PAPERS
in
MANITOBA
ARCHAEOLOGY

FINAL REPORT #2

ANALYSIS OF THE FAUNAL REMAINS FROM THE CHERRY POINT SITE

By

Rebecca J. Balcom
Department of Anthropology
University of Manitoba

DEPARTMENT OF TOURISM, RECREATION & CULTURAL AFFAIRS

HISTORIC RESOURCES BRANCH

Hon. René Toupin
Minister

Donald E. Vernon
Deputy Minister

1976

ANALYSIS OF THE FAUNAL REMAINS

FROM THE

CHERRY POINT SITE*

By

Rebecca J. Balcom
Department of Anthropology
University of Manitoba

* This paper was prepared in conjunction with "The 1974-75 Excavations at the Cherry Point Side (DkMe-10): A Stratified Archaic Site in Southwest Manitoba", by J. Haug. Final Report #1, Papers in Manitoba Archaeology, Department of Tourism, Recreation and Cultural Affairs, Historic Resources Branch, Province of Manitoba.

ACKNOWLEDGEMENTS

The final preparation of this report was initially made possible through the co-operation of Leigh Syms of Brandon University and Jim Whelan of the University of Manitoba, who read the manuscript. Their comments and criticisms are appreciated.

My thanks also go to Jim Haug, Field Director of the excavations at Cherry Point, for sorting the collection and providing maps, notes, references, and suggestions. His encouragement throughout the course of research was helpful.

The identification was assisted by Jack Dubois of the Manitoba Museum of Man and Nature, who made comparative faunal collections available and answered my queries. Signe Snortland, graduate student at the University of Manitoba, assisted with the tooth identification.

INTRODUCTION

This report is based on the faunal remains excavated at the Cherry Point Site on the north shore of Oak Lake in Southwestern Manitoba. Of the 54,000 square meters that the site encompasses, 130 square meters have been excavated during the test excavations in 1973, and the full-scale excavations carried out in 1974 and 1975 (Haug, personal communication). The following species have been identified from the bone: 7 to 10 bison, 1 moose, 1 elk, and 3 gray wolves. Unknown species of 2 fish, 1 duck, and 1 turtle have also been identified. Bison is the most numerous, both in regards to number of skeletal elements in the sample and in frequency of individuals.

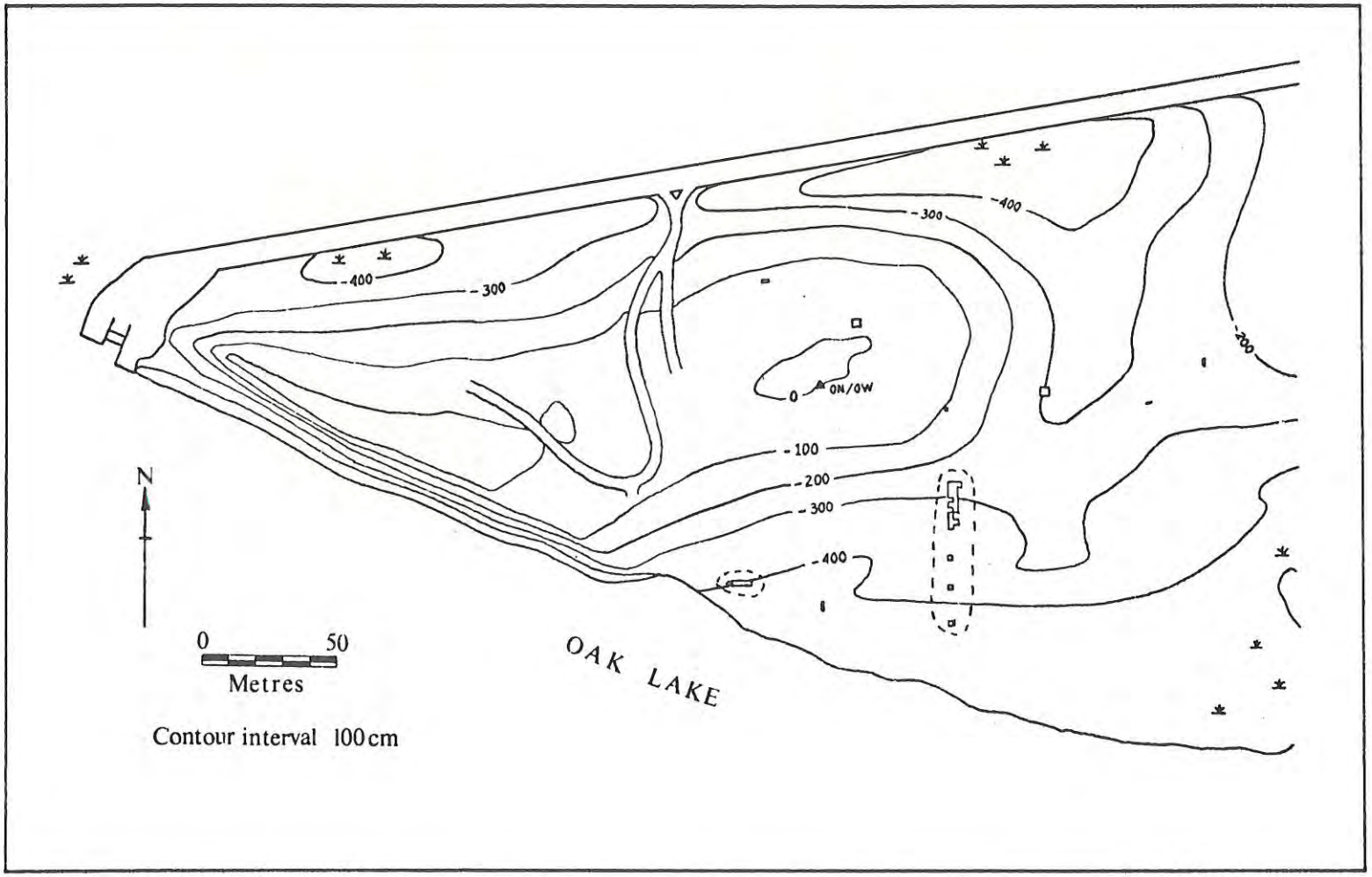

Fig. 1 Map showing units analysed in the present study.

Because of the nature of the topography at the Cherry Point Site, different areas of the site can readily be referred to (Figure 1). In one such area, the South Slope, four distinct occupation periods have been isolated. Bone samples from the three occupations that were excavated in 1974 were sent to the University of Saskatchewan for Carbon-14 dating. There were two dates for each occupation:

Main A (plough zone excluded) ... A.D. 935 ± 105
A.D. 910 ± 185

Main B ..... A.D. 100 ± 100
110 ± 130 B.C.

Main C ..... 880 ± 260 B.C.
910 ± 205 B.C.

These results have important implications for archaeologists because they alter the accepted time periods of the Oxbow and McKean complexes (Haug, personal communication). A continuum of samples is being submitted from the 1975 field season to serve as a check on the available dates, and for the purpose of determining the antiquity of Occupation D and other newly excavated areas of the site.

The purpose of this research is to analyze the bison bone with respect to certain criteria in order to maximize the amount of information obtainable: (a) which species was most abundant; (b) choice exercised in the age and sex of the animals; (c) distribution of bone throughout the site; (d) butchering practices; (e) mutilation by animals other than man; (f) utilization of bone for tools; and (g) evidence of cooking through burning and charring. From these observations it is possible to develop inferences regarding seasonality, type of site, and subsistence patterns (Daly 1969; Frison 1970; Gilbert 1969, 1973; Kehoe 1967; Olsen 1971; Wheat 1967; White 1955, 1961; Wood 1967). The development of such inferences will be

dependent upon the type of material collected from the site, excavation techniques, and identification and analysis factors.

FIELD AND LABORATORY METHODS

With respect to excavation of the faunal remains within the field, all material was exposed in levels of five or ten centimeters with trowels, spoons, dental picks, and brushes. With the exception of small, unidentifiable fragments, and bone found in rodent disturbances, scattergrams were drawn showing association with the corresponding artifacts of a particular level. All features (clusters of bone or flakes) were drawn to scale on both a vertical and horizontal plane. Photographs were taken during excavation and before removal of features; in addition to the features, photographs were also taken of fragile bone requiring a cast, articulated remains, bone from the lower levels, and any other fragments that happened to catch the photographer's eye. For the most part, bone was well preserved. Some bone required a plaster of paris case because of its delicate condition. One-quarter-inch mesh was used in all screens. Due to the nature of the soil (fine sand), and to the fact that small mammals, fish, birds, and reptiles were not common in the faunal material from this site, it is unlikely that enough bone was missed to necessitate a correction factor with respect to the number of species present (Zeiglar 1965).

In the laboratory, the bone was catalogued according to unit and level, each bone being given an individual catalogue number according to location. This allowed for the arrangement of the bone, during the analysis, according to exact location within the site, unit, and level. Small

unidentifiable fragments were catalogued collectively, and location within the unit was not given unless the fragments were found in clusters. Bone was cleaned with brushes. Water and cleaning solvents were not used so as to avoid cracking of the bone. After the field season, the material was sorted at Brandon and the faunal elements were later taken to the University of Manitoba where identification was undertaken.

Identification of the bone was accomplished with the use of comparative collections and the manuals by Olsen (1955) and Schmid (1972). Photographs were used to assist in the identification of the four fragments requiring casts from the Occupation D and from the furthermost of the South Slope extension units. Any questionable bones were taken to the Manitoba Museum of Man and Nature, where the more extensive collections and the expertise of mammologist Jack Dubois were utilized. All bone was identified where possible according to element. Other bone was listed as longbone, rib, flatbone, skull, vertebra, cortex, or "unidentifiable". Where possible, bone was identified to Order and then to species. Otherwise, it was listed as being from large, medium, or small mammal, reptile, fish, or bird, as the case might warrant. Observations relating to butchering marks, articulated bone, gnawing, and charring were incorporated into the data. Due to lack of comparative skeletons exhibiting various stages of growth in both male and female, age and sex were not feasible variables with which to work. However, where age was unmistakeable (based on epiphysial fusion and teeth), it was included in the data (Frison 1970; Gilbert 1973).

THE SAMPLE

This research was originally intended to include only those faunal

remains from the 1975 field season which were identified by the author (the test pit on the West Hill and the uncompleted units in the valley are excluded from the analysis). The study was later expanded to include the bone excavated in 1974 in the South Slope area that was identified by Jack Dubois (with the exception of Occupations A and B of one unit which have yet to be identified). Also excluded from the analysis, for the most part at least, are faunal remains from rodent-disturbed and plough zone areas, and levels which could be assigned to neither of the occupations between which it lay (Haug, personal communication).

The South Slope area is very important to the analysis because it has been the major area of excavation, and also because a definite chronological sequence has been established within the units. The South Slope extension is important because it shows the distinct pattern as the units extend towards the beach. The Shoreline units represent another excavation area closer to the beach (see Fig. 1).

Of the 130 square meters that have been excavated at Cherry Point, 81 square meters are included in this analysis. The consistencies and stylized practices inherent in the observed faunal remains (especially with respect to bison) allow for inferences about Cherry Point as a prehistoric site.

RESULTS OF THE ANALYSIS

Animal Population Identified at the Site

The minimum number of animals at the site was calculated by correlating the number of skeletal elements of a particular species with the number of that bone element found in an individual animal (i.e., 2 humeri,

2 tibiae, 1 sacrum, etc.). The largest number of any element for a particular site area or occupation would represent the minimum number (White 1953).

TABLE 1. MINIMUM NUMBER OF INDIVIDUALS

	Main A	Main B	Main C	Main D	Exten*	Shore*
Bison	1-2*	2	1-2*	1	1	1-2*
Elk		1				
Moose				1		
Gray Wolf	1		1		1	
Duck*						1
Turtle*						1
Fish*			1			1

*Exten - South Slope extension
*Shore - Shoreline
1-2* - This refers to a case where a bone count alone revealed one animal but an age consideration (in all three cases a single tooth) indicated two individuals.
Duck*, Turtle*, Fish* - not identifiable as to species.

SEASONALITY

Because the individual occupation levels and specific site areas at Cherry Point do not have extensive information when considered singularly, seasonality is best discussed with regards to the site as a whole. Bison have a well documented seasonal reproductive cycle (Arthur 1974: 52-53). Thus, age of bison allows one to make inferences about the season of the kill. The presence of foetal bones identifiable as bison in the plough zone and in Occupation A is evidence of a late autumn, winter, or spring kill.

There are documented cases of calving as late as August (Arthur 1974: 52); however, the main calving season is from March to June so the probability of the kill being after June is slight. There is no evidence to suspect that bison would not be in the area during the late autumn, winter, or spring months. Arthur (1974: 52) states: "... bison were to be encountered in herds on all parts of their range at all times." The presence of duck and fish supports the spring occupation. Turtles, by virtue of their hibernation tendencies, would have been most accessible during the summer.

ANIMAL PROCESSING

Since the bulk of the faunal remains from the Cherry Point Site are bison, the sections dealing with the analysis of bone are based on the treatment of one species. The other animals identified at the site were represented by only one element (Appendix) and are therefore not of prime concern.

It is evident that the greatest amount of bone lies within the second and third, or B and C, Occupations (Table 2). It must be kept in mind that, when considering bone counts, such factors as length of occupation, sample size, and butchering stages may alter the actual representation. With these factors in mind, it is possible to make several assumptions about the treatment of bone in preparation of food or tools.

An evident pattern occurs with respect to the long bones from the Cherry Point Site, this being the tendency of bone to fracture spirally. Bonnichsen, in Gilbert (1973: 13-16), defines two types of spiral fracturing: (a) the radial transverse fracturing which occurs when a unidirectional blow is delivered to the middle of a bone supported at both

TABLE 2. BISON BONE COUNTS ACCORDING TO OCCUPATION

Element	Occ.* A		Occ. B		Occ. C		Occ. D		Shore	
	R*	L*	R	L	R	L	R	L	R	L
Skull, petrous temporal			2		1					
Mandible, cd. pr.			1							
art. condyle				1						
Hyoid			1				1			
Scapula, prox.			1						1	
Humerus, prox.			1*			1			1	
dist.			1	1	1					
Radius, prox.			1	1	1					
dist.			1	1	1				1*	
Ulna, prox.				1	1	1			1*	
Carpals		1	5		2		1,1[e]		3	
Metacarpal, prox.	1									
dist.	1		2							1
Os Inominatum					1					
Sacrum, prox.		1								
Femur, prox.										
dist.										
Patella			1							
Tibia, prox.	1									
dist.			2	1						
Tarsals			3		1		1[e]			
Metatarsal, prox.										
dist.			1							
Phalange, 1st		2	5		6					
2nd			4		3					
3rd		1							1	
Sesamoid, prox.		1								
dist.			1		1					
Calcaneus, dist.			1							

Occ.* - Occupation R* - Right L* - Left cd. - coronoid

1[e] - South Slope Extension 1* - complete pr. - process

art. - articulation

extremities; and (b) the spiral transverse fracturing which occurs when a unidirectional blow is delivered to a bone which is supported directly under the point of impact. The second, or spiral transverse fracturing, is more common in the bone observed at this particular site. Bonnichsen describes what happens during a fracture of this type:

> When the fracture fronts approach the epiphyseal ends of the bones, from mid-shaft, they will spiral transversely rather than merge into cancellous bone area (Gilbert 1973: 14).

Much of the long bone had the above features, which suggests the preference of supporting the bone only under the point of impact. Less common was the radial transverse fracturing. Again, Bonnichsen's description:

> Multiple radial fractures move outward from the point of impact as failure occurs. Where spiral fractures converge the shaft may shatter, resulting in multiple fragments. Directly below the point of impact the fractures are sometimes reflected at the interfacial boundaries between the osteons. Conical step-fracturing is recorded in the bone morphology in the shaft interior. These identifying attributes frequently occur on fragments that have become separated from the main shaft as a consequence of radial transverse fracturing (Gilbert 1973: 14).

Evidence of where radial transverse fracturing could have been a possible method of breakage was rare. However, some fragments exhibited step-fracturing, so it was not a totally ignored method.

Once the bones were broken, the marrow could easily be removed with a smooth stick or slender bone fragment. The marrow could be stored for future use or, as Wissler (1910: 41-2) indicates, it could have been, and usually was, eaten fresh from the long bones during the butchering.

Significant in this site was the huge amount of fragmented and smashed bone. In all probability, these fragments resulted from the

making of bone grease (also referred to as "bone butter" and "bone oil"). Historically, the procedure for securing bone grease went as follows: after the meat had been removed from bones, they were left to dry for a day or so to remove the periosteal sheath to facilitate smashing. The drying also improved the flavor. Then the bones were smashed into small pieces, boiled, and later the grease was scooped off the top of the water for storage in the animal's stomach or bladder where it could be preserved for up to three years. Bone oil was used as we might use butter or lard today. It could be eaten alone when it was frozen, employed in the making of sweet pemmican, or used as hair oil (Kehoe 1967: 49; Leechman 1951: 355-56).

Only a very small sample of the bone showed evidence of cooking through burning or charring. All such specimens were minute, unidentifiable fragments. In any case, it is not likely that evidence of such would show up in the bones if they were boiled or roasted.

There were no worked bones in the collection. This is not to say that the bone was not utilized; it may well have been, but not to the extent that wear striations, grinding, or polishing was produced. There are several pointed bones which would have been excellent for extracting marrow, but such use would not have resulted in any evidence of such activity. A possible handle for a knife or scraper was excavated at the site, but was not included in the analysis because of its location in a rodent-disturbed area.

The faunal remains were checked for mutilation by animals (i.e., by dogs). This involved looking at such things as: (a) crunching and splintering, (b) chewing and scooping out of tissue (especially the heads of long bones), (c) partially digested bone, tooth markings, and (d) spiral

fracturing directed from the epiphyseal ends (Gilbert 1973: 24). Of these distinguishing features, only gnawing was present. The tooth perforations are in the form of tiny parallel grooves due to rodent gnawing.

BUTCHERING TECHNIQUES

For this segment of the study, not only the data contained in Table 2 are utilized, but also those elements defined to the Order of Artiodactyla (Appendix). There is little reason to doubt that these remains are also of bison, but in all cases absolute identity could not be ascertained. In some cases the similarities with other species does not warrant identification other than according to Order (i.e., ribs and some vertebrae).

Wissler uses the term "light butchering" as a referral to the butchering done in advance of transporting an animal carcass to a campsite located some distance away from the immediate area of the kill. Heavy, non-meaty bones were left behind (1910: 41-42). Judging from the nature of the remains at Cherry Point, it is probable that there was a light butchering area which would account for the lack of skull fragments, vertebrae, scapulae, inominates, and rib fragments. The area of initial butchering is possibly under the present day level of the lake (Haug, personal communication).

The following comments are supplementary to the data in Table 1: Skull and Mandible - These parts are only slightly represented at the site. Inner ear fragments were identified as those of bison, but all other skull fragments were too small to allow for observation of any particular features. Mandible fragments are directly associated with teeth in most cases. Teeth were found in all occupation levels and areas of the site, with the exception of the South Slope extension. Some teeth exhibited butchering marks,

probably where the mandible had been broken for extraction of the tongue. Only two hyoids were found. This is not surprising considering the size and delicacy of that particular element.

Vertebrae - Again, representation is slight. Two cervical fragments and one thoracic vertebra were identifiable as those of Artiodactyla in Occupation C and one cervical fragment in Occupation D. There was a sacrum fragment in Occupation A. Fragments were scattered in all areas of the site, but little can be said other than the fact that they are vertebrae chips. Vertebrae would commonly be left in the initial butchering area following removal of the hump meat and the blanket of flesh which lies under the skin. Neck meat was too tough for eating unless it was dried for pemmican (Wheat 1967: 51).

Scapula - Scapulae or scapula fragments are also comparatively rare at Cherry Point. Only two fragments were identifiable as belonging to bison - one in the Shoreline units and one in the second occupation of the South Slope. Scapulae are heavy and would be left in the light butchering area unless the proximal portion served as a point of detachment for the humerus. Scapulae could also have been taken from the site for use as digging tools.

Ribs - Ribs were not counted due to the fragmentary nature of nearly all representatives. Only two heads were found; both were in the Shoreline area, where the rib fragments were more common than in other units. Ribs are heavy and the meat on them is not very abundant, so it is possible these were left in the light butchering area as well. Perhaps, rather than completely waste the meat, the ribs were prepared closer to the kill area, there to be eaten during the butchering. The rib heads (one rib was complete) have no butchering marks, and since a complete radius and ulna were found in close proximity, there is reason to suspect that they are remnants of an incom-

pletely butchered animal.

Forelimb - These elements were the most common of all faunal remains in all site areas and occupations. Both proximal and distal portions of the humerus are present, so the removal of the forelimb from the trunk was probably through the scapula-humerus joint. As in all of the faunal remains, butchering marks are scarce. Barely visible on some of the bone are tiny longitudinal marks where the muscle attachments were cut and the meat removed. Since all elements are approximately equally represented, the entire forelimb was brought up from the light butchering area to be further prepared for cooking. Not detaching the foot at the kill site is reasonable, because it would not add much to the overall weight and could serve as a handle for the purpose of carrying the limb. After being taken to the camp-site, the forelimbs were detached from each other to facilitate the removal of meat. This would be followed by the marrow extraction and the boiling for bone grease. A complete humerus was excavated in Occupation B, the proximal end smashed with fragments directly associated. It appears that it was being prepared for extraction of marrow and bone grease but the procedure was not completed. The metacarpals have not been broken to obtain the marrow. Phalanges were not utilized for soap or glue (Wood 1967).

Hindlimb - Hindlimbs were absent from the Shoreline, and a fibular tarsal was the only representative in the South Slope extension. In the South Slope, hindlimbs were less conspicuous than the forelimb. One inominate fragement was excavated in Occupation C. There are several possible explanations for the lack of hindlimb elements. This could be evidence of specialized butchering areas where different elements of the carcass would be prepared in different areas of the site (Wheat 1967). Bonnichsen suggests that such occurrences are due to the smashing of the bone in the

bone grease extraction process. It seems unlikely, however, that there would be no evidence whatsoever for some elements (e.g., the femur). He also refers to the Calling Lake Cree who distribute certain portions of the meat to their relatives (Gilbert 1973: 11-12). With a limited sample size, as is the case here, no one explanation can be accepted or rejected to account for the small number of hindlimb elements. Indeed, the very answer could be related to the sample size. If so, further excavation would reveal the true case.

SUMMARY

The foregoing analysis of the Cherry Point faunal remains permits certain speculations concerning the prehistory of the site.

Bison was obviously the most sought-after species in all periods represented at the site. The means of obtaining the bison have not been determined. For example, no evidence of a drive has been excavated, nor is there any way of knowing whether bison, which may have fallen through thin lake ice, were utilized.

Elk, moose, gray wolf, duck, turtle, and fish may have been exploited to a lesser extent. The only non-bison bone which shows signs of actually having been butchered is a gray wolf tibia.

There appear to be several areas devoted to specific activities within the Cherry Point Site. The South Slope area seems to have been a station for meat-processing after initial butchering was accomplished. The initial butchering was probably done in the area currently under water. Along the South Slope Extension, there is progressively less bone as the present beach is approached. This was perhaps an "inactive" area between

the light and heavy butchering areas.

The shoreline units present a problem. Although the sample of bone found in this area was generally similar to that on the South Slope, the presence of the incompletely butchered bison in conjunction with numerous rib fragments suggests that it may have comprised a different activity area of the site. Possibly this is where initial butchering was carried out. Further excavations in this area are necessary before it can be established exactly what the dominant resource activity here was.

REFERENCES

ARTHUR, George W.

1974 An Introduction to the Ecology of Early Historic Communal Bison Hunting Among the Northern Plains Indians. Ph.D. thesis, University of Calgary.

DALY, Patricia

1969 Approaches to Faunal Analysis in Archaeology. American Antiquity, Vol. 34(2): 146-153.

FRISON, George

1970 The Glenrock Buffalo Jump 48C0304. Plains Anthropologist, Vol. 15(50), Memoir 7.

GILBERT, B. M.

1969 Some Aspects of Diet and Butchering Techniques Among Prehistoric Indians in South Dakota. Plains Anthropologist, Vol. 14(46): 277-294.

1973 Mammalian Osteo-archaeology: North America. Missouri Archaeology Society, Special Publication.

HAUG, J. K.

1975 The End of Season Field Report on the Cherry Point Site Excavations, Southwestern Manitoba. Archae-Facts, Vol. 2 (2-3).

KEHOE, T. F.

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

LEECHMAN, Douglas

1951 Bone Grease. American Antiquity, Vol. 16(4): 355-356.

OLSEN, Stanley

1960 Post-Cranial Skeletal Characters of Bison and Bos. Peabody Museum of Archaeology and Ethnology: Papers, Vol. 35(4).

SCHMID, Elizabeth

1972 Atlas of Animal Bones. New York: Elsevier Pub. Co.

WHEAT, J. B.

1967 A Paleo-Indian Bison Kill. Scientific American, Vol. 216(4): 538-540.

WHITE, Theodore

1955 Observations on the Butchering Techniques of Some Aboriginal Peoples: 1-9. American Antiquity, Vol. 17(4).

1961 The Study of Osteological Materials in the Plains. American Antiquity, Vol. 26(4): 538-540.

WISSLER, Clark

1910 The Material Culture of the Blackfoot Indians. American Museum of Natural History, Anthropological Papers, Vol. 4(1).

WOOD, W. R.

1967 An Interpretation of Mandan Culture History. River Basin Survey Papers, No. 39, Bureau of American Ethnology, Bulletin 198.

ZEIGLAR, Alan C.

1965 The Role of Faunal Remains in Archaeological Investigations. Sacramento Anthropological Society, Paper 3.

APPENDIX

FAUNAL IDENTIFICATION

Abbreviations and Terms for the Cherry Point Bone (compiled by Jack Dubois).

1. Position

R.	- right side	epip.	- epiphysis
L.	- left side	diaph.	- diaphysis (shaft)
dist.	- distal	art.	- articulation
prox.	- proximal		

2. Age

(f.) foetal	- bones very small and porous, no epiphyses fused
(y.) young	- epiphyses still unfused but bone more solid, still noticeably smaller than adult
(j.) juvenile	- close to adult size but certain epiphyses still unfused or barely fused; sutures prominent, teeth still erupting or hardly worn
(a.) adult	- bones full sized, epiphyses fused, teeth show some wear, sutures not as clear
(m.) mature	- has been adult for some time, teeth worn, muscle sears prominent
(s.) senile	- some resorption of bone, disappearance of alveoli, teeth badly worn or missing

SUMMARY OF THE FAUNAL REMAINS

SOUTH SLOPE AREA

Occupation A

Bison bison (bison)

R. M.[1] (y.)
carpal sesamoid
R. dist. metacarpal
art. prox. sacrum
R. prox. tibia
1st. phalanx (a.)
R. prox. metacarpal
3rd. phalanx
1st phalanx
P. fragments (pre-molar)

Artiodactyla (Order)

inner ear ossicle
tooth enamel frags.
sesamoid
molar frags.

Canis lupus (gray wolf)

R. incisor

Occupation B

Bison bison

ulnar carpal
R. dist. calcaneus
2nd phalanx
L. art. condyle
R. fused central and 4th tarsus
L. prox. art. ulna
L. P^3
1st. phalanx
patella
2nd phalanx
R. prox. radius
L. dist. radius
R. dist. humerus
L. prox. radius
accessory carpal
1st phalanx
R. dist. tibia
L. radial carpal
$M._2$ frags.
R. coronoid process
1st phalanx
1st phalanx
petrous temporal (inner ear)
P. frags.
molar frags.
molar roots
1st phalanx
2nd phalanx
2nd phalanx
L. intermediate carpal
R. dist. metacarpal
R. dist. radius
$M._3$ frags.
fused central and 4th tarsal
R. prox. scapula
R. distal tibia
R. fused central and 4th tarsal
R. dist. metacarpal
R. dist. metatarsal
dist. sesamoid
1st phalanx
malleolus
L. dist. humerus
L. M_3
R. M_3

Artiodactyla

tooth enamel frags.
L. dist. metacarpal
phalanx frags.
molar frags.
R. prox. humerus
epiphysis (j.)
scapula frags.
prox. tibia
rib frags.
3rd phalange frags.
skull frags.
epiphysis frags.
mandible frags.

Cervus canadensis (elk)

1st phalanx

Occupation C

Bison bison

1st phalanx
lateral malleolus
L. $M._3$
2nd phalanx
R. acetabulum (os inominatum)
R. dist. radius epip.
R. intermediate carpal
R. prox. radius
1st phalanx
1st phalanx
R. 2nd and 3rd carpal
2nd phalanx
1st phalanx
L. prox. ulna
L. prox. humerus
sesamoid
1st phalanx
2nd phalanx
4th tarsal
R. prox. ulna
1st. phalanx
R. distal humerus
R. $M._3$
M. 1 or 2
M. 1 or 2
petrous temporal

Artiodactyla

inner ear frag.
tooth enamel frag.
Cervical vertebrae frags.
rib frags
prox. humerus frags.
dist. metacarpal
dist. 1st phalanx
thoracic vertebrae frags.
cervical vertebrae frags.

Canis lupus

R. Capular glenoid fossa

Occupation D

Bison bison

R. hyoid
accessory carpal

Alces alces (moose)

$M._1$

Artiodactyla

cervical vertebrae
prox. 1st phalanx

SOUTH SLOPE EXTENSION

Bison bison

R. intermediate carpal
L. fibular tarsal

Canis lupus

L. tibia

SHORELINE

Bison bison

R. dist. humerus
R. medial scapula
$P._3$
R. 2nd and 3rd carpal
R. $P._4$, $M._1$ (s.)
2nd phalanx
L. art. radius and ulna
molar, premolar frags.
R. prox. radius and ulna
L. $P._4$, $M._{1 \& 2}$
radial carpal
L. metacarpal
L. intermediate carpal

Aythya sp.

R. sternum frag.

Turtle sp.

turtle carapace frags.

Artiodactyla

rib frags.
prox. rib
complete rib
L. medial tibia
tooth frags.