³	3 fragments ³
Lymnaeidae	16	2
Planorbidae (<i>Helisoma</i> <i>anceps</i>)	13	8

TABLE 19-Continued
List of Birds Identified

Bird	Max. ¹ MIND	Min. ² MIND	Common Name
Gaviiformes			
<i>Gavia immer</i>	4	2	Common loon
Pelecaniformes			
<i>Pelecanus erythrorhynchos</i>	5	1	White pelican
Anseriformes			
Cygninae			Swans
<i>Olor buccinator</i>	2	1	Whistling swan
<i>Olor columbianus</i>	2	1	Trumpeter swan
Anserinae			Geese
<i>Branta canadensis</i>	5	1	Canada Goose
Duck (6)			
<i>Spatula clypeata</i>	1		Shoveler
<i>Anas platyrhynchos</i>	5	1	Mallard
Ciconiiformes			
<i>Ardea herodias</i>	1		Great blue heron
Falconiformes (1)			
<i>Haliaeetus leucocephalus</i>	3	1	Bald eagle
Passeriformes			
<i>Icterus galbula</i>	1	1	Baltimore oriole

¹Calculations include features.

²Calculations exclude features.

³() Number of fragments that could not be further identified.

in abundance were the invertebrate freshwater snails and clams, followed by the mammal species of beaver, muskrat, and moose. Birds were fourth in abundance and were most strongly represented by the White Pelican, Canada Goose, Mallard, and Common Loon.

Calculation of the relative importance of harvested species by average meat yield (Table 20) was accomplished using data from White (1953:397-398) and Nicholson's (1977:9) adjusted figures for mammals and birds. Nicholson (1977) identified the bones that were recovered from the Aschikibokahn Site by the previous Manitoba Archaeological Society excavations, and his figures of the average meat yield of that sample are included in Table 20. Average meat yield for those species not covered in White (1953) or Nicholson (1977) (i.e., Shoveler, Baltimore Oriole, and Great Blue Heron) were estimated using data from Godfrey (1966). Fish meat yields were estimated using live weights for mature individuals from Scott and Crossman (1975). Invertebrates were not included because it is unlikely that the small snails were used for food and the total meat yield from freshwater clams would have been negligible.

The meat processed at the site came primarily from mammals (71%) and fish (27%). Only 1.5% of the estimated 10,522 pounds of meat was from birds (Table 16). Moose appear to have provided most of the meat (51%), then pike (15%), beaver (12%), walleye (8%), bear (4%), White Sucker (4%), and caribou (2%). Unfortunately, these figures do not represent the diet of a single occupation, but are a composite of a number of occupations. Comparison of the 1976 sample with the sample of large and medium species recovered during previous excavations of the site also reflects the importance of moose and beaver (Nicholson

TABLE 20. Meat Yield of Aschkibokahn Fauna,
Manitoba Archaeological Society from Nicholson (1977:9)

Species	Max. MIND	Average Yield	1976 Sample Yield	% 1976 Sample	% M.A.S. Sample
Mammals ¹					
Bison	0	900 lbs.	0 lbs.	0%	11.05%
Moose	12	450	5400	51	49.72
Elk	0	300	0	0	13.26
Caribou	2	125	250	2.3	0
Deer	0	100	0	0	4.42
Bear	2	210	420	3.9	4.64
Canidae	4	15.5	62	.5	1.71
Lynx	0	15	0	0	.66
Wolverine	0	30	0	0	.66
Otter	0	12.5	0	0	.55
Beaver	33	38.5	1270.5	12	11.5
Mink	2	1	2	negligible	.02
Skunk	2	5	10	negligible	.11
Rabbits & hares	11	1.5	16.5	.1	.07
Muskrat	24	2	48	.4	.27
Deer Mouse	1	0	0	0	0
Subtotal	92		7479	71%	98.19%
Fish ²					
Pike	65	25	1625	15.4	0
Walleye	181	4.5	814.5	7.7	0
White Sucker	90	4.3	387	3.6	0
Perch	3	.4	1.2	negligible	0
Whitefish	10	5.2	50.2	.4	0
Subtotal	349		2877.9	27%	0%
Birds ¹					
Loon	4	3	12	.1	.07
Pelican	5	18	40	.4	.40
Whistling Swan	2	17.5	35	.3	.40
Trumpeter Swan	2	10	20	.2	.22
Canada Goose	5	5.5	27.5	.3	.13
Shoveler ³	1	1	1	negligible	.07
Mallard	5	1.75	8.75	negligible	.18
Great Blue Heron ³	1	5.5(?)	5.5	negligible	0
Bald Eagle	3	5	15	.1	.22
Baltimore Oriole ³	1	negligible	0		
Subtotal	29		164.75	1.5%	1.82%
Total	470		10,521.65 lbs.		

1. Average yields from Nicholson (1977:9) and White (1953:397-398)
2. Average yield of mature fish from Scott and Crossman (1975)
3. Average yield estimated using Godfrey (1966)

1977:9), but does not reflect the importance of fish because of the recovery techniques used in previous excavations (Chap. 2). The number of individuals included in the sample presumably lies somewhere between Max. and Min. MIND. The only exception might be the MIND of fish species. Because not all identifiable bones were identified, these may be underrepresented.

Not all bones from the same animal have an equal chance of survival in an archaeological site. Although bone preservation in the site was excellent, other factors are involved. Nicholson (1977:5) reported "large numbers of utilized bone splinters and fragments gnawed by carnivores" from Aschkibokahn samples. Carnivores can consume, fracture, or drag away a large amount of bone from its original location. The production of bone grease by pounding long bones into splinters and then boiling the mass also alters bone survival patterns (Leechman 1951). Undoubtedly, the bone survival pattern in the site reflects these activities. The pattern varies with the species examined. For instance, bones are present from all portions of the bodies of beaver and muskrat, but front legs and vertebrae are absent from hares and the Artiodactyl family, probably due to grease production. Skunk, mink, and the Canid family are represented by too few elements to generalize. Remains of large mammals, such as moose, bear, and caribou show a predominance of toes and lower leg bones. These toe bones have been hollowed out, thereby further indicating a processing of bones for marrow.

Seasonal Indicators

The examination of the seasons in which a site was occupied is dependent upon faunal analysis. Fish scales and bones are

characterized by annuli which reflect rapid warm weather growth by wide bands and slow weather growth by narrow, translucent bands. These can be counted to determine the age of the fish at death, and the type of outermost annuli can be used to show the season of death. Also, scars on scales can be shown to reflect death around the time of spawning (Casteel 1972). Similarly all mammal teeth have dental cementum annuli which can be used to accurately determine the season and age of the specimen at death in conjunction with analysis of tooth wear and eruption (Klevezal' and Kleinenberg 1969). Another definite seasonal indicator is medullary bone, which develops only in female birds during the breeding period (Rick 1975:183). Other evidence which can be used to infer seasonality is the presence of bones from juveniles or migratory species and bones from animals that were seasonally available or more efficiently harvested during certain times of the year.

The analysis of fish scales from the site is being undertaken by Margaret Hanna and is not ready for discussion. However, several seasonal indicators were noted during analysis (Table 21). Nearly all of the birds represented at the site were migratory and included Common Loon, White Pelican, Trumpeter Swan, Canada Goose, Shoveler, Mallard, Great Blue Heron, Whistling Swan, and the Baltimore Oriole. Most of these birds followed pattern "a"; they arrived in the area in the Spring, stayed the Summer, and left in the Fall. The one representative of pattern "b" at the site is Whistling Swan; if geese are discounted as pattern "b" members. It migrated through the area only in the Spring and Autumn and was not present during the Summer months

TABLE 21. Seasonal Availability of Exploited Resources Based Upon Species Behaviour and Ethnographic Accounts.

Evidence	Spring	Summer	Fall	Winter
Migratory Birds:				
Common Loon	X	X	X	
White Pelican	X	X	X	
Trumpeter Swan	X	X	X	
Whistling Swan	X		X	
Canada Goose	X	X ¹	X	
Shoveler	X	X	X	
Mallard	X	X	X	
Great Blue Heron	X	X	X	
Baltimore Oriole	X	X	X	
Mammals:				
Moose	X	X	X	
Bear	X	X	X	
Beaver			X	
Muskrat				X
Rabbits and Hares				X
Spawning Fish:				
Northern Pike	X			
Walleye	X	X		
Common Sucker	X			
Yellow Perch	X			
Lake Whitefish			X	

1. Based upon observation of a resident local colony.

(Syms 1976). Notably, four fragments of bird medullary bone were also recovered, indicating a definite Spring occupation (Rick 1975).

Of the eleven species of fish native to Lake Winnipegosis, only five of these were identified in the faunal sample. The common denominator for four of them is that all spawn in the Spring in marshes and the Duck and Drake Rivers near Aschkibokahn Island. The fifth, Whitefish, are Fall lake spawners (Bill Howard, Fisheries Biologist, personal communication).

The majority of the harvested mammals--moose, bear, and beaver--were probably taken in the Spring or Summer, but a minority--muskrats and rabbits or hares--were more efficiently harvested in the Winter. However, a total of seventy-eight specimens of mammalian juvenile bone were recovered. Most of the identifiable specimens were from muskrat or beaver. Muskrats are born in the Spring or Summer and mature rapidly, becoming sub-adults in approximately four months. Beaver young are born in April or May and remain juveniles throughout the Summer and Fall (Hall and Kelson 1959:755). Therefore, the presence of juvenile bone in the site suggests that these individuals were killed in the Spring, Summer, or Fall rather than in the Winter.

In summary, the seasonal indicators all point to Spring and Fall occupations, with the possibility of Summer activities. Because the island is frequently flooded during Spring ice break-up, it is likely the occupations began after that time. Unfortunately, although much can be said about the seasons in which the site was inhabited, it is far more difficult to show when it was unoccupied or speak about the patterns of occupation. The residents of the island may have resided

there throughout the year; throughout the warmer months; for a different season each year; or they may have appeared in the Spring, abandoned the site for the Summer, and returned in the Fall. Such conclusions cannot be made with the present data base, but the lack of shelter on the tip of the island makes year-round residence unlikely.

Reconstruction of Procurement Activities

Table 22 summarizes a general reconstruction of procurement activities. These activities were scheduled in response to seasonal availability of resources. In the Spring, pike, walleye, and sucker spawned in the Duck and Drake Rivers and marsh backwaters. They were probably restrained in a weir (Gilford Sanderson, native informant to Margaret Hanna, personal communication) and then impaled upon a harpoon or scooped up in nets. Some perch may also have been included at this time. These fish were butchered, possibly with utilized flakes, and then smoked and dried on racks constructed over hearths (Rostlund 1952, Pollock 1978). In the Fall, whitefish spawning in the lake shallows could have been captured by net. These fish, if caught late enough in the Fall, may have been preserved by freezing after butchering (Rostlund 1952:137).

The large mammals, e.g., moose, caribou, bear, and the Canidae family, were probably hunted with bow and arrow. Carcasses were skinned and butchered using knives and other tools (Nicholson 1977). Field butchering may have occurred if the animal was killed some distance from camp. Skins were processed using stone scrapers and bone tools. Finally, marrow was extracted from long bones by crushing and boiling the splinters and additional marrow was removed by hollowing out toe

TABLE 22. Hypothetical Reconstruction of Procurement Activities

Season	Resource	Habitat ¹	Procurement	Source of Evidence	Processing	Source of Evidence
Spring	Pike	A	weir, net, harpoon, leister	local informants, ethnohistory, and tools ethnography	drying and smoking	hearths ethnohistory ethnography
Spring	Walleye	A	" " "	"	" "	"
Spring	Sucker	A	" " "	"	" "	"
Spring	Perch	A	" " "	"	" "	"
Fall	Whitefish	A	" " "	"	freezing or drying	ethnohistory
Spring, Summer	Moose	M	bow and arrow	projectile points	processed hides extracted marrow butchered meat	end scrapers, bone splinters, and hollowed phalanges knives Nicholson (1977)
All	Caribou	F	"	"	"	"
Spring, Summer or Fall	Bear	F	"	"	"	"
All	Canidae	Md, F	"	"	butchered	Nicholson (1977: 23)
Fall	Beaver	M, A	bone harpoons, club, bow & arrow	ethnography, harpoon frags., projectile points	butchered	Nicholson (1977: 10-12)
All	Mink	M, A	bone harpoons, bow & arrow	"	no data	no data
Winter	Rabbits and hares	Md	bow & arrow, snare	projectile points, ethnography	" "	" "

TABLE 22.-Continued

Season	Resource	Habitat ¹	Procurement	Source of Evidence	Processing	Source of Evidence
Fall Winter	Muskrat	M, A	bone harpoons	ethnography	cooked whole?	no evidence of butchering (Nicholson 1977:13)
Spring Fall	Ducks	M, A	clubs, bow & arrow, nets	ethnohistory	no data	no data
Summer or Fall Spring	Other birds	M, A	no data	no data	" "	" "

¹Key to habitats

A = Aquatic
M = Marsh
F = Forest
Md = Meadow

bones (Leechman 1951).

Evidence of activities concerned with small - to medium - mammals is less clear-cut. They may have been hunted with bow and arrow, or they may have been harpooned in their lodges in the Fall as Meyer (1973:14-8) reports for the Cree. Beaver are most easily exploited during Fall at their landing areas (Smith 1975:84-85) and may have been clubbed or shot by bow and arrow. Mink might have been captured by exploitation of the predator-prey relationship. They feed upon fish and may have been captured at the same time. Carcasses were butchered following the techniques described by Nicholson (1977). Beaver were butchered by crude dismemberment. Few cuts were made and limbs were generally removed by "smashing". Teeth were extracted to be used as tools. Muskrat and other small mammals may have been skinned and cooked whole.

Birds that feed upon fish may have also been attracted by fish processing refuse. In different times of the year, both groups could have been captured by exploitation of the predator-prey relationship (Greg Monks, personal communication).

Summary and Discussion

Plant and animal remains were identified by comparison with collected specimens. The identifiable plant remains were limited to seeds from the wild rose, sedge, and pigweed. The animal group present in the greatest number was fish (especially the Spring spawners), then invertebrate clams and snails, followed by mammals, and a few birds. In terms of importance measured by meat yield, moose produced an estimated 71% of the total 10,522 pounds, pike 15%, beaver 12%, and

walleye, bear, sucker, and caribou in lesser amounts. Of these important resources, only the bear and caribou are not found in a marsh or aquatic habitat.

Most of the important resources were economically feasible to harvest during the Spring or Fall. The seasonal indicators recovered from the site point to a Spring or Spring and Fall occupations. Comparison of lists of potential resources (Appendix C and Table 15) with lists of exploited resources (Table 19) shows that most of the animal resources available in the Spring or Fall were exploited.

The scarcity of plant remains cannot be explained by seasonality, but may be attributed to a variety, and possibly a combination, of cultural and natural factors. Cultural factors include timing (season or year) of occupation, exclusion of plants from diet, lack of utilitarian uses for vegetation, and food processing. During processing, tubers may have been crushed into raw starch and eaten raw or were not charred during cooking. The major natural agent was decomposition. Most marsh and aquatic plant foods are fibrous stems, bulbs and tubers and probably would not be preserved. Fibers and roots would be also difficult to identify. For example, out of one hundred and sixty-eight occurrences of plant remains found in Midwestern archaeological sites, only nine were marsh or aquatic plants. Of the nine, eight were unidentifiable tubers (Yarnell 1964:21). From this data it is obvious that despite strong ethnographic and ethnohistorical evidence of aquatic plant use, very few specimens became an integral part of the archaeological record.

Although few plant remains were recovered, it does not necessarily

indicate that marsh and aquatic plants were not an important part of the aboriginal diet. Plants may have been harvested from the Aschkibokahn marsh, been prepared, and consumed within the study area. In fact, examination of floral reports from other excavations indicates that preservation of aquatic plant remains occurs only under ideal conditions, and this fact may limit our knowledge about the utility of marsh plants to what we have learned from ethnology and ethnohistory.

Bone tools recovered during the 1976 excavations include awls, bird bone beads or tubes, chisels, antler handles, harpoons, needles or leister tines, and spatula, a wedge or flesher, and several unidentified tools. Several of these served in resource exploitation. Harpoons and leister tines were undoubtedly used in either the harvest of fish or medium mammals, or possibly both. Scrapers or knives were probably hafted in antler handles and used in processing resources.

A hypothetical reconstruction of resource procurement activities pursued at the site indicates that fish were caught in the Spring and Fall in weirs and then harvested using harpoons, leisters, and possibly nets. They were cleaned and then were smoked and dried while suspended over hearths. Whitefish, which were probably captured in the Fall, may have been preserved by freezing or by smoking and drying. Large mammals were hunted with bow and arrow, skinned, butchered, and marrow extracted from the bones. Medium-sized and small mammals were captured using bone harpoons, clubs, bow and arrows, or snares, depending upon the species and hunting strategy. Beaver were then butchered, but some of the smaller mammals may have been cooked whole. Ducks were obtained most easily in the Spring and early Summer when some

species were flightless and could be clubbed. In the Autumn, they may have been shot with bow and arrow or netted.

9. SUMMARY AND CONCLUSIONS

The Aschkibokahn Site (FbMb-1) is situated on the southern tip of a low-lying island near the marshy western shore of Lake Winnipegosis in West-Central Manitoba. The region surrounding the site is in the Manitoba Lowlands, a poorly drained region lying between the Boreal Forest to the north and the Aspen Parkland to the south, and populated by plants and animals characteristic to both. The position of the site on an island near the mouth of two rivers allowed for exploitation of four local habitats: marsh, open water (lake and river), meadow and forest. Such a situation is unusual in the Manitoba Lowlands and hence served as a focus for occupation.

The site's structure is characterized by indistinct and complex stratigraphy. Features were primarily hearth or ash concentrations which were irregular in shape and contained little charcoal. They were surrounded by and contained dense concentrations of fish bones and scales.

Two ceramic wares which were intermixed were recovered: Blackduck and Duck Bay (Appendix E). These were described and a typology of the Duck Bay sample presented in which the ware was divided into Duck Bay Punctate Type and Duck Bay Decorated Lip Type (Syms, personal communication). The types were further subdivided into decorative modes. Comparisons between the wares demonstrated obvious differences yet basic similarities. Examination of the geographical distribution of the Duck

Bay Ware suggests that the Manitoba Lowlands functioned as a "core" area of Duck Bay peoples.

Projectile points were classified as Eastern Triangular, Prairie Side-Notched, and Plains Side-Notched Types. Other stone tools found were end and side scrapers, knives, and utilized flakes. Locally available Swan River Chert is the dominant lithic material but smaller percentages of other lithic materials may reflect seasonal movements of peoples into other ecological zones. Bone tools reflect some of the subsistence activities pursued on the island, and harpoon heads and possible leisters indicate fishing was a primary focus.

The distribution of artifacts and features in the site (Appendix E) shows that most of the cultural material occurred in the central levels; and although a majority of the artifacts were recovered from 28N2W, little of the faunal material occurred in that unit. Few of the lithic tools other than utilized flakes were found in the units that contained the bone. However, the units that had dense concentrations of bone also had the largest hearths, especially units 14N8W and 22N22W. Thus, it appears that the hearths were activity areas where fish were cleaned with flakes, smoked and dried. Other foods may have been processed in areas away from the largest hearths.

The site was occupied during the Late Woodland Period. Two sets of radiocarbon dates obtained from the middle levels are: A.D. 680 \pm 275 (Dic. 845) and A.D. 690 \pm 285 (Dic. 846), and A.D. 1255 \pm 175 and A.D. 1180 \pm 110. It is believed that the first set of dates was affected by the small size of the carbon samples and a possible laboratory malfunction. The later dates are supported by the fact that the decorative motifs of the Blackduck Ceramics resemble Late Blackduck vessels from

the Smith Site, dated at A.D. 1280 \pm 60. This is further substantiated by a chronology based upon projectile point typology, which indicates occupation of the site beginning between A.D. 800 and A.D. 1250 and continuing until A.D. 1600. A spun whitemetal button dated *circa* A.D. 1750-1812, a small amount of recent trash, and information from local residents reveal that people lived on the island until *circa* 1950.

It appears that the site was occupied at least during the Spring and Fall by groups that harvested primarily marsh and river resources. The important animal foods were moose, beaver, and fish. Although few plant remains were recovered from the site, it is likely that more plant species were exploited. Numerous plants were potentially available in the nearby marsh, but due to cultural and natural factors few would be preserved.

Although harvesting and hunting were indeed important, this site was not merely a hunting camp. Various activities are reflected in the archaeological record. During the Spring, spawning fish were trapped with weirs placed across the mouths of the rivers and then harvested using bone harpoons, leisters, or possibly nets. This activity may have been repeated during the Fall to capture whitefish. The harvested fish were then cleaned, using lithic knives and flakes, and placed on drying racks over smoldering hearths to preserve the meat. Some may have been cooked in ceramic vessels for immediate consumption. At the same time, fish predators, such as the eagle, may have been captured as a byproduct of the fish harvest. Ducks and geese were clubbed, netted, or shot with bow and arrow as they nested in the nearby marsh during the Spring and early Summer. Moose browsing on aquatic vegetation were probably shot with bow and arrow, skinned, butchered, and then their

bones were processed for grease. Beaver were probably exploited in the Fall.

Recommendations for Further Work

Further work on the island is required in order to delineate activity areas. Excavations need to be undertaken at the northern tip of the island where similar harvesting activities may have occurred, and central sections of the island need to be excavated in order to find habitation localities. It is probable that the 1976 excavations merely tested an extensive activity area utilized to process fish and other resources. The relationship of this activity area to other areas of the island needs to be determined in order to fully understand the subsistence pursuits of the prehistoric inhabitants. Further work on the southern part of the island should include a trench to aid in understanding the complex stratigraphy characteristic of the site and in separating the cultural components. More radiocarbon dates are needed to date successive occupations. In addition, a pollen core should be taken nearby in order to more fully understand the past environment.

Additional research in the Manitoba Lowlands is necessary if the seasonal cycle of the Late Woodland peoples is to be understood. First of all, more sites need to be located in order to determine the distribution of Duck Bay ceramic ware. The Aschkibokahn Site is an example of a warm weather occupation. Other sites which represent Winter occupations must exist and should be investigated.

It has been said that the position of the Aschkibokahn Site at the junction of four potentially rich habitats is unusual, but it is not unique. cursory examination of the 1:250,000 topographic map of the Swan Lake region reveals three similar situations in the Manitoba

Lowlands. One is an island in Swan Lake at the mouth of the Swan River. The island is about the same size as Aschkibokahn and is surrounded by marsh. The second is a peninsula extending into Swan Lake beside the marshy mouth of Birch Creek. The third is another marshy, delta island located at the mouth of the Red Deer River in Red Deer Lake. All three appear to be potential site locations, which may have been utilized in a manner similar to the Aschkibokahn site. Future archaeological surveyors should carefully examine these areas and any others with similar characteristics.

The investigation and analysis of the Aschkibokahn Site has shown that a marsh was a valuable source of prehistoric resources and probably served as a focus for settlement. Increased use of flotation, water-screening, and precise recovery techniques, as well as archaeological surveys around the borders of wetlands, will provide added support for this idea. Attitudes held by archaeologists must change. For example, Higgs (1975) included swamps and presumably marshes under the category "unproductive land". If this thesis has at least succeeded in demonstrating that marshlands should not be included in site catchment analyses under that heading, it has fulfilled its purpose.

APPENDICES

APPENDIX A

METRIC AND NON-METRIC ATTRIBUTES OF CERAMICS AND LITHICS

APPENDIX A-1

METRIC AND NON-METRIC ATTRIBUTES OF CERAMICS

METRIC ATTRIBUTES (After Syms Personal Communication)

- A) Lip thickness
- B) Rim thickness
- C) Diameter lip
- D) Neck height
- E) Neck angle
- F) Thickness (near rim)
- G) Shoulder angle
- H) Spacing between decorative elements
- I) Number of rows of decorative elements

NON-METRIC ATTRIBUTES (After Syms Personal Communication)

- 1) Surface treatment
 - a) fabric impression
 - b) cord wrapped paddle impression
 - c) polished
 - d) roughened/scraped
 - e) obliterated
 - f) plain
 - g) vertical mesh
 - h) brushed
 - i) indeterminate
- 2) Interior treatment
 - a) brushed

- b) polished/smoothed
- c) split
- 3) Temper
 - a) extremely fine grit
 - b) fine grit
 - c) medium grit
 - d) coarse grit
- 4) Profile
 - a) shallow S
 - b) straight
 - c) excurve
- 5) Colour
 - a) grey black
 - b) light brown
 - c) dark brown
 - d) grey white
 - e) sandy orange
- 6) Encrustations
 - a) lip
 - b) interior rim
 - c) exterior rim
- 7) Place of Decoration
 - a) top lip
 - b) interior lip
 - c) exterior lip
 - d) exterior rim
 - e) shoulder
- f) obliterated
- 8) Decoration
 - a) notched lip
 - b) individual punctate
 - c) dentates
 - d) push and pull
 - e) round
 - f) rectangular
- 9) Depth of punctate
 - a) shallow
 - b) deep (interior boss)
 - c) punch
- 10) Cord impressions
 - a) cord impression
 - b) cord wrapped object
 - c) cord wrapped flake
 - d) tight
 - e) loose
 - f) perpendicular
 - g) oblique
 - h) parallel
 - i) chevron
- 11) Incised
 - a) present
 - b) absent
- 12) Lip type
 - a) flat

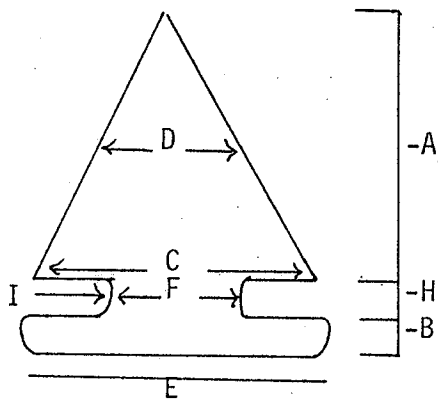
- b) convex
- c) beveled-in
- d) beveled-out
- e) splayed
- f) rectangular
- g) rolled

APPENDIX A-2

PROJECTILE POINTS

METRIC ATTRIBUTES

- A) Blade Length
- B) Length of the Lateral Edge Base (Average)
- C) Shoulder Width
- D) Blade Width, Mid-shaft
- E) Width, Tang Base
- F) Neck Width
- G) Maximum Thickness
- H) Notch Height
- I) Notch Depth



NON-METRIC ATTRIBUTES

I. Completeness of Form (Taken from Nicholson 1976:76)

- a. indeterminate
- b. complete
- c. base/shoulder (stem)
- d. shoulder/tip (body)
- e. base/notch
- f. notch/tip
- g. body segment
- h. base/shoulder (tip only missing)
- i. basal edge(s) or shoulder(s)
- j. basal edge(s) or shoulder(s) missing & tip missing
- k. fracture along transverse plane
- l. shoulder and body segment
- m. tip only

II. Blade Shape (Taken from Binford 1963:200)

- a. triangular
- b. excurvate
- c. incurvate
- d. ovate
- e. excurvate-incurvate
- f. parallel-ovate
- g. expanding-ovate
- h. contracting ovate

III. Base Shape (ibid:209)

- a. straight
- b. subconvex
- c. convex
- d. subconcave
- e. concave
- f. triangulo-concave
- g. bivectoral base

IV. Transverse Section (ibid:202)

- a. plano-convex
- b. plano-triangular
- c. biplano
- d. biconvex
- e. bitriangular
- f. assymetrically biconvex
- g. assymetrically bitriangular
- h. convexo-triangular

V. Longitudinal Section (Taken from Binford 1963:202)

- a. plano-convex
- b. biplano
- c. biconvex
- d. assymetrically biconvex
- e. concavo-convex
- f. excurvate
- g. ovate or triangular
- h. assymetrically ovate
- i. assymetrically excurvate
- j. assymetrically concavo-convex

VI. Lithic Type

- a. unidentified
- b. Swan River Chert
- c. Selkirk Chert
- d. Cathead Chert
- e. Knife River Flint
- f. Quartzite

VII. Grinding/Polishing

- a. absent
- b. basal
- c. lateral - one side only
- d. lateral - both sides
- e. basal/lateral

VIII. Type

- a. unclassified
- b. McKean
- c. Prairie Side-Notched...Lewis Narrow Rounded Base Variety
- d. Prairie Side-Notched...Tompkins Side Corner-Notched Variety
- e. Prairie Side-Notched...Nanton Wide Rounded Base Variety
- f. Prairie Side-Notched...Undetermined Variety
- g. Plains Side-Notched...Paskapoo
- h. Plains Side-Notched...Emigrant Basal-Notched
- i. Plains Side-Notched...Undetermined Variety
- j. Eastern Triangular...NT-1
- k. Eastern Triangular...NT-2
- l. Eastern Triangular...NT-3

PROJECTILE POINTS: METRIC AND NON-METRIC DATA

Metric																	Non-Metric					Plate	Cat. Number	Provenience	
A	B	C	D	E	F	G	H	I	I	II	III	IV	V	VI	VII	VIII	Unit	Level							
-	-	13.1	14.2	-	-	4.8	-	-	h	b	d	d	c	b	b	j	26Q	6752	22N22W	4					
17.4	-	12.6	12.2	-	-	2.8	-	-	b	b	d	c	e	b	b	j	26O	8856	20N18W	5					
21.4	-	15.3	12.6	-	-	2.4	-	-	b	d		c	d	b	a	j	26N	10787	10N22W	6					
-	-	15.4	14.9	-	-	3.6	-	-	h	b	a	c	c	b	b	j	26S	10640	10N22W	5					
-	-	15.8	-	-	-	4.1	-	-	h		d	d	h	b	a	l	26R	6420	22N22W	7					
23.4	-	8.3	12.2	-	-	3.6	-	-	b	b	b	f	a	c	a	l	26U	No C.#	No Provenience						
-	-	12.6	12.9	-	-	3.4	-	-	h	b	b	a	h	c	a	l	26T	No C.#	No Provenience						
-	-	13.2	13.0	-	-	3.9	-	-	h	b	d	h	f	c	a	j	26P	6072	22N22W	6					
20.2	-	14.9	13.9	-	11.3	4.6	2.4	1.2	i	b	-	f	c	b	a	i	26C	3527	14N8W	5					
-	2.2	-	-	13.7	9.5	2.0	3.3	2.0	e	-	b	c	-	b	a	i	26D	4476	14N8W	7					
20.2	4.2	12.2	11.1	10.0	12.3	5.0	4.1	2.0	b	d	b	d	c	d	b	i	26B	10908	10N22W	7					
17.6	4.3	12.5	11.4	12.8	7.8	3.2	3.1	2.1	b	a	a	d	c	d	b	g	26A	7322	28N2W	3					
-	-	12.1	14.5	-	-	7.6	-	-	h	f	e	d	c	b	e	b	26V	7797	28N2W	5					
-	3.6	18.9	-	15.9	10.2	4.4	4.6	3.2	h	d	c	d	j	b	a	c	26L	9716	20N18W	8					
16.5	3.75	14.5	12.3	15.8	12.2	3.9	4.0	1.5	b	a	a	h	d	b	a	e	26J	6977	28N2W	1					
13.3	-	10.2	9.2	10.5	9.0	2.0	3.2	.9	i	b	-	d	e	c	-	d	26E	10924	10N22W	7					
11.1	2.6	9.6	8.6	10.9	7.7	2.3	3.3	1.2	b	b	b	d	b	b	a	e	26F	7676	28N2W	5					
-	4.2	15.8	13.2	-	11.1	4.1	4.3	2.0	i	d	b	f	c	a	b	f	26I	9113	20N18W	6					
9.3	4.0	14.2	11.6	14.5	10.9	3.3	4.5	1.7	b	a	b	d	b	d	a	a	26M	9054	20N18W	6					
13.1	3.7	12.6	11.1	14.8	12.3	4.4	3.4	1.0	b	e	b	f	f	b	a	a	26K	4980	22N22W	3					
12.7	2.3	11.7	9.7	-	8.3	3.2	3.2	1.4	i	c	d	a	d	a	b	d	26G	10557	10N22W	4					
-	3.4	-	-	11.2	12.9	3.1	3.2	1.0	h	c	d	c	b		a	h	26H	8237	28N2W	7					
-	8.3	14.6	12.7	5.3	-	4.1	-	-	a	b	?	b	b	d	a	a	26W	6530	22N22W	8					
-	-	-	-	-	-	2.9	-	-	m	e	-	a	f	c	-	a	27B	8806	20N18W	4					

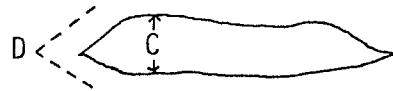
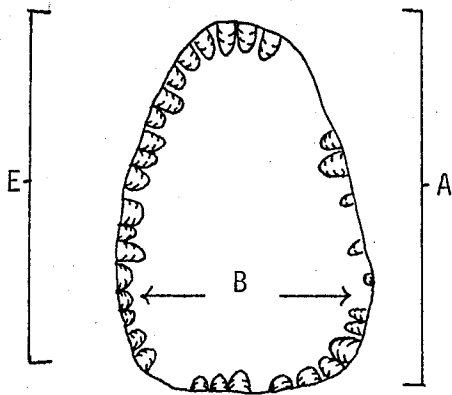
	Metric										Non-Metric						Plate	Cat. Number	Provenience	
A	B	C	D	E	F	G	H	I	I	II	III	IV	V	VI	VII	VIII			Unit	Level
-	-	-	-	-	-	2.6	-	-	m	h	-	a	d	b	-	a	27C	7033	28N2W	2
-	-	-	-	-	-	3.1	-	-	m	d	-	d	d	b	-	a	27E	7105	28N2W	3
-	-	-	-	-	-	3.8	-	-	m	d	-	h	b	b	-	a	27D	9463	20N18W	7
-	-	-	-	-	-	3.7	-	-	m	-	-	f	f	b	-	a	27A	7536	28N2W	4
19.7	-	15.0	12.5	-	9.6	3.8	-	-	d	d	-	f	c	b	-	a	27F	5746	22N22W	5
-	5.0	-	-	-	-	1.9	-	-	j	-	a	-	-	b	b	a	-	10945	10N22W	7
-	-	-	?	-	-	3.9	-	-	i	d	-	d	d	b	a	a	-	8239	28N2W	7

APPENDIX A-3

BIFACES

METRIC ATTRIBUTES

- A) Maximum Length
- B) Maximum Width
- C) Maximum Thickness
- D) Worked Edge Angle
- E) Maximum Length of Worked Surface



NON-METRIC ATTRIBUTES

- I. Completeness of Form
 - a. indeterminate
 - b. complete
 - c. tip (only)
 - d. blade mid-section
 - e. base (only)
 - f. mid-section and base (tip missing)
 - g. tip and mid-section (base missing)

- II. Transverse Section

see Appendix A-2, Part IV.

- III. Longitudinal Section

see Appendix A-2, Part V.

- IV. Lithic Type

see Appendix A-2, Part VI.

- V. Wear
 - a. absent
 - b. distal end
 - c. proximal end
 - d. right lateral
 - e. left lateral
 - f. laterals
 - g. all edges

- VI. Grinding/Polishing
 - a. absent
 - b. present

- VII. Type
 - a. drill base
 - b. miscellaneous biface

BIFACES: METRIC AND NON-METRIC DATA

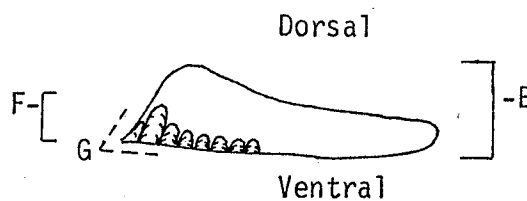
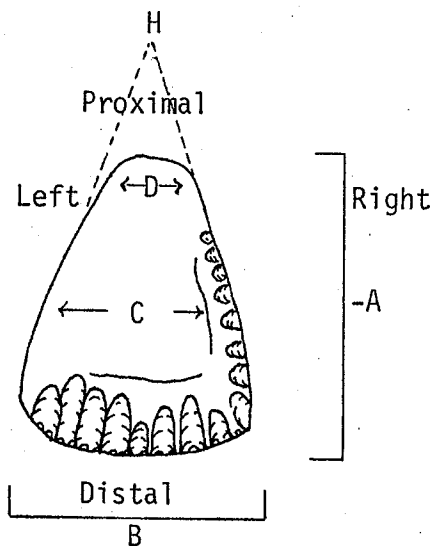
Metric					Non-Metric							Catalogue		Provenience	
A	B	C	D	E	I.	II.	III.	IV.	V.	VI.	VII.	Number	Plate	Unit	Level
	13.2	6.0			b	d	b	b	a	a	a?	9056	28 C	20N18W	6
	9.4	3.1	25	23	b	d	b	b	a	a	a	6753	28 B	22N22W	5
	12.8	4.2			b	b	b	b	a	a	a?	10923	28 A	10N22W	7
14.1	1.5	3.8		12.2	e	d	c	d	a	a	a?	7966		28N2W	6
		3.2	30	25.1	a	c		c	a	a	b	5986	29 F	22N22W	6
	27.1	5.6	30	33.3	f	d	d	b	a	a	b	6577	29 D	22N22W	7
	27.3	7.2	15	25.5	e	d	c	c	c	a	b	9461	29 E	20N18W	7
36.2	46.2	9.3	10	45.8	g	d	c	d	g	a	b	10421	29 B	20N18W	10
	40.7	13.5	45	32.7	e	b	i	b	b	a	b	11129	29 A	10N22W	11&12
	29.3	8.0	12	33.8	g	d	i	d	g	a	b	11107	29 C		-
121.4	85.8	15.8			b	c	b	Lime-	?	a	?	5221		22N22W	4
								stone							

APPENDIX A-4

SCRAPERS

METRIC ATTRIBUTES (After Nicholson 1976:14)

- A) Overall Length
- B) Width, Distal End
- C) Width, Mid-section
- D) Width, Proximal End
- E) Maximum Width
- F) Maximum Thickness
- G) Maximum Thickness Across the Distal Working Edge
- H) Angle of the Distal Working Edge
- I) Angle of Divergence of the Laterals



NON-METRIC ATTRIBUTES

I. Completeness of Form

- a. indeterminate
- b. complete
- c. distal end (only)
- d. proximal end (only)
- e. distal end and mid-section (proximal end missing)
- f. proximal end and mid-section (distal end missing)
- g. mid-section (proximal and distal ends missing)
- h. half (split longitudinally)

II. Outline

- a. indeterminate
- b. triangular
- c. rectangular
- d. crescentic
- e. oval

III. Transverse Section

see Appendix A-2, Part IV.

IV. Longitudinal Section

see Appendix A-2, Part V.

V. Lithic Type

see Appendix A-2, Part VI.

VI. Wear, Location

- a. absent
- b. distal end (only)
- c. proximal end (only)
- d. distal end and right lateral
- e. distal end and left lateral
- f. distal end and laterals
- g. right lateral
- h. left lateral
- i. laterals (only)
- j. all edges

VII. Striking Platform

- a. absent
- b. present

VIII. Type

- a. indeterminate
- b. end scraper
- c. side scraper
- d. both

SCRAPERS: METRIC AND NON-METRIC DATA

Metric									Non-Metric									Catalogue		Provenience	
A	B	C	D	E	F	G	H	I	I.	II.	III.	IV.	V.	VI.	VII.	VIII.	Number	Plate	Unit	Level	
21.2	14.2	11.2	2	-	5.0	4.3	60 ⁰	-	e	a	c	h	b	b	a	b	3563	30,0	14N8W	5	
25.4	8.5	11.1	11.9	-	4.0	3.3	70 ⁰	15 ⁰	b	c	h	b	c	j	a	d	4791	-	14N8W	9	
32.1	24.5	23.3	-	-	4.2	4.3	50 ⁰	20 ⁰	b	c	c	j	b	b	b	b	4801	30,D	14N8W	10	
26.8	26.4	22.1	7.4	-	6.5	6.6	65 ⁰	36 ⁰	b	b	f	h	b	b	a	b	5236	30,F	22N22W	4	
20.5	22.5	22.0	18.8	-	7.2	6.7	60 ⁰	-	e	a	f	h	b	f	a	b	5658	30,J	22N22W	5	
36.4	18.7	18.7	9.4	-	11.2	10.2	85 ⁰	60 ⁰	b	c	b	g	d	b	b	b	5977	30,B	22N22W	6	
26.9	-	-	-	-	8.2	7.6	40 ⁰	-	h	a	f	h	d	h	a	a	6240	-	22N22W	7	
41.1	27.4	30	24.2	-	13.5	6.7	65 ⁰	25 ⁰	b	e	h	h	b	d	a	b	6403	30,A	22N22W	7	
25.9	25.2	20.5	13.7	-	6.2	3.7	55 ⁰	35 ⁰	b	b	a	j	b	d	b	b	N.C#	30G	No Prov.		
16.7	19.0	16.9	11.2	-	5.0	4.2	70 ⁰	50 ⁰	b	b	c	h	d	f	b	b	6649	30,M	22N22W	8	
15.7	15.4	13.8	6.2	-	6.6	6.3	65 ⁰	50 ⁰	b	b	f	i	d	e	b	b	8477	30,P	28N2W	8	
21.3	17.6	19.6	15.0	-	7.6	8.8	65 ⁰	25 ⁰	b	c	b	i	c	e	b	b	8952	30,H	20N18W	5	
17.3	20.4	19.4	-	-	4.8	5.7	60 ⁰	-	b	b	c	h	b	d	a	b	9582	30,L	20N18W	7	
-	15.3	-	-	-	3.7	3.0	60 ⁰	-	c	-	b	-	c	c	a	a	9625	-	20N18W	8	
24.6	23.4	19.7	-	-	8.0	7.0	70 ⁰	40 ⁰	b	b	f	h	b	b	a	b	6805	30,I	22N22W	6	
19.9	20.1	20.1	20.5	-	10.2	4.9	90 ⁰	-	b	c	c	g	d	b	b	b	7635	-	28N2W	5	
-	20.2	23.1	-	-	5.3	5.6	70 ⁰	-	e	-	f	i	b	f	a	b	7650	30,K	28N2W	5	
20.9	18.0	13.6	-	-	5.3	5.2	50 ⁰	30 ⁰	b	b	c	h	b	b	a	b	8138	30,N	28N2W	6	
29.2	13.0	13.6	11.1	-	11.1	12.2	60 ⁰	25 ⁰	b	c	b	i	b	b	b	b	9108	30,E	20N18W	6	
34.1	22.2	17.3	8.6	-	8.0	8.8	65 ⁰	15 ⁰	b	c	b	h	d	d	b	b	9250	30,C	20N18W	7	
44.2	-	-	-	19.4	4.4	37.2	40 ⁰	55 ⁰	b	d	b	e	c	g	b	c	3	30,R	C-4	5	
20.9	-	-	-	20.5	4.8	20.0	50 ⁰	-	f	-	c	e	d	h	b	c	4825	-	22N22W	5	
17.5	-	-	-	11.7	3.4	3.1	40 ⁰	-	f	b	c	g	c	i	a	c	5648	30,Q	22N22W	5	
32.1	-	-	-	28.1	6.7	24.5	30 ⁰	50 ⁰	b	c	d	c	b	-	a	c	6346	-	22N22W	7	
40.0	20.7	20.2	15.7	-	5.3	9.0	30 ⁰	15 ⁰	b	c	c	e	b	d	b	c	8598	-	28N2W	9	

APPENDIX B
TABULAR DATA ON POLLEN SAMPLES

APPENDIX B. Relative Frequencies¹ of Pollen and Spores from Soil Samples from the Aschkibokahn Site (FbMb-1)

		Feature #	3	5	4	5	6	6	8	10	(Slater 1977)		
		Sample #	2	5	17	4	6	28	3	29	1	30	
Arboreal Pollen	<i>Abies</i>												
	<i>Alnus</i>										0.9	+	
	<i>Betula</i>		+						+		0.9	+	
	<i>Picea</i>		+					15.4	+		11.2	12.4	
	<i>Pinus</i>			+		+	+	80.8			59.8	77.6	
	<i>Populus</i>										0.9		
	<i>Quercus</i>												
	<i>Salix</i>												
	Indeterminate		+	+	+	+	+		+	+		25.2	7.5
	Unknown											0.9	1.5

Herb Pollen	<i>Ambrosia</i>												
	<i>Artemisia</i>								+				
	<i>Boraginaceae</i>								+				
	<i>Chenopodiaceae</i>		+			+	+	+			27.9	8.5	
	<i>Cyperaceae</i>				+	+	+			+	15.4		
	<i>Epilobium</i>										1.0		
	<i>Gramineae</i>								+		7.7	3.0	
	<i>Liguliflorae</i>								+		2.9	4.0	
	<i>Plantago eriopoda type</i>												
	<i>Stellaria</i>												
	<i>Tubuliflorae</i>		+						7.7		+	45.2	31.8
	<i>Typha latifolia</i>								+				+
<i>Umbelliferae</i>								+					

Spores	<i>Dryopteris type</i>												
	<i>Lycopodium</i>									+		1.5	
	<i>Pteridium</i>								+	+			
	<i>Selaginella</i>											+	
	<i>Sphagnum</i>		+	+	+	+	+	+	+	+	+	7.0	

1: Calculated for each taxon as a percentage of the arboreal pollen total for each sample.
 +: Indicates trace count.

APPENDIX B (Continued)

	Sample #	7	8	9	10	11	12	13	14	15	16
Arboreal Pollen	<i>Abies</i>							0.5			
	<i>Alnus</i>				1.4	+	+	3.9			+
	<i>Betula</i>				23.1			3.0			+
	<i>Picea</i>	+	+		14.7		+	16.3		+	9.2
	<i>Pinus</i>	+	+	+	44.1	+	+	69.0	+	+	61.8
	<i>Populus</i>										
	<i>Quercus</i>								1.0		
	<i>Salix</i>	+			9.1				2.0	+	
	Indeterminate	+	+		6.3		+	3.0	+		25.0
	Unknown		+		1.4				1.5		+
	Herb Pollen	<i>Ambrosia</i>								+	
<i>Artemisia</i>					+				+		
Boraginaceae			+		+						
Chenopodiaceae		+	109.1		2.8	+	+	3.9		+	21.1
Cyperaceae							+	2.0	+		+
<i>Epilobium</i>											
Gramineae								0.5			5.3
Liguliflorae		+			3.5			2.0	+		+
<i>Plantago eriopoda</i> type											+
<i>Stellaria</i>											
Tubuliflorae		96.0	81.8		14.7	+	+	6.9		+	6.6
<i>Typha latifolia</i>				+							
Umbelliferae											
Spores	<i>Dryopteris</i> type										
	<i>Lycopodium</i>				+		+				
	<i>Pteridium</i>										
	<i>Selaginella</i>										
	<i>Sphagnum</i>	+	+		5.6	+		5.9	+		51.3

1: Calculated for each taxon as a percentage of the arboreal pollen total for each sample.
 +: Indicates trace count.

APPENDIX B (Continued)

	Sample #	18	19	20	21	22	23	24	25	26	27
Arboreal Pollen	<i>Abies</i>										
	<i>Alnus</i>			1.1							
	<i>Betula</i>			1.5					+		
	<i>Picea</i>	+		14.5				+	14.2	21.6	+
	<i>Pinus</i>	+	+	76.6	+			+	79.6	71.9	+
	<i>Populus</i>										
	<i>Quercus</i>							+			
	<i>Salix</i>			+				+			
	Indeterminate		+	5.2	+		+		4.4	6.5	
	Unknown			+							
Herb Pollen	<i>Ambrosia</i>										
	<i>Artemisia</i>		+	1.5							
	Boraginaceae										
	Chenopodiaceae		+	+	+			+	7.1	2.2	+
	Cyperaceae			3.3							
	<i>Epilobium</i>										
	Gramineae			5.2					+		
	Liguliflorae			+				+	4.4	97.8	
	<i>Plantago eriopoda</i> type										
	<i>Stellaria</i>										+
	Tubuliflorae			6.7	+				71.7	11.5	
	<i>Typha latifolia</i>			+							
Umbelliferae											
Spores	<i>Dryopteris</i> type										
	<i>Lycopodium</i>								+		+
	<i>Pteridium</i>			+	+					+	
	<i>Selaginella</i>	+	+							5.0	+
	<i>Sphagnum</i>			5.2				+	3.5		+

1: Calculated for each taxon as a percentage of the arboreal pollen total for each sample.
 +: Indicates trace count.

APPENDIX C
TABULAR DATA ON PLANT RESOURCES

APPENDIX C-1

Plant Resources^a

Botanical Name	Common Name	Use	Habitat	Source
Algae Chlorophyceae	green algae	green stain	M	Johnston (1969:116)
<i>Acorus calamus</i>	sweet flag	fishing medicine on net, medicine and wigwam thatch	M	Gilmore (1919:69) Yarnell (1970:177) Johnston (1969:130)
<i>Actaea rubra</i>	red baneberry	medicine (diseases of women)	F	Densmore (1928:286)
<i>Apocynum</i> spp.	dogbane	cough medicine	Md	Densmore (1928:286)
<i>Apocynum androsaemifolium</i>	dogbane	medicine for heart palpitation, earache, headache, baby's cold, and also a charm	Md/F	Densmore (1928:286)
<i>Aralia nudicaulis</i>	wild sarsaparilla	medicine which is applied to a sore or used as a remedy "for the blood"; also used as charm	F	Densmore (1928:286)
<i>Artemisia frigida</i>	prairie sagewort	medicine for convulsions, hemorrhage, tonic, and "antidote"	Md	Densmore (1928:287)
<i>Asclepias incarnata</i>	swamp milkweed	medicine, food (flower buds)	Md	Densmore (1928:287) Yarnell (1970:56)
<i>Aster</i> spp.	aster	food	Md/F	Densmore (1928:287)
<i>Aster novae-angliae</i>	aster	charm	Md	Densmore (1928:287)

APPENDIX C-1 Continued

Botanical Name	Common Name	Use	Habitat	Source
<i>Caltha palustris</i>	marsh marigold cowslip	food (greens)	M	Waugh (1916:117) Yarnell (1970:53)
<i>Campanula rotundifolia</i>	harebell	medicine for ear diseases	Md	Densmore (1928:288)
<i>Carex</i> spp.	sedge	insulation in mocassins	M	Johnston (1969:129)
<i>Celastrus scandens</i>	bittersweet	medicine - physic and eruptions	F	Densmore (1928:288)
<i>Chenopodium</i> spp.	pigweed	food (seeds)	M	Johnston (1962)
<i>Cicuta</i> spp.	water hemlock	roots used to commit suicide; raw root applied to snakebite	M	Johnston (1969:155)
<i>Cicuta maculata</i>	poison hemlock	root smoked by Ojibwa to attract M deer	M	Densmore (1928:288) Yarnell (1970:180)
<i>Cornus alternifolia</i>	dogwood	medicine - eye diseases, utility, F charm	F	Densmore (1928:288)
<i>Cornus canadensis</i>	bunchberry	food	F	Densmore (1928:288)
<i>Cornus stolonifera</i>	red-osier dogwood	eye medicine, utility, dye, and smoked in a pipe	F/M	Densmore (1928:288) Gilmore (1919:74)
<i>Corylus americana</i>	hazel	food dye, and utility	F	Densmore (1928:289) Gilmore (1919:74)
<i>Epilobium angustifolium</i>	fireweed	medicine for bruises	F	Densmore (1928:289)

APPENDIX C-1 Continued

Botanical Name	Common Name	Use	Habitat	Source
<i>Equisetum fluviatile</i>	swamp horsetail	Blackfoot fed their horses "jointed water grass"	M	Ewers (1955)
<i>Erigeron canadensis</i>	horseweed	medicine for stomach pains and women's diseases	Md	Densmore (1928:289)
<i>Eupatorium maculatum</i>	Joe-Pye-weed	strengthening bath	M	Densmore (1928:289)
<i>Fraxinus</i> spp.	ash	tonic, utility	F	Densmore (1928:289)
<i>Heracleum lanatum</i>	cow parsnip	indigestion, boils and sore throat	M	Densmore (1928:289) Gilmore (1919:107)
<i>Hordeum jubatum</i>	squirrel tail	medicine for eye sty	M	Densmore (1928:290)
<i>Humulus lupulus</i>	common hop	used by the Ojibwa as a medicinal beverage	F	Yarnell (1970:157)
<i>Juncus balticus</i>	wire rush	green-brown dye from stem	M	Johnston (1969:130)
<i>Juncus dudleyi</i>	Dudley's rush	stems used for weaving mats	M	Yarnell (1970:187)
<i>Lathyrus palustris</i>	marsh vetchling	food (seeds)	F/M	Yarnell (1970:64)
<i>Lycopus asper</i>	buglewood, crow potato	food (tubers dried and boiled)	M	Densmore (1928:290) Yarnell (1970:71)
<i>Nepeta cataria</i>	catnip	fever medicine	M	Densmore (1928:290)
<i>Nuphar variegatum</i>	yellow pond lily	food (root and tubers) medicine	M	Yarnell (1970:53) Fenton (1968:107)

APPENDIX C-1 Continued

Botanical Name	Common Name	Use	Habitat	Source
<i>Parthenocissus quinquefolia</i>	woodbine	kidney medicine	F	Densmore (1928:291) Gilmore (1919:102)
<i>Phragmites communis</i>	reed	stems used for pipestems and arrowshafts	M	Densmore (1928:291) Johnston (1969:128)
<i>Polygonum coccineum</i>	marsh smartweed	medicinal beverage, also smoked to attract deer; medicinal tea	M	Yarnell (1970:157,180)
<i>Polygonum lapathifolium</i>	nodding smartweed	medicinal beverage	M	Yarnell (1970:157)
<i>Polygonum punctatum</i>	dotted smartweed	medicine for stomach pains	M	Densmore (1928:291)
<i>Populus tremuloides</i>	aspen	food, women's diseases	F	Densmore (1928:291)
<i>Potentilla palustris</i>	marshlocks	medicine for dysentery	M	Densmore (1928:291) Yarness (1970:169)
<i>Prunus virginiana</i>	chokecherry	food, digestive trouble medicine	F	Densmore (1928:291)
<i>Quercus macrocarpa</i>	bur oak	Medicine for wounds, food	F	Densmore (1928:292) Gilmore (1919:75)
<i>Rosa arkansana</i>	wild rose	tonic	F	Densmore (1928:292)
<i>Rudbeckia laciniata</i>	cone flower	medicine for indigestion and burns	Md	Densmore (1928:292)
<i>Rumex crispus</i>	yellow dock	eruption medicine	M	Densmore (1928:292)

APPENDIX C-1 Continued

Botanical Name	Common Name	Use	Habitat	Source
<i>Sagittaria cuneata</i>	arrow-leaved arrowhead	food (root, tubers)	M	Yarnell (1970:71) Johnston (1969:125)
<i>Sagittaria latifolia</i>	duck potato	food (root, tubers) also as medicine	M	Fenton (1968) Yarnell (1970:71)
<i>Salix</i>	willow	indigestion medicine, utility	F,M	Gilmore (1919:73) Densmore (1928:292)
<i>Scirpus acutus</i>	bulrush	food - roots eaten raw and as medicine	M	Johnston (1969:129)
<i>Scirpus paludosus</i>	prairie bulrush	food (tubers)	M	Johnston (1969:129,130)
<i>Scirpus validus</i>	great bulrush	food (tubers); stems used to make baskets	M	Densmore (1928:293) Gilmore (1919:69)
<i>Scutellaria epilobiiifolia</i>	marsh skullcap	medicine	M	Yarnell (1970:173)
<i>Sium suave</i>	water parsnip	food (root); also charm	M	Yarnell (1970:73)
<i>Smilax herbacea</i>	carrion - flower	medicine - physic and urinary system, food and a remedy for hoarseness	F	Densmore (1928:293) Gilmore (1919:71)
<i>Solidago</i> spp.	goldenrod	medicine - fever, ulcers and boils	Md	Densmore (1928:293)
<i>Solidago rigida</i>	goldenrod	medicine for urinary trouble	Md	Densmore (1928:293)

APPENDIX C-1 Continued

Botanical Name	Common Name	Use	Habitat	Source
<i>Stachys palustris</i>	hedge-nettle	Colic medicine	M	Densmore (1928:293)
<i>Triglochin maritima</i>	arrow grass	seeds parched and eaten	M	Johnston (1969:125)
<i>Typha latifolia</i>	cat-tail	down - diapers and dressing for burns; food (root); thatching wigwam, mats	M	Gilmore (1919:66) Johnston (1969:125) Fenton (1968:108) Yarnell (1970:186)
<i>Urtica gracilis</i>	nettle	fiber used for sewing, twine, and weaving bags	F	Yarnell (1970:187)
<i>Zizania palustris</i>	wild rice	food	M	Densmore (1926:294) Jenks (1898) Waugh (1916:78) Johnston (1969) Yarnell (1970:65)

^a Habitat symbols are: M = Marsh and aquatic

F = Forest

Md = Meadow

APPENDIX D
FORMS USED IN FAUNAL ANALYSIS

SPECIES:

SITE:

L R ELEMENT:

PROVENIENCE:

DMG.

Part

Condition

Age

WHOLE:

WATER-WORN/
WEATHERED:

ADULT:

PROXIMAL:

BURNED:

YOUNG ADULT:

MID SECTION:

CALCINED:

IMMATURE:

DISTAL:

BUTCHERING OR
SKINNING:

(Basis):

ARTIFACT:

DISEASE:

CAR.-CHEWED:

ROD.-CHEWED:

COMMENTS AND MEASUREMENTS:

FORM #2

APPENDIX E
DISTRIBUTION OF SITE CONTENTS

APPENDIX E
DISTRIBUTION OF THE CONTENTS OF THE ASCHKIBOKAHN SITE

Units	10N22W												14N8W												20N18W												
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	
Levels																																					
Features														1	1				1														1				
Duck Bay Ware					2	2	1	1						2	2	2	1	5	1									1	2	3	1						
Blackduck Ware																	2		1									1		1	4	3	4				
Unclassified Vessels																	1																				
Projectile Points				1	1	1	2										1		1									1	1	3	1	1					
Bifaces						1				1																			1	1				1			
Unifaces																	1			1	1							1	1	2	1						
Ground Stone																																					
Utilized Flakes						2				1	2			1	1		5	5	1	2										3	2	2					
Bone Tools						2											1	5	2									1		1	3	2			1		
% Volume Faunal Material							11%												33%												20%						
Artifact Total by Levels				1	3	3	8	1			2	2		1	4	2	7	10	13	6	1	1	1				3	5	12	12	10	6	1	1			
Artifact Total by Unit	20												46												50												

APPENDIX E-Continued

Units	22N22W												28N2W												No Provenience
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	No Provenience
Features	1			1													1			1					
Duck Bay Ware			1	1	6	3	3								5	6	7	3		1					
Blackduck Ware					1	2										1				1					5
Unclassified Vessels							1								1		1	1							
Projectile Points			2	1	1	1	1						1	1	2	1	2		2						2
Bifaces					1	1												1							1
Unifaces	1			1	2	2	3	1									2	1		1	1				2
Ground Stone					1																				
Utilized Flakes	1				3	1	4	3	1					2		2	2	3		4	1				5
Bone Tools					4	2	1							1		1	1	1	1	2					2
% Volume Faunal Material							22%												14%						
Artifact Total by Levels	2		3	3	9	1	1	4	4	1			2	3	9	5	3	4	8	6	3				17
Artifact Total by Unit	57												63												17

APPENDIX F
PLATES

PLATE 1

View of the site taken facing north from the shore of the Duck River



PLATE 2

Aerial photo of the Aschkibokahn Site. Excavation units are in the clearing in the left foreground

PLATE 3

Crew laying a grid over the study area



PLATE 4

Crew waterscreening wet, excavated soil

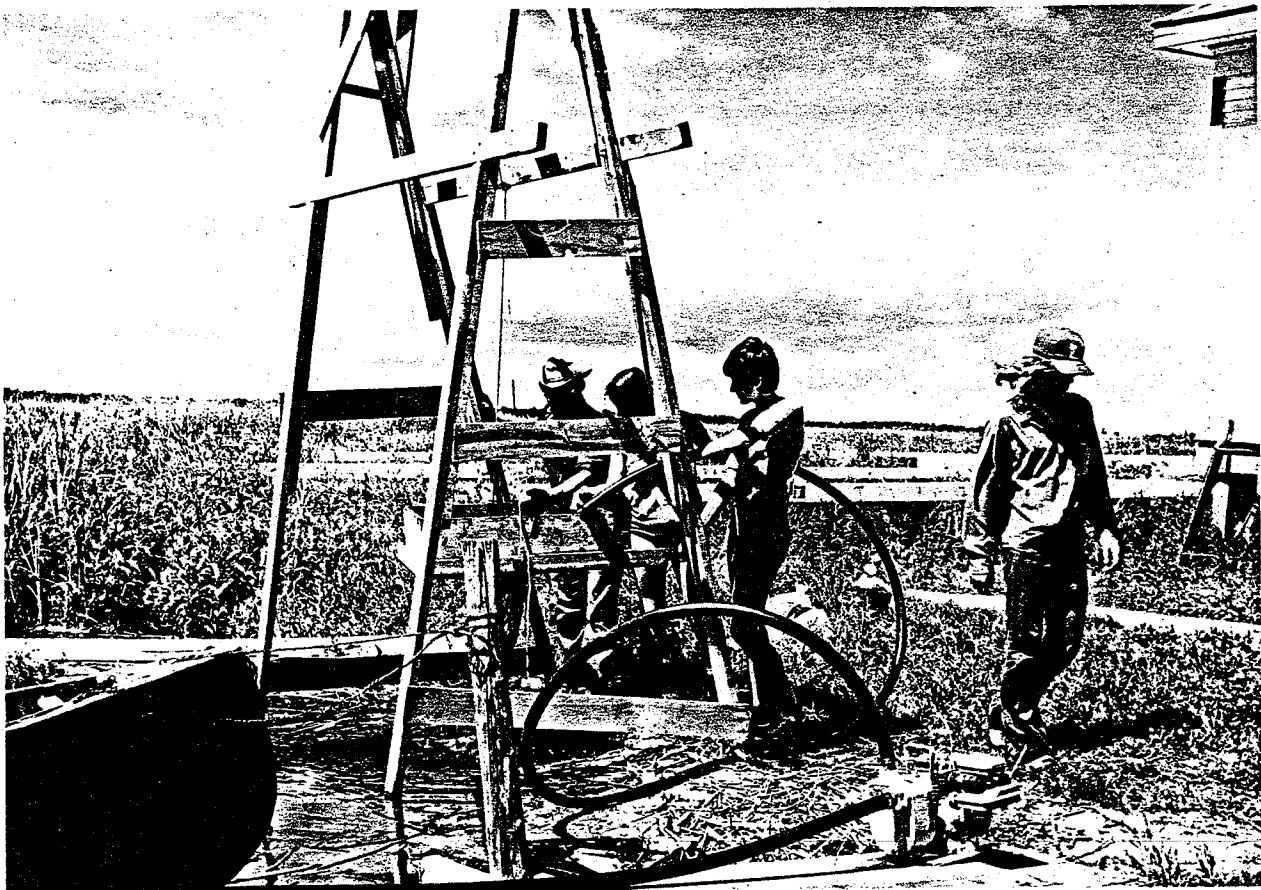


PLATE 5

Sampling units used in the recovery of macrofossils

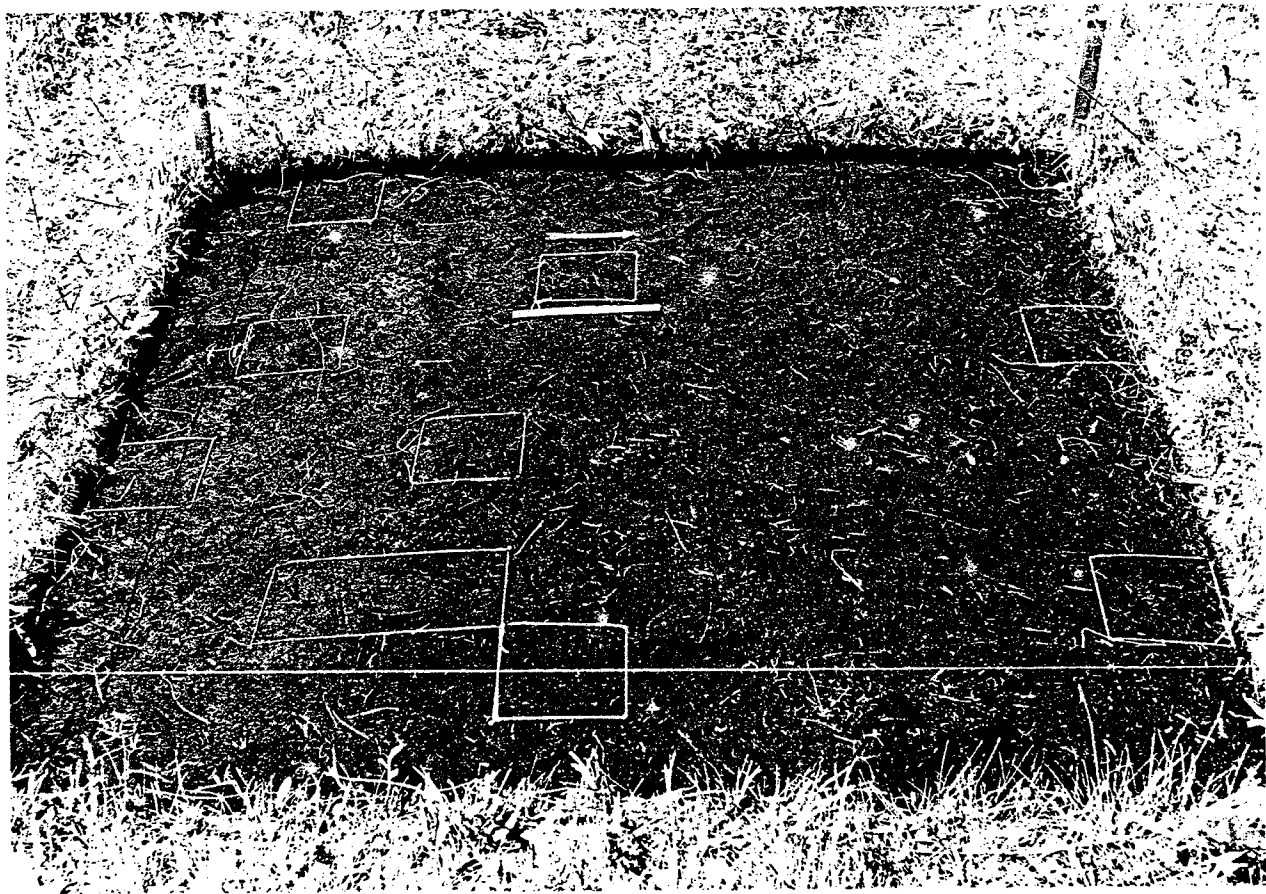
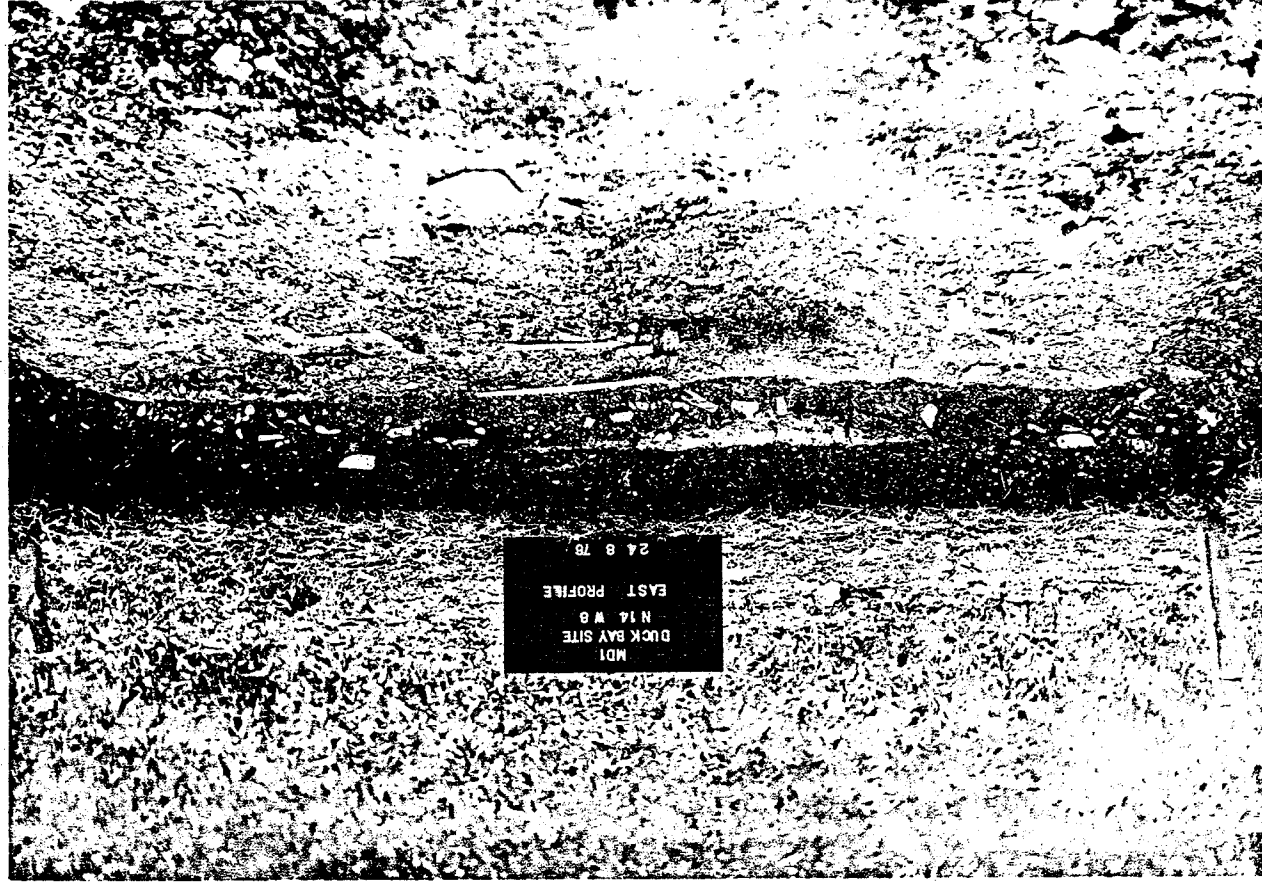


PLATE 6

East wall profile of unit 14N8W
Scale: depth of excavation is 24 cm.



MDI
DUCK BAY SITE
N 1A W 8
EAST PROFILE
24 8 78

PLATE 7

North wall profile of unit 10N22W. Three strata; sod, dark humus, and sand and gravel; are visible



PLATE 8

North-south profile of feature 4, a hearth in unit 14N8W

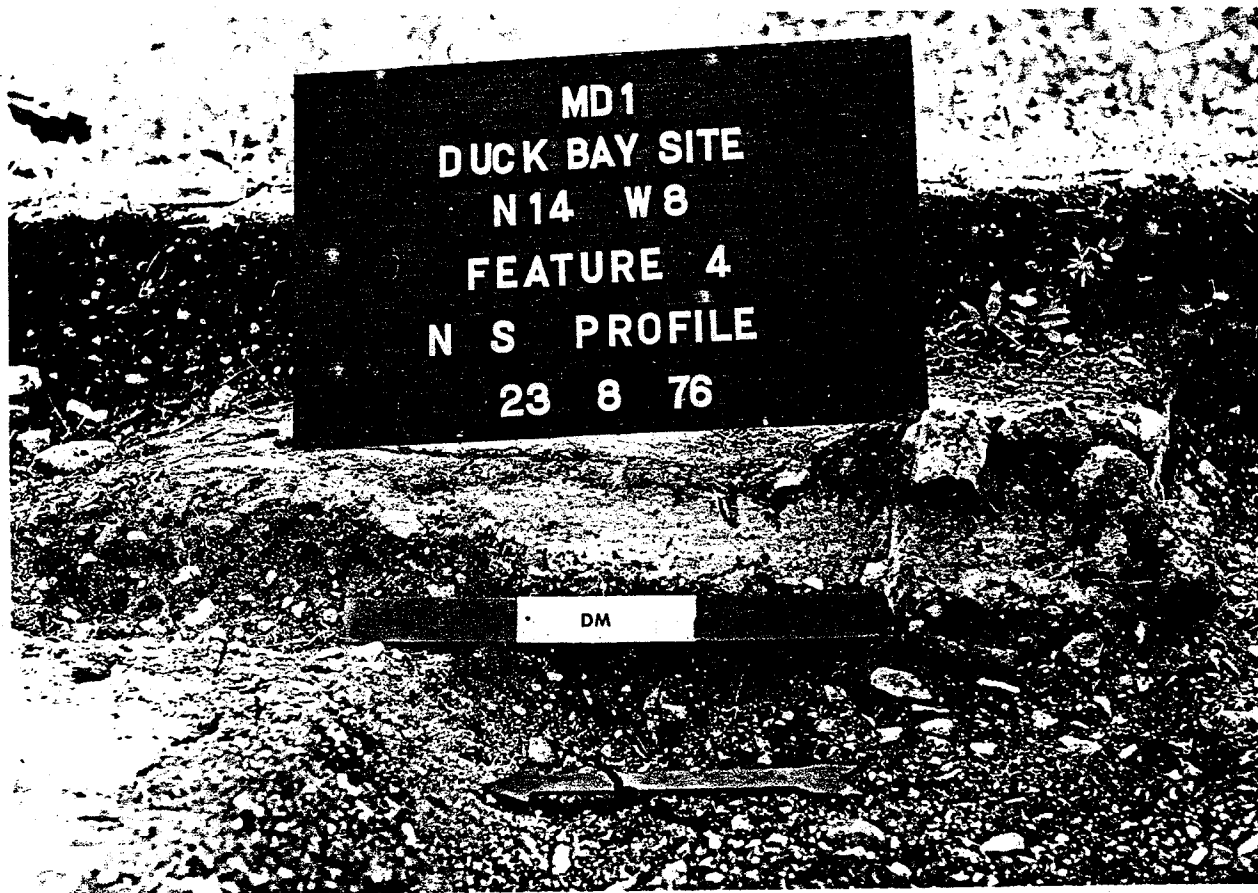


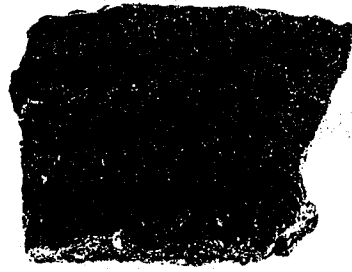
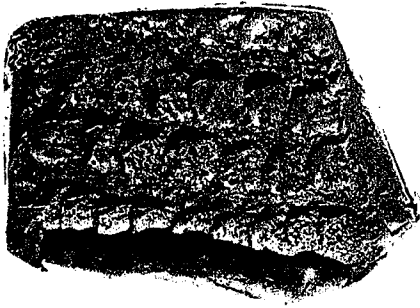
PLATE 9

Planview of feature 6 in unit 22N22W



PLATE 10

Type A, Mode 1 rims.
Orientation of rim profiles is stylized



A



B



C



D

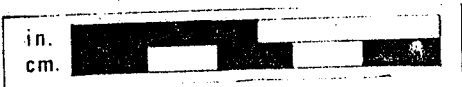
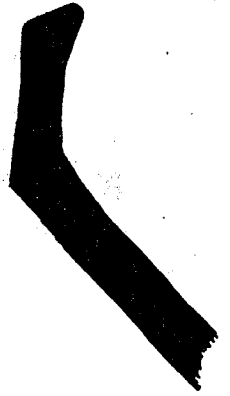
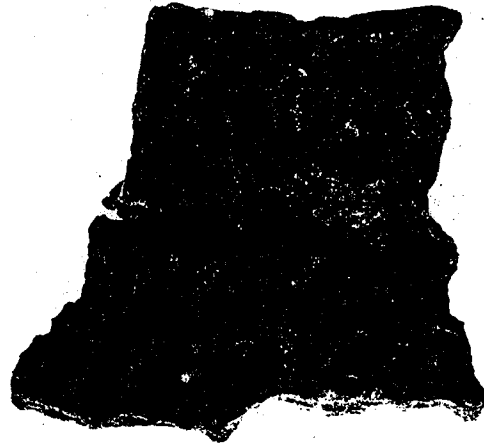
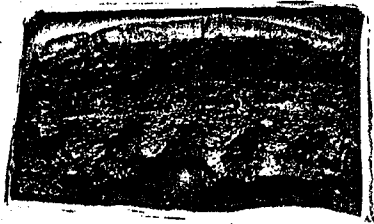


PLATE 11

Type A, Mode 1 rims



A



B



C



D



PLATE 12

Type A, Mode 2 rims



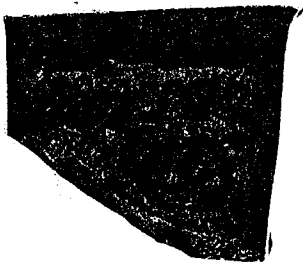
A



B



C

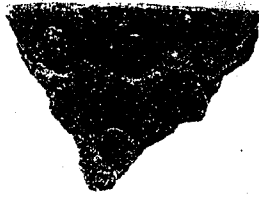


D



PLATE 13

Type A, Mode 2 rims



A



B



C

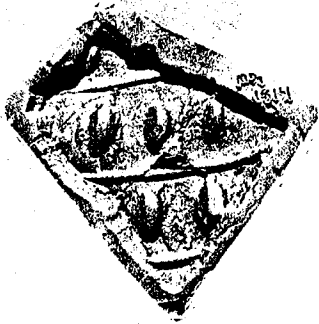


D

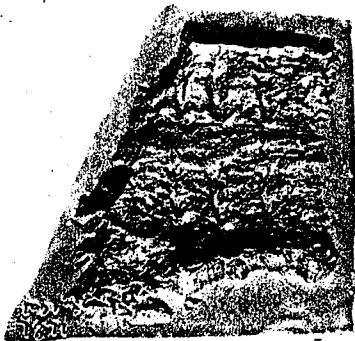


PLATE 14

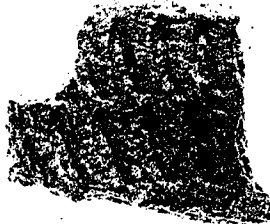
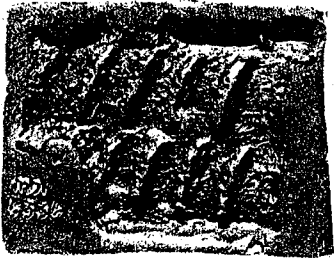
Type A, Mode 2 rims



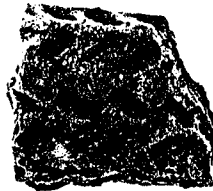
A



B



C



D



PLATE 15

Type B, Mode 6 rims

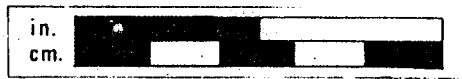
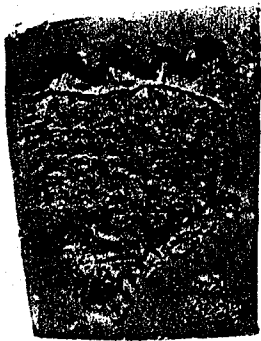


PLATE 16

Type B, Mode 7 rims



A



B



C

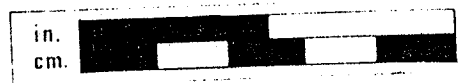
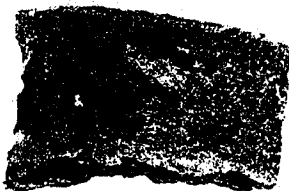


PLATE 17

Type B, Mode 8 rims



A



B



C



D



E



PLATE 18

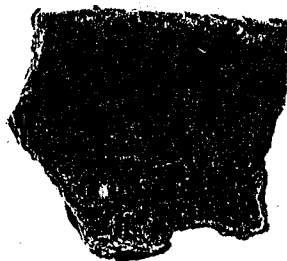
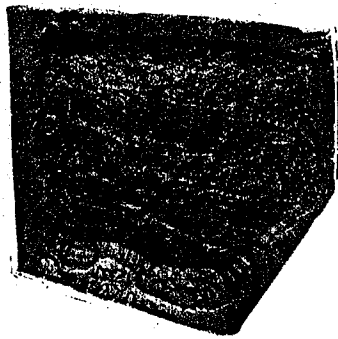
Type B, Mode 9 rims



A



B



C

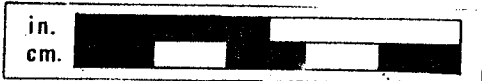


PLATE 19

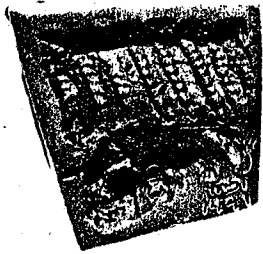
Five of Evans' types of Blackduck Ware



A



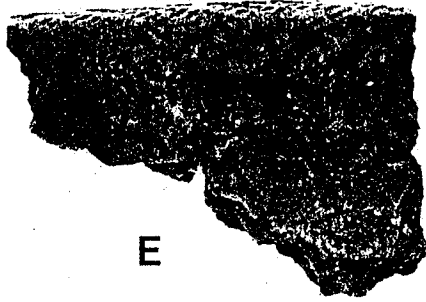
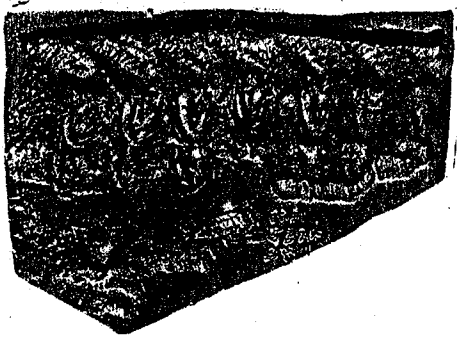
B



C



D



E



PLATE 20

Blackduck Ware, Modes "A"(D), "C"(C), "D"(B), "E"(A)



A



B



C



D

PLATE 21

Blackduck Ware, Mode B rim.

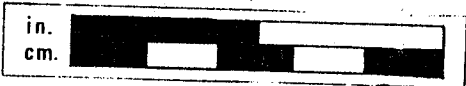
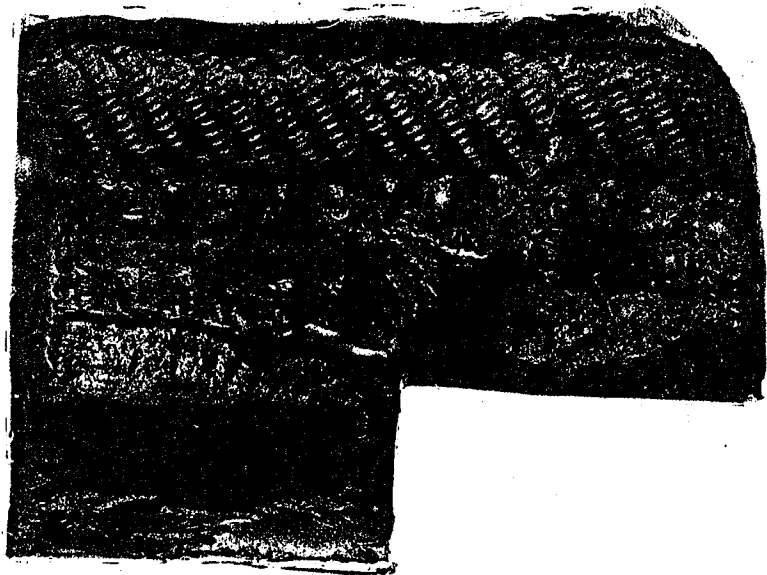
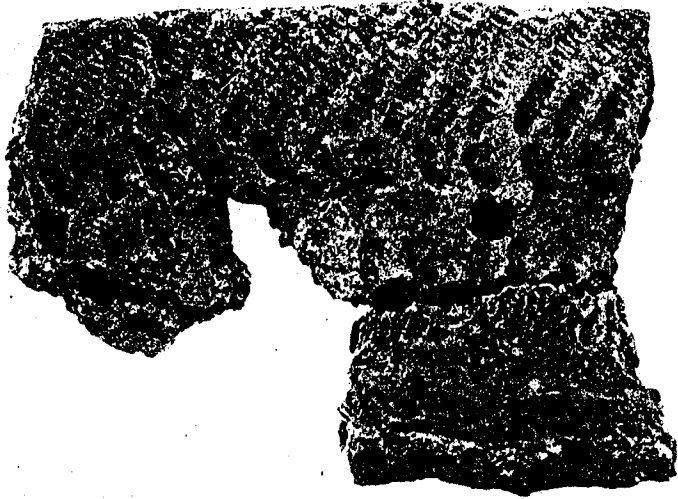
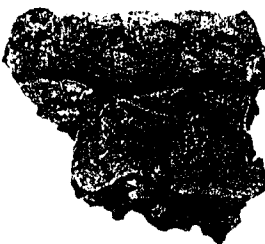
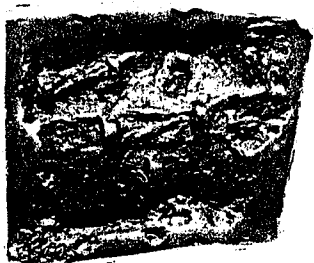


PLATE 22

Miscellaneous vessels



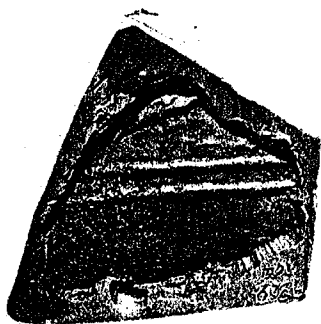
A



B



C



D

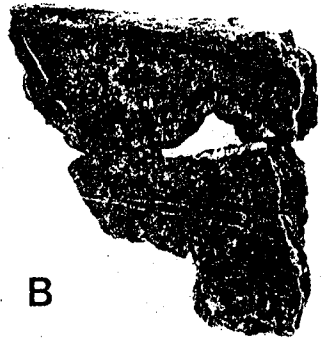
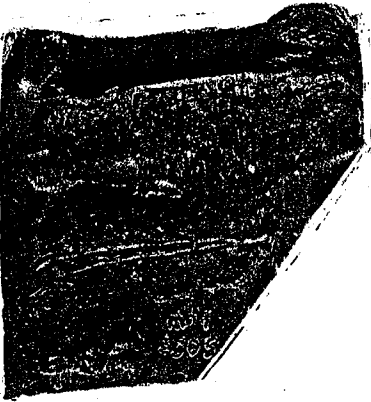
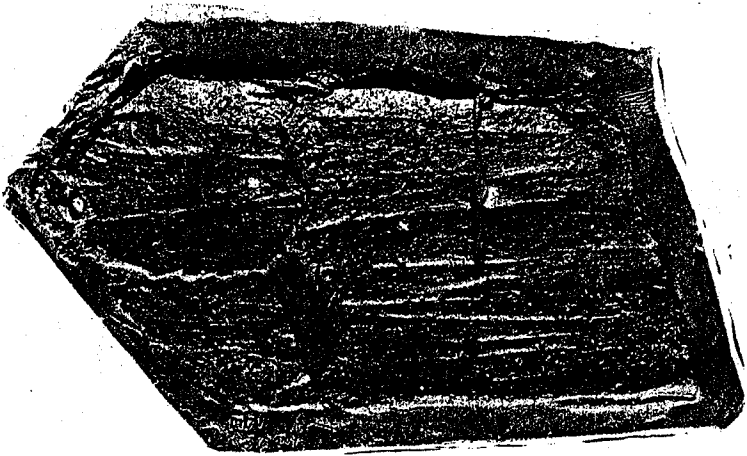


PLATE 23

Miscellaneous vessels



A



B

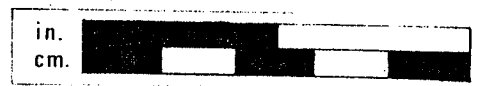


PLATE 24

Clay Pipe Fragments

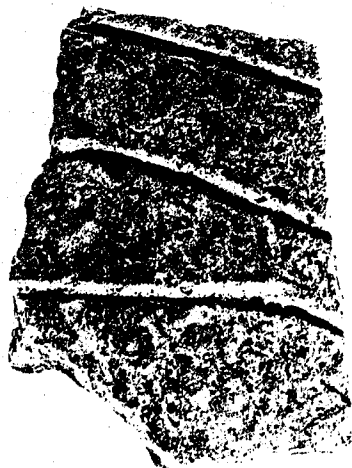
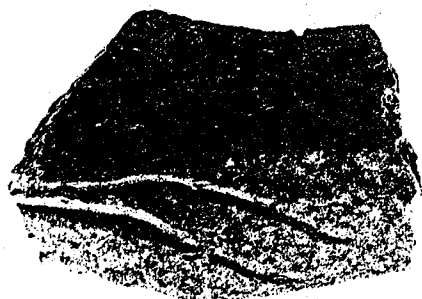


PLATE 25

Projectile points



A



B



C



D



E



F



G



H



I



J



K



L



M



N



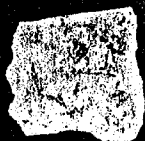
O



P



Q



R



S



T



U



V



W

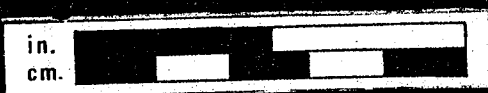


PLATE 26

Projectile point tips



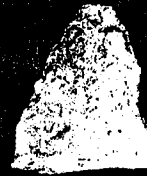
A



B



C



D



E



F

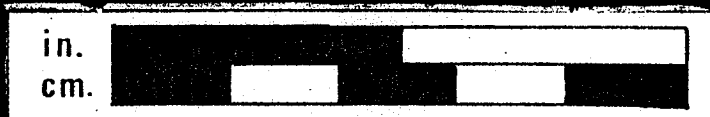


PLATE 27

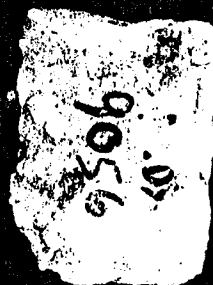
Drill bases (?)



A



B



C

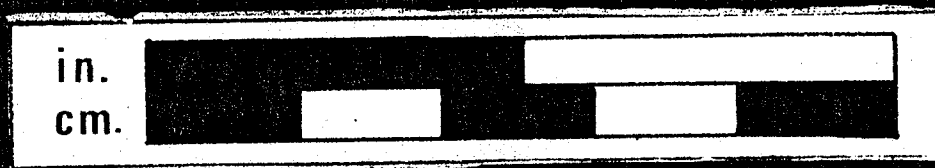
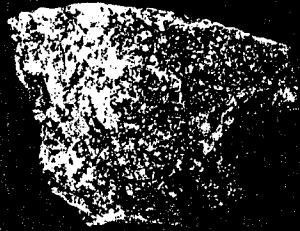


PLATE 28

Knives



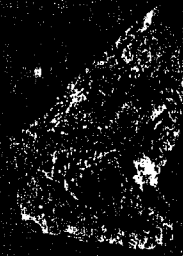
A



B



C



D



E



F



PLATE 29

Scrapers



A



B



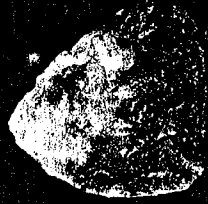
C



D



E



F



G



H



I



J



K



L



M



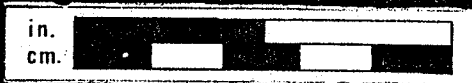
N



O



P



Q



R

PLATE 30

Ground stone

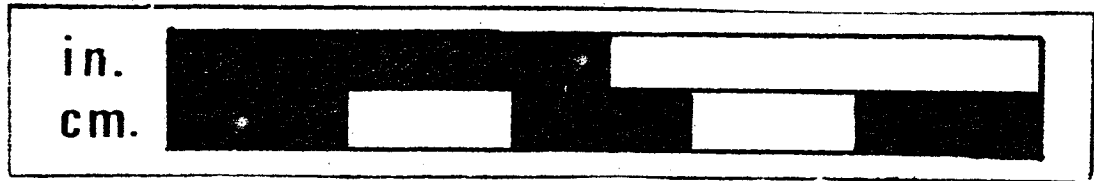
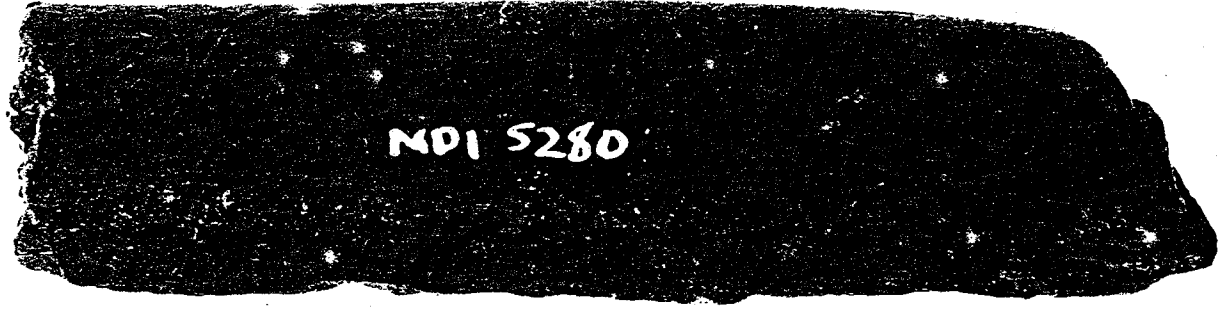


PLATE 31

Cast whitemetal button, *circa* 1750-1812

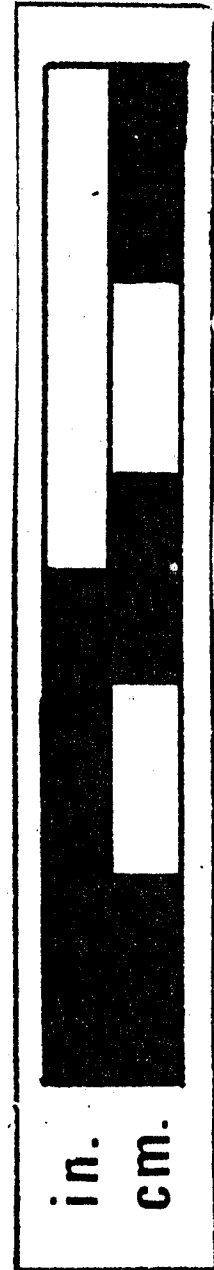
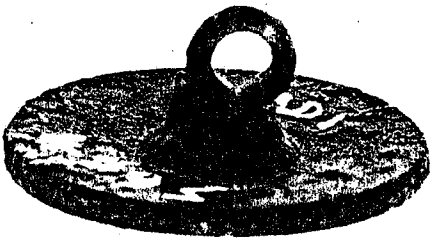


PLATE 32

Bone awls

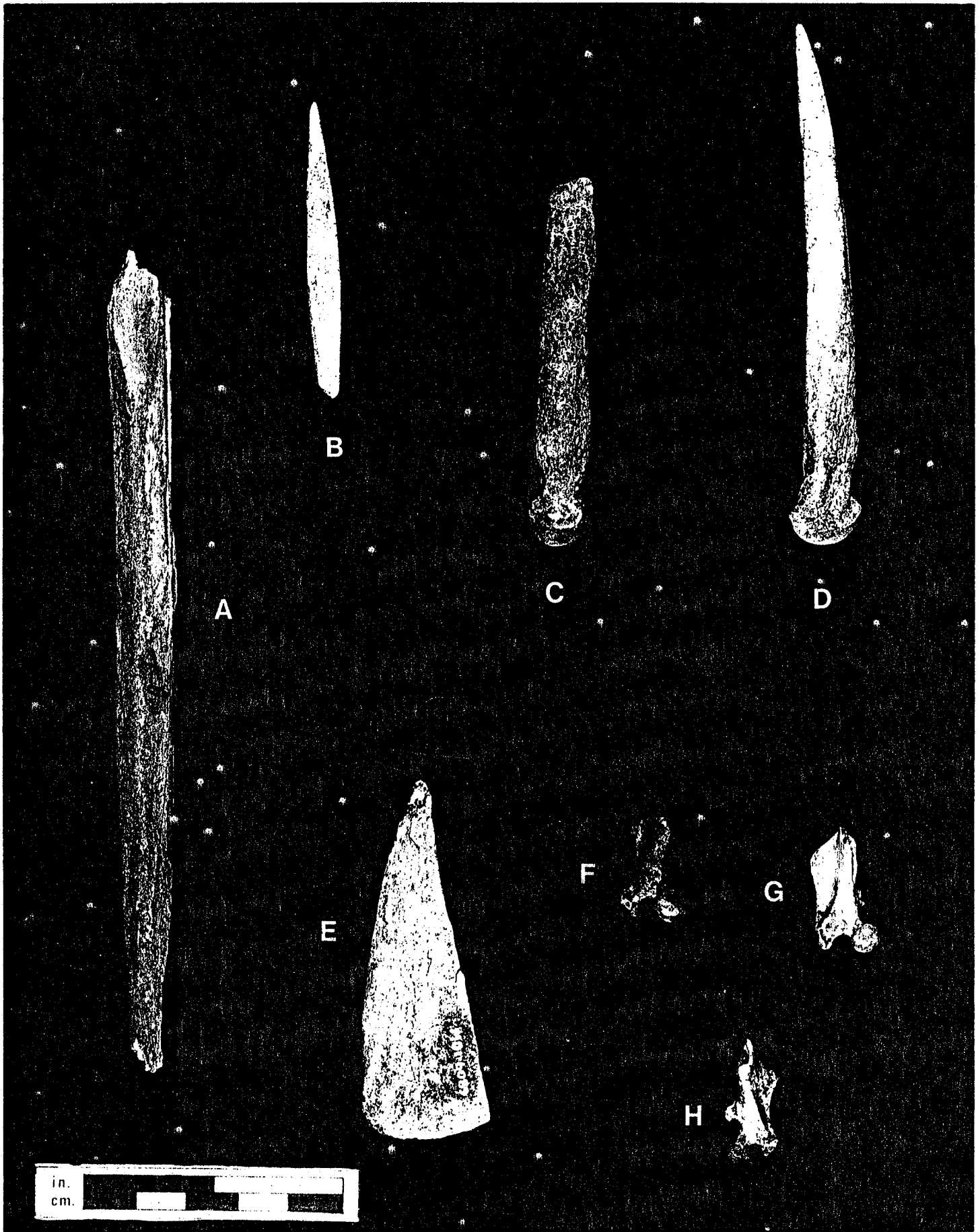


PLATE 33

Bird bone beads or tubes.



A



B



C



D



E



F



G



H

PLATE 34

Bird bone tube with scalloped edge

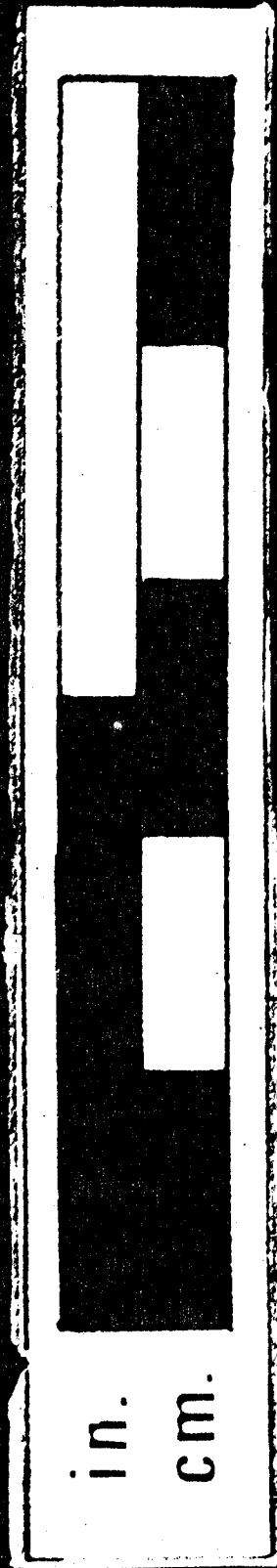
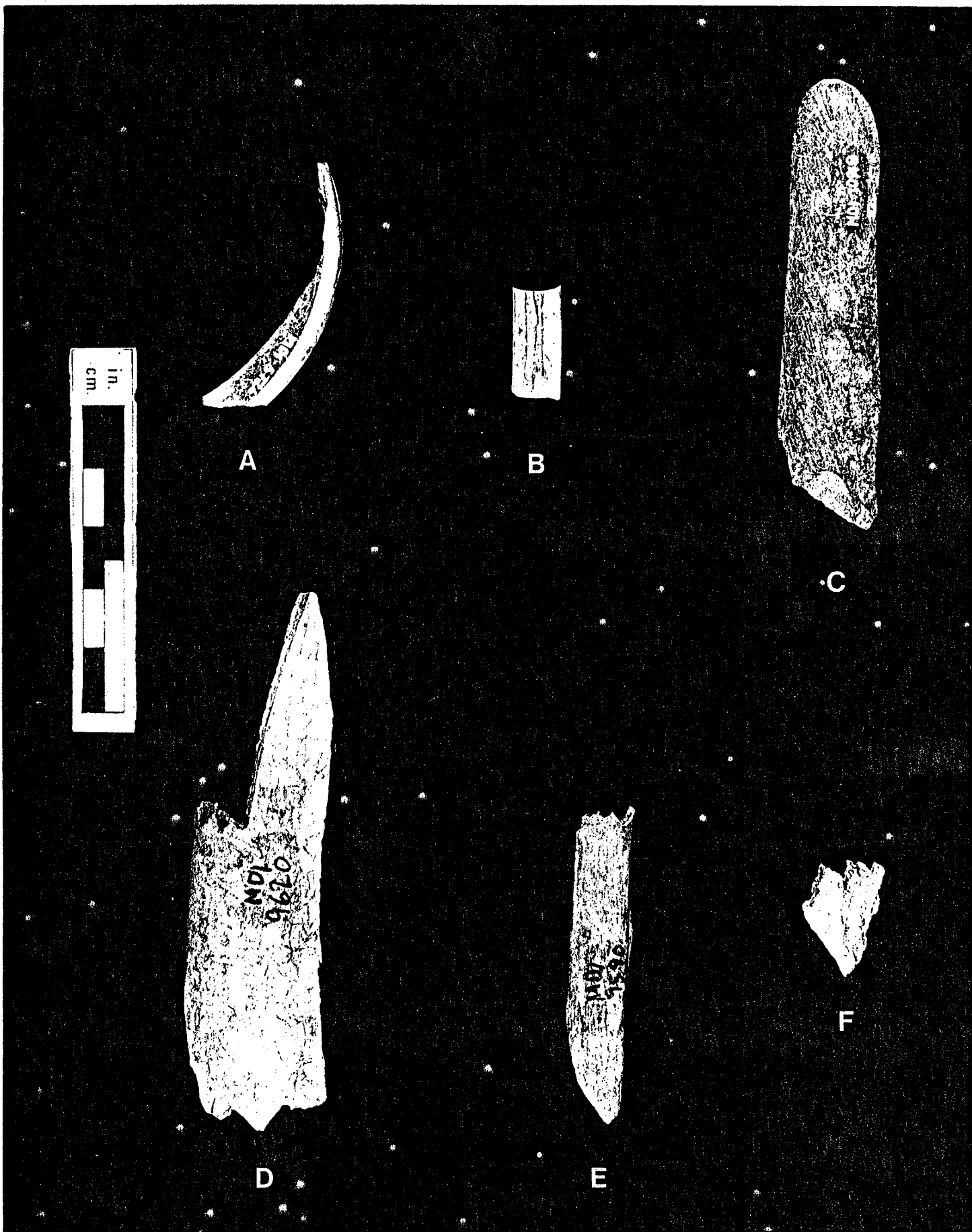


PLATE 35

Bone chisels, spatula, and miscellaneous bone tools



A



B



C



D



E



F



PLATE 36

Antler handles



A



B

PLATE 37

Antler harpoons



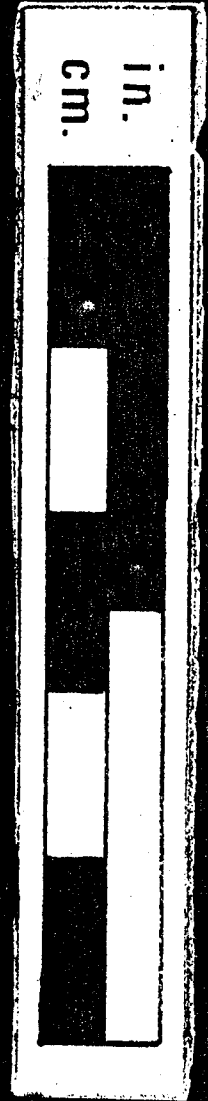
A



B

PLATE 38

Bone needles or leister tines



A



B



C

PLATE 39

Bone wedge?



LITERATURE CITED

- Bellrose, F. C.
1950 The relationship of muskrat populations to various marsh aquatic plants. *Journal of Wildlife Management* 14(3):299-315.
- Binford, L. R.
1963 A proposed attribute list for the description and classification of projectile points. *Museum of Anthropology, University of Michigan, Anthropological Papers* 19:193-221.
- Bird, R. D.
1930 Biotic communities of the Aspen Parkland of central Canada. *Ecology* 2:356-442.
1961 *Ecology of the Aspen Parkland of Western Canada in relation to land use*. Canadian Department of Education Publication 1066.
- Bökönyi, S.
1970 A new method for the determination of the number of individuals in animal bone material. *American Journal of Archaeology* 74:291-292.
- Bossenmaier, E. F., J. Cober, W. G. Leitch, G. H. MacKay, W. R. Miller, D. D. Moore, J. M. Walker, and P. Ward
1968 *Delta Marsh: its values, problems and potentialities*. Manitoba Government, Department of Mines and National Resources, Technical Committee for the Development of Delta Marsh.
- Burpee, L. J. (editor)
1927 *Journals and letters of Pierre Gaultier de Varennes de la Verendrye and his sons*. The Champlain Society, Toronto.
- Carmichael, P. H.
1977 A descriptive summary of Blackduck ceramics from the Wanipigow Lake Site Area (Eg Kx-1), 1975 and 1976. *Papers in Manitoba Archaeology, Miscellaneous Paper* 5.
- Casteel, R. W.
1972 Some archaeological uses of fish remains. *American Antiquity* 37(3):404-419.
- Chaplin, R. E.
1971 *The study of animal bones from archaeological sites*. Seminar Press, London and New York.

LITERATURE CITED-Continued

- Clayton, L., W. B. Bickley, Jr., and W. J. Stone
1970 Knife River flint. *Plains Anthropologist* 15(50):282-290.
- Clarke, D.
1976 Mesolithic Europe: The economic basis. In *Problems in economic and social archaeology*, edited by G. de G. Siaveking, I. H. Longworth and K. E. Wilson, pp. 449-481. Duckworth Co. Ltd., London.
- Cleland, C. E.
1966 The prehistoric animal ecology and ethnozoology of the Upper Great Lakes Region. *University of Michigan, Museum of Anthropology, Anthropological Papers*, 29.
- Coues, E. (editor)
1897 *New light on the history of the greater Northwest. The manuscript journals of Alexander Henry and of David Thompson, 1799-1814 (Vol.1)*. Francis P. Harper, New York.
- Dawson, K. C. A.
1974 The McCluskey Site. *Archaeological Survey of Canada. Mercury Series Paper* 25.
- Densmore, F.
1928 Uses of plants by the Chippewa Indians. *Bureau of American Ethnology, Smithsonian Institution, Annual Report* 44:275-397.
- Dickson, G.
1976 Recent radiocarbon dates from Northern Manitoba. *Papers in Manitoba Archaeology, Miscellaneous Papers* 3.
- Dore, W. G.
1969 Wild rice. *Canada Department of Agriculture Research Branch Publication* 1393:1-84.
- Ehrlich, W. A., L. E. Pratt, and F. P. Leclaire
1959 Report of the reconnaissance soil survey of Grand Map Sheet Area. *Manitoba Soils Survey Soils Report* 9.
- Eisenlohr, W. S., Jr.
1969 Hydrology of small water areas in the prairie pothole region. Saskatoon Wetlands Seminar. *Canadian Wildlife Service Report Series* 6:35-39.
- Errington, P. L.
1961 *Muskrats and marsh management*. The Stackpole Co., Harrisburg, Pennsylvania.

LITERATURE CITED-Continued

Evans, G. E.

1961a A reappraisal of the Blackduck Focus or Headwaters Lake Aspect. Unpublished M. A. thesis, Department of Anthropology, University of Minnesota.

1961b Ceramic analysis of the Blackduck Ware and its general cultural relationships. *Proceedings: The Minnesota Academy of Science* 29:33-54.

Fenton, W. N. (editor)

1968 *Parker on the Iroquois: Iroquois uses of maize and other food plants. The code of Handsome Lake, the Seneca Prophet. The Constitution of the Five Nations.* Syracuse University Press, Syracuse, New York.

Flannery, K. V.

1967 Vertebrate fauna and hunting patterns. In *The Prehistory of the Tehuacan Valley* (Vol. 1), *Environment and subsistence.* edited by D. S. Byers, pp. 132-175. University of Texas Press, Austin.

1968 Archaeological systems theory and early Mesoamerica. In *Anthropological archaeology in the Americas*, edited by B. J. Meggers, pp. 79-110. Dumbarton Oaks, Washington, D.C.

1971 Archaeological systems theory and early Mesoamerica. In *Man's imprint from the past, readings in the methods of archaeology*, edited by J. Deetz, pp. 344-364. Little & Brown Co., Boston.

1976 Empirical determination of site catchments in Oaxaca and Tehuacan. In *The early Mesoamerican village*, edited by K. V. Flannery, pp. 103-117. Academic Press, New York.

Flannery, K. V., and M. D. Coe

1968 Social and economic systems in Formative Mesoamerica. In *New Perspectives in archaeology*, edited by S. R. Binford and L. R. Binford, pp. 267-283. Aldine, Chicago.

Gibson, T. H.

1976 The Winnipegosis Site. *Papers in Manitoba Archaeology, Preliminary Report* 2.

Gilmore, M. R.

1919 Uses of plants by the Indians of the Upper Missouri region. *Bureau of American Ethnology, Smithsonian Institution, Annual Report* 33:1-30.

Godfrey, E. W.

1966 The birds of Canada. *National Museums of Canada. Bulletin* 203 *Biological Series* 73.

LITERATURE CITED-Continued

- Grainger, D. M.
1977 Faunal report for the Duck Bay Site. Ms. on file, Historic Resources Branch, Department of Tourism, Recreation, and Cultural Affairs, Winnipeg.
- Grayson, D. K.
1973 On the methodology of faunal analysis. *American Antiquity* 38(4):432-439.
- Gryba, E. M.
1977 The prehistoric occupation of the Lower Trout Creek-Hubble Creek drainage area in the Swan Valley of Manitoba. *Na'Pao* 7(1):8-28.
- Hall, R. E., and K. R. Kelson
1959 *The mammals of North America* (2 vols). The Ronald Press Co., New Ork.
- Hanna, M.
1978 *Preliminary description of Duck Bay Ware*. Paper presented at the eleventh annual meeting of the Canadian Archaeological Association, Quebec City.
- Haug, J. K.
1976 The 1974-1975 excavations at the Cherry Point Site (DkMe-10). A stratified Archaic Site in Southwest Manitoba. *Papers in Manitoba Archaeology, Final Report 1*.
- Heizer, R. F., and J. A. Graham
1967 *A guide to field methods in archaeology, approaches to the anthropology of the dead*. The National Press, Palo Alto, California.
- Hester, T. R., R. F. Heizer, and J. A. Graham
1975 *Field methods in archaeology*. Mayfield Publishing Co., Palo Alto, California.
- Higgs, E. S.
1975 Site catchment analysis: a concise guide to field methods. In *Palaeoeconomy*, edited by E. S. Higgs, pp. 223-224. Cambridge University Press, London.
- Hill, M. H.
1965 An archaeological survey in the Glacial Lake Agassiz Basin in Manitoba. Ms. on file, Department of Anthropology, University of Manitoba.

LITERATURE CITED-Continued

Hotchkiss, N.

1972 *Common marsh, underwater and floating-leaved plants of the United States and Canada*. Dover Publications, Inc., New York.

Jeglum, K. V., A. N. Boissonneau, V. F. Haavisto

1974 *Toward a wetland classification for Ontario*. *Canadian Forestry Service, Department of the Interior, Information Report O-X-215*.

Jenks, A. E.

1898 *Wild rice gatherers of the Upper Great Lakes*. *Bureau of American Ethnology, Smithsonian Institution, Annual Report 1013-1137*.

Jenness, D.

1963 *Indians of Canada*. *National Museum of Canada, Bulletin 65, Anthropology Series 15*.

Jochim, M. A.

1976 *Hunter-gatherer subsistence and settlement, a predictive model*. Academic Press, New York.

Johnston, W. A.

1921 *Winnipegosis and Upper Whitemouth River Areas, Manitoba, Pleistocene and recent deposits*. *Canada Department of Mines, Geological Survey, Geological Series 1904*.

Johnston, A.

1969 *Man's utilization of the flora of the Northwest Plains*. In *Post-Pleistocene man and his environment on the Northern Plains*, pp. 109-177. University of Calgary Archaeological Association. The Student's Press, Calgary.

Kehoe, T. F.

1966 *The small side-notched point system of the Northern Plains*. *American Antiquity 31(6):827-841*.

1967 *The Boarding School Bison Drive Site*. *Plains Anthropologist Memoir 4*.

1973 *The Gull Lake Site: a prehistoric bison drive site in Southwestern Saskatchewan*. *Milwaukee Public Museum, Publications in Anthropology and History 1*.

Kiel, W. H., A. S. Hawkins, and N. G. Perret

1972 *Waterfowl habitat trends in the Aspen Parkland of Manitoba*. *Canadian Wildlife Service Report Series 18:1-63*.

Klevezal¹, G.A. and S. E. Kleinenberg

1969 *Age determination of mammals by layered structure in teeth and bone*. *Fisheries Research Board of Canada, Translation series 1024*.

LITERATURE CITED-Continued

- Leechman, D.
1951 Bone Grease. *American Antiquity* 16(4):355-356.
- Leonoff, L. M.
1970 *The identification, distribution and sources of lithic raw materials in Manitoba archaeological sites*. Unpublished M. A. thesis, Department of Anthropology, University of Manitoba.
- Limp, W. F. and V. A. Reidhead
1978 An economic evaluation of the potential of fish utilization in riverine environments. *American Antiquity* 44(1):70-78.
- Lugenbeal, E. N.
1976 *The archeology of the Smith Site: The ceramics and culture history of Minnesota Laurel and Blackduck*. Ph.D. dissertation, Department of Anthropology, University of Wisconsin, Madison. University of Microfilms, Ann Arbor.
- MacNeish, R. S.
1954 The Stott Mound and Village near Brandon, Manitoba. *National Museum of Canada Bulletin* 132.

1958 An introduction to the archaeology of Southeast Manitoba. *National Museum of Canada Bulletin* 157.
- McPherron, A.
1967 The Juntunen Site and the Late Woodland prehistory of the Upper Great Lakes area. *Museum of Anthropology, University of Michigan, Anthropological Papers* 30.
- Mayer-Oakes, W. J.
1970 Archaeological investigations in the Grand Rapids, Manitoba, Reservoir 1961-1962. *Department of Anthropology, University of Manitoba, Occasional Paper* 3.
- Meyer, D.
1973 The Red Earth Cree: history and culture a preliminary report. Ms. on file, Department of Anthropology, University of Manitoba.
- Meyer, D. and S. J. Smailes
1975 Churchill River Study (Missinipe Probe) *Archaeology, Final Report* 19. Saskatoon, Saskatchewan.
- Meyer, D.
1978 Prehistoric pottery from northern Saskatchewan. *NaPaó* 8(1&2):5-30.

LITERATURE CITED-Continued

- Miles, C.
1963 *Indian and Eskimo artifacts of North America*. H. Regnery Co., Chicago.
- Monks, G. G.
1977 *An examination of relationships between artifact classes and food resources remains at Deep Bay, DiSe-7*. Unpublished Ph.D. dissertation, Department of Anthropology and Sociology, University of British Columbia.
- Munro, D. A.
1969 Ducks and the Great Plains wetlands. In *vegetation, soils and wildlife*, edited by J. G. Nelson and M. J. Chambers, pp. 263-276. Methuen Publications, Toronto.
- Nicholson, B. A.
1976a An analysis of scrapers recovered from the Stott Site during the Brandon University field school 1975. *Journal of the Archaeological Society of South-Western Manitoba* 4(1):9-24.

1976b A study of projectile point typology at the Stott Site (D1Ma-1) and some observations on basal attrition. *Archaeology in Montana* 17(1&2):53-81.

1978 An analysis of faunal remains recovered by an amateur salvage operation at Duck Bay on Lake Winnipegosis. FbMb-1. *Papers in Manitoba Archaeology, Miscellaneous Paper* 7.
- Olsen, D. J.
1963 Dating early plain buttons by their form. *American Antiquity* 28(4):551-554.
- Orr, R. T.
1971 *Vertebrate biology*. W. B. Saunders Company. Philadelphia/London/Toronto.
- Parlour, J. W., T. S. Major, and A. E. Rattray
1972 *The Red River Delta; a review of present resource use suitability, and a comprehensive resource systems analysis feasibility study*. The Natural Resource Institute, University of Manitoba.
- Pennak, R. W.
1953 *Fresh-water invertebrates of the United States*. The Ronald Press Company, New York.
- Pollock, J. W.
1975 Algonquian culture development and archaeological sequences in northeastern Ontario. *Canadian Archaeological Association Bulletin* 1.

LITERATURE CITED-Continued

- Pollock, J. W.
1978 Early Cultures of the Clearwater River Area. *Archaeological Survey of Alberta, Occasional Paper 6.*
- Quimby, G.
1967 Cord marking versus fabric impressing of Woodland pottery. *American Antiquity* 26:426-428.
- Rappaport, R. A.
1969 Some suggestions concerning concept and method in ecological anthropology. In *Contributions to Anthropology: ecological essays*, edited by D. Damas, pp. 184-188. Queens Printer.
- Ray, A. J.
1971 *Indian exploitation of the forest-grassland transition zone in Western Canada, 1650-1860: a geographical view of two centuries of change.* Unpublished Ph.D. dissertation, University of Wisconsin. Madison.

1974 *Indians in the fur trade.* University of Toronto Press, Toronto.

1975 Some conservation schemes of the Hudson's Bay Company, 1821-50. *Journal of Historical Geographers* 1(1):49-68.
- Rhoades, R. E.
1978 Archaeological use and abuse of ecological concepts and studies: the ecotone example. *American Antiquity* 43(4):608-614.
- Rick, A. M.
1975 Bird medullary bone: a seasonal dating technique for faunal analysis. *Canadian Archaeological Association Bulletin* 7:183-190.
- Ritchie, J. C.
1969 Absolute pollen frequencies and carbon-14 age of a section of Holocene Lake sediment from the Riding Mountain area of Manitoba. *Canadian Journal of Botany* 4:1345-1349.
- Rostlund, E.
1952 *Freshwater Fish and Fishing in Native North America.* *University of California Publications in Geography* 9. University of California Press, Berkley and Los Angeles.
- Rowe, J. S.
1972 *Forest regions of Canada.* Department of the Environment, Canadian Forest Service, Publication 1300.
- Scoggan, H. J.
1957 *Flora of Manitoba.* *National Museum of Canada Bulletin* 140.

LITERATURE CITED- Continued

- Scott, W. B., and E. J. Crossman
1973 *Freshwater fishes of Canada*. Fisheries Board of Canada.
Ottawa.
- Shay, C. T.
1971a Delta Diggings. *Zoolog* 12(1):5-7.

1971b *The Itaska Bison Kill Site: an ecological analysis*.
Minnesota Historical Society, St. Paul.
- Shepard, A. O.
1965 Ceramics for the archaeologist. *Carnegie Institution of
Washington, Publication* 609. Washington, D.C.
- Simpson, A. A.
1970 The Manitoba Escarpment cultural sequence. In *Ten thousand
years, archaeology in Manitoba*, edited by Walter M. Hlady,
pp. 139-152. Manitoba Archaeological Society, Winnipeg.
- Slater, D. S.
1977 Pollen analysis of soil samples, Schkibokahn FbMb-1.
Ms. on file, Historic Resources Branch, Department of Tourism,
Recreation, and Cultural Affairs, Winnipeg.
- Smith, B. D.
1975 Middle Mississippi exploitation of animal populations.
*Museum of Anthropology, University of Michigan, Anthropological
Papers* 57.
- Snortland-Coles, J. S.
1977 A preliminary report on the 1976 excavation at the
Schkibokahn Site. *Arche-Facts* 4(3):22.
- Spaulding, A. C.
1952 Report by the committee on nomenclature. *Plains Archaeological
Conference Newsletter* 1 (3):41 and 1(4):73-80.
- Steeves, T. A.
1952 Wild rice - Indian food and a modern delicacy. *Economic
Botany* 62:107-142.
- Streuver, S.
1968a Flotation techniques for the recovery of small-scale
archaeological remains. *American Antiquity* 33(3):353-362.

1968b Woodland subsistence-settlement systems in the Lower Illinois
Valley. In *New perspectives in archaeology*, edited by Sally R.
Binford and Lewis R. Binford, pp. 285-312. Aldine-Atherton,
Chicago.

LITERATURE CITED-Continued

Syms, E. L.

1969 *The McKean Complex as a horizon marker in Manitoba and the Northern Great Plains*. Unpublished M.A. thesis, Department of Anthropology, University of Manitoba.

1970 *The McKean Complex in Manitoba*. In *Ten Thousand Years, Archaeology in Manitoba*, edited by Walter M. Hlady, pp. 123-138. Manitoba Archaeological Society, Winnipeg.

1976 *Indigenous ceramics and ecological dynamics of Southwestern Manitoba*. Unpublished Ph.D. dissertation. Department of Anthropology, University of Alberta.

1977 *Cultural ecology and ecological dynamics of the ceramic period in Southwestern Manitoba*. *Plains Anthropologist* Memoir 12.

Vayda, A. P., and R. A. Rappaport

1967 *Ecology, cultural and non-cultural*. In *Introduction to Cultural Anthropology*, edited by James Clifton, pp. 477-97. Mifflin Co., Boston.

Walker, J. M.

1965 *Vegetation changes with falling water levels in the Delta Marsh Manitoba*. Unpublished M.A. thesis, University of Manitoba.

Watson, P. J.

1976 *In pursuit of prehistoric subsistence: a comparative account of some contemporary flotation techniques*. *Mid-Continental Journal of Archaeology* 1(1):77-100.

Waugh, F. W.

1916 *Iroquois foods and food preparation*. *Canada Department of Mines, Anthropological Series* 12.

Weller, M. W.

1978 *Management of freshwater marshes for wildlife*. In *Freshwater wetlands: ecological processes and management potential*, edited by R. E. Good, D. F. Whigham, and R. L. Simpson, pp. 267-284. Academic Press, New York.

White, T. E.

1953 *A method of calculating the dietary percentage of various food animals utilized by aboriginal peoples*. *American Antiquity* 18(4):396-398.

Wolf, K.

1955 *Some effects of fluctuating and falling water levels on waterfowl production*. *Journal of Wildlife Management* 19(1):13-23.

LITERATURE CITED-Continued

Wright, J. V.

1972 *Ontario prehistory: an eleven-thousand year archaeological outline*. National Museums of Canada, Ottawa.

Yarnell, R. A.

1970 Aboriginal relationships between culture and plant life in the Upper Great Lakes region. *Museum of Anthropology, University of Michigan, Anthropological Papers* 23.