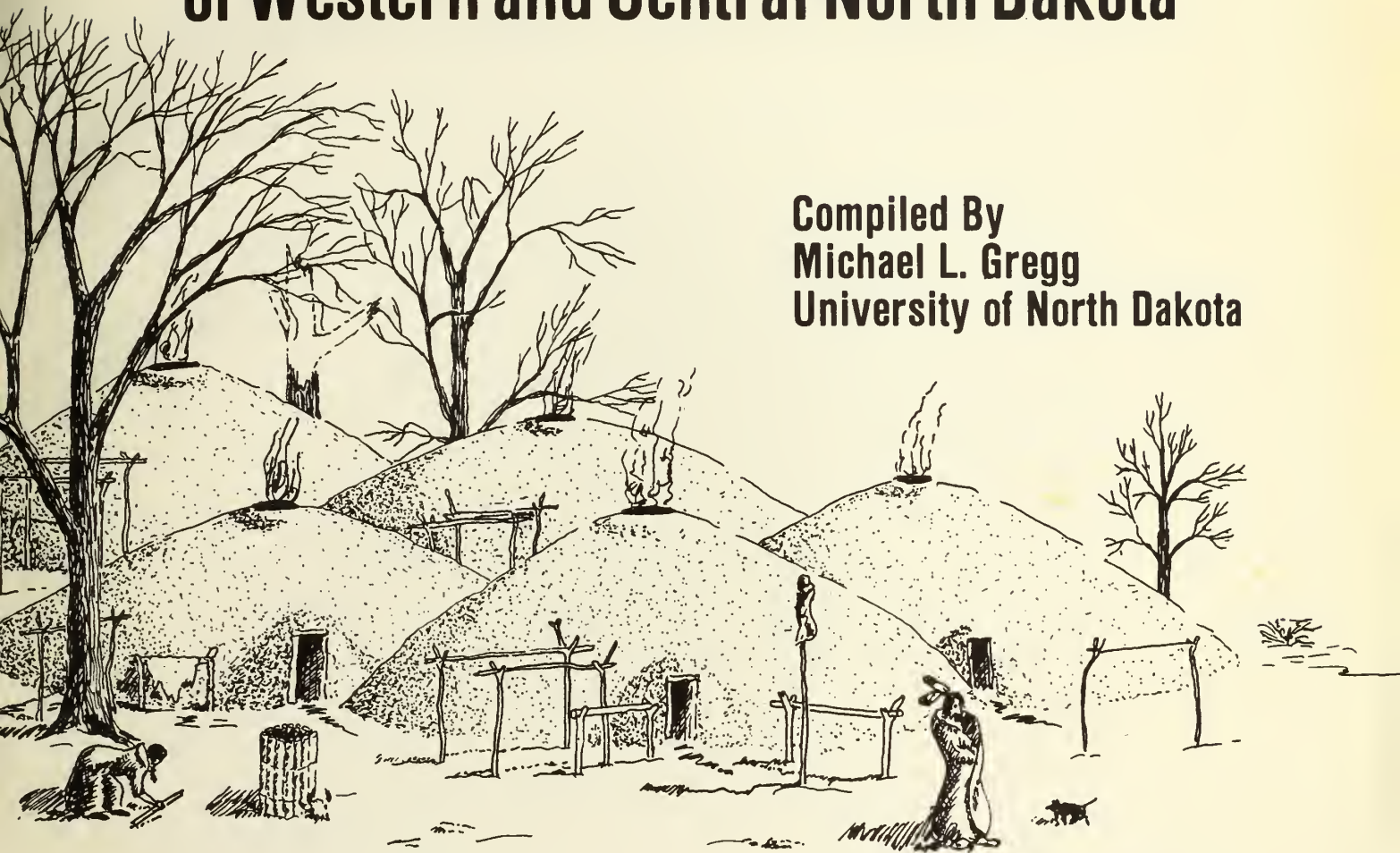




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An Overview of the Prehistory of Western and Central North Dakota

Compiled By
Michael L. Gregg
University of North Dakota



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AN OVERVIEW OF THE PREHISTORY
OF WESTERN AND CENTRAL NORTH DAKOTA

Class I Cultural Resources Inventory,
Dickinson District, Bureau of Land Management
February 1984

Compiled by
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FOREWORD

With this volume, the Montana State Office of the Bureau of Land Management begins a series of occasional cultural resource monographs. The Bureau's planning and general management system requires that the cultural resource context be compiled for each of its major areas of jurisdiction. The National Historic Preservation Act has been a catalyst for producing large-scale sampling inventories of the cultural resources of many parts of Montana, North Dakota and South Dakota, as well as site specific inventories in advance of land use changes and excavation projects to mitigate impacts to cultural resources.

Much of this work has been accomplished by contract to universities and consultants, either directly by the Bureau or indirectly through industry. The resulting documents are reproduced only in enough copies to satisfy contract requirements, and are not distributed generally. While some Bureau-sponsored work has appeared in professional journals, much of the work is too long or inappropriate for such publications.

In this series, the Bureau intends to publish cultural resource work which should be a part of the basis for future research and management in the Plains, but which often has gone unreferenced because of its limited distribution. Future volumes planned for the series will make Class I overviews, Class II sampling inventories, and other cultural resource work available to a wider public.

This first volume in the series presents an overview of North Dakota prehistory for the western and central portions of the State. It was prepared by Michael L. Gregg of the University of North Dakota under contract to the Bureau of Land Management. The research and writing was done between 1980 and early 1984. Site information used in the document is based on all information entered into the State Historical Society of North Dakota site files through 1981, while literature was examined through February 1984. We have used a 1984 date in the title to ensure that readers recognize when the overview literature review terminates, although our publication date is 1985.

We feel that this overview makes a valuable contribution to the study of North Dakota prehistory and cultural resource management. Its scope and wide topical coverage should make it a usable and effective source document for future research and cultural resource management actions within its area of coverage. It offers a synthesis which brings together for the first time in a single volume, information and bibliographic references for the ethnography, history of the archeology, and present state of research and management for the western two-thirds of North Dakota.

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State Office Archeologist
Bureau of Land Management
Montana, North Dakota and South Dakota
Billings, Montana
September, 1985

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INTRODUCTION

by Michael L. Gregg and Dale Davidson

This section presents some general background information regarding the purpose of this project, the deliverables required by contract YA-553-CTI-1089, and the work schedule and personnel involved in gathering and reporting the required information. It also includes definitions of the western and central North Dakota study region and individual study areas within it. The natural setting is discussed briefly, followed by a sketch of current knowledge of Holocene paleoclimate in the Northern Plains. The paleoclimatic information should aid in understanding the potential range of natural settings, and hence land use potentials, through the entire period of human adaptation to the study region.

General Project Summary

The primary purpose of this Class I inventory is to improve the base for cultural resource management decision making in the District. That is accomplished in this volume by summarizing the current knowledge of human use of central and western North Dakota from the initial peopling of the area to the A.D. 1800s. Current knowledge is summarized in (1) a major background statement for prehistory, and (2) lists and map displays of all formally recorded cultural sites in the study region. Based on current knowledge, information deficiencies, limitations to research, and current research directions, recommendations are offered for future cultural resource management and research work in the District.

The major background statement for prehistory includes (1) ethnographic sketches of selected Northern Plains Indian groups, (2) a discussion of archeological units used in classifying prehistoric cultural remains, (3) some considerations of the meaning of artifact style in understanding and classifying prehistoric cultural remains, (4) a chronology of named archeological units for the study region, and (5) descriptions of all presently named archeological units with sites known or anticipated in the study region. The ethnographic sketches are included because most prehistoric human behavior is explained at least partially through analogy with ethnographically or ethnohistorically documented behavior. The descriptions of named archeological units include information on geographic and temporal distributions, itemizations of documented site types and artifact diversity, and discussions of various points that aid in identifying, researching, and understanding the adaptations and material traits associated with the named archeological units in the study region and the surrounding area. Nearly all of this information is incomplete in the sense that increased knowledge and understanding is certain to develop from current and future work.

The site listings and map displays are separate deliverables and are not included as part of this printed report. They will be used only by District personnel in identifying cultural sites already recorded in the Smithsonian Institution Trinomial System and on file with the Archeology and Historic Preservation Division (AHPD), State Historical Society of North Dakota (SHSND). They include all cultural sites entered on the AHPD computerized site data file through December, 1981.

Work Schedule, Personnel and Acknowledgments

Planning and development for this project began in 1980. Possible formats, categories of information to be included, methods for data collection, time schedules, and budgets were some of the items considered. Preliminary plans were reviewed and commented on by the AHPD, SHSND. Their input continued throughout the project as data from their files were made available.

Work on the Class I began in the fall of 1981 and was completed in February, 1984. Michael L. Gregg and Dale Davidson designed the overall work effort and report structure. Michael L. Gregg prepared the ethnographic sketches portion of the major background statement for prehistory with the assistance of Jeffrey R. Hanson, and compiled the remainder of the prehistoric background statement. David D. Kuehn prepared the individual study area overviews for prehistory with the assistance of Michael L. Gregg.

The site listings by county were generated by Shiela Bichler from the computerized site data file compiled by the AHPD, SHSND. The AHPD granted the University of North Dakota use of a copy of the file for the purpose of generating the site listings required for this project. Shiela Bichler's file editing and programming skills were valuable assets to the work effort.

Meredith Meyer prepared the map displays on half inch to the mile county highway maps. The original project design envisioned computer generated map displays using locational data from the computerized site file, but problems of scale, clarity, and detail were judged to be too great for successful resolution within the time and funding limitations of this project.

Thanks to the following colleagues who reviewed portions of the major background statement for prehistory and offered valuable criticism and supplementary information: S. Ahler, G. Baker, M. Beckes, W. Billeck, J. Clark, C. Dill, J. Hanson, L. Loendorf, M. Meier, M. Michlovic, L. Pettipas, M. Root, F. Schneider, M. J. Schneider, C. Stiles-Hanson, and D. Toom. Thanks also to the Word Processing Center at UND and the word processing operators at the Dickinson District Office-BLM for their professional treatment of draft manuscripts.

Drafts of all illustrations in the prehistoric background section were prepared by Michael L. Gregg to serve for this project and for a background chapter in a Northern Border Pipeline Project report. The final figures were drafted by Sarah Moore for Northern Border use and were duplicated for use here with the consent of the Northern Border Pipeline Company.

Dan Martin and Burt Williams are credited for their continuing support of Class I cultural resources inventories in the Montana State Office-BLM.

Study Region and Study Areas

Figure 1 illustrates the boundaries of the study region and six study areas within it. The borders of the study region bound the surface areas and mineral resources managed by the Dickinson District Office-BLM. The six study areas approximate more specific BLM management units. The definition of a large study region with smaller study areas within it facilitates certain aspects of information presentation in a class I cultural resources overview. More generalized information is presented in the major background statements, and information specific to certain localities is presented in the study area overviews.

Natural Setting

The study region is mostly within the Missouri Plateau section (Pirkle and Yoho 1977) of the Great Plains physiographic province (Fenneman 1931; Hunt 1974), but the extreme northeastern portion of the study region is within the Central Lowlands physiographic province (Hunt 1974). In the Missouri Plateau section, the southwestern portion of the study region is within the Unglaciaded Missouri Plateau subsection while the remainder is within the Glaciaded Missouri Plateau subsection (Fenneman 1931). From east to west within the Glaciaded Missouri Plateau subsection are the Missouri Coteau district (bounded on the east by the Missouri Escarpment), Coteau Slope district, Missouri River Trench district, and an unnamed district (Winters 1967).

The entire study region lies within the Williston Basin, a large structural depression filled with sedimentary rocks, sand, silt, clay, lignite, silicified lignite [Knife River flint (Clayton et al. 1970)], and other sedimentary materials laid down by ancient seas, lakes, swamps, rivers, streams, and ponds (Bluemle

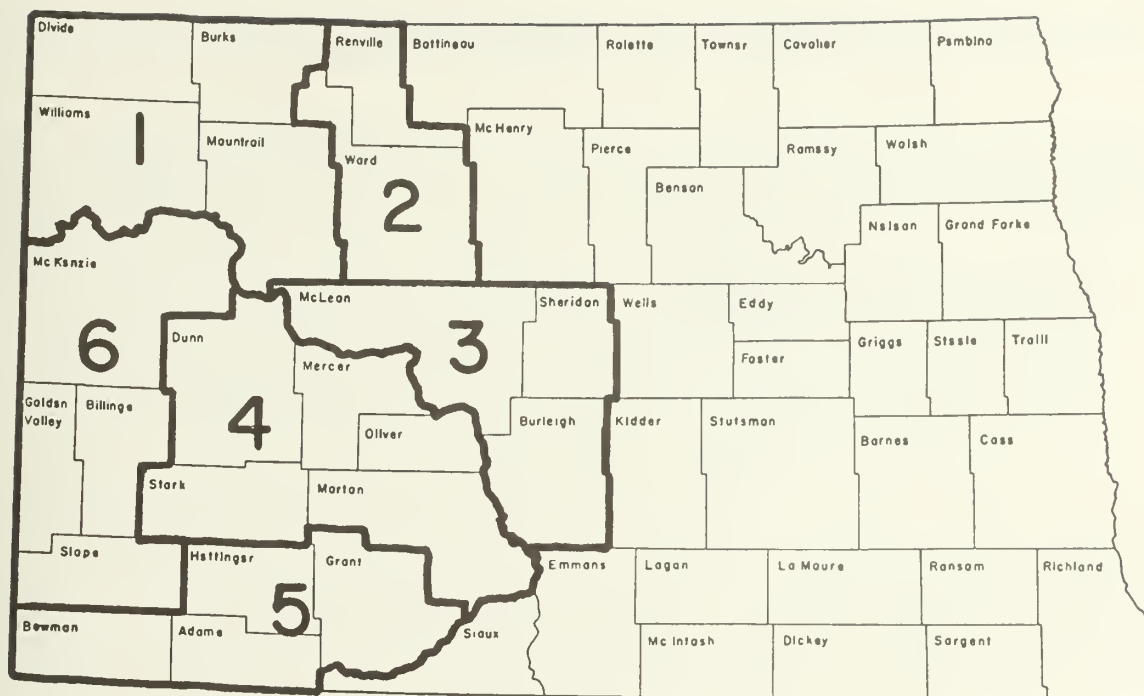


Figure 1. The western and central North Dakota study region with (1) Northwest, (2) North-Central, (3) East-Central, (4) Central, (5) Southwest, and (6) Little Missouri study areas.

1975). This bedrock has been modified by wind and water erosion and continental glacial advances and retreats. This modification has been hastened in some locales by surface collapse resulting from removal of lignite by natural underground burning (Bluemle 1975; Fredlund 1976). Soils in the study region have formed through the decomposition of bedrock and/or glacial drift and/or alluvial parent material through weathering, and surface and subsurface biological and chemical processes.

The continental climate of the study region (Jensen 1972) is characterized by daily and seasonal extremes in temperature and rainfall. The extremes are largely the result of the relative dominance of the Arctic, Tropical Maritime, and Mild Pacific air masses (Borchert 1950). Severe winter cold and drought pose significant limitations to human use of the study region. Winters can be long and cold, averaging 180-210 days below freezing annually (Jensen 1972:29). Major droughts have hit the study region three times in the current century, centering around 1912, 1934, and 1953 (Borchert 1971).

The study region is situated in the northern temperature grassland biome (Shelford 1963), mostly in mixed grass prairie, but with the northeastern portion in transition grassland (Dodds 1979; Whitman and Wali 1975). There are woody, grassland, and wetland ecosystem classes present in both grassland regions (Brown et al. 1983). These ecosystems provide favorable habitats for a variety of flora and fauna, many of which provided important subsistence and technological resources through most of the region's prehistory and history (Brown et al. 1983).

The Missouri Escarpment, running northwest-southeast across the northeastern part of the study region, is a subcontinental divide; drainage to the north is into Hudson Bay. All of the study region south of the Missouri Escarpment is drained by the Missouri River into the Gulf of Mexico. More detail on the natural setting is provided in the individual study area overviews.

Paleoclimate and Some Considerations of the Natural Environment of the Study Region During the Holocene

Climate is an important independent variable acting to influence and determine certain significant aspects of subsistence and economic resource potential for cultural groups, particularly when stone age technologies are involved. Therefore, paleoclimate is an important independent variable to consider in dealing with the prehistory of the study region. One of the most significant limitations to reconstructing prehistoric settlement systems is the degree to which prehistoric subsistence resource potential can be refined. The distribution of plants and animals through time and their availability to prehistoric people are important variables in archeological reconstruction. It is not possible to formulate refined subsistence-settlement models without information regarding locations and seasons of availability of subsistence resources. "The survival of a hunting group depends upon its ability to predict food conditions in different parts of its territory and to take advantage of these predictions" (Wilmsen 1974:10).

During the past 30 years, some important contributions have been made in the Holocene paleoclimatology of North America, the Plains, and the study region. While there have been little paleoclimatic and paleoecological data collected directly from the study region, several models have been formulated which apply to geographic areas including the study region. Refinements in paleoclimatic and paleoecological modeling have been paralleled by refinements in paleocultural modeling, and some correlations have been identified between certain climatic/ecological characteristics and aspects of prehistoric human adaptations. It is anticipated that modeling will continue to be refined in these and related areas to the immense benefit of many archeological investigations. The purpose of this section is to briefly introduce some of the paleoclimatic and paleoecological models which are frequently referred to by archeologists working in the study region.

Antevs (1955) summarized 20 years of his paleoclimatic work, carried out primarily in the Southwest, and some of the work of others in northern Europe and the west coast of North America. He presented an "indistinct transitional model" (Reeves 1973:1223) for late Pleistocene and Holocene fluctuations in temperature and moisture in the Southwest based on geologic data from "fluctuations, disappearance, and rebirth of glaciers and lakes, wind erosion and stabilization of dunes, stream deposition and erosion, changes in vegetation, calichification, and soil formation" as correlated with relative dating (salinization in Oregon and California lakes and varve analysis) and absolute dating (radiocarbon analysis and dendrochronology) (Antevs 1955:331). The Neothermal (climatic regime of the Holocene) was divided into three periods: an Anathermal period of gradual warming and drying (ca. 8000-5500 B.C.), an Altithermal period within which warming and drought peaked (ca. 5500-2000 B.C.), and a Medithermal period characterized by cooling and increased precipitation (beginning ca. 2000 B.C.). He suggested that trends in temperature change and moisture availability were cyclic and that such climatic cycles could be marked off by times of peak drought. With evidence for at least two significant droughts during the Medithermal in the Southwest (ca. 500 B.C. and ca. A.D. 1275), he noted that "the number, age, duration, and geographic range of such cycles are still inadequately known" (Antevs 1955).

The "episodic model" (Reeves 1973:1223) of late-glacial and postglacial climatic/ecological change has been introduced in North American archeological literature by Bryson et al. (1970), Bryson and Wendland (1967), Wendland (1978), and others. The "episodic model postulates a number of quasistable climatic episodes, each exhibiting a characteristic climate. Rapid and distinctive climatic changes occur between each episode" (Reeves 1973:1223). The named climatic episodes (pre-Boreal, Boreal, Atlantic, Sub-Boreal, and Sub-Atlantic) used by these authors derive from a sequence of postglacial climatic changes identified in Norway and Sweden by Blytt and Sernander respectively during the period 1876-1910 (Lamb 1977:78). Bryson et al. suggested adoption of the Blytt-Sernander terminology in North American work for purposes of maintaining consistency, not to indicate that temperature, precipitation, and ecological characteristics in North America paralleled those in northern Europe (1970:56). For example, while Antevs proposed peak warmth and aridity at ca. 4000 B.C. in the Southwest, he noted that the Atlantic climatic episode in northern Europe, while also warm, was moist "in comparison to the preceding and following ages" (1955:322). "The atmosphere simply does not behave in such a way that the world, or even a continent, gets everywhere warmer or drier or colder or wetter as the climate changes . . . , even though the world mean may change that way" (Bryson et al. 1970:55). Further, "in North America

certain differences from the climatic history of the rest of the world resulted from the long time needed to melt the vast Laurentide ice sheet" (Lamb 1977:391).

In essence, a series of named episodes originally defined to represent climatic/ecological periods in Sweden and Norway has been laid over all of North America, including the study region. It has been anticipated by some that because there were distinctive kinds of climate and biota in northern Europe during these episodes, distinctive kinds of climate and biota will also be found to characterize these episodes in different areas of North America. Not everyone agrees:

The biostratigraphic terms Boreal, Atlantic, etc. . . . have taken on climatic connotations that cannot always be defended. To maintain any validity they must be defined and extended geographically on the basis of their stratigraphic characteristics and not on the assumption of global climatic cycles or chronological uniformity. Hafsten (1970) strongly recommended that the use of these pollen zones be confined to the type area of Denmark and vicinity, and that a more general three-part division of the postglacial be adopted for global correlation similar to Lennart von Post's original concept, which recognizes simply a central interval of maximum warmth (Wright 1974:12).

Not without regard for such reasoning, the episode names which are currently so popular in much of the archeological literature are being used in this report. It is understood that the most elementary characteristics of the model remain to be documented in the study region. The climatic conditions of each episode must be described. Each episode must be found to have distinctive climatic conditions, contrasting with each preceding and subsequent episode. The temporal duration of the episodes must be shown to correlate with the model.

Figure 2 illustrates the approximate ages and durations of the named climatic episodes, and includes comments regarding general Northern Plains climatic characteristics suggested to correlate with the episodes. The figure also correlates the named episodes with climatic and sedimentological information presented for the study region by Clayton et al. (1976). This figure indicates that a general paleoclimatic model is developing for the study region. Several researchers have noted the chronometric potential of the Oahe formation paleosols depicted in this figure. These paleosols are a focus of current research being conducted by John Wyckoff, Department of Geography, University of North Dakota in conjunction with University of North Dakota Archaeological Research.

At present, the Atlantic, Sub-Boreal, Neo-Atlantic, Pacific, and Neo-Boreal episodes have taken on the greatest significance for the prehistory of the Northern Plains in general and the study region in particular. The Late Glacial, Pre-Boreal, and Boreal episodes together represent a period of warming in the Northern Plains and there is little paleoecological detail as yet to differentiate the three episodes.

During the long time of fluctuating ice retreat from 20,000 to 11,000 years ago, spruce pioneered everywhere on deglaciated ground, except from central Minnesota northward. There tundra became established first and lasted until as late as 11,000 years ago, when it was succeeded by spruce forest.

This vast boreal forest of the ice age stretched from the Atlantic coastal plain and the southern Appalachians . . . west to the Great Plains and at least as far south as Kansas and Missouri . . . It may have had about the same area dimensions as the boreal forest of today — 2,000 miles from the east coast to the Rocky Mountains and about 700 miles from north to south.

When man expanded on the North American continent with a sizable population about 11,500 years ago, most of the country was in the midst of a climatic and vegetational shift from the conditions that prevailed during the glacial period to those of the postglacial era. The boreal forest and parkland that had existed for thousands of years featured numerous species of large mammals which provided game for a rapidly growing human population. Most of these mammals were grazing rather than browsing herbivores. Their prevalence is further evidence of abundant openings in the boreal forest with relatively dry climate in which sedge plants and other herbs, rather than woodland shrubs, could grow (Wright 1974:8-9).

Figures 3-5 are intended to illustrate the ecological setting of the study region in relation to its surroundings during the first ca. 2000 years of the study region's prehistory. They illustrate gross approximations of Laurentide ice frontal positions, ecotones between major biotic provinces, and extents of major glacial lakes for ca. 9000, 8000, and 7000 B.C. The ecotone positions are taken from Wendland (1978) and represent a culmination of work initially reported by Borchert (1950). Borchert had proposed that the climate of the North American continental interior was largely dependent upon the relative dominance of three air masses: Arctic, Tropical Maritime, and Mild Pacific. Bryson (1966) correlated the extents of temperature and moisture regimes with these "mean airmass boundaries" and "mean ecotones in North America" (Wendland 1978:273). Bryson suggested the ecotones between the Plains grassland and other biotic provinces should correlate with the mean frontal positions of these three air masses, such that the maximum northern and eastern extent of the grasslands should have correlated with maximum northern and eastern mean frontal position of the Mild Pacific air mass (1966).

Figures 3-5 illustrate the retreat of the Laurentide ice front, shifts in the major ecotones, and existence of major glacial lakes during the Late Glacial, Pre-Boreal, and Boreal episodes. Land surfaces were stabilized and A₁ soil horizons were developing. These soil horizons are now buried in some parts of the study region and are identified as the Leonard paleosols. The paleosol in the upper sub-member of the Aggie Brown is "considerably blacker than the modern soil, suggesting a more moist environment of formation" (Clayton et al. 1976:7). Glacial Lake Souris was present in north-central North Dakota and undoubtedly was a significant factor in the human use of the area. The Missouri and Little Missouri rivers should have been established in their essentially modern trenches. Grasslands should have been relatively lush and landforms relatively stable.

Figures 6 and 7 illustrate general glacial front and ecotone conditions at ca. 6000 and 5000 B.C. These approximate time levels are early and midway in the Atlantic episode. There is little debate regarding the relative aridity of the Atlantic, but seasonal and annual temperature patterns and extremes are not understood. The Cochrane readvance of the Laurentide ice sheet is dated at ca. 5800 B.C., so there is evidence for some fluctuation in temperature; there was not a steady and constant rise in temperature through the first half of the Holocene.

Aridity probably fluctuated too. There was not a single, extended drought for the 3000+ years of the Atlantic. However, the general pattern of the Atlantic appears to have been relative aridity. The thick, windblown sediments of the Atlantic age Pick City member of the Oahe formation in the study region have contemporary depositional analogs, e.g.:

The conditions during the Dirty Thirties may be taken as representative of conditions during earlier periods when wind-blown silt was being deposited. Hamilton (1967) has shown that the Dirty Thirties was a period of instability on steep hillslopes in the Little Missouri Badlands of western North Dakota; a layer of sediment 1 or 2 m thick was washed from hillslopes into valley bottoms throughout most of the area. The age of this layer of sediment has been determined with considerable precision using artifacts (miscellaneous junk such as car hood ornaments and bottles), annual growth rings of partly buried trees, old photos (including air photos taken at the end of the 1930s), and historic records (Hamilton 1967). Both before and after the 1930s little sediment was deposited in valley bottoms, gullies were cut, steep hillslopes were stable, and soils were formed on hillslopes. The mean annual temperature during the Dirty Thirties was 2°C or 3°C warmer than usual, and the annual precipitation was about 100 mm less than usual (Bavendick 1952). By analogy, it is probable that dryer periods in the northern Great Plains during the late Quaternary were periods when steep hillslopes were unstable, when valley bottoms were alluviating, when a large amount of sediment was available to the wind, when dust storms were numerous, and when silt was actively being deposited on gentle slopes (Clayton et al. 1976:8).

The period of the Atlantic episode has been a focal point of debate in Plains archeology. What was the nature of subsistence and technological resource availability? Although opinions are divided, it is apparent that resource availability varied geographically through the Atlantic. During peak aridity, river valleys (especially the Missouri) and landforms like the Killdeer Mountains or Turtle Mountains probably acted as refugia for biota of the pre-Atlantic and maintained usable levels of resource availability. Areas like the Badlands may have had little or no subsistence resource potential outside the Little Missouri Valley.

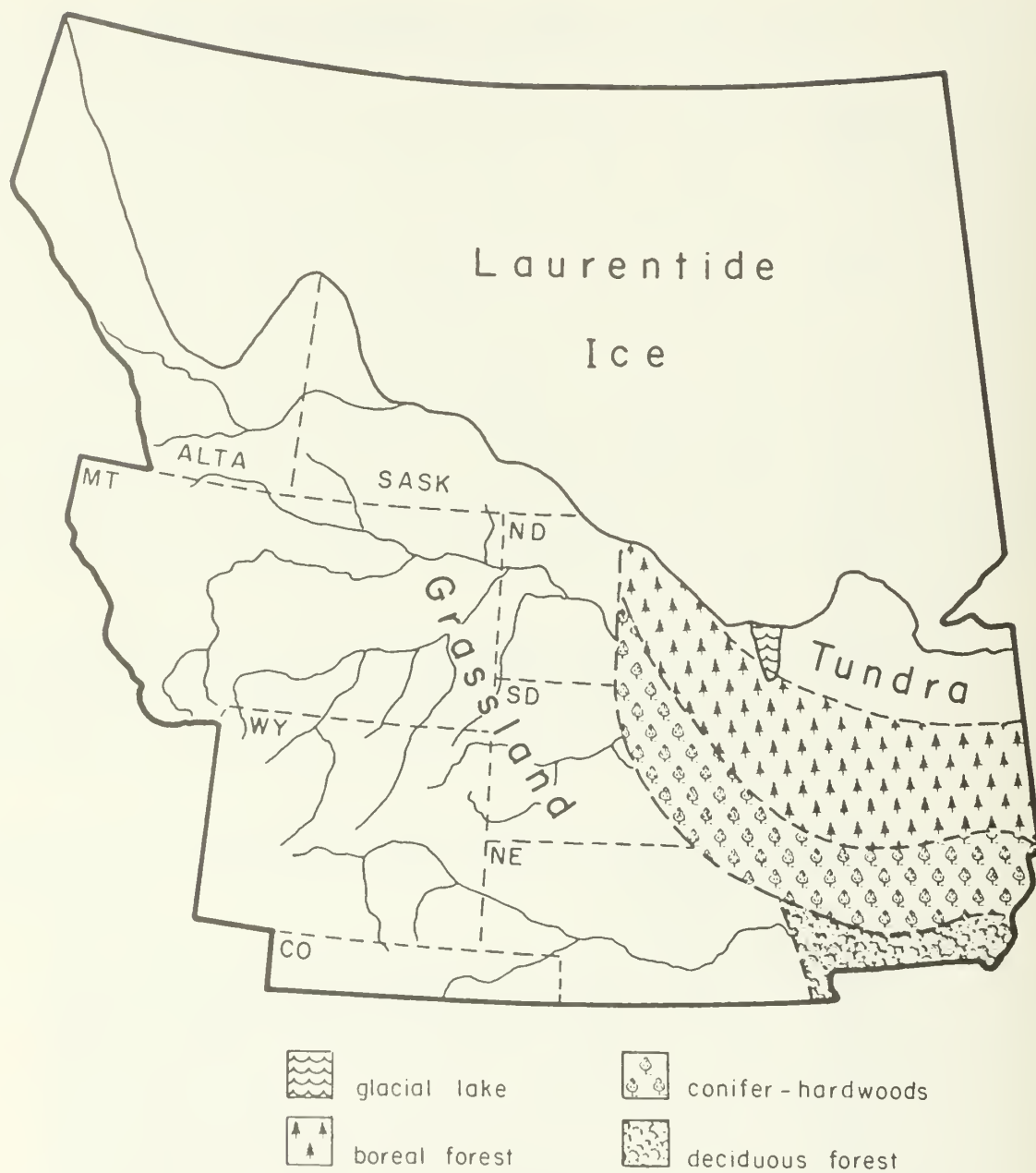


Figure 3. Gross approximation of Laurentide ice front (from Bryson et al. 1970:57) and major ecotones (from Wendland 1978:276) at ca. 9000 B.C.

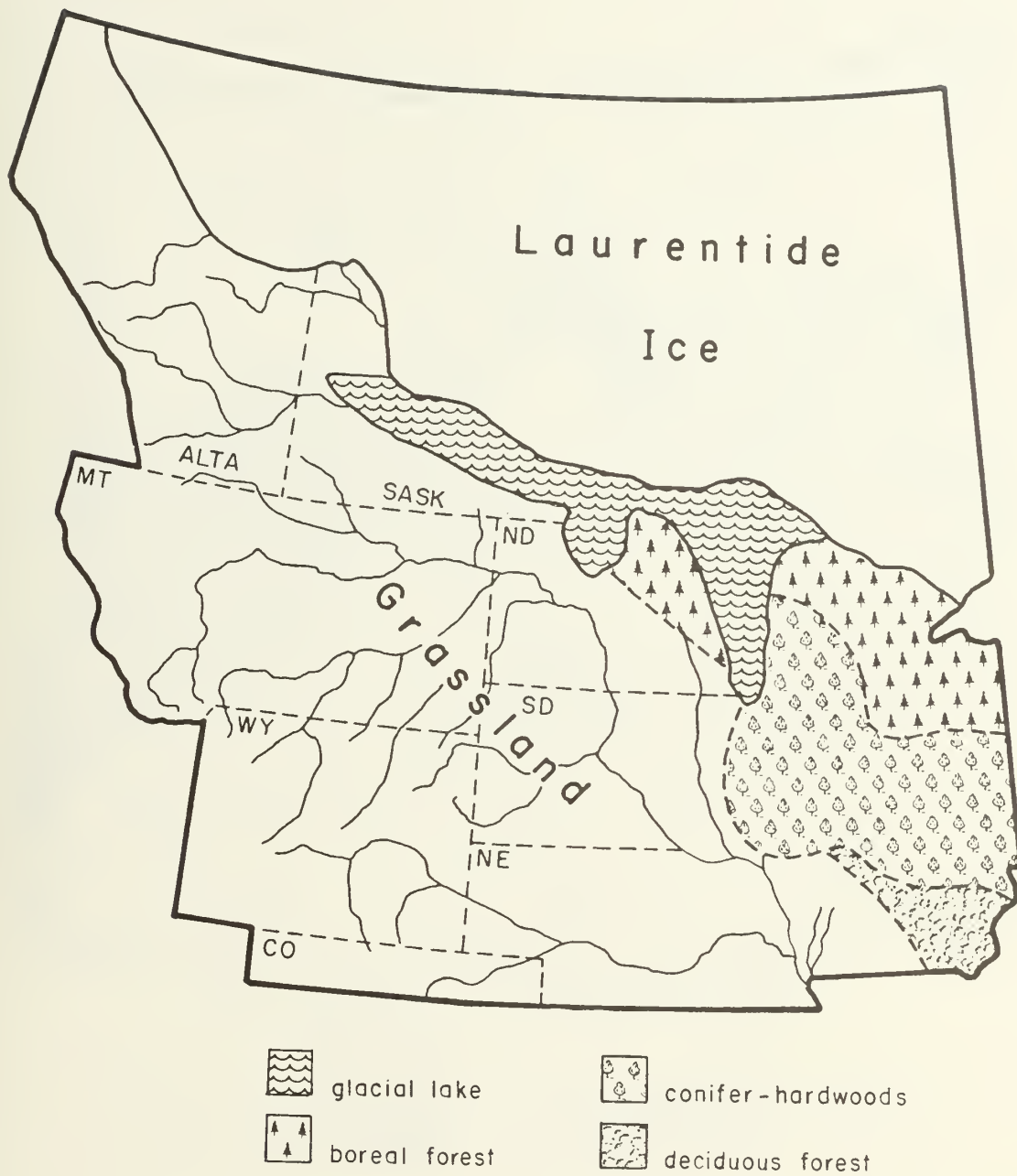


Figure 4. Gross approximation of Laurentide ice front (from Bryson et al. 1970:57) and major ecotones (from Wendland 1978:276) at ca. 8000 B.C.

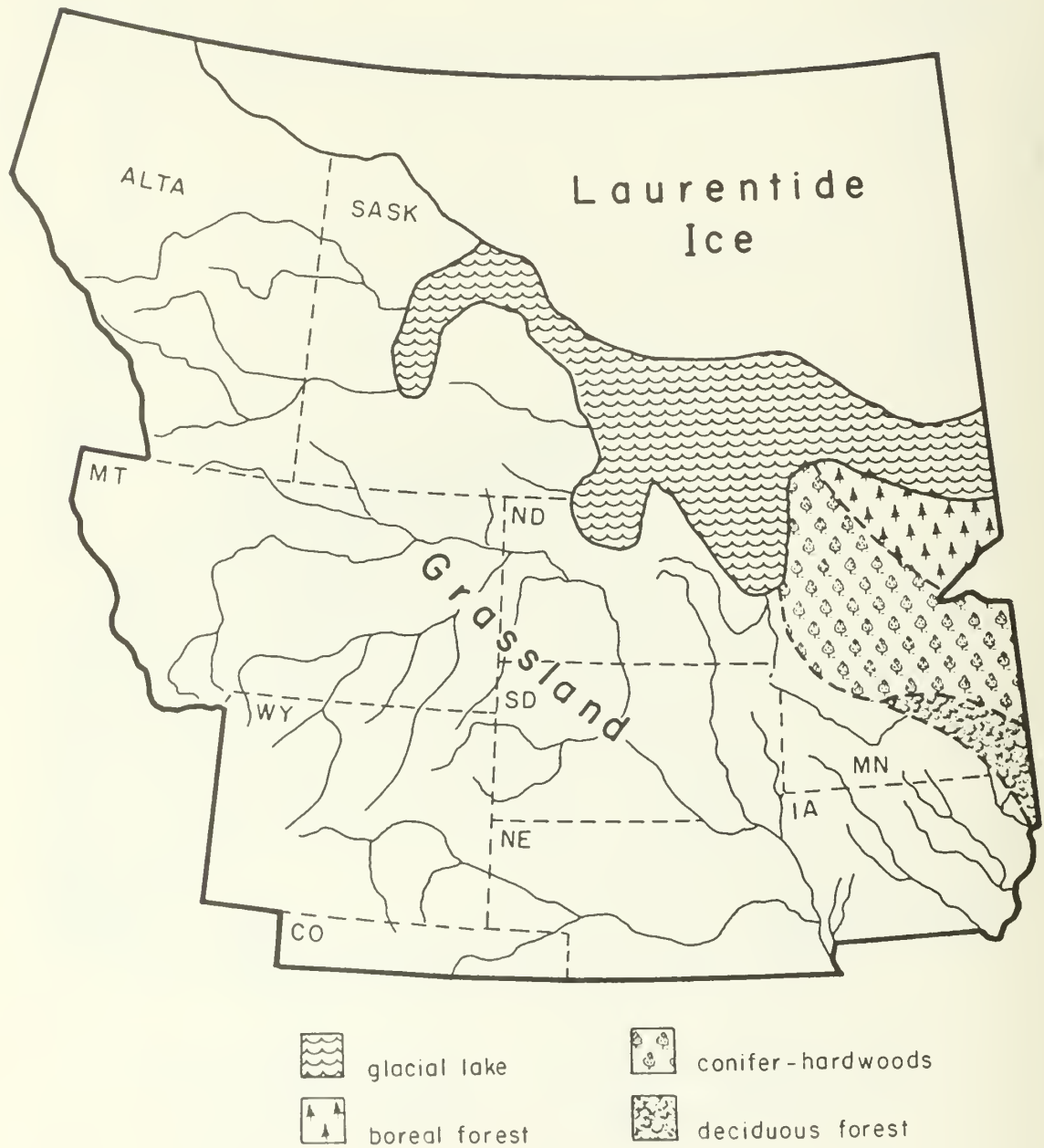


Figure 5. Gross approximation of Laurentide ice front (from Bryson et al. 1970:57) and major ecotones (from Wendland 1978:277) at ca. 7000 B.C.

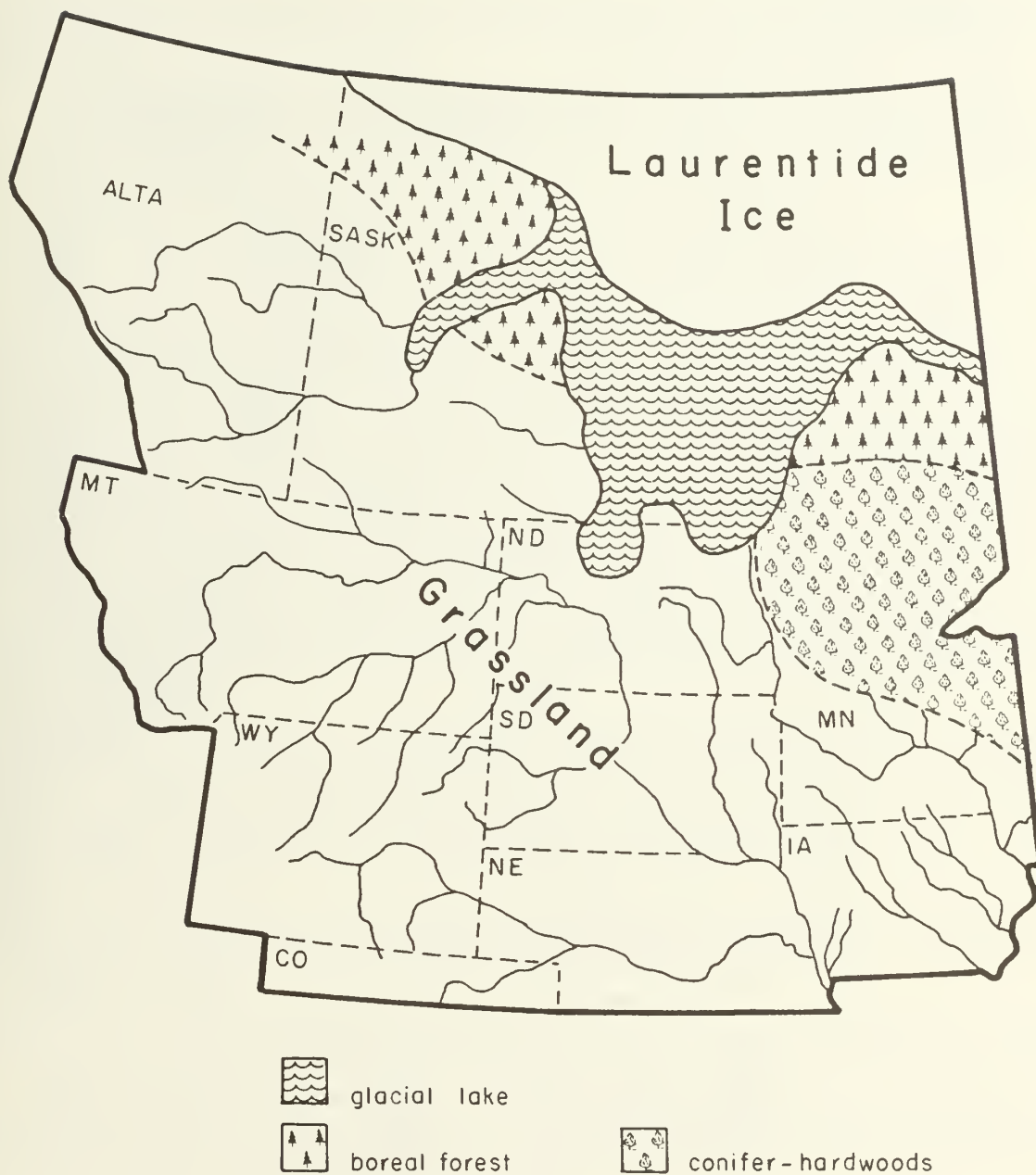


Figure 6. Gross approximation of Laurentide ice front (from Bryson et al. 1970:57) and major ecotones (from Wendland 1978:277) at ca. 6000 B.C.

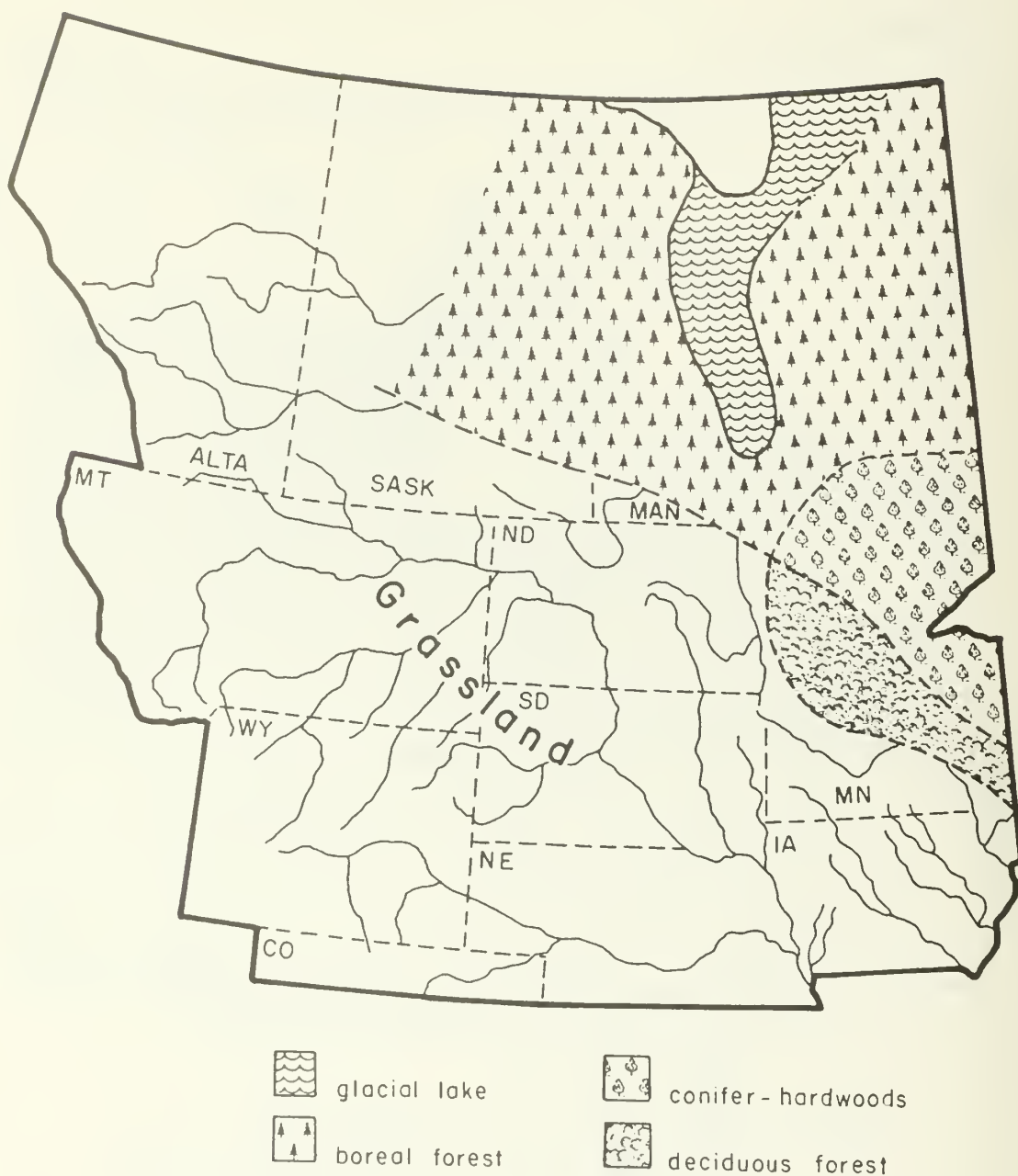


Figure 7. Gross approximation of Laurentide ice front (from Bryson et al. 1970:57) and major ecotones (from Wendland 1978:278) at ca. 5000 B.C.

The presence of a few Atlantic age archeological components in the study region does not mean the entire study region was characterized by usable levels of subsistence and technological resources throughout the entire Atlantic. To the east:

Archaeological evidence from the Cherokee Sewer site suggests that there were bison herds on the eastern plains throughout the height of the altithermal drying. When the western plains were dessicated, the eastward extension of the prairie peninsula provided a suitable environment for the short-grass adapted bison (Tatum 1980:166).

Alternatively, the archeological evidence from the Cherokee Sewer site demonstrates that there were a few episodes of cultural groups exploiting bison in the eastern Plains during the Atlantic.

The relationship between climatic conditions during the Atlantic and the presence and distribution of floral and faunal resources is of extreme importance in understanding Northern Plains prehistory. This is especially the case with the thermal maximum of the Atlantic, the Altithermal. Unfortunately, the paleoecological data necessary for reconstructing past ecosystems for the Northern Plains in general, and the study region in particular, are sparse. Therefore, any reconstruction of faunal distributions, for example bison, are speculative at this point. Reeves (1973) has argued that Altithermal conditions resulted in an extension of the drought resistant short grasses (such as blue grama and buffalo grass) at the expense of the more mesic mixed and tall grasses. Concomitantly, this resulted in favorable conditions for bison populations in the Northern Plains. Such an interpretation, if accurate, would suggest viable bison populations in the study region during the Altithermal. On the other hand, Buchner (1980) has argued for about a 75% decrease in bison populations as a result of a reduction in grassland carrying capacity. However, since Altithermal period excavated sites with associated fauna are rare in North Dakota, these interpretations should best be framed as alternative working hypotheses subject to empirical investigation.

At least parts of the Sub-Boreal climatic episode were characterized by significant increases in precipitation and decreases in temperature over the Atlantic. In the study region, one or both of the Thompson paleosols may correlate with the Sub-Boreal, indicating increased available moisture and landform stabilization. Floral and faunal resource reliability was enhanced as evidenced by indications of the most significant human population densities up to that time in prehistory.

There are indications of climatic fluctuations in late Sub-Boreal, Sub-Atlantic, and Scandic times. It is difficult to characterize these episodes in the study region with present information. An interpretation of a general lack of climatic stability is indicated by little or no soil humic horizon development preserved in the Oahe formation.

The Neo-Atlantic episode is generally characterized as warm and moist in the Central and Northern Plains. There is an increase in arboreal pollen in one pollen sequence in Nebraska (Wendland 1978:281). Warm, moist conditions would have been favorable for horticulturalists, and horticultural groups expanded westward and northward during Neo-Atlantic times. In the study region, land surfaces stabilized and humic horizons developed; these horizons are represented by paleosols in the upper Riverdale member of the Oahe formation (Clayton et al. 1976:11).

The Pacific episode is generally characterized as droughty on the Plains (Clayton et al. 1976). Lehmer notes:

Many Upper Republican sites are thickly blanketed with sterile windblown silt which suggest dust bowl conditions due to a severe drought. This interpretation is supported by Harry E. Weakly's (1950) pioneer tree-ring studies which indicated drought periods lasting for as much as 26 years. These might well have had such adverse affects on both agriculture and pasturage that they forced the abandonment of parts of the Central Plains (1971:109).

The subsequent Neo-Boreal, or "Little Ice Age," was cooler and moister. This generally favorable climate allowed the Plains grasslands to flourish. Increased carrying capacity of the grasslands was paralleled by an increase in the size of bison herds and the predatory human populations. Early historic accounts are replete with references to the great size and geographic extent of bison populations. The earliest European observers on the Northern Plains witnessed favorable climatic conditions, peak human population densities, and peak cultural complexity.

ETHNOGRAPHIC SKETCHES OF SELECTED NORTHERN PLAINS INDIANS

by Michael L. Gregg and Jeffery R. Hanson

Introduction

One of the ways of understanding the prehistoric past is by way of the ethnographic present. With this interest in mind, this section has a dual purpose: (1) to sketch a variety of cultural adaptations based on known cultural groups to indicate potential directions for modeling prehistoric cultural adaptations during the prehistoric period in the western North Dakota study region, and (2) to identify a small sample of the ethnohistoric and ethnographic literature with archeological interpretive value for this geographic area. A variety of possible cultural adaptations needs to be considered in the prehistory of the study region because (1) there has been geographic and temporal variation in the region's resource base with attendant variation in cultural adaptations, and (2) there are numerous examples of contemporary multicultural use of the study region by groups with different overall adaptive strategies. This section is cursory in nature and should in no way be viewed as an in-depth review of the ethnographic and ethnohistoric literature relevant to the study region.

A variety of contemporaneous human societies with varying cultural adaptations should be anticipated for the study region during much of the prehistoric past. This perspective is in line with that of the Co-Influence Sphere model for the Northeastern Plains (Syms 1977). This model emphasizes the coexistence, interaction, and territorial overlapping of different cultural groups. It also emphasizes cultural responses to seasonally fluctuating resource potential, multiple biome exploitation, interaction through trade, conflict, and sharing of resources. A variety of forms of intergroup relations has been documented for historic sociopolitical groups in the Northern Plains: (1) both formal and informal trade (e.g., Blakeslee 1976; Ewers 1954; Wood 1972) during which marriage partners, subsistence resources, and a variety of technological resources were exchanged; (2) peacekeeping alliances (Blakeslee 1976); and (3) warfare (e.g., Ewers 1967; Newcombe 1950). These forms of intergroup relations should be considered as having been operative in prehistory. It is wise to assume complex cultural settings until proven otherwise. Intergroup relations are, however, frequently difficult to demonstrate when dealing with only prehistoric physical remains of cultural activity.

Some causal variables involved in large-scale change in native adaptive strategies for the study region include the changing Holocene environmental conditions, the introduction of cultigens (particularly maize, beans, squash, and sunflowers), the increase in bison populations during the Little Ice Age, the introduction of the horse, the spread of epidemic diseases via Euro-American contact with native peoples, and the introduction of the fur trade. These are examples of variables involved in causal processes that affected major changes in technology, economy, social organization, demography, settlement patterns, and ideology. The horse, for example, was a new form of energy which facilitated the rapid evolution of the Equestrian Nomadic tradition characterized by a much more efficient bison hunting economy.

The introduction of the horse as a new and efficient hunting tool in the grassland or parkland environment increases the capacity both to acquire food and to transport it. The ability to exploit a larger radius for daily subsistence and to accumulate food in quantity permits a larger population concentration than in the same environment when the horse is absent (Beardsley et al. 1956:148).

According to Bowers, the Hidatsa called the place where they first acquired horses "the End of the World:"

It is like finding a new world to find these horses which will be so useful to our people.
Now we will be able to do almost anything (1948:156).

Settled horticultural village groups like the Hidatsa, however, suffered significant population losses from recurrent epidemics through Euro-American contact (Abel 1932; Lehmer 1977). Depopulation in combination with increased intertribal warfare had profound demographic consequences which rami-fied throughout subsistence and settlement practices, social organization, and ceremonial activities (Bowers 1965; Lehmer 1971; Trimble 1980; Wood 1980). The point here is that the postcontact cultural systems of the Plains nomads and village horticulturalists differed significantly from their precontact predecessors. As Mason states:

In the Americas, Oceania, Africa, and parts of Asia, the appearance of European man was dramatically underlined by the initiation of cultural changes the results of which are still not understood fully by anthropologists. The magnitude of these alterations in demography, epidemiology, technology, ideology, and in whole fabrics of social relations and economic arrangements were certainly unprecedented in most of these areas. Indeed, significant and ramifying shifts in aboriginal institutions were more often than not already under way when the earliest written accounts were compiled. This being the case, *the archeologist of prehistory especially must guard against a conceptualization of the past uncritically influenced by ethnohistorical or ethnographic information that is the product of highly atypical conditions in the "life histories" of the people whose remains he studies* (1976:350) (emphasis added).

The selection of cultural groups for consideration here is the result of a generalizing and lumping perspective necessitated by the scope of this project. Fromhold (1978:173) identified "some 400 distinct and identifiable aboriginal political socio-economic groupings in the Northern Plains, ranging from bands to tribes in size" for the period A.D. 1600-1800; these were mostly Cree and Assiniboiné peoples. It would not be possible to work at that level of detail within the scope of this project. However, an attempt has been made to balance a generalizing perspective on traits and adaptations of potential archeological significance with occasional observations related to the complexity of the cultural scene.

The ethnographic sketches to follow are organized by linguistic groups: Algonkian, Athapaskan, Caddoan, Siouan, and Uto-Aztecan. There are 13 tribes involved, not all of which had core, secondary, or tertiary areas within the study region. These 13 tribes were selected because they either have documented North Dakota adaptations or have documented adaptations which are likely to have had analogs in the prehistory of the study region.

Most of the ethnographic sketches do not apply to a specific, restricted time level. For example, the Mandan-Hidatsa sketch includes information from oral history which applies to the prehistoric period as well as ethnographic information relating to activities in the 1800s and early 1900s. Some cultural activities documented for the early 1900s will have prehistoric analogs, others will not. Similarly, some cultural activities documented in prehistory will have historic analogs while others will not. There are significant problems involved with formulating ethnographic analogies for application in prehistoric research, but consideration of these problems is beyond the scope of this section.

The presentation of information within each sketch generally follows this outline:

I. Introduction.

II. Cultural setting and demography: territory, population density, and intergroup relations.

III. Sociopolitical organization: household and community, society, residence and descent systems, political systems, status/authority, and role structure.

IV. Subsistence and settlement: subsistence resources, technological resources, economic groups, site types, and site seasonality.

V. Technology and material culture: tools and tool industries, technological groups, transportation, structures and furnishings, clothing, adornments, and art.

VI. Religion, ritual, and funerary practices.

Not all of these topics are covered for all tribes due to time limitations on this research. At the end of most sketches is a brief listing of additional key sources on that particular tribe to which the interested reader is referred for more detailed information.

Algonkian Speakers

The ethnic groups involved here are the westernmost Algonkian speakers.

Arapaho/Atsina

The Atsina (Gros Ventre) were one of five Arapaho subtribes or bands (Kroeber 1902:5). The Arapaho-Atsina split came about after the combined group shifted its core area west onto the Plains and took up a nomadic lifeway. It has been suggested that in the 1600s they were a sedentary, horticultural people living in the Red River Valley in North Dakota-Minnesota territory (Eggan 1937:36; Elkin 1940:207). The time depth of their Northeastern Plains adaptation is unknown, but may have been considerable.

The early home and subsequent migrations of the Arapaho cannot be verified historically or archaeologically as no Arapaho archaeology has as yet been turned up and in the scant historical references to the Cheyenne east of the Missouri River there exists no mention of the Arapaho whatsoever (Gussow 1954:70).

"Their migration preceded that of the Cheyenne, with whom they were associated and allied" (Parks et al. 1980:285).

Their territory on the Plains, which they held together with the Cheyenne, was eastern Colorado and eastern Wyoming; together they were the southwesternmost Algonkian speakers on record. In this territory the Atsina separated and moved north, becoming associated with the Blackfeet (Parks et al. 1980:285). The Arapaho had generally hostile relations with the Kiowa, Comanche, Ute, and Pawnee (Kroeber 1902:3, 8). Mooney estimated there were 3000 Arapaho and 3000 Atsina in 1780 (Parks et al. 1980:285).

The Arapaho traded horses, hides, and other goods for the agricultural products of the Mandan, Hidatsa, and Arikara. Usually this trade went on at the villages, but sometimes the villagers ventured out onto the Plains to the west to trade with the nomads (Gussow 1954:37).

A man belonged to the band in which he was born or with which he lived; sometimes he would change at marriage. There were no clans, gentes, or totemic divisions among the Arapaho, although the Gros Ventre apparently had patrilineal exogamous clans (Eggan 1937:37). Both tribes had a ceremonial organization of warrior societies similar to that of several other Plains tribes (Kroeber 1902:3, 8).

Arapaho society was further differentiated internally by a series of age-graded associations or societies. These groupings constituted a series covering the entire period from youth to old age. Each society was composed of a group of men, of approximately the same age, who, as a body, mounted the rungs in the series (Gussow 1954:50).

They focused on the bison for the bulk of their subsistence and technological resources. They trapped eagles and used wood or bone whistles to call deer (Kroeber 1902:3, 22). Deer, elk, and antelope were of secondary importance.

In addition, all kinds of smaller and less plentiful animals were hunted or trapped in order to vary the fare or else to stave off starvation. In this supplementary category the following animals are included: black bear, wolves, foxes, coyotes, young wildcats, panthers, mountain sheep, badgers, skunks, and beavers. Dogs were also eaten, sometimes as a special delicacy, sometimes when no other food was available. Horses, especially the very old and useless, were also eaten on occasion (Grinnell 1923:247-311; Beals 1935:4; Elkin 1940:208) (Gussow 1954:6).

When the bands were separate, the people each camped without order. When the whole tribe was together, it camped in a circle that had an opening to the east. The members of each band then camped in one area of the circle (Kroeber 1902:8).

As among other Plains people, the smaller Cheyenne and Arapaho units came together and formed tribal units only for that part of the year when abundant food and the opportunities for large-scale communal hunting favored concentration. For the rest of the year, they were divided into a number of smaller groups which did not, however, lose their identity during the summer. These small groups or bands were fundamentally social and economic units.

For the winter season each band or camp group retired to a traditional tract of territory in which it had one or more favored sites. Sheltered valleys and hollows at the foothills of the mountains and along streams, away from the open prairies, affording if possible wood, water and game, were sought out as protection against the cold winters and severe snows and winds. Group hunting played an important part of the winter food quest, although the group formed was smaller than in summer and the buffalo were driven into pounds or enclosures large enough to hold a hundred head or more.

Elkin tells us that at least among the Arapaho it was customary for the bands in winter to locate along streams about five to thirty miles from one another and so form an enclosed game-reserve between them (Elkin 1940:210) (Gussow 1954:38).

They dwelled exclusively in tipis. A man with two wives generally had a tent for each. The entrance to the tipi was always at the east with the owner's bed along the southern side (Kroeber 1902:3, 12, 14).

Kroeber (1902:25) says they made pottery as Woodland people, but not as Plains hunter-gatherers. They stone boiled in rawhide lined pits.

Hide working typically involved fixing the hide on the ground with wooden pegs. Elk antler scraper hafts were an important component of the hide working tool kit, but were sometimes also used for digging roots (Kroeber 1902:23, 26). Bison bone was used for scapula knives, vertebral spine knife handles, awls, arrow foreshafts, and rib dart points; sinew was used for backing bows (sometimes made from "cedar") and for sewing with bone needles (Kroeber 1902:24, 28). "The women have work-bags in which they keep awls, sinew, quills, needles, bones for quill-flattening and painting, incense, paint, medicine, and similar miscellaneous articles" (Kroeber 1902:28, 29).

They made catlinite and antelope leg bone pipes. They made rawhide plates, cottonwood burl bowls, and spoons and cups of mountain sheep horn (Kroeber 1902:21, 25).

Horses and dogs were used for transportation. Each dog could haul a travois with a 35-50 pound payload (Lowie 1954:40).

They performed the sun dance and buried in graves (Kroeber 1902:3, 16).

Other source material on the Arapaho/Atsina includes Eggan (1937), Elkin (1940), Mooney (1907), and Scott (1907).

Blackfoot

The three Blackfoot tribes are Piegan, Blood, and Blackfoot-proper (northern Blackfoot). The three tribes were politically independent, but spoke the same language, shared many customs, intermarried, and made war upon common enemies (Ewers 1958:5). They were probably the earliest Algonkian residents of the Plains (Ewers 1958:6). They may have lived for an extended period, perhaps centuries, in the transition zone between the shortgrass plains and forests before they pushed on westward to lands watered by the upper tributaries of the Saskatchewan and Missouri rivers in the 1700s (Ewers 1958:7).

Ewers (1958) reconstructs the Blackfoot lifeway for prehorse times. All the following is quoted directly with page numbers in parentheses.

The tribes were divided into separate hunting bands. Each band probably comprised about twenty to thirty families, totaling some one hundred to two hundred men, women,

and children. These bands were large enough to enable their members to encircle a small herd of buffalo on the prairie and large enough to offer a stiff defense against human enemies; yet they were small enough to permit survival during periods of game scarcity and limited rations. Probably each band was composed primarily of blood relatives, led by the most respected able-bodied man in the group (9).

Throughout most of the year these hunting bands moved from one temporary encampment to another, following the buffalo over the open grasslands. Each family was responsible for the movement of its own baggage. Its largest and heaviest possession was the tipi. The size of this Indian home was limited by the weight its owners' wolflike dogs could haul. A strong dog could drag a load of about seventy-five pounds on the A-shaped wooden travois. A lodge cover made from six or eight buffalo cowskins was a good load for one of these dogs. The necessity for dragging the lodgepoles, which increased in length and weight with the number of hides in the cover, must have encouraged the use of small lodges in dog days. The family's lodge furnishings and household utensils, also designed for ready transportation, were tied into compact bundles or fitted into skin sacks which could be hauled on dog travois or carried on the backs of dogs or women (10).

Five or six miles was a good day's march for the camp. Blackfoot traditions refer to the surround as the favorite method of hunting buffalo in the summer season in dog days (11).

As the days grew shorter and colder in late fall, the hunting camp moved to the edge of a wooded area in anticipation of the buffalo migration to winter shelter (13). Through the dead of winter the Blackfoot bands pitched their lodges among the trees in sheltered valleys offering maximum protection from winds and snow. But when the skies cleared they scoured the wooded areas for buffalo or smaller game, or they ventured out into the open country to kill buffalo that had bogged down in snowdrifts or fallen into ravines. In late winter and early spring, when the supply of fresh meat was low, the Blackfoot hunters, alone or in small groups, stalked the buffalo (14).

When the snows melted and the ice in the rivers began to break up, the period of the winter camp came to an end. Joyfully, the Indians took down their lodges, packed their belongings, and once again journeyed over the grasslands on their cooperative, warm-weather hunts (14).

So long as there was buffalo available, these Indians needed no other meat. Buffalo flesh, with its rich, gamy taste, was both delicious and nourishing. This big-game animal furnished a host of other useful materials. Dressed cowskins sewn together with sinew of the same animal served for lodge covers. The heavy winter hides, covered with thick, shaggy hair, were wrapped around the body, hair side in, to make warm, snug overcoats. They also served for bedding. From winter hides they also made mittens, caps, and moccasins to protect their extremities from the freezing cold. They made shields from the thick hide of the buffalo's neck and used green rawhide for securing binding stone clubs, knives, mauls, and berry mashers to wooden handles. From soft-dressed buffalo skins they fashioned bags to hold their household goods when they moved camp. They made serviceable spoons and drinking cups from buffalo horns. The paunch of this animal made a tight water bucket. Buffalo sinew supplied thread, bow strings, and cord for binding both stone heads and feathers to wooden arrow shafts (14-15).

Persistent Blackfoot traditions tell of the crude clay cooking pots made and used by their ancestors (15).

Aged Indians told David Thompson of Blackfoot warfare in dog days. In the early years of the eighteenth century their bitterest enemies were the Snake or Shoshoni dwelling on the plains southwest of the Piegan, who were the frontier tribe of the Blackfoot Indians. More destructive and probably more typical of warfare in dog days was the surprise attack on a small hunting camp by a superior enemy force. In these actions casualties were heavy as the defenders fought desperately for their lives. Sometimes the men were

wiped out, their scalps taken as trophies of war, and their children and women led into captivity by the victorious attackers. Captive women and children helped to replace previous losses of the side of the victors (15-16).

There is no denying it — a Blackfoot woman's life was hard in dog days. Not only did she bear and rear her children, prepare and cook the family meals, dress the hides of buffalo and other animals, make the tipi, the family clothing, and her domestic tools and utensils, but she was also responsible for the movement of the camp equipment. She dismantled the tipi, caught the reluctant dogs and tackled them to the travois, loaded the travois, and kept the lively dogs in line on the march. Often she carried heavy loads on her own back. At the end of a hard day's journey she could not rest until she had pitched the tipi and fed the family. Furthermore, as indicated above, women rendered active assistance in the cooperative buffalo hunt. In this toilsome life, youthful beauty was short lived, and there was little comfort in old age. When they became bent with age and too feeble to follow the moving camp on foot, they were abandoned to face death alone (16-17).

Certainly, the hunting band must have been the primary political unit (18).

In 1772, the Gros Ventres, Bloods, Blackfoot, Piegans, and Sarcee were allied (Ewers 1958:28). After the 1781 smallpox plague devastated the Shoshoni, and after the Blackfoot had both the horse and gun, they controlled former Shoshoni, Flathead, Kutenai, and Nez Perces territory (Ewers 1958:23-30). The entire Blackfoot population is estimated at 15,000 for 1780 (Parks et al. 1980:286). In 1809, it was estimated there were 2800 Piegan, 1600 Blackfoot proper, and 800 Blood (Ewers 1958:37).

Ewers (1968) discusses the range of Blackfoot site types: buffalo surround; deer pitfall; wolf/coyote pitfall; temporary camps in rockshelters; war lodges of various log-brush-bark types with or without breastworks or fortifications of stone and/or logs; and, other camps. War lodge sites were temporary camps, often with more than one lodge. It was the war party's supply base and base for all types of scouting, limited hunting, and undoubtedly a wide range of other extractive and maintenance tasks. The use of the war lodge was also characteristic of the Plains Cree, Crow, Sioux, Gros Ventre, Assiniboine, Cheyenne, and Arikara in the waning decades of intertribal warfare (Ewers 1968:8-11, 122, 126-129).

Some Blackfeet were still making and using pottery in 1772 (Jenness 1938:14). Crushed sandstone and selenite were used in the process (Ewers 1968:11). Additional information on Blackfoot ceramics can be found in Simon (1979).

Other key sources on the Blackfeet include Wissler (1910, 1911) and Lewis (1942).

Cheyenne

Cheyenne occupation on the Northeastern Plains and prairie-forest ecotone may have a long history. Ossenberg (1974:38) concludes that "skeletal analysis positively identifies Arvilla as ancestral Cheyenne." Arvilla is a Late Woodland mound burial complex of western Minnesota and the central and southern Red River Valley. French explorers, the first Europeans to document the Cheyenne, located them in the upper Mississippi River Valley in the 1600s (Wisconsin-Minnesota territory) (Service 1963:116). Also in the 1600s they were identified as hunter-gatherer-gardeners in the territory bounded by the Mississippi, Minnesota, and upper Red rivers (Parks et al. 1980:286). Their core area shifted west out of Minnesota during a period of conflict with neighboring Ojibwa and Dakota after trade firearms were introduced (Robinson 1966:23-25).

Some Cheyenne were living a village, horticultural-hunting-gathering lifeway at the Beisterfeldt site (also called the Sheyenne-Cheyenne site) on the Sheyenne River in southeastern North Dakota between 1740 and 1790, perhaps earlier (Strong 1941; Wood 1971). A Cheyenne informant said they had occupied the Sheyenne valley as early as 1600. Beisterfeldt had about 70 house depressions surrounded by a fortification ditch.

The Cheyenne at this period were both agriculturalists and hunters. They lived in fixed fortified villages, used a four-post earth lodge, and possessed a culture very similar to that of the semi-sedentary Caddoan and Siouan peoples of the eastern Plains. Their ceramics

are of a northeastern type and, in their use of birchbark, shell knives or scrapers, stemmed arrowpoints and a few other traits, they also differed from their sedentary Missouri river neighbors. However, their earth lodges and basic culture were so similar to the latter that contacts must have been close. It seems very probable, though unproved, that this Sheyenne-Cheyenne village was contemporary with other Cheyenne villages that had already moved west and located on the Missouri River (Strong 1941:165).

After they were burned out of their village on the Sheyenne River, their core area appears to have shifted to the Missouri Trench in the vicinity of Fort Yates (Parks et al. 1980:286; Will and Hyde 1917:43; Wood 1971:60-63) where the Plains Village lifeway continued. Will (1924:305) says they were on the Missouri River between 1740 and 1780.

Some bands were fully nomadic by 1770 (Hoebel 1960; Service 1963:117), participating in the Equestrian Nomadic tradition. As Plains nomads their territory was northern Colorado, eastern Wyoming, and east to the Black Hills. On the Plains they were allied with the Algonkian speaking Arapaho and Gros Ventre (Atsina) (Hoebel 1960; Service 1963:118).

An early population estimate for the Cheyenne is provided by Lewis and Clark who noted it variously as 110 and 130-150 lodges with three warriors or 11 persons per lodge (tipi) (Thwaites 1905, Vol. 5:356-357; 1905, Vol. 6:100). These figures represent a minimum 330 warriors or 1100 persons and a maximum of 900 and 3300 respectively. Cheyenne population calculations are fairly consistent in listing the number of persons per tipi. Lewis and Clark place it at 11, Culbertson at 10, and Dodge at 12 (Gussow 1954:52).

"The feeling concerning descent is bilateral, or even slightly patrilineal at present, but matrilineal residence led to the identification of children with the mother's band for the most part" (Eggan 1937:37). The basic, social segment was the matrilineal extended family or kindred which typically consisted of a man, wife, married daughters and husbands, daughter's children, and unmarried sons (Driver 1961:287; Hoebel 1960; Service 1963:125). Marriages were offered and validated by exchanges of goods and respect and obligations between in-laws were signified by frequent exchanges of presents. Giveaways were important. Descent was reckoned bilaterally (Eggan 1937; Hoebel 1960; Service 1963:121-122).

They were divided into 10, loosely organized bands, each with its own taboos, ceremonies, and medicines. The entire tribe was also crosscut by sodalities, six of a military nature. Decisionmaking was in the hands of a tribal council of 44 members, four from each band and four general chiefs (Hoebel 1960:37; Service 1963:121-122).

In the last three or four hundred years of their history, the Cheyenne appear to have maintained adaptations which can be characterized as Woodland, Plains Village, and Equestrian Nomadic. As nomads they focused on bison for subsistence, but also hunted other big game. They used weirs and traps to take fish (Grinnell 1923:308-311; Service 1963:119). Turtles were also a subsistence resource (Gussow 1954:37). They collected roots and berries and occasionally ate dogs (Hoebel 1960:59-60; Service 1963:120).

Cheyenne bison kill strategies involved jumping, pounding, and surrounding (Grinnell 1923:264; Hoebel 1960:60; Wissler 1910:47-48). They also used grass firing to control herd movement (Wissler 1910:47-48). Individual hunting techniques included chasing bison on snowshoes, chasing them on ice, and solitary stalking (ibid.). Grinnell (1923:268) says they would set nooses in small openings of the buffalo pound fence when they left in order to catch the wolves, badgers, and foxes which were attracted to the butchered bison remains.

They drove antelope into a prepared pit, usually placed at the end of a brush fence that ran uphill (Grinnell 1923:278). The antelope were killed with clubs by people who layed concealed in shallow trenches near the pit (ibid.).

Vegetal remains at Beisterfeldt include "what appears to be maize, numerous seeds, and a considerable amount of birchbark. A wide fauna, including bison, deer, bear, fish, and domestic dog is represented" (Strong 1941:164). As equestrian nomads they continued to exploit floral subsistence resources, but "there were no favorite or special sites from which plant foods were gathered" (Gussow 1954:41). Floral resources were gathered when they were available near camps and along travel routes (ibid.).

Community sizes varied seasonally. Aggregation of the entire tribe was characteristic of the summer season (Hoebel 1960:31; Service 1963:119-121). For the rest of the year, they were subdivided into small family groups; sometimes several of these smaller groups would aggregate and camp together (ibid.).

A single tipi would shelter only a nuclear family. The extended family's camp, therefore, consisted of a cluster of several tipis. The people of these camps would collaborate in many activities such as communal cooking (Hoebel 1960:22; Service 1963:125). The large summer camp was circular or horseshoe shaped with a central, public area. The back of the tipi lodge was usually to the west and that was the owner's place; to the left was the family's private area (Service 1963). Other structure types included menstrual huts and sweatlodges.

As bison hunting nomads, skin, bone, and horn of buffalo and other big game provided most of the raw material for tools, weapons, clothing, and shelter (Grinnell 1923:170; Service 1963:120). They used stone hoes in their Plains Village lifeway (Will and Hyde 1917:90).

They also made pottery as Plains Villagers, as they probably did in an earlier Woodland lifeway. Strong (1941:163) states, "in surface treatment Cheyenne pottery resembles the later sedentary Plains types . . . , but in decoration it seems more "Woodland," having some resemblance to Blackduck ware. However, Wood (1971:25) has assigned most of the Beisterfeldt pottery to either Stanley or Talking Crow wares of the Plains Village tradition.

Their clothing, as nomads, was noted as particularly well made and ornate with quillwork and beadwork. They were also noted for hair and body decoration. They wore eagle feathers, bracelets, necklaces, and earrings. Body and face paints were used (Service 1963:120-121).

The central, religious acts of the tribe were performed in the great camp circle in the summer. The Sun Dance was performed in a large, circular, ceremonial lodge (Hoebel 1960:11-17). Self-torture was expected of young men to bring them visions and access to supernatural power or "medicine." Everyone wore or carried special charms such as arrowpoints, stones, and crystals (Service 1963:128-131). Sweatlodges were used in religious contexts.

When a war party member was killed, he was usually left unburied on the prairie. Burial patterns included use of tree scaffolds, caves, and rockpile graves. A dead man's favorite horse was sometimes shot and placed near him along with his favorite possessions (Hoebel 1960:87).

Other sources on the Cheyenne include Anderson (1951), Dorsey (1905), Eggan (1955), Jablow (1950), Llewellyn and Hoebel (1941), and Mooney (1907).

Plains Cree

The earliest documentation of the Cree is from the *Jesuit Relations* of 1640-1690 where they are described as nomadic hunters who were at war with the Dakota (Mandelbaum 1979:15). The Plains Cree were the westernmost bands of this tribe whose traditional home territory seems to have been the forested area from Lake Superior to Hudson Bay and to the west of Lake Winnipeg. Parts of this territory were also occupied by bands of other tribes (ibid.:22). Since European contacts were initiated from the east, it is not possible to use documentary sources to determine the western extent of the Cree at contact time. LaVerendrye in 1730 enlisted the aid of a Cree to prepare a map depicting the Saskatchewan, Red, and Missouri rivers, so some Cree were familiar with Plains territory at that time. Also in 1730, when nearly all travel was on foot, some western Cree were familiar with territory to the Rocky Mountains (ibid.:26-27, 32). The Plains Cree territory of 1850 was within the drainages of the Pembina, Souris, and Assiniboine rivers (Denig 1961:103).

The Plains Cree appear to have been adapted to the prairie-forest ecotone much like the Assiniboine, Ojibwa, and Dakota. The prairie-forest ecotone in Saskatchewan and Manitoba is a parkland belt. The area is characterized by "luxuriant vegetation and dotted with patches of hilly woodland" (Mandelbaum 1979:7-8). Plains Cree culture is characterized by a mix of Plains and Woodland characteristics. The total Cree population was estimated at 15,000 in 1670 (Parks et al. 1980:286). The Plains Cree population was approximately 7000 in 1853 (Mandelbaum 1979:7) after at least 114 years of suffering plagues and epidemics of European diseases.

The Plains Cree were closely allied with the Assiniboiné. The Assiniboiné "introduced them to many of the manners of Plains life and they often camped together and were allies in warfare. The Plains Cree freely intermarried with them" (Mandelbaum 1979:8). This friendship was in effect from at least the late 1600s when the Cree armed the Assiniboiné with firearms (Denig 1961:101 fn). The Plains Ojibwa were also friends and allies of the Plains Cree "and exchanged their medicines, beadwork, and even their women for the horses of the Plains Cree" (Mandelbaum 1979:8).

They were traditionally enemies of the Blackfeet and Sarcee to the west and Crow to the south and southwest. They also raided the village tribes on the Missouri (Mandelbaum 1979:9). "Early accounts make it clear that the unceasing hostility between the Plains Cree and their enemies was . . . largely the result of the continual raiding and counter-raiding for horses" (Mandelbaum 1979:62). The intensity of historic intertribal hostilities would appear to have been greater than prehistoric hostilities.

Rigid territorial lines were unknown. A band welcomed any other band of Plains Cree, Assiniboiné, or Plains Ojibwa who might hunt in their territory when buffalo were abundant. If the herds failed, no other band would want to come into the area. Thus, there were never any disputes over the occupation of land (ibid:78).

The Cree language was a sort of lingua franca on the northern Plains during the latter half of the 1800s and was spoken by Assiniboiné, Blackfoot, Dakota, Plains Ojibwa, and Métis (Howard 1965:7).

Band composition appears to have been loose and highly variable:

Acceptance into band membership was a simple matter. Any person who lived in the encampment for some time and who traveled with the group soon came to be known as one of its members. The numbers of each band were constantly augmented by recruits from other bands of Plains Cree, or from other tribes (Mandelbaum 1979:105-106).

Mandelbaum has sketched a typical annual round (1979:77):

Throughout the year, the Plains Cree looked forward to the annual Sun dance encampment. Late in June or early in July the scattered sections of a band, or even several bands, converged to the preappointed place where the ceremony was to be held. The great encampment might hold together for two weekends or even longer. When the food supply ran low, the bands drifted apart, each slowly moving toward its own territory. In mid-summer roots were collected and a little later the people moved toward the low hills and valleys where berries were ripening. During August fresh buffalo meat had a poor taste. Many-birds said that this was because the buffalo ate wild onions at that time. Dried meat, berries, turnips were then eaten.

With the onset of autumn, a few of the men separated from the larger groups to hunt elk and deer. As the weather turned cold, buffalo pounds were built and a successful pound was the nucleus for a large gathering of families. The pounds were operated throughout the winter, but after it became very cold, in January and February, they yielded few returns. This season was the most difficult of the year and the tribesmen scattered in small family units into the more densely wooded country. Fishing was carried on and an occasional elk or deer was killed. Buffalo were hunted with varying success.

After the break-up of the river ice in the spring, fish weirs were built. At this time maple sugar was collected. The small groups moved to the open country as buffalo herds appeared. The groups grew in numbers until it was time for the Sun dance encampment.

When food was collectively procured, it was collectively distributed. When it was individually procured, there was no obligation to share (Mandelbaum 1979). While a great variety of plant and animal foods were used, the primary subsistence resource was bison.

The techniques of procuring buffalo varied seasonally. In the autumn and early winter, when the herds were entering the wooded regions, the chute and pound methods were used. Whenever it was possible, buffalo were driven into places where they floundered and were easily taken. In summer, they were guided into marshes; in winter, they were forced into deep snow or over ice. Sometimes a herd was stampeded over a cliff or a steep bank. Horses were used if they were available, but a great deal of buffalo hunting was

done on foot. In the late winter and early spring, when only a few buffalo were to be found, various means of stalking were employed (ibid.:56-57).

A block of meat was cut spirally into thin sheets which were hung up to dry. In summer a drying rack made of two tripods joined by a number of horizontal poles was set up outside of every tipi. During inclement weather a drying rack consisting of four uprights which supported a platform was erected over the fire inside the tipi. When the strips of meat were thoroughly dry, they were tied in small bales or stuffed into rawhide sacks (ibid.:58).

The usual meal consisted of a thick soup which contained pieces of meat, berries, fat, and Indian turnips. An old method of preparing food, usually used by men while on the warpath, entailed digging a pit which was lined with a green hide pegged to the ground around its rim. Meat and water were placed in the pocket and brought to a boil by adding hot stones. Meat was occasionally baked in a pit, although roots were more often prepared in this manner. A hole was dug in the tipi floor in which the food was placed. It was covered with hot ashes and left over night (ibid.:59).

When there was a surplus of meat, a tipi-like store-house was built. Platform caches were constructed by utilizing the forks of two trees and two forked uprights. Poles were laid across these supports and on them a rectangular flooring was laid (ibid.).

"Their movements and lifeways were closely adjusted to a variable and migratory food supply" (Smith 1980:7). In addition to the bison; however, they also hunted or trapped and ate moose, elk, deer, wolves, coyotes, badger, lynx, rabbits, prairie chickens, gophers, waterfowl, bear, beaver, chipmunk, fisher, fox, ground hog, prairie dog, martin, mink, muskrat, otter, porcupine, skunk, squirrel, and wolverine. Fish were eaten when hunting was poor or a change of diet was desired (Mandelbaum 1979:70-71). Eating dog meat marked special occasions. "Thus, a dog might be killed to provide food for an honored guest or to be served during a bundle transfer" (Mandelbaum 1979:66).

Vegetal foods included roots, berries, and maple sugar (ibid.:74-76). The form of "maple" tapped was box elder (*Acer negundo*). They used "large baskets of birch bark to contain the juice while being collected" (Denig 1961:130). They also used bark to line storage pits to hold food (MacNeish 1958:20).

Regarding the sexual division of labor:

The old men remain indoors, make pipes, bows, pans, spoons, snowshoes, nets and other fishing tackle. The middle-aged hunt; make their dog trains, harness, saddles, traps; prepare the bark and frame of birch canoes which the women sew on and gum. The women dry, stretch and dress skins, cure meat, make pemmican cords and grease, cook, make clothing and other things (Denig 1961:130).

* The flint arrowheads, spear points, knives, and axes that they made (Denig 1961:127) were completely replaced by European tools by the late 1700s (MacNeish 1958:8). They made bison vertebral spine knives, bone fishhooks, bone arrowheads, hoof ladles and spoons, and tooth ornaments (Denig 1961:127; Mandelbaum 1979:60). Moose antler was used to make pans (Denig 1961:127). They used cedar root fiber to sew birch bark (ibid.). Grease soaked bison skulls were burned for fuel in wet weather when the combustibility of ordinary fuels became a problem (Mandelbaum 1979:60). Cartilage from the head was boiled for glue (ibid.). Chips were a principal fuel (ibid.). Spoons and ladles were made from horn and shell. Rawhide bags were used for storing food. Clothes, ornaments, and sometimes food were kept in tanned skin bags. Buffalo paunch containers were also used (Mandelbaum 1979:92).

The woodworking industry produced snowshoes, toboggans, spears, spoons, and bowls. Many of these items were whittled into shape with knives. Celts and adzes were used for felling and working trees. There was much work in birch bark including baskets and rectangular pots for cooking. Birch bark work was decorated by etching. Baskets or nets were woven from birch bark, small twigs, or roots. The Cree in southern Manitoba made pottery (Selkirk wares) during the earliest historic period, but the pottery was replaced by copper kettles after trade with Euro-Americans began (MacNeish 1958:8).

Every woman has as part of her household equipment several stone mauls and hammers. The maul used for splitting bones was roughly egg-shaped, its handle being about ten inches long. A lighter stone with a longer handle and sharp edges was used for pounding meat (Mandelbaum 1979:93).

Smoking pipes were made from red catlinite obtained in trade and from "a soft black stone taken out of the bed of the Battle River" (ibid.:96).

The principal habitation structure was the tipi. In the early 1800s, most people lived year-round in the skin lodges, but a few lived in log houses covered with earth (Denig 1961:117). In cold weather a liner was used in the tipi and hay was stuffed between it and the cover for insulation. "Ten or twelve people usually lived in a single tipi. The fireplace was in the center, the place of honor being behind the fire, opposite the door" (Mandelbaum 1979:89). A variety of other temporary shelters were made using branches and skins, sometimes in conjunction with standing trees (ibid.:90).

Tanned hides with the hair or fur on were used for winter garments like coats, leggings, boots, and hats. "All kinds of garmenting are very neatly wrought both on skin and cloth with silk, beads, porcupine quills, feathers, and moose hair" (Denig 1961:129).

Dogs, horses, and rafts were used in transportation. Dogs hauled meat when the group was moving. Dogs were also taken on war parties to haul extra moccasins and other gear (Mandelbaum 1979:66).

Several forms of burial were practiced: grave burials, surface log burials during winter, tree burials, and occasional tipi burials. Some burials were extended, others flexed (ibid.:150-151).

Plains Ojibwa (Bungi)

As the Plains Cree were the westernmost Cree, the Bungi were the westernmost Ojibwa. The Ojibwa are a geographically widespread ethnic and linguistic group, and although readily identifiable, were never at any time united in any political sense (Hallowell 1955:112). As with the Plains Cree, the origin of the Bungi is usually viewed as an early historic phenomenon. Haxo and Libby (1941:231) say the Ojibwa were pushing across the Red River Valley toward the Turtle Mountains in 1738. Robinson (1966:23-27) says the Ojibwa moved into North Dakota territory in the late 1700s and picked up some of the new plains oriented lifeway from the Cree. Howard (1965:14-15) says the Ojibwa gained occupancy of northwestern Minnesota during the period 1725-1775 and subsequently a nucleus of Bungi pressed westward into the Red River Valley. These early Bungi, he contends, drove the Hidatsa and Cheyenne out of southeastern North Dakota.

A much different perspective is offered by Ossenberg (1974:37). She contends that evidence from archeology and discrete human skeletal analyses indicate the Ojibwa moved into northern Minnesota during the period A.D. 800-1400. This perspective suggests the Ojibwa adaptation to the prairie-forest ecotone, and perhaps use of the Northeastern Plains, may have a long history (as it may have with the Blackfeet, Cree, and Dakota). Mooney's population estimate for all Ojibwa is 35,000 in 1650 (Parks et al. 1980:287).

The historic Bungi core area was northeastern North Dakota, including the Turtle Mountains. In the late 1700s, without horses, the Bungi were ranging far out into the Plains after bison (Howard 1965:15). They warred with the Hidatsa on the Missouri, were familiar with the Souris loop area, and ranged as far as the Rockies to war with the Atsina (ibid.:17-18). In 1832, Catlin painted a Bungi chief at the mouth of the Yellowstone.

There is mention of the Bungi combining forces with Assiniboiné and Plains Cree to attack Middle and Teton Dakota villages along the Missouri River south of the Bismarck-Mandan area (Howard 1965:23). Other traditional enemies included the Mandan and Arikara (Howard 1965:99).

Bungi social structure took the form of loose, shifting bands, usually named for the territory they occupied. The people were also divided into exogamous clans and kinship was based on cross-cousin marriage (Howard 1965:73, 98). The totemic clan system within the total body of Ojibwa in the early historic period appears to have been fully developed and quite complex (Carmichael 1981:32-33).

The total number of Ojibwa clans listed from all sources is 40. However, it was universally acknowledged by their members that most were subdivisions of five great original totemic clans which fissioned through time. These five original clans, the Crane, Catfish, Bear, Marten and Loon, thus attained the status of phratries. The Bear Phratry was the most numerous of all, being divided into many lesser clans . . . Members of the five great

phratries composed four-fifths of the Ojibwa Nation while the remainder belonged to minor gentes such as the Sturgeon, White-Fish and Black Duck clans which were not known to the tribe in general but were located in small groups on the northern boundaries of Ojibwa territory. Each phratry fulfilled various functions within the larger society, and while there was some congregation of certain clan members in some areas, members were dispersed throughout the Ojibwa territory. The clans were strictly exogamous and descent was reckoned in the male line. It was very much a corporate institution in that certain ceremonies, cult objects, and social functions were the properties of specific clans, and that particular territories were generally associated with each clan. That members from several different clans could be encountered in a single band demonstrates the tribal sodality function of the clan system.

Carmichael suggests that Ojibwa development of a corporate clan system occurred on a late prehistoric time level in response to interaction with, and pressure from, southern horticulturalists. He also suggests that the corporate clan structure may be revealed in the "core modes" of Blackduck ceramic decoration (1981:36-40).

Howard presents information on Bungi chieftainship and political organization (1965:73-76, 98). Each Bungi band usually had several chiefs, one of whom was the head chief. The head chief position was generally hereditary, going to the head chief's son. The head chief usually held office for life and could only be deposed by the tribal council. Powers of the head chief were very limited; his orders were usually obeyed only when they expressed the will of the majority. The chief was assisted in governing the band by four to 12 councilors. The council was made up of adult male members of the band. A man's status was primarily determined by his success as a warrior and a hunter. The council was the ultimate, governing body of the band.

Howard (1965:19-20) describes the Bungi seasonal settlement system:

In the autumn, hunts were organized to secure meat for the winter. Deer and elk were the common quarry in the Red River Valley territory. After the fall performances of the Midewiwin, the bands would break into small groups of two or three related families and these would set out for their winter trapping territories. Winter was a time of privation at best and starvation at worst. The approach of spring was eagerly awaited. In the spring a few hunters would join forces to hunt beaver and secure enough skins to purchase commodities needed during the summer when the fur trade came to a standstill. After the spring hunt people would gather in areas where maple and boxelder trees were available for making sugar. In the late spring, large bands would gather for trading; this was a time of feasting, ceremony, and week-long drunken orgies. Buffalo hunts were conducted in summer and winter.

Bison herd movements influenced the movements of the various bands. Bison cows were preferred as they produced the best hides and tenderest meat. Bone grease did not freeze and thus was ideal for making pemmican. The Bungi also hunted moose, deer, elk, caribou, antelope, grizzly bear, black bear, and coyotes. Caribou were sometimes found as far south as the Turtle Mountains and were also hunted. When larger game could not be located, they hunted rabbits, beaver, badger, muskrat, squirrel, skunk, and ground squirrel. They used dogs to aid in hunting bison, deer, elk, caribou, and bear (Howard 1965:23, 28-30, 38, 48). Important wild plant food resources were wild rice, berries, chokecherries, plums, *Psoralea*, maple, and box elder.

Campsites were usually selected with regard to wood and water availability. The typical dwelling was the tipi with a dewcloth/liner. Snow was sometimes piled around the outside for insulation. Beds were piles of dried grass with buffalo robes laid over them (Howard 1965:42, 80).

"In the summer, fires were built outside the door of the tipi and food was cooked there" (Howard 1965:81). A willow shade was usually set up at the cooking area. "In winter, the fire was built in the center of the lodge and a small drying rack built above it" (Howard 1965:81).

Clothing and household articles were kept in parfleches. Tanned skin bags were used. Beadwork and quillwork provided decoration. Willow baskets were made as well as willow dishes, bowls, measures, and spoons (Howard 1965:42-43).

Elk antler brow tine tanning adzes were passed down from mother to daughter as heirlooms. Bows were usually made of ash, and arrows of junberry or chokecherry. Bone arrowheads were used. Spears were sometimes used in hunting and warfare and also served as insignia. They made bison rib knives. Fully grooved stone warclub heads were fastened with wet rawhide lashing. They used fully grooved mauls. Other characteristic forms of material culture included snowshoes, pipes of catlinite or smoke blackened steatite, and a variety of carved, wooden items. Dogs were used extensively as beasts of burden (Howard 1965:43-44, 48, 109-110).

Athapaskan Speakers

Traditional Athapaskan territory is in the Subarctic and extreme Northern Plains. The Athapascans of the Central and Southern Plains and Southwest (Kiowa-Apache and Navaho) probably separated from the main body of Athapaskan speakers and migrated southward around A.D. 1500; this may have been a rapid migration via the High Plains just east of the Rocky Mountains facilitated by increase in the bison herds correlated with improving climatic conditions following the droughts of the 1300s and 1400s (Gunnerson 1979:162-163). Linguistic similarities between Sarcee, Navajo, and Apachean (Krauss and Golla 1981:84) may indicate Kiowa-Apache and Navaho fissioning from a parent stock which included Sarcee. Athapascans are a part of Northwestern Plains prehistory.

Sarcee

The Sarcee are the southeasternmost of the Northern Plains-Subarctic aggregate of Athapaskan speakers (Krauss and Golla 1981:70). Their core area in the historic period centered in the ecotone between the Northern Plains and boreal forest. They are given brief consideration here because characteristics of their culture are germane to nomadic Northern Plains hunter-gatherer modeling. Further, there are records of Sarcee visits with the Gataka (Guttacka) Apache in the Black Hills area (Hultkrantz 1968:59); there was potential for Sarcee tertiary use of western North Dakota territory.

Their core area in the 1700s and 1800s was around the headwaters of the Saskatchewan and Athabaska rivers. Territory to their north was occupied by the Athapaskan Beaver Indians, to the south the Blackfeet-proper, with Cree to the east (Jenness 1938:2-3). They were generally allied with the Blackfeet and at war with the Cree.

They appear to have been a small tribe. However, the earliest population estimates for them, all listing less than 1000 individuals, are from around 1800 (ibid.:6); the plagues of the 1700s had undoubtedly reduced their numbers considerably.

The Sarcee were composed of several bands, each containing a number of closely related families; a band "always camped together as a unit when the tribe united" (ibid.:10). Daughters belonged to their mother's band; boys over nine or 10 years of age belonged to their father's band. Band membership, however, was not rigid; "a family could temporarily hunt or travel with another band at will, and even change its allegiance permanently:

The bands, indeed, seem to have been very fluid, constant neither in number nor composition; they could arise quite naturally whenever a man had several sons, and by his success in hunting or warfare drew into his orbit one or more other families (Jenness 1938:10).

Crosscutting the bands were "societies" or associations, "to one or more of which every male Sarcee belonged at some time or other in his career" (ibid.:11).

During most of the year the Sarcee moved about their territory in groups consisting of one to a dozen families. Mobility resulted from a focus upon bison for subsistence and technological resources. In winter, groups of several families camped in wooded areas at distances of one or two days' journey apart. However, winter group aggregation for bison drives was common. In early spring, the typical multifamily groups moved out onto the Plains to hunt bison. In summer, when many buffalo herds roamed the plains,

numerous small parties, even single families, hunted separately a few miles apart. Once or twice during the summer the entire tribe united for bison pounding or jumping. In late summer, groups aggregated for berrying and various ceremonials. In September the tribe dispersed into small groups, returning to the shelter and resources of wooded areas (Jenness 1938:11-12).

Their only dwelling type was the tipi "made by wrapping from 12 to 16 tanned buffalo hides, stitched together, around a framework of from 14 to 24 poles" (Jenness 1938:13). Generally, the entry was toward the east. There was a central fireplace. Honored guests slept at the back opposite the door. The owner and his wife slept on the south side.

The least honorable position was among the storage near the door. Here lay the meat and the leather water-buckets, the woman's stone axe with which she broke dead limbs for fuel, scrapers and fleshers for dressing hides, some mauls, horn ladles, perhaps, too, the clay pot that preceded cooking vessels of iron (ibid.:13-14).

Sarcee informants said they abandoned the use of pottery vessels about the time they obtained horses (ibid.).

Clothing was generally made from elk or deer skin. Moccasins were usually made from the heavier buffalo hide (ibid.:19).

Jenness' description of variation in sweatlodge features is of special interest:

On solemn occasions they made a temple of the sweatlodge, believing that prayers uttered under its roof were more likely of fulfillment than prayers made elsewhere. For special rituals they varied the shape of the sweatlodge fireplace and the number of stones to be heated. Even the dirt moved to make room for these stones they did not throw idly outside, but carefully piled at the back of the lodge (ibid.:68).

The traditional, posthorse burial mode utilized a tree scaffold. Jenness (1938:38-39) describes a male burial. The corpse and clothing were wrapped in a bundle and placed on a high branch of a tree on a hilltop. The weapons and certain other possessions of the deceased were abandoned at this spot and one of his horses was killed, also at the foot of the scaffold tree.

Caddoan Speakers

Caddoan speakers include the Caddo, Wichita, Pawnee, and Arikara. Traditional Caddoan territory lies in the eastern part of the Central and Southern Plains. In the 1300s and 1400s, Mississippianization brought them into the Southeastern Ceremonial Cult, integrating them with other tribal and chiefdom level societies across the southern U.S. Only the Arikara are directly pertinent to the archeology of North Dakota territory, and this on a relatively recent time level.

Arikara

There is special significance associated with the Arikara in the history of American archeology:

The Arikara and Pawnee were among the first historically known groups in North America to be identified with certain archaeological sites through the use of the direct historical approach (Strong 1932, 1940; Wedel 1938). Strong's study was carried out on the Leavenworth, or Lewis and Clark site, a known Arikara village of the early nineteenth century, through which he was able to characterize late Arikara material culture in great detail (Deetz 1965:19).

The Arikara core area was centered along the Missouri Trench in South Dakota from prehistoric times until 1832. When Bourgmont visited them in about 1717, they were the downstream (South Dakota) neighbors of the Mandan and Hidatsa (Smith 1980:9), as they had probably been since the A.D. 1400s (Lehmer 1971:115). By 1770 (or somewhat later), they were pushed out of the Bad River area by Teton Dakota armed with British trade guns (Will 1924:303). Since epidemics of European diseases were

especially devastating on settled villagers, it is likely the Teton were dealing with a weakened Arikara population. The Arikara then established two villages just below the mouth of the Cheyenne River.

In 1795, Truteau observed the Arikara established in the two Cheyenne River villages and one village below the Mandan in North Dakota (Nasatir 1952). The North Dakota village, about "ten leagues below the Mandan and Hidatsa" (Will 1924:303), is the Greenshield site (320L17) (Wood 1978).

Hoffman suggests the two Cheyenne River villages were occupied during the period 1793-1797 (1972:25). In 1797, Sioux pressure again forced the Arikara to abandon their South Dakota villages (Bushnell 1922:169-170) and these two village groups moved upriver to join the other Arikara at Greenshield. This arrangement didn't last long. Charboneau told Maximillian that in ca. 1797 a force of Sioux and Arikara attacked the Mandan (Thwaites 1906, Vol. 23:229-230). Hidatsa came to the aid of the Mandan and drove off the attackers (*ibid.*).

The Arikara moved back downriver after these hostilities with the Mandan and Hidatsa and formed three villages near Mobridge, South Dakota, just above the mouth of the Grand River (Bushnell 1922:169-170). There were two villages at the Leavenworth site (39C09) and another on Ashly Island where the Arikara remained until 1832 (Krause 1972), except for a period after they were attacked by the U.S. military (Denig 1961:54-56). From late 1832 till early 1837 they lived in Pawnee country in Nebraska and around the Black Hills (Wood 1955:29-33).

In 1837 or 1838, the Arikara moved into the former Mandan village at Fort Clark (32ME2) which had just been abandoned because of smallpox. Eventually, after spending the winter of 1861-62 at Heart Village (Caldwell and Smith 1962:30), they were to combine with the Mandan and Hidatsa in a single community at Like-a-Fishhook Village (32ML2) in 1862.

Like the Mandan and Hidatsa, the Arikara appear to have been at their peak of power and influence in the protohistoric period prior to their decimation by plagues of European diseases. There are significant differences between the preplague and postplague Arikara manifested in nearly every aspect of their culture: technological capabilities and stylistics, social organization, demographic organization, and settlement pattern. Pierre-Antoine Tabeau was in the Arikara villages as a trading company emissary when Lewis and Clark arrived on October 8, 1804:

Tabeau informed them that the three existing villages were the remnants of a tribe that once had numbered eighteen villages scattered along the Missouri. He had noticed the factionalism that resulted from the presence in these villages of a large number of chiefs, each of whom headed a remnant of one of the old bands. Tabeau counted ten recognizable "tribes," plus a number of others that in some cases numbered only two or three families (Meyer 1977:39; see also Abel 1939:123-124).

There are indications the Arikara were more numerous than the Mandan in 1738 (Smith 1980:69). Lewis and Clark estimated a total Arikara population of 2000 in 1804 (Thwaites 1905, Vol. 6:88).

Intertribal relations with most of their neighbors seem to have been irregular, vacillating between friendly exchange-cooperative hunts and hostility-warfare. Relations such as these appear to have held between them and the Mandan (Smith 1980:25), middle Dakota (Meyer 1977:40), Crow (Abel 1939:150), and presumably others. Their relations seem to have been most consistently amicable with the Cheyenne. They sometimes travelled with the Cheyenne to the Black Hills where they traded corn and tobacco with other Plains tribes (Meyer 1977:40).

Turning to social organization:

According to Holder's (1951:60-62, 1958:214-215, 1970:56-57) analysis, the household (earth lodge) unit consisted of a matrilineal, matrilocal extended family of three generations depth. The household unit averaged 15-20 persons (Berry 1978:61).

Polygyny was typical in the early 1800s (Meyer 1977:74). Ember has demonstrated the high correlation between polygyny and a high male mortality rate in warfare (1974). However, prior to depopulation they held military supremacy in their territory. Warfare related male mortality would not have been so great, and more marriages were probably monogamous.

According to Holder (1951:44, 1970:35), the basic unit of speech, tradition, and custom among all the Caddoan peoples was the village. There was a tendency toward village endogamy (Holder 1950:72, 85). While there was a Caddoan tendency to form pan-village political units . . . there is little or no evidence of the formation of supra-village political confederations among the Arikaras (Holder 1951:42-43, 1970:34-35) (Berry 1978:61).

Parks et al. (1980:287), however, refer to the Arikara as a band confederacy. Each village was equivalent to a band and there was no recognizable clan system (Meyer 1977:72). "Arikara society appears to have been stratified into two nascent social classes: nobility and commoners; slaves were also present in these villages, but their position and importance within the social structure is uncertain (Holder 1951:45, 1958)" (Berry 1978:61). There was internal stratification within the two social classes, and the foundation of the social order was set in religious sanctions (Holder 1951:47). "Within the system there was heavy emphasis on payment for the receipt of goods, services, and knowledge (Holder 1951:47)" (Berry 1978:61-62).

The subsistence-settlement pattern was an annual cycle involving spring-summer band aggregation at the principal village, and fall-winter fissioning into subband segments away from the principal village.

For the late protohistoric and early historic periods, Wesley R. Hurt (1969) has divided the Arikara year into five periods of seasonal economic activities: the spring planting season (March-May), the summer hunt (June-July), the harvest season (August-October), the fall hunt (November-December), and the season of varied economic activities (January-February). While much of this seasonal cycle and settlement pattern is no doubt applicable to earlier periods of Arikara history, there is also much that has changed.

At the beginning of the spring planting season, the Arikara bands returned from their scattered winter encampments to the summer villages adjacent to their fields in the river bottoms (Hurt 1969:32). Gardening was the task of women. The Arikaras grew maize, pumpkins, beans, sunflowers, several varieties of squash, and tobacco (Thwaites 1904-05, I:188). Fields varied "from a half to one and a half acres, which are separated from each other by brush and pole fences of rude construction" (Ewers 1950:202; see also Will and Hyde 1917:64-65). The women also planted small, enclosed gardens near the earthlodges (Thwaites 1904, VI:116) (Berry 1978:51-52).

In any given year, there was a risk of crop destruction from drought or floods (Ewers 1950:202), and Tabeau (Abel 1939:149) reports that floods destroyed the field of two of the three Arikara villages in 1803 (Berry 1978:53).

The corn usually produced about 20 bushels per acre. There were many rites and ceremonies attendant to the planting and other stages in the production of the crop (Denig 1961:45).

If conditions were similar to those of the historic period, at this time of year the men were engaged in collecting firewood, hunting near the village, and retrieving from the Missouri any buffalo which had drowned upstream the previous winter (Abel 1939:74-75; Ewers 1950:205) (Berry 1978:53).

As soon as the spring planting had been completed, the main body of the band left for the prairies to follow the buffalo, leaving only the old people behind to guard the villages (Abel 1939:74; Hurt 1969:34) (Berry 1978:56).

Since it was the habit of the buffalo to return frequently to the major watercourses, it is likely that Arikara hunting parties traveled along these tributaries of the Missouri in search of them. It is also possible that they established semi-permanent base camps, perhaps like that described by Cooper (1958) for the Mandans on the Heart River (Berry 1978:57).

The harvest season began in early August, when the green corn was picked (Ewers 1950:202). Crops were kept in cache pits within the houses, as well as in well-hidden field caches, where food was stored for the following spring (Ewers 1950:202-203). It was during the harvest season that the Teton Dakotas and the other nomads came to the villages to trade buffalo meat and hides for agricultural products (Abel 1939:131). The end of the harvest season brought a return to hunting (Berry 1978:58).

Ewers (1950:204) and Denig (1961:48) discuss a winter hunt pattern for ca. 1800. Groups would set up tipi camps within 24-65 km of the earthlodge villages. They would pass the winter hunting, sometimes jointly with Sioux hunting parties. In early spring, they would return to the earthlodge village with cured meat (dried) and green hides to be worked. The pattern of remaining close to the earthlodge village is probably another late characteristic resulting from depopulation and concomitant loss of military supremacy over much more extensive territory.

While it appears that some of the Arikaras remained out hunting all winter, others retired during the coldest winter months to dispersed winter villages in the river bottoms, which were sheltered from the wind and provided wood for fuel (Hurt 1969:34-35) (Berry 1978:59).

Antelope hunts provided meat, skins preferred for certain items of apparel, and other technological resources. When a herd of antelope attempted to cross the Missouri, as many as 400 could be killed in a single hunt. Hunters stationed on opposing banks would prevent the animals from crossing, keeping them frenzied in the water. After the antelope had tired from the ordeal, the Arikara would kill them in the water (Abel 1939:78).

Fishing was ordinarily of limited importance. They fished with traps and by hook-and-line (Denig 1961:49).

The historic Arikara earthlodge is similar enough to the Mandan-Hidatsa form that the reader is referred to that section for description. Denig (1961:43-44) provides good, specific details for Arikara earthlodges.

Typically, summer villages were situated on the river terraces and were composed of an average of perhaps thirty-five haphazardly arranged houses (Lehmer 1971:141). There are indications that the irregular placement of the earthlodges within the village was done intentionally for reasons of defense (Berry 1978:55).

In historic times, there seems to have been a chronic shortage of timber along the Missouri downstream of the Mandans, for Truteau (Beauregard 1912:22) reported in 1795 that only driftwood was used for construction and fuel (Berry 1978:53).

Dogs were used for transporting goods and materials. The horse enhanced this capability by the early 1700s. "Battiste Good's Winter Count represents Dakota groups bringing back Omaha horses in 1708-09, Assiniboine horses in 1709-10 and 1717-18, and Arikara horses in 1718-19 (Mallery 1893, I:295-97)" (Berry 1978:65). Like the Mandan and Hidatsa, they also used bullboats (Denig 1961:51).

Study of historic and prehistoric Arikara and other Plains Village ceramics is a specialized field with a considerable body of literature and unpublished information. The Deetz (1965) study of change in protohistoric Arikara ceramic stylistics is controversial, yet classic. The great body of ceramic information which resulted from the River Basin Surveys work in the Missouri Trench in South Dakota was pivotal in developing a fairly sound reconstruction for 400 years of Arikara culture history (Lehmer 1971). Late in their history, they made "a very hard but very coarse pottery which stands heat well and suffices for all their cooking" (Abel 1939:149).

The focus of the religious system was the sacred personal and tribal bundle, "a sort of portable ceremonial center" of Mississippian origin, which served as the "basis for the control of production and social relations within the villages" (Holder 1951:47, 1958:213, 1970:42) (Berry 1978:62).

Historically, they buried their dead in graves (Meyer 1977:76).

Siouan Speakers

The Siouan speaking people for whom there is documented use of North Dakota territory possessed a variety of subsistence economies. Their subsistence was derived about equally from gardening and hunting. The Crow, Teton Dakota, and Assiniboine were hunter-gatherers. The Mandan and most

Hidatsa were horticultural hunter-gatherers. The Middle and Santee Dakota were hunter-gatherer-gardeners, deriving most subsistence resources from hunting and gathering, and a small amount from gardening. These subsistence characterizations are for the 1800s, the period upon which most ethnographic accounts are focused. Working back into the prehistoric period, these characterizations break down at different times for the different groups. It is important, however, to consider the hunter-gatherer-gardener adaptation because this subsistence strategy may provide the most appropriate information base from which to derive analogs for evaluating some Woodland occupations in North Dakota.

All of these Siouan speakers moved into North Dakota territory from the east and southeast. Hollow and Parks (1980:80) feel glottochronology supports an interpretation that the Mandan and Dakota have been separated for ca. 1600 years and the Hidatsa separated from the Dakota ca. 2100 years ago. Some moved here, or through here, because of territorial pressures generated by Euro-Americans, or the introduction of European weaponry to neighboring, hostile native groups. Some moved because of intragroup conflict and fissioning. Some moved because of native intergroup conflict in combination with climatic conditions favoring movement. The extent of historic territorial shifts was unusual, but probably not unique in the histories of any of the groups.

Mandan and Hidatsa Horticultural Hunter-Gatherers

There is a great amount of ethnohistoric and ethnographic information of archeological interpretive value on the Mandan and Hidatsa.

The amount of published information on the Three Tribes is immense. Because of their relative accessibility, they were visited frequently by travelers on the Missouri throughout the nineteenth century, and . . . they were the subject of special interest on the part of many of these visitors. Lewis and Clark, George Catlin, Prince Maximilian, Father Pierre De Smet, Lewis Henry Morgan, Washington Matthews the list of those who wrote extensively of these tribes when their aboriginal culture was still largely intact could be extended much further (Meyer 1977:xii).

Ethnographic work by Gilbert Wilson, Robert Lowie, Alfred Bowers, and others during the period 1900-1930 salvaged volumes of traditional information. Fortunately for the Middle Missouri archeologist, these ethnographers usually paid attention to, and often focused on, material culture.

Because of the relatively recent demise of traditional Mandan and Hidatsa villages, and the importance and strength of native oral traditions:

. . . it is possible to identify many sites with the organized village groups who lived there. For this area we also have the information of native informants whose continuous residence for long periods in the area is part of the traditional lore connected with numerous village sites and other landmarks (Bowers 1948:15).

The Mandan and Hidatsa (called "the Sioux who go underground" by the Cree) are considered together here because their societal structures, territories, and material cultures were similar and stand in contrast to all other groups of the area excepting the Arikara from the south. Archeologists are usually unable to distinguish between Mandan and Hidatsa sites on the basis of material evidence, and "it has become customary to speak of a common Mandan-Hidatsa culture" (Meyer 1977:xi).

The following sketch focuses on technology and social organization. However, it is important to remember that "religion, defined as a belief in the dependence of supernatural beings or forces, pervaded every aspect of life" (Meyer 1977:76).

Both the Mandan and Hidatsa were in North Dakota territory in prehistoric times. The origins of some of the basic characteristics of both societies can be traced back to Mississippian/Oneota cultures centered in northern Iowa and southern Minnesota during the period A.D. 1000-1300, but many of these characteristics may have developed in the Northern Plains as a result of intergroup interaction. Both are Siouan speakers, but the languages are mutually unintelligible. Wood (1967:3) feels the emergence of the historic Mandan culture can be safely traced to about A.D. 1500 when it developed "under the impact of trade and contact with (1) sedentary village peoples from the Central Plains, and (2) adjacent pedestrian nomads."

The Mandan recognize three dialectic groups which they believe developed as a result of the dispersal of the early population from South Dakota territory while migrating to the Heart River-Missouri River confluence area. The population in late prehistoric times was represented by the Nuptadi (or east side Mandan) and Nunitadi (or west side Mandan). In the early 1700s a third group, the more diverse Awigaxa Mandans, moved northward from the Grand River region and the tributary stream flowing eastward from the Black Hills; the Awigaxa lived north of the Heart River and were absorbed by the Nunitadi (Bowers 1948:171; 1950:14-15). Figure 8 reproduces Bowers' (1948) reconstruction of principal Mandan, Hidatsa, and Crow migrations to A.D. 1700 based on oral tradition and archeological information. Bowers' interpretations of group movements are presented below, however his interpretations are not uncontested by contemporary researchers.

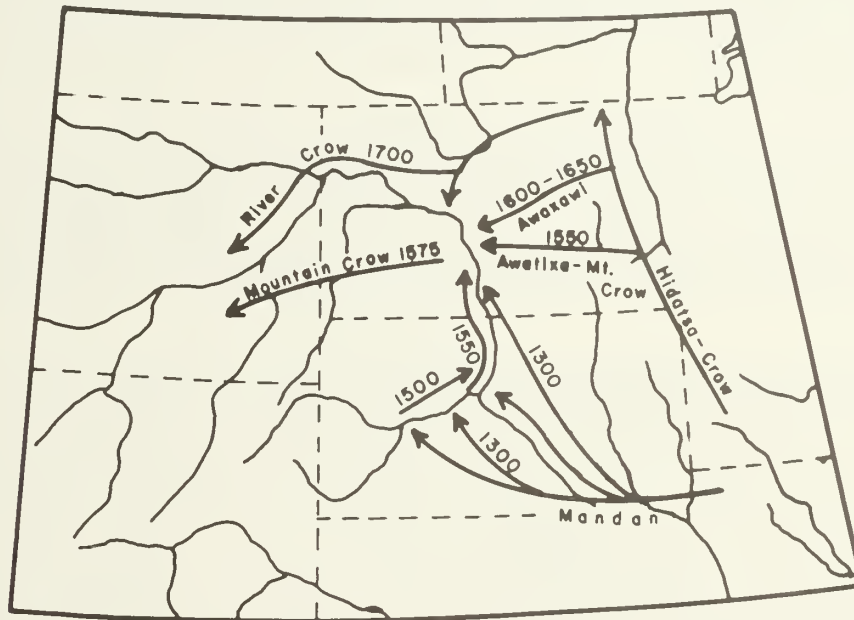


Figure 8. Some Mandan, Hidatsa, Crow population movements generalized from Bowers (1948).

David Thompson in 1797 was one of the first to distinguish the Hidatsa from the Mandan; he did so on the basis of linguistic and minor cultural differences (Bowers 1965:476). Traders assigned the tribal name "Hidatsa" whereas the people themselves used the term "Hidatsa" to identify only the inhabitants of the largest village community situated on the north bank of the Knife River (32ME12, the Big Hidatsa site) (Bowers 1965:2).

The Hidatsa tribe was composed of at least three village groups, excluding the Crow, between which there were minor linguistic and cultural differences: Hidatsa-proper, Awatixa (both called Minnetaree), and Awaxawi (also called Amahami or Saultier) (Bowers 1948:16; 1965). The traditional Hidatsa territory was from the Red River westward to the headwaters of the Sheyenne and James rivers, the Turtle Mountains, the southern loop of the Souris, on to the Missouri, up the Little Missouri to its headwaters, and up the Yellowstone to the Powder River (Bowers 1965:22).

The first to arrive on the Missouri River in North Dakota were the Awatixa, a horticultural, earthlodge dwelling people who had formerly lived along the Red River and such tributaries as the Sheyenne. They may have arrived on the Missouri as early as 1550 and moved quickly to the mouth of the Knife. The Awatixa seem to have had a richer ceremonial structure than the more nomadic Awaxawi and Hidatsa-proper (Bowers 1948:186); they also had closer ties with the Mandan than did the other Hidatsa (Ahler and Weston 1981:8; Bowers 1965). Part of this first group of Hidatsa immigrants soon separated from the main body, continued westward, and eventually became the Mountain Crow.

The second element to reach the Missouri was the Awaxawi, probably in the 1600s. The Painted Woods/Square Butte area was their traditional territory on the Missouri (Ahler and Weston 1981:9; Bowers 1965); the large Painted Woods bottoms were admirably suited for winter camps (Bowers 1965:40).

The Hidatsa-proper came to the Missouri River even later. Before the 1781 epidemic they were comprised of a loose association of closely related bands that ranged northward along the Missouri and lower Yellowstone, the Little Missouri, Mouse River, Turtle Mountains, and Devils Lake region (Bowers 1965:26). They moved first to temporary camps near the Mandan in the Heart River area, and then moved upstream north of the Knife River by agreement with the Mandan and other Hidatsa (Bowers 1948:19). "The River Crow separated from the Hidatsa-proper at about the time of their collective arrival on the Missouri River or a little later, in what was apparently a slow process over a long period of time (Wood 1980:35; Wood and Downer 1977)" (Ahler and Weston 1981:10). The movements of the Awaxawi and Hidatsa-proper coincided with the introduction of firearms to the neighboring Cree, Ojibwa, and perhaps Assiniboin (Meyer 1977:10-11).

In 1738, at the time of La Verendrye's explorations into North Dakota territory, the Hidatsa-proper had just abandoned their easternmost territory in the vicinity of Star Mound, Manitoba, under pressure from the Ojibwa (Haxo and Libby 1941:231). They still held possession of the Devils Lake area and the general area south and west of the Souris loop (ibid.). They had three earthlodge villages at Star Mound, two marked by well defined boulder effigies of turtles (ibid.). There are also earthlodge village sites at the northern edge of the Turtle Mountains, and they had an earthlodge village on Graham's Island in Devils Lake (ibid.:232, 237).

Mandan-Hidatsa population densities probably peaked during the period 1600-1750. For this period Bowers (1950:14) estimates 7000-8000 Mandan with a total Mandan-Hidatsa population of 12,000.

Ceramic data suggest a major plague occurred about 1750, "well before the first well-recorded smallpox epidemic of 1780-81" (Ahler and Weston 1981:i). There are currently no estimates for the population losses attributable to this early plague. Big White said there were seven villages in 1757 when he was born at Slant (Fort Lincoln Village) (Will 1924:306). In 1773 they had 9-13 villages according to Mackintosh (Will 1924:306). The 1781 smallpox epidemic reduced the population by 50% or more. The Sioux then destroyed the decimated Mandan villages at the mouth of the Heart River and "sent the survivors fleeing up the Missouri" to the protection of the Hidatsa (Meyer 1977:27). The three Hidatsa and nine or more Mandan village groups reorganized for mutual defense at the Knife River villages. The Mandan formed two villages here (Metutahanke and Ruptare) in which they resided when Lewis and Clark visited. Certain of the Hidatsa who were accustomed to periodically break up in small hunting groups and abandon horticulture were less affected by the 1781 plague because dispersed populations and infrequent contacts act to retard or stop the spread of contagious disease.

In the 1837 plague the Mandan were reduced from 1600 to about 125 people (Abel 1932; Meyer 1977:97). The Hidatsa lost about half their population, being reduced to about 1250. So, from a very realistic Heart River phase population peak of about 12,000 Mandan and Hidatsa, they were reduced to about 1375 individuals by 1837.

Certain anthropologists stress the importance of intertribal contact and trade focused at the major villages as fundamental to the development of Mandan and Hidatsa culture (e.g., Wood 1967; 1972). Wood suggests the Mandan population center at the Heart-Missouri confluence was established at that location for trade purposes. The "valley of the Heart served as a natural route of travel for the nomads to the west" (Wood 1967:16). Evidence for long distance trade has been recovered from nearly all the major village sites in North Dakota for the entire period of Plains Village occupation. By 1700 the Mandans received "obsidian from the Yellowstone Park region, native copper from the Great Lakes area, and conch shells (or artifacts made from them) from the Gulf Coast" (Meyer 1977:15-16). *Dentalium* and *Olivella* were brought to the villages from the Pacific coast; the varieties of tobacco grown by the men may also have derived from the Pacific coast (Wood 1967:19-20). In the 1700s:

The Mandans were located at the nexus of three trade routes. From the west the Crows brought goods they had obtained at the Shoshoni rendezvous in southwestern Wyoming, where the Shoshonis traded with the Nez Percés, Flatheads, and Utes. From the southwest, by way of the Kiowas, Comanches, and later the Cheyennes and Arapahoes, they

received goods of Pueblo and Spanish origin. And from the Crees and Assiniboin in the northeast they obtained firearms when these began filtering from the English and French (Meyer 1977:16).

In addition to long distance trade, there was long distance travel. The Hidatsa have "numerous traditional accounts of expeditions far into the eastern woods or into the valleys of the Rockies" before the horse (Bowers 1965:212-213).

La Verendrye in 1738 observed a prehorse situation. Two men left in the villages as observers during the period December 1738-September 1739 reported that at the beginning of June every year representatives of various Plains tribes came to the villages to trade hides for garden products. This trade was a beneficial enterprise for both the villagers and the visitors. In addition to this sort of trade, hundreds of families from neighboring tribes would come to visit in the villages and stay for a month or so. Corn, meat, fat, dressed robes, and bearskins were described by La Verendrye as the "currency of the region" (Smith 1980:60, 98). Intratribal and intertribal contacts, both economic and social, were most numerous in the warm season (Bowers 1965:47).

In contrast to this background of active intertribal trade, there are examples of hostilities and warfare between the villagers and *all* of their neighbors. The Awaxawi and Hidatsa-proper warred with the Shoshoni to the west (Meyer 1977:43). The Cree and the Assiniboin made war on the villages and captured children (Smith 1980:25). The Ojibwa routed the Awaxawi and Hidatsa-proper out of their homelands to the northeast. In 1738, as well as many times earlier and later, the Mandan were at war with the Arikara (Smith 1980:57). After the villagers had suffered dramatic population reductions from plagues, the Sioux were a constant and deadly menace.

Frequent intertribal conflict and constant, successful intertribal trade would seem to present a paradox. However, trade and conflict were not irreconcilable patterns of interaction. A system of family adoption between trade partners was developed which insured intertribal trade even during periods of hostility (Wood 1972:162). Individual, ritualized, trade partnerships suggest that this trade-conflict problem was one with a long history in village-nomad and village-Woodland intergroup relations.

Mandan households were made up of one to three matrilineal, matrilocal, sometimes polygynous extended families (Wood 1967:13), although multilocal postmarital residence became important after epidemics hit (Hanson 1983c). Related families tended to live near one another within the village (Bowers 1950:28). The household was the smallest economic unit in society. Sexual division of labor required that men were responsible for most of the work away from the lodge and gardens; women were responsible for most of the work in and around the lodge and gardens. Men hunted and warred. Horticulture, food handling, and the maintenance of the lodges were women's tasks. The women of a household collectively owned the lodge and garden equipment, the garden produce, whatever game the men killed, and the dogs, mares, and colts. The men owned their weapons, personal possessions, and the stallions and geldings (Meyer 1977:75).

The villages of the Mandans may be regarded as constituting a tribe because (1) they shared common social and ceremonial organizations, (2) clans extended throughout, and thus linked, all the villages, and (3) the entire population was classed as relatives and were treated as such (Wood 1967:12).

Both Mandan and Hidatsa had named, matrilineal, exogamous, nontotemic clans. The clans of the Mandan, Awaxawi, and Hidatsa-proper were divided into two, exogamous, unnamed moieties; the Awatixa clans were not divided into moieties (Bowers 1948:186-187). The exogamous character of the moieties broke down after the 1837 plague (Meyer 1977:73). The moiety concept was of less social and economic importance among the Hidatsa than among the Mandan (Bowers 1965:78).

The Mandans claim originally to have had 13 clans, but six of these disappeared after the 1781 epidemic and three more after the 1837 epidemic (Meyer 1977:72). Bowers (1948:187) was able to document a seven clan system for the Awaxawi and Hidatsa-proper, but since this information was collected in 1930 to represent the situation in the mid-1800s, it is likely clans were more numerous before the plagues. The Awatixa originally had 13 clans (Bowers 1948:186).

The clan and moiety systems acted to integrate these societies. The population of the various villages "had a feeling of kinship dating far back into the mythological period when the first clan and moieties

were founded by the culture heroes" (Bowers 1948:179). The clans "helped forge a sense of unity within the individual tribes, transcending village loyalty" (Meyer 1977:73).

"Another integrating force in Mandan-Hidatsa society was the system of age-grade societies, which cut across clan lines and mitigated the potential divisiveness of the clan system" (Meyer 1977:73). There were seven to 10 such bodies for the Mandan men and four for the women. Age grade societies were characteristic of all villages (Bowers 1948:178). They played an important role in setting up standards of appropriate behavior for each age group (Meyer 1977:73).

While there were defensive alliances, mutual provisioning, and potentially a high development of intervillage cooperation (Bowers 1948:177), political allegiance was first to the clan, then to the village, and then to the tribe. "Even such loyalty was less than unwavering, for families could readily pack up and move to another village" (Meyer 1977:71-72).

The political system of the Mandans was "an oligarchy of bundle-owners, two of whom were selected as chiefs" (Meyer 1977:72). One skilled at resolving internal disputes and displaying generosity and wisdom was the village or peace chief; the other was the war chief (*ibid.*). Their tenures were dependent upon the merits of their performance. There was some tendency for the chieftainship to be hereditary. Authority was further diffused by the practice of choosing other "individuals for leadership roles in the various ceremonial and other activities" (*ibid.*). Success in war was the key to social and political advance in one's community (*ibid.*:70).

Subsistence was obtained about equally from horticulture and hunting, with minor reliance on fishing and food gathering. Horticulture focused on four major crops: corn, beans, squash, and sunflowers; several varieties of each were raised (Meyer 1977:63). Garden plots were in the vicinity of the summer village at the base of the terrace, on the bench at the rear of the village, and on the adjacent stream valley bottoms (Will and Hyde 1917:50). They ordinarily cultivated 0.1-0.4 ha per person in the village (*ibid.*:102). Near the women's gardens the men often had small tobacco gardens (*ibid.*:108).

Planting time was from early May till the time when the roses bloomed in June. Rows of corn were alternated with rows of beans. After the crops were well started and had been cultivated several times there was usually a major bison hunt. The hunt was ended before harvest time (Will and Hyde 1917:110). During the end of summer when the ears were beginning to ripen, there was usually someone present in the fields all day to ward off the blackbirds and crows (Will and Hyde 1917:88, 93-94).

Harvest began in early August when young squashes were harvested, sliced, and dried. At about the same time, the green corn season marked a time for rejoicing and feasting. While much green corn was eaten immediately, other was parboiled, dried in the sun, and shelled from the cob to be stored (Will and Hyde 1917:115, 116, 118). Harvesting was the dominant village activity during late September and early October. Excepting crop failure years, most village activities were subordinate to harvest activities during this time (Will and Hyde 1917:124).

Ripe corn was braided in strings and carried to the village where it was hung on the drying scaffold adjacent to the lodge. Some corn was stored in the braided strings, other was threshed and stored in skin bags, parfleches, and cache pits. Beans, squash, sunflower seeds, and often dried meat and fat were also stored in the cache pits (Will and Hyde 1917:128, 133, 138). The Hidatsa "did not normally rely heavily on the garden products for winter subsistence" but endeavored to "save their produce for use while at the summer village" (Bowers 1965:59).

Sunflower seeds were dried, then parched and ground to powder (Meyer 1977:66). Grinding was done on small stone metates or in large wooden mortars (Will and Hyde 1917:169). Mortars were also prepared by setting a piece of buffalo bull rawhide in a hole and allowing it to harden (Wilson 1924:270). A provident household would save out enough seed corn for two years' planting in case of crop failure (Meyer 1977:65).

Dried green corn was usually boiled with beans, squash, pumpkins, fruit, and the roots of certain wild plants. Roasted green corn was often flavored with buffalo fat, marrow, or bone grease (Will and Hyde 1917:148, 152). Alkali salt was collected and used to season food (Wilson 1924).

Bison were an important subsistence and technological resource and were hunted throughout the year. Surprisingly, dead bison retrieved from the Missouri during the spring thaw were preferred to fresh

meat (Wood 1967:21). Summer, fall, and winter communal hunts appear to have been equally important; there were also spring hunts (Bowers 1965:61).

The Hidatsa relied heavily on winter buffalo migrations onto the river bottoms both for their primary source of food during the winter months, and for a surplus to carry them through the spring months when they were engaged in agricultural pursuits. Frequently the winter herds did not come onto the river bottoms, especially when the season was mild. Then the winter camp suffered. [If the herds did not appear] the population divided into smaller hunting groups to seek other game such as deer and elk in the undisturbed wooded areas (Bowers 1965:58-59).

According to traditions, corrals were widely used in earlier times and, prior to the adoption of horses, each village group and one or more corrals situated near both the summer and winter villages. If corralling buffaloes during the summer, the corrals were usually built near the Missouri at those points where the herds usually crossed from the eastern range to the west banks during the late summers when the waterholes and sloughs had dried up. For winter corralling, the pens were situated near the winter villages on tributary streams. Any sharp bank with a flat area extending back from the cliff made a suitable spot for the corral, particularly when the flat land narrowed toward the river bank. It was important that the cliff over which the animals run was precipitous enough to prevent the animals from climbing back out (Bowers 1965:446-447).

A bank 3.0-4.5 m high was sufficient. Eight piles of stones were placed in a funnel shaped arrangement reaching up to the entrance to the corral (Bowers 1965:446-448).

Surrounds were also employed. In prehorse days, the surround required a communal effort. After the horse was in use, fewer participants were needed. In the mid-1800s, mounted hunters still preferred the bow and arrow over the rifle for killing bison (Wilson 1924:232). Individual or team stalking of solitary animals or small herds was also a frequent occurrence throughout the year.

Antelope were second in importance to bison. They were ordinarily driven in large groups into enclosures in a manner similar to bison (Bowers 1965:449) and killed with stone clubs (Wood 1967:21).

Hunted in addition to bison, antelope, elk and deer were nearly all other mammals and birds: an occasional bear, bighorn sheep, beaver, porcupine, badger, prairie chickens, rabbits, ducks, geese, and wading birds such as whistling swan and whooping crane (Will and Spinden 1906:120; Wilson 1924; Wood 1967:21). Catfish (Bowers 1950) and sturgeon were obtained by means of traps. Small fish, turtles, snails, and occasional shellfish were also eaten (Meyer 1977:65; Will and Spinden 1906:121). Young boys, off for the day pasturing and guarding the horses, often hunted gophers or blackbirds which they cooked and ate at their campfires (Wilson 1924:155).

Gathering of plant foods may have been important, but it contributed little in terms of volume to the total amount of food consumed; perhaps berries were most important (Driver 1961:27). They made extensive use of chokecherries, buffalo berries, and wild plums (Meyer 1977:65). They also used wild rice (Bowers 1948), wild rose (Wilson 1928), and prairie turnip (Bowers 1948; Reid 1977).

Apparently most cooking and drinking water for the summer village came from the Missouri River or nearby tributary streams. It was hauled in paunch buckets and probably ceramic vessels as well. In winter they would melt snow for water by the stone boiling method (Wilson 1924:225).

Hunting also generated a large quantity of technological resources. Animals killed for their hides alone included wolves, foxes, ermine, bobcats, raccoons, coyotes, and mountain lions. Wolves and foxes were trapped in pitfalls which were dug to a depth of 2.5-3.0 m, covered with branches, and baited with pieces of buffalo meat. Beaver and other small fur bearing animals were trapped (Will and Spinden 1906:120-121). Golden and bald eagles, great horned owls, and crows were trapped for feathers and bone (Wilson 1928; Wood 1967:7). Buffalo hide characteristics vary seasonally; winter hides usually have more fat on the inside and thicker hair on the outside.

The hides obtained during a summer hunt were used for tent skins, for parfleches, bags, and rawhide ropes, but never for robes; while those obtained on the winter hunt were tanned for use as robes, bed coverlets, bedding, and winter moccasins (Wilson 1924:291).

There are certain, broad patterns of seasonal activities which most people of most villages followed most of the time. There are also a great number of ethnohistoric and ethnographic accounts of deviations from the broad patterns. The focus here is on patterns from the period before the epidemics. After severe population reduction, the villagers were not free to greatly subdivide the summer village groups for wintering or otherwise carry out small group ventures away from the main body of their people. The military superiority and hostility of surrounding nomads mitigated against travelling great distances in accord with traditional patterns (Bowers 1965:45).

People were concentrated in the summer villages in May and June when effort focused on gardening. The summer hunt came during a period of about a month before harvest. Older women, smaller children, and enough older men to fight any prairie fires were left behind by the Hidatsa (Bowers 1965:50). For the Mandan, there is no record of the whole tribe abandoning the villages and crops to go on summer hunts; it was uncommon for even large groups to forsake the crops for an extended period of time (Will and Hyde 1917:92).

The Hidatsa would customarily go out 150-320 km from the village for the primary purpose of hunting, curing meat, and securing hides (Bowers 1965:50). They sometimes hunted up the Missouri, but more often went "to the southwest of Knife River between the Killdeer Mountains and the Black Hills;" they frequently went to the same place each year (Bowers 1965:51, 53). The Mandan and Hidatsa considered the Little Missouri territory a very good hunting region since no tribes lived there permanently; Mandan hunting expeditions to the Little Missouri and its headwaters were a regular occurrence (Bowers 1948).

As the summer hunt group moved along, stationed out of temporary tipi camps, young men were permitted or encouraged to "go out to hunt small game such as antelope, deer, and elk or even to surround a small herd of buffaloes" (Bowers 1965:53). Women would "dig wild turnips or pick Juneberries and chokeberries whenever the quantity of these foods warranted the delay" (ibid.). While some ceremonial activity went on during the summer hunt, this was primarily an economic activity. This contrasts with the equestrian nomadic pattern where aggregating for summer hunts was a time for reorganizing tribal structure, selecting new chiefs, and joining military societies (Bowers 1965:56).

The men killed and butchered and brought meat to the camps where the women cut and dried it on scaffolds. People returned to the summer village before the corn had developed to the point the young ears were edible (Bowers 1950:88-90).

Gardening, harvesting, feasting, food processing, and food storage were important activities from early August to early October, after which the summer village groups were often subdivided into winter groups. For the Hidatsa:

In the fall, after the garden products had been stored away, the population of any of the summer villages would disperse into several groups to seek shelter on the Missouri or one of its tributaries. There, under the leadership of an eagle-trapping bundle owner, eagles and other birds were caught until ice began to form along the edges of the streams. If the crops were poor, they usually remained in the eagle-trapping camp until spring, depending on the hunt, and returning in the spring by bullboat, floating down their lodge goods, dried meat, and hides (Bowers 1965:57).

It was not unusual for Mandan groups also to camp for the winter in sheltered areas near the headwaters of the Little Missouri (Bowers 1948:167-168).

Some groups would return from fall eagle trapping and hunting to reside in lodges at a winter village near the summer village. Perhaps the concentration of fall hunting activities far to the west of the villages relieved hunting pressure in the proximity of the winter villages and allowed game populations to develop in relatively undisturbed conditions, thus enhancing prospects for successful winter hunting.

Winter camp sites are exceedingly difficult to find even when taken to the actual locations by older informants who lived there. These were temporary sites located in the heavy timber for protection from the storms. The wood was used for lodges, fuel, and feed for the horses. The site was selected solely on the basis of the wood supply and observations that the buffalo sought shelter there during the colder months. The lodges were neither large nor carefully constructed, and the eagle-trapping lodge was of common use (Bowers 1965:56-57).

Wilson (1924:231, 253) relates an account of six Hidatsa men and their wives on a spring hunting trip during the mid-1800s. They traveled up the Missouri, staying close to the river. They spent 10 days at one transient camp and just one night at others. In prehorse times it was customary for younger married people to leave the village for awhile any time of year to hunt and cure meat (Bowers 1948).

The tool industries of the villagers displayed many similarities with those of neighboring groups on the Northern Plains. There were chipped stone, ground stone, bone, wood, antler, horn, and shell tool industries.

There is very little coverage on chipped stone toolmaking or use in either the ethnohistoric or ethnographic coverage of the villagers. Among the Mandan:

. . . arrowmakers were highly regarded. Although all males usually made arrows, some were employed specially for arrowmaking. These were the older men of the lodge who had passed the prime of life and others who, having been crippled either in warfare, hunting, or other active pursuits, were unable to carry out the work normally performed by men. The older men of the lodge usually made the arrows used by the men of the household, and ten arrows complete with heads and feathers have the value of one unpainted robe. Young men of the lodge paid the older men for the right to learn the techniques of arrowmaking (Bowers 1950:92-93).

The ground stone industry produced items such as metates (Will and Hyde 1917:169), grooved mauls, axes, hammers, shaft smoothers, celts, beads, scoria hide grainers (Bowers 1948), pigment, pipestone items, scoria whetstones (Will and Spinden 1906), and pestles (Wilson 1934). The bone industry generated scapula hoes, shaft wrenches, slotted knife handles, elk metatarsal fleshers, spatulas, knapping tools, projectile points, beads, awls, knives, fishhooks, wristlets (Bowers 1948), bison humerus hide grainers (Wilson 1924:283), scoops and ladles (Will and Hyde 1917), whistles (Wilson 1928), stakes, pegs, pins, and much more.

Lowie (1954:61) states that woodworking was an "undistinguished" craft among Plains Indians, though the skill shown in fitting the posts and beams of earthlodges commands respect. Woodworking may not have been distinguished, but it certainly was very important. Buffalo Bird Woman describes the fire hardening process for digging stick tips: grease well with bone butter, wrap in grass, and fire harden (Will and Hyde 1917:88). Wooden mortars were fashioned by burning out with coals (Will and Hyde 1917:170). Baskets were made from box elder inner bark (Will and Hyde 1917:166). Their twilled plaited, carrying baskets were highly distinctive (Lowie 1954:59). Bows were made of elm or ash; the strings were made of twisted sinews (Meyer 1977). Other products of the woodworking industry include construction elements for all forms of lodges and drying stages, palisades and bastions, bullboat frames, boat paddles, log rafts, bowls, snowshoes, arrowshafts, cottonwood and birch travois poles (Wilson 1924:216-220), hardwood skewers, willow with lashing (Wilson 1924), burial scaffolds, ash and junberry stakes and pins (Wilson 1924:243), catfish traps (Bowers 1950), and the sacred cedar post in the Mandan village ceremonial center (Bowers 1950).

The antler industry generated rakes for gardening (Will and Hyde 1917:88). Bows were sometimes made of antler and reinforced with sinew (Meyer 1977). Other bone products included projectile points, wristlets (Bowers 1948), scraper hafts, and saddles (Wilson 1924).

The horn industry produced sheep horn spoons (Will and Hyde 1917:120), bison horn spoons and ladles (Will and Hyde 1917:166), horn core hoes (Bowers 1948), and powder horns (Wilson 1928).

The shell industry generated mussel shell scrapers (Will and Hyde 1917:123), paint dishes, scoops, pendants, and beads (Bowers 1948).

Materials were transported by people in bullboats, packed on dogs and horses, and dragged by dogs and horses on travois. The Hidatsa in the 1800s selectively bred their dogs by keeping only the larger pups from each litter. An average dog could haul 36 kg and a good dog could haul 45 kg (Wilson 1924:208, 227). In comparison, an entire dressed and butchered buffalo could be loaded on a horse (Wilson 1924:228).

The importance of dogs in transporting raw materials and goods is easy to overlook. It was no hardship, for example, to haul meat and bones 11 km from a winter kill site back to camp with dogs (ibid.:227).

Mandan bullboats were made by covering a frame of willow branches with the thick hide of a mature bull buffalo, the tail serving as a tow rope. They were light and durable and were used mostly by women. Bullboats were used primarily for transport across and downriver, not up rivers. This may be a significant factor for territorial consideration in prehorse times. A village might have tended to exploit areas upstream on the Missouri, Cannonball, Heart, Knife, or Little Missouri for heavy/massive resources such as meat, bone, hides, wood, and rock.

Many summer villages were fortified, some were not. The village visited by La Verendrye in 1738 was palisaded and had a defensive ditch more than 4.5 m deep and 4.5-5.5 wide (Smith 1980:59).

Earthlodges varied from 9-18 m in diameter, with some larger, and were said to last 10-12 years (Wilson 1934:358). They were owned by the women, and the architects and builders were women, but the men helped put the heavy timbers in place (Meyer 1977:61). Juniper and oak were preferred over cottonwood for the main lodge supports until supplies in the local area were exhausted (Bowers 1948:47).

On hunting trips, short journeys, and other occasions when more or less temporary shelter was needed, the Hidatsa did not build the elaborate earthlodge, but contented themselves with one of three impermanent structures. For summer camping, a dome-shaped structure, consisting merely of half a 'tent skin' stretched over a framework of arched poles seems to have sufficed. In cold weather, a conical skin covered tipi, with the shallow fireplace inside, was sometimes used as a temporary abode. A third form of shelter, for semi-permanent use, as when a hunting party expected to be camped at one place for a month or more, was the conical hunting lodge built on a foundation of four forked poles the size of tipi poles and covered either with skins or with bark and earth. In a hunting lodge the fire-place was about three feet across and about four inches deep (Wilson 1934:411, 413).

When the "sweatlodge type temporary shelter" was used away from the village during cold weather, stones were heated outside the lodge and placed in a pit in the center of the lodge (Bowers 1948:168). If a group planned to spend the winter away from the village, then "eagle trapping type" lodges were built in the heavier timber for shelter from the winter storms (ibid.). Wilson (1924:255) presents one account of a skin covered temporary hunting lodge housing 12 adults, and another account depicting 11 people occupying a tipi at a temporary camp on a bison hunt.

The old-time tipi cover was made from well-tanned buffalo cowskins. The best time for securing the hides was the latter part of June. After the buffalo hunt, the hides were brought in for tanning by the women of the household. Thirteen hides were required for an ordinary sized tipi. Tipis were said to have ranged in size from those requiring only seven skins for a cover to a maximum of as many as twenty skins (Wilson 1934:416).

The semisedentary Hidatsa expected a tipi cover to last about two years (Wilson 1934:418), so nomads might wear one out faster and the more sedentary Mandan might have expected theirs to last longer.

Drying racks (drying stages, drying scaffolds) represent another structure type commonly erected at several different kinds of sites. They were situated adjacent to the entrance of the summer earthlodge. They were also erected at and near kill sites and at transient camps (Wilson 1924:249).

There has been little progress in distinguishing Mandan from Hidatsa pottery since Will and Hecker (1944:33) stated that "careful study . . . shows no traits on which a differentiation can be made at this time." Bowers (1948) has suggested that check stamped surface treatment is a trait developed by the Hidatsa, but it has not been possible as yet to test this proposition.

Plains Village pottery vessels were lump modeled from a paste described by Maximilian as clay "mixed with powdered granite which has been burnt" (Will and Spinden 1906:117). Perhaps granite cobbles would have been collected and burned for the purpose, but burned granite also could have been recycled from stone boiling, sweatlodge, and hearth stone uses. A wide range of jar forms and a limited variety of bowl forms were shaped by the paddle-and-anvil process.

Gilbert Wilson's unpublished field notes in the collections of the Minnesota Historical Society include drawings of cottonwood bark paddles used in Hidatsa pottery making. One of these implements, with a series of parallel grooves cut diagonally across the

smooth concave inner surface of the bark, would have produced the characteristic simple-stamped finish (Lehmer 1971:143).

Information obtained from Hidatsa oral tradition indicates that pottery found within or adjacent to a particular residence was not necessarily made by female members of that residence:

According to tradition, the potters were formerly owners of rights in the big Bird, River, and other Snake bundles. The rites were secret and defined the meaning of each step in terms of the supernatural. For that reason, individuals not possessing rights to make pottery were not permitted to sit around and watch. There was a limited number of households possessing rights to make pottery, and the other households bought their pottery in exchange for decorated robes, clothing, and other property. There was general agreement that the zigzag lines (decoration) were lightning, curved designs represent clouds or rainbow, horizontal lines around the rim were snakes entwining the pot, and herringbone designs represent tracks of the wading birds: snipe, heron and cranes (Bowers 1965:373-374).

Mandan pottery decoration was a personally held right. There were a variety of decorations, and:

... the person buying the right to make pottery acquired only the right to employ such decorations as the mother had a right to use. If she wished to utilize other decorations, she was obliged to seek another woman entitled to make the particular decoration and buy the right (Bowers 1950:91-92).

Pottery vessels were in use in the major summer and winter village, but they were also among the necessary items transported by Mandan men and women to eagle trapping lodge sites for fall and winter use (Bowers 1950:232-233, 355). Pottery apparently ceased to be made shortly after Like-a-Fishhook Village was established in 1845 (Meyer 1977:66).

The villagers were characterized by La Verendrye as "well dressed" and producing fine work with fur and feathers (Will and Hyde 1917:180). Many features of dress were indicators of status. Bighorn sheep skins were preferred for shirts and dresses (Bowers 1948:165). Women wore a full length garment made from two deer skins or two bighorn skins (Meyer 1977:68). In winter, fur gloves and moccasins with the fur side in were worn.

While many household articles were cached during the summer hunt period, gala clothing and regalia were usually taken along since ceremonial activity also went on during the summer hunting season (Will and Hyde 1917:134).

Face paints of red and yellow ochre or white clay were used by both tribes (Meyer 1977:69). A paint bag was often carried on any trip away from the village (Wilson 1924:257). Clothing and leather containers were ornamented with quillwork and later glass beads. Certain Mandans were fond of tattooing (Smith 1980:60).

"Religion, defined as a belief in the dependence on supernatural beings or forces, pervaded every aspect of life" (Meyer 1977:76). In this regard, religion and ritual are very important since they were tied directly to many, everyday activities which have left physical traces for the archeologist to recover. Much of the standardization and uniformity in the various classes of material culture may be understood as related to patterning in religious and ritual procedures.

The society theoretically survived by virtue of the supernatural powers acquired by various means: fasting; ritual performances; feasts; ceremonial purchases from other tribes; and rigid conformance to the tribal rules of individual and group conduct. At the base of all Hidatsa religious activities and concepts is the belief in individual and group-owned supernatural powers which are controlled according to long-standing rules (Bowers 1965:282).

The Hidatsa boulder effigies are ritual sites:

The Hidatsa groups also brought onto the Missouri the custom of shaping animal effigies from boulders to which they periodically return to perform rites for success in hunting and none of these effigies have been observed adjacent to the Mandan sites. As late as

1880 leaders of Hidatsa hunting parties were accustomed to make offerings to and perform rites at these sacred shrines (Bowers 1948:131-132).

The Hidatsa at Big Hidatsa village buried in the ground. The Mandan and smaller Hidatsa units commonly practiced scaffold burial, though burial in the ground was also carried out (Haxo and Libby 1941:233; Meyer 1977:76).

Key sources on the Mandan-Hidatsa include Lehmer's *Introduction to Middle Missouri archeology* (1971), *Selected writings of Donald J. Lehmer* (1977), Wilson's *Agriculture of the Hidatsa Indians* (1917) and *The Hidatsa earthlodge* (1934), and Stewart's *Mandan and Hidatsa Villages in the eighteenth and nineteenth centuries* (1974).

Hunter-Gatherers and Hunter-Gatherer-Gardeners

The Assiniboiné, Crow, and Teton Dakota on the prairie and Plains were hunter-gatherers, while the Santee and Middle Dakota derived some of their subsistence from gardening.

ASSINIBOINE

Linguistically they are a member of the Dakota branch of the Siouan stock. In the mid-1600s, some inhabited the Lake of the Woods and Lake Nipigon vicinity of northern Minnesota (Lowie 1909b:7). According to Alexander Henry the younger, the Assiniboiné of the late 1700s occupied a large portion of the Northern Plains and prairies:

Henry gives as the boundaries for their domain the Red River on the east, the Assiniboiné west to the junction of the north and south branches of the Saskatchewan at Prince Albert, the south branch of the Saskatchewan to Fort Vermilion, from Fort Vermilion to the Battle River, and then southeast from the Battle River to the Missouri River, down the Missouri as far as the Mandan in North Dakota, and back to the Red River of Manitoba (MacNeish 1958:4).

MacNeish (1958:4) estimates about 8000-10,000 Assiniboiné for the early 1800s. Syms (1982) estimates for 1807 there were 200-1600 people per band with 11 bands for a total of about 7000 Assiniboiné. Denig (1961) recognized seven Assiniboiné bands with a total population of about 3200 for the mid-1800s. The Assiniboiné were "hit terribly by smallpox" (Denig 1961:72) and certainly other plagues and epidemics of the 1700s, so the precontact population was likely larger.

While some Assiniboiné probably split from the Middle Dakota about 1640 as per native oral tradition (Smith 1980:8), there are indications of greater time depth for at least some Assiniboiné in and around the Northeastern Plains-woodland ecotone. Lowie held the opinion of an earlier linguistic divergence. It is possible the initial Dakota-Assiniboiné fissioning occurred with a Laurel population base (Ossenberg 1974:34) and was a long-term divergence similar to the Crow-Hidatsa split.

MacNeish (1958:82) suggested the Manitoba focus of southeastern Manitoba, the Blackduck focus of northern Minnesota, and the Melita focus of southeast Saskatchewan represent the material culture of the Assiniboiné. The material culture was typically Woodland: they buried their dead in log covered tombs capped with mounds, made grit tempered cord marked pottery, manufactured a wide variety of chipped stone tools, and had a subsistence economy based on hunting. The hunting patterns varied with the environment of the group territory, those to the east being dependent upon forest animals and those to the west on buffalo.

The Plains-prairie Assiniboiné focused on bison for subsistence. Whenever possible, they would locate their camps no more than a day's travel from a herd (Denig 1961:96). Buffalo were either hunted by the whole tribe in the "great ceremonial chase," by small parties, or by solitary hunters (Lowie 1909b:10). They were especially adept at impounding and stalked bison in the snow on snowshoes (Lowie 1954:13-14).

Supplemental wild plant foods included prairie turnip, serviceberry, chokecherries, wild plums, rose hips, gooseberries, currants, grapes, "artichokes, bullberries, and a plant similar to garden rhubarb" (Denig 1961:68). As Woodland hunter-gatherers they gathered wild rice, hunted porcupine, and ate roots, seeds, and pulverized insects dried in the sun (Lowie 1909b:12).

Meat was often roasted on spits leaned over a fire or directly on embers or hot stones. Stew was occasionally stone boiled in pottery vessels, skin vessels, or circular skin lined pits (Lowie 1909b:12; MacNeish 1958:5).

Arthur (1975:112) says they generally wintered in large camps. However, as a general rule for nomadic hunter-gatherers, the size and duration of group aggregation was limited by stored and locally available subsistence resources. Large camps became more frequent after adoption of the horse. The horse dramatically increased the catchment area of a camp. There was a large encampment of about 122 Assiniboiné families in the Souris loop vicinity in late October, 1738 (Smith 1980:94).

Food was served on plates carved from box elder or willow. They made horn spoons and catlinite pipes. They used birch bark vessels in the east (Lowie 1909b:12-13). One household industry was working in clay, making earthen pots and pipes (MacNeish 1958:5).

Their nomadic settlement pattern prevented the accumulation of much personal property (Denig 1961:96-97). Each family had six to 12 dogs, each of which could haul from 13-23 kg (Lowie 1909b:15). This potential was increased with the horse.

Men's clothing included wolf skin caps; shirts and leggings were sometimes trimmed with quills and human hair. Women preferred mountain goat skin dresses ornamented with quillwork and elk teeth. "Earbeads" and bear claw necklaces were common (Lowie 1909b:15-17).

Denig noted that prairie fires occurred "more or less every year" in different parts of Assiniboiné territory (1961:67). He also noted that buffalo chips were used for fuel any time they were not covered with snow (1961:65).

Assiniboiné mound burials were recorded by the early European explorers in Manitoba. Personal possessions, bison skulls, and sometimes sacrificed dogs were placed with the body (MacNeish 1958:6). The two historically documented mound burial practices also characterize the prehistoric Manitoba focus (MacNeish 1958:50):

One method was to place the deceased, shortly after death, in a sitting position in a pit with logs and earth. The other was to leave the dead in the open (perhaps on scaffolds) until the flesh was gone and then to gather (or bundle) up their bones and place them in a pit, which was covered with logs and earth.

An additional key source on the Assiniboiné is Rodnick's *The Fort Belknap Assiniboiné of Montana* (1938).

CROW

The "first full descriptive reports on the Crow, in the form of written and visual materials," derive from rather late (1805) (Heidenreich 1971:5-6), yet a fairly good record of their earlier history has been reconstructed through the efforts of historians, ethnographers, and archeologists. Bowers' (1948) interpretation of Hidatsa oral traditions suggests the Mountain Crow separated from the Awatixa Hidatsa in the late 1500s shortly after the Awatixa had shifted their core territory from somewhere in the James and/or Cheyenne valley(s) of southeastern North Dakota to the Knife-Missouri confluence. Further, the River Crow separated from the Hidatsa-proper over a period of time in the early 1700s, coincident with a shift of their village core territory from the Devils Lake area to the Knife-Heart region along the Trench. The Hidatsa-Crow parent groups were culturally adapted to the tall grass prairie/pond/lake/riverine area on the eastern fringe of the Northern Plains. The Crow out-migration involved a shift from a hunting-gathering-gardening subsistence economy adapted to the prairie to a hunting and gathering economy adapted to the Plains. There are other interpretations of early Crow movements and fissioning from the Hidatsa (cf., Medicine Crow 1979; Wood and Downer 1977).

While we know nothing of territorial restrictions of tribal and subtribal social groups in the late 1500s, it is likely that some of the proto-Crow were familiar with the Yellowstone and Missouri drainages to the Rockies. The prehistoric Hagen site on the Yellowstone River near Glendive, Montana, has been considered possibly early Crow (Mulloy 1942:99-102).

Frison (1967:27, 39, 48), whose work is among the most current on Crow prehistory, gives radiocarbon dates of A.D. 1580 $\pm$ 100 and A.D. 1610 $\pm$ 100 from one of the Piney Creek

sites, Wyoming, and suggests cautiously that those sites represent the ancestors of the Crow, for the pottery styles found there seem to be a degenerate form of the Mandan-Hidatsa tradition, and "the Piney Creek sites could be a somewhat later manifestation of the Hagen site people after their adaptation to a full-fledged buffalo economy" (Heidenreich 1971:38).

The western territory into which the prehistoric Crow moved appears to have been the domain of the Shoshoni. Looking at the situation from a western perspective:

The Crow were first heard of as advancing from the east and fighting the Shoshoni, whom they drove out of the Yellowstone River country into the mountains and around the headwaters of the river to the west and south. It seems that the Crow occupied part of the Shoshoni country and stayed there (Heidenreich 1971:36-37).

Curtis (1909:4) described the Crow territory of the 1800s, a description which closely parallels that recognized in the Fort Laramie Treaty of 1851:

The borders of their range were, roughly, a line extending from the mouth of the Yellowstone southward through the Black Hills, thence westward to the crest of the Wind River mountains, northwestward through the Yellowstone Park to the site of Helena, thence to the junction of the Musselshell and the Missouri, and down the latter stream to the mouth of Yellowstone.

The Crow maintained close social and trade relations with the Hidatsa into the 1800s (Curtis 1909:xi). In fact, the River Crow of that time still considered the Hidatsa-proper one of their bands (Bowers 1948). Territorial continuity appears to have been maintained between the Crow and Hidatsa from the initial fissioning until hostile Teton Dakota and Assiniboine forced a wedge between them (Hanson 1979:82) in the country between the Little Missouri and Powder rivers (this after the Hidatsa were weakened by the plagues of the late 1700s). Crow-Hidatsa relations were maintained notwithstanding the certainty of hostilities with the Dakota and Assiniboine.

The Crow figure prominently in the intertribal trade of the 1700s and 1800s. Their trade relations with the Shoshoni linked them with the Spanish Southwest; relations with the Salish speakers of the Inter-mountain region linked them with the Northwest Coast. In 1716, some Crow traded at York Factory at the mouth of the Saskatchewan River on Hudson Bay (Syms 1979:304).

They obtained horses, Spanish riding gear and blankets, and horn bows from the Flat-heads, Shoshones, and Nez Perces farther west in exchange for objects of European manufacture (metal knives, awls, spear and arrow heads, kettles, ornaments, and a few guns). At the Hidatsa villages they traded some of the horses and other articles received from the western tribes, together with dried meat, skin lodges, and clothing prepared by Crow women, for corn, pumpkins, tobacco, and European trade articles (Ewers 1954).

Mooney estimates the Crow population at 4000 in 1780 (Parks et al. 1980:290).

Lowie (1935:4-5) describes a distinction between three local divisions or bands, two of Mountain Crow and one of River Crow, each in control of a defined territory. He describes the bands as crosscut by matrilineal, exogamous clans (1935:9; 1954:90). The clans would occasionally fission or merge in order to maintain appropriate membership (1935:15). Curtis (1909:24-25) describes a higher level grouping of six phratries, each comprising two clans.

When a woman married, she usually joined the camp group of her husband, although sometimes a woman of unusual force was able to compel him to pitch his tipi among her people (Curtis 1909:24-25).

Sexual division of labor paralleled that of all the other ethnic groups of this region; men responsible for defense, warfare, and hunting, while women processed foods and shouldered domestic responsibilities. A notable exception to this pattern was Woman Chief, the most famous female war leader in the history of the Crow or any of the Northern Plains tribes. She was an Atsina who had been taken prisoner by the Crow when she was about 10 years old (Denig 1961:196-200):

When further advanced in years she carried a gun, learned to shoot, and when yet a young woman was equal if not superior to any of the men in hunting both on horseback and on foot . . . Her protector having been killed in battle, she assumed the charge of his lodge and family, performing the double duty of father and mother to his children.

She went on to lead war parties and took her place among the chiefs, ranking third in a band of 160 lodges. She eventually took four wives. Ironically, she was killed without warning by an ostensibly friendly party of Atsina (Denig 1961:198-199).

Subsistence focused on bison. Men hunted individually, in small groups, and in large communal groups. They used jumps and pounds and constructed rock pile drivelines; there is testimony for as many as 700 buffalo killed in a single drive (Lowie 1935:72-73). Lowie also reports the impounding of antelope and deer (1935:72). As another note of caution to archeologists seeking explanations founded in techno-economics for all camp features and refuse: "After a hunt, boys . . . rode around looking for calves without mothers, killed them with arrows, and brought home the meat, giving their girl playmates the skins as coverings for their toy tipis" (Lowie 1935:37).

Little progress has been made toward distinguishing Crow camp refuse from Hidatsa or Mandan hunting camp refuse. They made a variety of containers in addition to some ceramic vessels: carved wooden bowls (some of box elder burls), bighorn sheep and bison horn cups and small dishes, and rawhide, stone, and soapstone vessels (Curtis 1909:21; Lowie 1935:92).

Pots that held a couple of gallons were made of gray soapstone. A buffalo-paunch was used for carrying water, while the pericardium served as a smaller water-bag (Curtis 1909:21).

The tipi was the typical dwelling, although a variety of temporary structures were employed when necessary. Five to 10 buffalo skins were used for the lodge cover in prehorse times. "In later times, as many as sixteen of the largest skins were required" (Curtis 1909:21).

Every year they put up new lodges, using the old covers for inner curtains, for leggings, moccasins, and other clothing. A large square of the old tipi-covering was frequently used by a warrior as a saddle, as a shield from rain and wind, and, with a sort of drawstring around the edge, as a large bag in which food and clothing could be placed and kept dry when rivers were crossed (Curtis 1909:22).

As with many other contemporary Northern Plains ethnic groups, the place opposite the tipi entry was the place of honor. The fireplace was situated approximately in the center. The bottom of the cover was pegged or weighted down with rocks. A shade was often erected beside the lodge during warm weather. Stone grinding slabs were used outside the lodge (Lowie 1935:84, 88-89).

Lowie (1935:75-79) presents information on their hide processing techniques. They employed ash derived lye to aid with dehairing, and used brains for tanning (Catlin 1973:45). Metatarsal fleshers, antler scraper hafts, and bone graining tools are documented. Smudge pit features were prepared for smoking some skins. Some rawhide items were decorated with relief carving.

Bows were made of elk antler, sheep horn, and cedar (Curtis 1909:21). The Crow were one of several tribes making a laminated, sinew backed, antler bow. Lowie (1954:74) reports that fabricating this bow was a process of three months' duration.

The horn was boiled, straightened, worked into shape, and spliced to obtain the necessary length of about three and a half feet. Threads of sinew from the neck and shoulder of the buffalo were . . . carefully fastened on the bow with strong glue, made by boiling the neckskin of the elk, membrane from beaver tails, tips of elk-horns, and hide scrapings (Curtis 1909:21).

These bows were then carved, painted, and equipped with sinew strings.

Arrows were fashioned employing goat horn shaft straighteners and grooved stone shaft abraders, and tipped with stone or bone points (Lowie 1935:84). Ten arrows were equivalent in value to a horse (Lowie 1935:85). "Lance-shafts were made of red birch, a little longer than the height of a man, and often were tipped with a prong of elk-horn" (Curtis 1909:21).

Durable personal adornments included bear claw necklaces, bone disc bead necklaces, bone ear ornaments, and shell earrings. Bone dice were used for gaming (Lowie 1935:82, 100).

Dogs, and later horses, were factors in transportation. In addition to packing goods and pulling travois, dogs served a camp guard function. "Most evidence and opinion suggest that the Crow acquired horses from the Comanche, Shoshone, and/or Sioux sometime between 1730 and 1760" (Heidenreich 1971:39).

Sweatlodge features were typically associated with Crow camps:

Sweating is strictly a part of the devotional observances of the Apsaroke, practiced not for material cleanliness, but for such purification as will make their bodies acceptable to the spirits. Close by every dwelling even today can be seen the sweatlodge (Curtis 1909:54).

Practices for burial of the dead included use of scaffolds and in-ground internment. A scaffold of four forked poles and the tree scaffold were employed (Lowie 1935:67). Larocque reported in-ground burial for a woman in 1805 (Hazlitt 1962:11).

Other key sources on the Crow Indians include Wildschut (1960) and Lowie (1922).

DAKOTA: SANTEE, MIDDLE, AND TETON

When first mentioned by European explorers about 1640, all Dakota were prairie/Woodland Indians living in the region east and west of the upper Mississippi River, centered in central Minnesota. Their territory embraced what is now the southern two-thirds of Minnesota with adjacent parts of Iowa, Wisconsin, and North and South Dakota. The economy of the Dakota at that time was based upon hunting, fishing, gathering of lake and forest plant foods, and some slash and burn horticulture (Howard 1966:2).

Through the 1600s, the French distinguished only Sioux of the east (east of the Mississippi River) and Sioux of the west (DeMallie 1982). Cultural and dialectic differences had developed, resulting in three divisions: Santee (Eastern Dakota), Yankton and Yanktonai (Middle Dakota), and Teton (Western Dakota). The linguistic dialect of the Eastern division is called Dakota, that of the Middle division Nakota, and that of the Teton is Lakota (Howard 1966:3-4). At this date, there was usually no fixed political alliance above the level of the band or village, at least for the Santee (E. Johnson 1982).

The Dakota population was estimated at 4000 families in 1695 (DeMallie 1982) and at 17,000 individuals in 1743 (Little 1982). For 1833, Denig lists the population of the Teton as 1630 lodges averaging five people per lodge (8150 people); the Yankton were estimated at 300 lodges (1500 people); and Yanktonai at 400 lodges (2000 people).

Santee or Eastern Dakota. Their subsistence economy was based on hunting, fishing, gathering, and horticulture. Important wild plant foods were wild rice, maple sugar, and prairie turnip. Women gardened corn, beans, squash, pumpkins, and tobacco (Howard 1966:4). The common summer dwelling was a large, gable roofed house of bark. In winter, small hemispherical cattail mat or bark wigwams were used, as well as conical dwellings covered with hides or bark. The gable roofed house had a sleeping/lounging platform about 1.5 m wide around the inside. Braided corn husk floor mats and woven cattail mats were used on the floors and lounging platforms, and to line the walls. Over the door was a flat roof extending 2.4-3.0 m out from the house; this served as an outside lounging platform and doubled for a drying rack (Howard 1966:5).

When contacted by the French in the late 1600s, there was fluid band organization, voluntary men's associations, and no interband political unity. The kinship system was basically bilateral. There was some tendency for patrilocality (E. Johnson 1982).

In winter, the village groups split into smaller groups consisting of one to three families which moved to favorable hunting and trapping territories. In the spring, the bands regrouped in the summer villages to plant gardens, conduct tribal ceremonies, and organize large hunting and war expeditions (Howard 1966:5). The available archeological evidence supports the position that a similar type of settlement pattern had operated in Minnesota throughout the Woodland period (Batura 1981:20).

All bands made pottery of pounded clay tempered with crushed rock. It was decorated by stamping with a carved paddle (Howard 1966:7). Skinner (1919:165) mentions the use of burned flint as temper.

They used flint knives, scrapers, arrowpoints, and axes. Ground stone tools included double pitted hammerstones, grooved mauls, and grooved axes. Woodworking produced horizontal wooden mortars, bowls (some with animal effigies on the rim), spoons, and measures. They also made bison horn spoons. Cedar and basswood fiber bags were woven. They made and used parfleches, birch bark containers, and cradle boards. They also had drums, deer hoof and gourd rattles, and elk antler and wooden scraper hafts (Howard 1966:8).

Spector has identified 10 site types for the historic Santee Dakota: summer residential/logistical base, winter encampment, ricing camp, cranberry camp, deer hunting base camp, deer kill site, deer cache site, ephemeral encampment, maple sugaring site, and muskrat procurement site (1982). The summer residential/logistical bases had bark lodges and cache pits; people came to visit with their own lodges (tipis) (Spector 1982). Winter encampments occurred during January-March with tipi lodging. Ricing camps had ricing pit features. Deer hunting base camps involved men and women and sites were moved at least every few weeks (Spector 1982). Maple sugaring sites were primarily occupied by females and children; rabbit and squirrel remains dominate subsistence remains; oval structures with a series of firepits served both for residences and syrup processing tasks (ibid.).

Other sources include Riggs (1983), Lesser (1958), and Eastman (1975).

Yankton and Yanktonai (or Middle Dakota). Yankton-Yanktonai territory was in central Minnesota in the mid-1600s (E. Johnson 1982). From the mid-1700s, Yankton territory was centered in southeastern South Dakota; Yanktonai territory centered in southern North Dakota east of the Missouri River. Several hundred years in this territory resulted in the economy, housing, dress, and ceremonialism resembling the Middle Missouri villagers more than that of the eastern or western divisions of the Dakota (Howard 1966:11). For example, Drifting Goose, Big Head, and Little Soldier were Yanktonai earthlodge horticultural villages on the Missouri River north of the Arikara, but this way of life involved only about 5% of the Yanktonai at that point in time (W. Raymond Wood, discussant comments at the UNIC-3 Anthropology Conference, 2/26/82).

The subsistence economy out on the prairie and plains was based on hunting, fishing, gathering, and river bottom horticulture. Great tribal bison hunts took place in midsummer and late fall. Some of these hunts were made far west of the Missouri. The Yankton also made periodic trips to the Black Hills to secure tipi poles. Bison, elk, deer, and antelope were hunted year-round east of the Missouri. Small game was taken with heavy throwing sticks (Howard 1966:11-12).

Fish were taken in weirs, fish traps, willow seines, with bow and arrow, and by hook-and-line. They gathered prairie turnips and chokecherries. Women gardened at least three varieties of corn, two types of squash, and at least three varieties of beans (Howard 1966:12).

They used three types of dwellings: the skin tipi, a skin covered wikiup, and late in their history, the earthlodge. One Yanktonai earthlodge village is suggested for North Dakota ca., 2.4 km north of Fort Yates (Howard 1966:12-13), and another at the Ice Glider site in Oliver County (Warren 1982).

They made and used the bullboat. They made pottery, but only small vessels. Large pottery vessels were obtained through trade with the Arikara and Mandan. They made use of *Dentalium* shell and quills in ornamentation (Howard 1966:14-15).

Social organization in the late period probably involved bilateral kindreds and warrior societies that were not age graded. Although the Middle Dakota were traditional enemies of the Missouri villagers, "there were many peaceful interludes which permitted cultural exchange and intermarriage" (Howard 1966:16-17).

The John K. Bear winter count (Howard 1976) depicts Middle Dakota patterns of movement and interaction in the late 1600s, including trading with the Mandan and hostilities with the Arikara.

Scaffold burial was the only type reported (Howard 1966:16).

Teton Dakota. The Teton core area was in western Minnesota, northeastern South Dakota, and southeastern North Dakota in the late 1600s. Subsequently, this core area shifted further westward fully onto the Plains. Teton core territory within the Northeastern Plains was certainly a precontact pattern (E. Johnson 1982; Michlovic 1982a).

The Western Dakota of the late 1600s were hunter-gatherers with no gardening. They hunted between the upper Mississippi and the upper Missouri, traveling in groups of five or six families and larger (DeMallie 1982).

Out on the Plains, the original single band of Teton grew and evolved into seven subbands: Brules, Oglalas, Miniconjous, Hunkpapas, Blackfeet, Wohaincoompah (Two Kettle), and Sans Arcs (Without Bows).

By 1750 they were ranging along and beyond the Missouri River. A nomadic, High Plains, bison hunting lifeway developed from the prairie hunting-gathering lifeway. Animals listed by Denig (1961:13) as hunted by the Teton are buffalo, elk, mule deer, white-tailed deer, bighorn sheep, antelope, wolves, red and grey fox, beaver and otter, grizzly bear, badger, skunk, porcupine, jack rabbit, cottontail rabbit, muskrat, and mountain lion.

The various bands traveled widely following the herds and "it was rare for more than one or two of the sub-bands to camp together, except at the Sun dance" (Howard 1966:21).

The steady diet of bison meat was varied with prairie turnip and other wild foods gathered by the women: chokecherries, serviceberries, and rosehips (Denig 1961:13). There was occasional gardening, but garden foods were more commonly secured by raiding or trading with the villagers. "Fish were despised" (Howard 1966:21).

The characteristic local group was a camp of extended bilateral and bilocal kin groups headed by one or more chiefs. Chieftainship was based on success in leading the groups in war and the hunt; people were free to leave the camp of an unpopular man. No one was barred from chieftainship by birth (Howard 1966:22). There was an elaborate system of non-age graded warrior societies, each of which had its own customs, songs, dances, and costumes (ibid.:24).

The tipi was the principal type of dwelling, both in summer and winter (ibid.:21). They made no pottery, using skin containers and stone boiling in skin lined pits. They also carved bowls from elm or box elder. They made bison horn spoons. Ornamentation was enhanced with otter skin, quillwork, ermine skin fringes, beadwork, and elk teeth. Burial was invariably of the scaffold type (ibid.:21-24).

The Teton bands "occupied separate districts, though they could if they chose hunt unmolested by each other in any place through the entire country." They were "generally intermarried and connected by societies of dances and clans." Each band confined its "hunting operations as nearly as practicable to a certain tract of country accustomed to the rule of its own chief" (Denig 1961:15-16).

Other source material on the Dakota includes Ewers (1937), Hassrick (1964), and Walker (1980).

Uto-Aztecan Speakers

The Shoshoni are the only Uto-Aztecan speakers documented using this territory.

Shoshoni

Steward's treatment (1938) of the Shoshoni and other, closely related, Basin-Plateau, aboriginal sociopolitical groups is valuable for the insight it provides concerning the variety of forms that settlement, kinship, political organization, and ceremonialism can take within contiguous groups with close linguistic and other cultural affinities. One drawback of Steward's work, from a North Dakota perspective, is that it deals with the Shoshoni almost exclusively within the context of their late, Basin-Plateau territory.

While it is questionable or debatable that the historic Shoshoni ever included western North Dakota in their territory, they are appropriate for consideration for several reasons. They definitely traveled into western North Dakota when they had the horse (Abel 1939:161). More importantly, their successful adaptation to semiarid and arid environments provides information which should be considered when

dealing with prehistoric remains from periods characterized by semiarid and arid environmental conditions. Where other Northern Plains nomads had subsistence economies oriented primarily toward fauna, Shoshoni subsistence was based primarily on plant foods (Steward 1938:321).

Shoshoni use of the Northern Plains may be of considerable antiquity. Wedel (1961:254) suggests the forager way of life spread into Wyoming by way of Desert Culture immigrants from the Great Basin. Mulloy also suggests a population movement into Wyoming out of the Great Basin around 1000 B.C. as a possible explanation for a shift toward increased reliance on plant foods evidenced in archeological sites in some parts of the Northwestern Plains (1958:210). Bryan (1965) suggests movement into the Plains from the Basin-Plateau in the Paleo-Indian period (9500-6000 B.C.). The La Verendrye party of 1738-39 noted that the Hidatsa were at war with the Shoshoni to the west.

The Shoshoni also traded at the villages on the Missouri. The Mandan villages were a source of guns and ammunition for them (Abel 1939:161). A Shoshoni band, in company with Crow from the Powder River country, came to trade at the Mandan villages in 1805 (Hazlitt 1962; Hultkrantz 1968:65). The Shoshoni may also have received certain influences from Plains Villagers in Nebraska (Hultkrantz 1968:72). The Shoshoni interacted with Village cultures over an extended range on the Plains, but the time depth of this interaction remains uncertain.

The average population density was about one person per 4000 ha in the Basin-Plateau area (Steward 1938:48). However, this density varied widely in response to food resources. Subsistence resources and procurement:

. . . largely predetermined the population density, imposed limitations upon the size, distribution, and mobility of village groups, and affected the nature of economic cooperation, political controls, and certain property rights (Steward 1938:230).

The biological family was characteristically the independent, self-supporting unit. Units larger than the family were for the most part transient (Steward 1938:230). The average household was about six persons, but additions might bring it up to 10 (Steward 1938:240). The family was bilateral rather than patrilineal or matrilineal because the uncertainties of food, and consequently of residence, made uncertain the extended family and association with persons other than those of the immediate household. Residence was with one parent or the other, rarely independent. Up to a year of matrilocal residence as bride service was common. There were no localized lineages nor conditions for clan development (Steward 1938:236, 239-240).

The people of different regions exhibited considerable variation in political organization and headman's authority. These ranged from an irreducible minimum in the biological family or household to a maximum in the band. Bands, and sometimes land owning bands, developed in some places where a rich environmental setting allowed storage of surplus food and where the horse allowed for bringing surplus food to a central point. Places and times of high surplus food potential offer a foundation for increased population density and increased elaboration of interpersonal and intergroup differentiation and control (Steward 1938:230, 236, 246).

When several related families were associated in a winter camp, the eldest or most influential man directed activities. Larger villages had a single headman, but his authority was not absolute and any family was at liberty to pursue an independent course at any time. Skilled individuals offered specialized leadership in specific, communal efforts (Steward 1938:246-247).

Subsistence in most of the Basin-Plateau area was primarily based upon plant foods. As food shortage was always a real danger, it was necessary that families harvest alone or in the company of not more than one or two other families. Group endeavor might bring the pleasure of companionship, but it did not increase the per capita harvest (Steward 1938:231). Further, the techniques used for exploiting limited resources did not permit a woman to gather more plant foods than were absolutely required by her family (Steward 1938:230-231).

Where harvesting was the main subsistence activity, families traveled alone or in very small groups for the greater part of the year and harvested over a large area. They ordinarily ranged 32 km or more in each direction from a winter village base area. The itinerary was not always fixed, and seasonal variation in rainfall frequently required them to alter their routine (Steward 1938:232).

Multifamily winter camps required stored seeds, water, sufficient wood for house building and fuel, and absence of extremely low winter temperatures. These winter camps might be scattered along an area 1.6 km long or might be truly clustered with as many as 15-20 families in a true village. People were not always able to return to the same winter village (Steward 1938:232-233).

Hunting was the complement to collecting. Game provided not only essential foods, but skins for clothing and materials for certain implements. Most hunting was done on a family basis similar to gathering. Small species such as rodents and insects were taken by both men and women. Large game was usually taken by men. A hunter was obliged to share large game with other members of the village if that was the sort of residence pattern he was involved in at the time. In times of dire need, other families would aid if possible (Steward 1938:231).

The family was not always the maximum economic unit in hunting. When taking buffalo, antelope, rabbits, deer, mountain sheep, and, under certain conditions, waterfowl, fish, and even insects, collective effort increased manyfold what an individual hunter could have procured. The duration of such hunts and the number of participants depended upon special conditions in each case. Participants rarely numbered more than two dozen families (Steward 1938:231).

Groups which had access to the buffalo were able to remain together for several months. In fact, the advantages offered by successful buffalo hunting so outweighed the advantages of focusing on seed gathering that Northern Shoshoni families separated and scattered out to harvest plant foods only during a small portion of the year (Steward 1938:231).

Several plant and animal species occurred in such great quantities in certain localities during short periods that even when they were not taken cooperatively, they drew large numbers of families. Outstanding among such species are pinon pine nuts, which were often a major factor in the location of winter villages, and crickets and grasshoppers (Steward 1938:232).

In areas of extreme geographic diversity where all essential foods and materials could be secured within small territories, there developed stable villages with more or less perennial habitation. Habitual, cooperative exploitation of the same general terrain gave point to, if it did not account for, the origin of band cohesion, band territory, and ownership of territory (Steward 1938:234).

There were good obsidian sources in Shoshoni territory and they used this material for toolmaking (Lowie 1909a:173). Obsidian in some western North Dakota sites may have been deposited by people who ranged to source areas in the Rockies [this situation is presently confused by material similarities between obsidian and NVN glass from eastern Wyoming and Montana (Frison 1974a), and obsidian from western South Dakota (Adrian Hannus, personal communication, 2/22/82)]. Obsidian knives were sometimes hafted in wood or "horn" handles and were resharpened with elk or deer antler flakers. They also used the bipolar reduction technique (Lowie 1909a:173-174).

They made bone awls and gaming pieces, rib scrapers, and cups and spoons from bighorn sheep and bison horn. They made bows from sheep horn and elk antler by soaking and heating, scraping with stone scrapers, and abrading "between two rough stones." Abalone ornaments were obtained in trade from coastal Indians (ibid.:175).

In hideworking they used "the typical serrate Prairie fleshing tool" and "the elk-horn adze of the Plains" and tanned with a mixture of deer brains boiled with deer bone (ibid.:175-176). Smudge pits for hide smoking were dug 30-45 cm deep (ibid.).

The Shoshoni made steatite pipes and vessels. Larocque (Hazlitt 1962:18) noted a stone vessel 38 mm thick with a 7.2 liter capacity. They also made ceramic vessels (Lowie 1909a:174, 177). Coiled and twined basketry was made, some water tight and sufficient for hauling water or stone boiling (ibid.:179).

Sagebrush bark was used for weaving baskets, bags, and blankets. Blankets were also made from rabbit, groundhog, and other small mammal skins (ibid.:178).

Summer dress was ordinarily of elk skin. Winter blankets and robes were made from buffalo, antelope, deer, bighorn, beaver, wolf, groundhog, or rabbit. Winter moccasins were of buffalo skin with the hair side in (Lowie 1909a:179).

Elk tooth necklaces were worn by women and children while bear claw necklaces “were the prerogative of men who had killed a grizzly” (ibid.:181).

Structures included summer shades, menstrual huts, sweatlodges, tipis, and large circular enclosures for feasts and some dances (ibid.:183).

Ritual was everywhere exceedingly limited and practically none was attached to economic activities. The main rituals were at birth, girl's puberty, and death (Steward 1938:45).

Festivals were made possible by temporarily increased food supplies produced by rabbit drives, pinenut trips, antelope hunts, or other communal food producing affairs. The essential motivation of festivals, however, was noneconomic. People desired social intercourse with friends and relatives not seen during the remainder of the year. They wished to dance and gamble, and, in some localities, to hold religious observances (ibid.:237).

The shaman was the only true specialist. But, information showing the extent to which he was relieved of ordinary subsistence activities and supported himself entirely by his practice is not available (ibid.:230).

Key sources on the Shoshoni include Jennings and Norbeck (1955), Stewart (1939), Powell (1971), and Manners (1974).

Discussion

This concluding section presents wandering and cursory discussion of some of the cultural characteristics covered in the ethnographic sketches. The primary purpose here is to reinforce the importance of an ethnographic perspective before turning to the study region's prehistoric record. All of the topics in this discussion could be expanded and many key references could be added.

Tribes and Their Territories

A major focus of anthropological archeology is to explain the integration, adaptation, and change of extinct cultural systems. In general, historically documented components offer the greatest potential for refined anthropological archeology if the documentation includes information on group size, composition, site activities, and ethnic identity. Potentials for ethnographic analogy are strengthened in these situations, and at least partial explanation may be documented for archeologically recovered materials and their distributions, enabling the pursuit of more detailed lines of inquiry.

However, the difficulty of doing anthropological archeology is generally increased as the intervening time depth between the subject culture and the historic record increases. In prehistoric archeology, it is generally impossible to identify ethnic or sociopolitical groups (e.g., bands, ethnic groups, cultural groups, tribes, societies, cultural systems). A major cultural characteristic underlying this problem relates to shifting and overlapping sociopolitical groups territories.

The realities of adaptation to variable resources and a variety of patterns of interaction of various groups . . . require that the social environment, in a synchronic perspective, be viewed as a series of overlapping territories. In a diachronic perspective, the social environment must be viewed as a series of shifting long-term areal distributions. The distribution of a group must be analyzed as the total associated with subsistence, trading, and conflict in all seasons. The distribution of seasonal forays by small hunting, raiding or trading groups in secondary or tertiary areas is as important in defining distributions as locating the core or homeland of a group (Syms 1977:39).

Syms' concepts of core, secondary, and tertiary areas are utilized throughout this report.

Each Core presents the area in which an ethnic group traditionally spent most of the year, or minimally, habitually spent certain seasons of the year (e.g., the Santee Dakota

occupied the Upper Mississippi woodlands in the fall, winter, and spring; the Hidatsa occupied summer villages along the Missouri River). Secondary areas are those areas to which particular groups went on regular trips for a specific resource (e.g., Mandan groups left their villages along the Missouri River to trap eagles in the western North Dakota badlands; Assiniboin groups left Southwestern Manitoba each fall to trade in the villages along the Missouri River). Tertiary areas represent marginal areas that were utilized briefly and intermittently, but with sufficient frequency to provide evidence of repeated settlements or resource utilization . . . (e.g., war parties, distant trading parties, of trips for specific raw materials) (Syms 1977:5-6).

The ethnographic record is instructive regarding territoriality. It is clear that (1) all cultural groups maintained territories of some sort, (2) significant shifts in core territories were not uncommon, and (3) territorial shifts seldom carried a group into country with which there was not at least some previous familiarity resulting from secondary or tertiary use.

A fundamental reason for territoriality among hunter-gatherers relates to minimizing risk in the subsistence economy.

Locating animal or plant resources in unfamiliar territory is a difficult task. Animals are predictable within limits, and familiarity with a territory means that the hunter has a chance to observe the way the animals behave in a given area. He can then apply the hunting strategy that has the best chance of success. The same is true of the floral resources. It takes a long time to learn where the berry patches, seeds, greens, tubers, roots, and other resources are located and when they are available (Frison 1978:12).

Territorial organization tends to become synonymous with political bounding. Those people who occupy a particular territory are integrated internally with respect to each other and at the same time are organized to present a united front to the outside (Driver 1961:325).

Band or tribal ownership of territory, or more properly, exclusive rights to hunting, fishing, gathering, or gardening on the land, occurs repeatedly among widely separated groups in different parts of the world (Steward 1938:255). However, ownership, bounding, and defense of territory appears to have varied through time among all the ethnic groups considered above.

Since it was essential that the Plains hunter-gatherers be intimately familiar with a territory for hunting, defense, and other purposes,

Plains Indians came to roam over a somewhat well defined territory, though making occasional . . . forays into territories lying outside their usual range of movements. The extent of the territory covered seasonally by one Indian group, given their population size, made it impossible for them to control, by military means, the sharing of a territory with other groups whose movements may or may not have coincided with the movements of other nearby tribes. In this way the range of hunting territory seasonally covered by half a dozen or so Plains groups considerably overlapped. Yet to each group concerned the range of the territory habitually covered by them during any one year constituted their primary area of subsistence (Gussow 1954:33).

The sections of the Missouri River in the study region occupied by different groups of Plains Villagers remained essentially unchanged for the approximate period 1780-1810.

On the whole, the territory occupied by these groups was respected by the others. When the Awaxawi attempted to move above the Knife, they were resisted by the Hidatsa. The smaller Awaxawi group was defeated in a prolonged war and moved temporarily below the Cannonball where they allied with the Yankton Sioux and conducted raids against the Hidatsa for three years (Bowers 1948:141-142).

The territorial shifts which stand out in the ethnographic record are those involving entire tribal groups (e.g., Arapaho, Cheyenne, Teton Dakota, Mountain Crow). In addition, however, intermittent movements of smaller population segments may have formed the basic elements from which the larger picture of a territorial shift becomes apparent. For example, the territorial shifts of the Cheyenne are frequently

condensed to a movement from the area of the Red, James, and Sheyenne drainages in southeastern North Dakota to the Missouri River near the North-South Dakota border, then to the Black Hills and the High Plains. In reality, these territorial shifts might more properly be viewed as a continuum with frequent, westerly trending movements of the core areas of band and subband elements of the tribe, always remaining within territory familiar from previous secondary and tertiary use.

After the 1782 smallpox epidemic, Hidatsa

... who elected to pursue a sedentary life and cultivate corn moved permanently into the Big Hidatsa village ... while those who preferred to live by the hunt moved upstream and joined the River Crow. This separation was largely one of individual families rather than a mass separation such as traditionally occurred when the two major Crow groups left the Missouri. Genealogies show that there was a simultaneous movement of a few Crow families to the Missouri to become permanent members of the Hidatsa villages (Bowers 1948:142).

Population Density

Population estimates for the tribal/ethnic groups considered above appear, in general, to have been lowest for hunter-gatherers, higher for hunter-gatherer-gardeners, and highest for the horticultural-hunter-gatherers. The Arapaho, Cheyenne, and Sarcée of about A.D. 1800 were in the general range of 1000-3000 members each. The three major divisions of the Dakota of about A.D. 1700 may have numbered about 5000 members each. For the same period there were about 7000-8000 Mandan.

Throughout most of prehistory, population density was probably quite low for North Dakota territory and surroundings. A range of potential population densities can be derived by reference to band level hunter-gatherers elsewhere. Hassan (1975:38) states that "population density of hunter-gatherers is very low, varying from 0.01 to 2 persons per square mile." Steward (1968:103) gives a range for Great Basin Shoshoni varying from 0.01 to 0.20 persons per square mile. Driver (1961:map 36) estimates approximately 0.01 to 0.05 persons per square mile for North Dakota territory outside the Middle Missouri subarea.

Prehistoric North Dakota resource potentials, at their lowest levels, might have paralleled Great Basin areas of sparse resources and the approximate 79,165 square mile area of North Dakota would have provided support for only about 800 hunter-gatherers. During times of consistently high resource potential, a density of 0.2 hunter-gatherers per square mile, or about 16,000 people might have been possible.

Late in prehistory, on a prehorse time level, horticultural-hunter-gatherers developed an apparent domination in this territory and the total population density was probably increased beyond the upper level potential of the hunter-gatherer adaptation (perhaps 10,000-12,000 combined Mandan-Hidatsa and another 5000-10,000 hunter-gatherers). The introduction of the horse substantially increased potentials.

Population density is a function of three major factors: (1) resource potentials, (2) food extractive potentials, and (3) consumption level (Hassan 1975:28). Resource potentials are best understood in terms of (1) the optimum yield to man, i.e., the maximum sustained yield that can be removed without impairing the ability of the resources to replace the biomass harvested, (2) nutritional quality of the resources, (3) the spatial distribution of the resources, and (4) the seasonal and long-term fluctuations in the abundance of the resources (Hassan 1975:29). "Most hunting-gathering populations are bestowed with the wisdom of regulating their population density well below that during times when essential resources are least abundant" (Hassan 1975:33).

Anthropologists seem to agree that bands of hunter-gatherers vary between 15 and 50 persons, with an average of about 25. Regional groups, or band aggregates, on the other hand, show a wider range of variations with an average of about 500 persons and a range from 200-800 (Hassan 1975:33). North Dakota territory might have been occupied at a given point in the prehorticultural prehistoric past by as few as one or two, or as many as 30 or so band aggregates.

Intersocietal Relations

Intersocietal relations (and even intrasocietal, interband relations) may be characterized as predominantly friendly, predominantly hostile, or variable between friendly and hostile. Long-term, fixed relations of any sort appear to have been uncommon. From an ecological perspective, it is apparent that these hunter-gatherer and horticultural-hunter-gatherer societies had to maintain flexibility in their adaptations to both short-term and long-term variability in resource potential. There is heuristic value in maintaining a perspective that subsistence and technological resources were limited. Sometimes territorial adjustments would be necessary in order to secure resources for maintaining population size and established patterns of social organization. Territoriality was undoubtedly a major factor in intersocietal relations.

Wood (1972) believes the pattern of alternative trading and raiding between nomads and villagers may have extended far back into the prehistoric past. The Plains nomads and Woodland people offered meat, hides, fat, buffalo robes and other furs, prairie turnip flour, eagle feathers, catlinite from Minnesota, shirts and leggings of buckskin decorated with quillwork, moccasins, rock salt from the plains south of the Arkansas River, and later, horses (Driver 1961:232; Will and Hyde 1917:171). The villagers offered horticultural produce, specialized craft items, and later, European trade goods. This patterned trade "enhanced the survival potential of the nomads" (Berry 1978:137) as well as the villagers.

There was undoubtedly a competitive aspect to some of this trade since the Plains nomads and Woodland people could choose to deal with any of a number of villages, and vice versa. Add to this situation (1) the need of some males to secure war honors in order to advance to positions of leadership, and (2) the pattern of capturing women for wives (Driver 1961:269), and it becomes apparent there was a high probability of occasional conflict interceding in normalized trade relations.

In terms of long distance trade, Wood (1972) notes the considerable antiquity of trade patterns that brought *Dentalium* into the Northern Plains from the Northwest Coast. Will and Hyde (1917:174-175) note the trade network linking the villagers on the Upper Missouri with the New Mexico area was in existence in the early 1500s.

Trade/exchange vs. direct procurement sometimes becomes a matter of contention in accounting for "exotic" materials in cultural sites. Cases have been made for both direct procurement and trade to account for Yellowstone obsidian in Ohio Hopewell mortuary sites. Evaluations of prehistoric trade/exchange vs. direct procurement in terms of cost/benefit analysis are fraught with the problems of projecting recreated values into the calculations.

It is postulated that, in general, the friendly or hostile character of intersocietal relations was related to the adaptive advantage of friendship vs. hostility. Further, short-term hostility could often be tolerated in anticipation of eventual moderation of hostilities and return to friendship. The details of such anthropological problems are nearly unapproachable in prehistory.

Sociopolitical Organization

It is a healthy sign that there has been an increase in the amount of attention paid by Northern Plains archeologists to aspects of prehistoric social organization.

As archaeology, in the service of anthropology, moves from one operational level to the next, it is compelled to pay more attention to the social aspects of its subject matter, until there takes place on the explanatory level an actual convergence with cultural anthropology and the possibility of an eventual synthesis in a common search for sociocultural causality of law (Willey and Phillips 1958:7).

Some levels of social organization are more difficult to deal with than others. There is higher potential, for example, to recover information from archeological context which relates to considerations of village organization than to considerations of sodalities. Problems relating to sociopolitical organization might be ranked from those least difficult to approach to those most difficult to approach: the village or camp, the individual, the family, the band, descent groups and associations, and finally, ethnic groups or tribes.

VILLAGE OR CAMP

The village settlement unit is unquestionably the least difficult to deal with, especially when it is bounded by lodge distribution or a fortification system. Situations are often complicated by multiple occupations and the attendant difficulty of isolating contemporary activity episodes. Potential for isolating single episode camp activity is often greater when dealing with small sites.

It is often possible to formulate estimates of group size from villages and campsites. Formulations may be based on total numbers of tipis, earthlodges, or other type of lodges combined with estimated numbers of occupants per dwelling. Formulations may also be based on amounts of a certain material class present in the archeologically recovered assemblage.

Archeology in the study region has demonstrated differences in villages and camps. The riverine earthlodge villages stand in contrast to the tipi camps of the Plains and the small villages of Woodland houses of the eastern prairie. Debris density and midden accumulation provide information on intensity and duration of occupation. The semisedentary villages of the horticulturalists are distinguished from the transient camps of the nomadic hunter-gatherers.

Looking at the 13 tribes, camp and village sizes vary considerably through a typical annual cycle.

THE INDIVIDUAL

A great percentage of cultural remains are items of individual workmanship. This provides opportunity for examining differences in individual workmanship.

THE FAMILY

House floors of earthlodges, Woodland houses, and tipi rings present opportunities for studying family activities. It is sometimes possible to isolate men's and women's tools in residential context. Following the sexual division of labor, hide scrapers may be predominantly associated with female activities. It is very difficult to get at the composition of the family and the numbers of individuals per household.

BANDS

The prehistoric record in this territory is dominated by evidence of people with family or band level social organization. There was a limit on the ability of people to associate in sufficient density to require wider ranging authority to fix territorial boundaries over large areas. The limit was raised at least twice, however, once by the introduction of horticulture and again with the introduction of the horse. There may also have been several times in the more distant prehistoric past when the limit was raised by extremely favorable climatic conditions over an extended period of time coupled with extremely reliable subsistence resource availability. In these cases, higher levels of social organization were possible. There may have developed subbands, regularized descent groups, and tribal level society.

Bilateral bands with bilocal residence were probably predominant in the study region's prehistory. One married someone from outside one's own band and the married couple could join in residence with either band. Exogamy is comprehensible as a rule of marriage made by a group, and its function is to widen the network of kinship relations for the purpose of alliance (Service 1968:144-146).

The modal size of bands is 25 persons, and "is essentially a function of the optimal size for effective feeding strategy, interpersonal interaction, and defense, whereas the regional group size is most probably a function of the optimum size of an effective breeding unit" (Hassan 1975:38).

Brown (1979) sees the primary kin groups, the local band, and cooperative task group consisting of neighboring, allied bands as the three societal units fundamental to social organization on the prehistoric Northwestern Plains.

Female and male economic productivity appear to be quite evenly balanced. Despite an emphasis on hunting, female labor was important for seasonal plant gathering and milling grasses; plausible year-round female tasks include microfaunal procurement, processing game, food preparation, collecting firewood, and preparation of animal hides to satisfy extremely high clothing demands. At the same time female productivity does not seem to be high enough to imply polygynous or even matrilineal tendencies (Brown 1979:12).

Brown refers to Steward in describing the local band as a cohesive group of 10-50 persons, generally averaging 20-30, integrated by kinship and joint subsistence.

We can predict, then, that Northwestern Plains hunter-gatherers were organized into fairly small, bilocal bands with a flexible bilateral social structure responsive to extreme seasonal and long-term fluctuations in the High Plains environment and its mobile, unpredictable food resources. Decisions to join or to leave a particular band, whether to reside with matrilineal and patrilineal kin, and so on, were weighted more heavily by demographic considerations than prescribed rules of social behavior (Brown 1979:8-9).

TRIBES

The highest level of sociopolitical organization for prehistoric societies in the study region probably varied through time in response to subsistence resource availability, and was represented by families, bands, or tribes. The archeology here is not further complicated by chiefdom or state level societies as it is in other parts of North America. Familial organization as the highest level of sociopolitical organization was probably uncommon, but perhaps typical when subsistence resource potential and/or population densities were very low. Band level organization was probably the dominant form of organization through most of prehistory.

Many researchers believe the large tribes and band confederacies characteristic of Northern Plains groups in the historic period were uncommon in prehistory (Driver 1961:340). When, and under what conditions, was tribal level sociopolitical organization characteristic here? The answer depends on the definition of "tribal level." A tribe is a supraband society integrated by kinship and nonkinship sodalities or associations which unify persons belonging to different residential groups. The pantribal sodalities "cut entirely across the tribe to its very boundaries" (Service 1963:xxiii). Tribes are not held together by the dominance of one group over another and leadership is "charismatic."

Not only are pantribal sodalities the sole means of uniting larger numbers of groups of people, but they also serve to distinguish one tribe from another. This fact of social boundaries to the tribe is another point of differentiation of tribes from bands, for the forms of alliance of groups in band society are so weak and so personal, that each society seems to shade off gradually to the next (Service 1963:xxiii).

However, while tribal members may feel a common sense of cohesion and identity, they may differ in speech, territory, name, custom, and otherwise (Forbis 1979:45), like the Hidatsa, Dakota, Blackfeet, and Assiniboiné. Forbis (1979:46) says the "best that archaeologists can hope to identify in ancient sites are the bands themselves, not tribes by any definition."

Subsistence Economy

Consideration of subsistence economy are especially important in prehistoric archeology for several reasons. Understanding subsistence is fundamental to understanding society. Subsistence resource potential, combined with technological capability, relates directly to potentials for population density and social organization. Societal potentials are limited by subsistence resource potential. Secondly, recovering information and generating data regarding subsistence resources combine to form one of contemporary archeology's strongest capabilities. Ecofactual information, in the form of bone and carbonized floral remains, is often preserved and easily recovered. Capabilities for precise identification derive from well developed background information generated in the biological sciences.

In the historic period, hunter-gatherer subsistence economies dominated on the Plains and in the prairie and parkland to the north and northeast. This pattern also holds for all of prehistory with few exceptions. Aridity and/or short frost-free season mitigated against successful cultivation of domesticated plant foods. Horticultural pursuits were most successful in the Missouri River Valley as typified by the horticultural-hunting-gathering subsistence economy of the Plains Villagers. The Sheyenne, James, and Red River valleys also appear to have been favorable settings for (1) the Plains Village horticultural emphasis, and also (2) the Woodland hunter-gatherer-gardening subsistence economy wherein garden produce appears to have provided considerably less than half the subsistence base.

In general, these three subsistence economies relate well to several of the community pattern types defined by Beardsley et al. (1956). The hunter-gatherers fit the restricted wandering pattern. The hunter-gatherer-gardeners fit the central based wandering pattern. The horticultural-hunter-gatherers generally fit the semipermanent sedentary pattern; however, the Arikara, Mandan, and Hidatsa were not continuously sedentary.

Notwithstanding the diversity in subsistence economies, sexual division of labor was similar among all the tribes. Women did most of the work around the home and men did most of the work away from home (Driver 1961:179).

It is hardly possible to overemphasize the importance of bison to any of the native subsistence economies of this geographic area. All tribes appear to have relied on bison to as great an extent as possible. This discussion provides the opportunity to itemize some additional information on bison and bison hunting presented by Arthur (1975): the average live weight of a bull was 850 kg, a cow 320-360 kg. They dressed out at about 54% of live weight. The main calving season ranged from the beginning of March to the end of June. All seasons were potentially great hunting seasons. Bison sometimes aggregated in large, sedentary herds in winter, favoring well grassed sheltered stream and river valleys. Also in winter, small herds were scattered over the range in sheltered localities. Pounds and associated camps were always in areas where bison were expected to winter. Drivelines were constructed of whatever materials available, including brush, buffalo chips, logs, rocks, sticks, stakes, tree roots, and heaps of snow or dirt. Wilson (1934:356) notes that the bones of one buffalo yielded about 2.3 kg, or 1.9 liters, of bone grease.

Considerations of wild ricing are indirect for western North Dakota, but are relevant to the Woodland tribes. The western limit of the natural distribution of wild rice was in the ponds, lakes, and slow moving streams of eastern North Dakota. Wild rice (*Zizania aquatica*) was an important subsistence resource for some Dakota, Ojibwa, and Assiniboin. The Mandan also used and stored wild rice (Jenks 1900:1072).

Technological Economy

The technological component or subsystem of culture may be defined as the mechanical and chemical means by which humans seek to modify and control their environment (cf. Spier 1970:2; White 1949:364). Technologies consist of, among other things, tools and tool industries, tool kits and activity areas, structures, and techniques for manipulating the environment. Raw material selection, form, function, techniques of manufacture, construction, preparation, maintenance, and manufacture-use-discard trajectories are also important technological considerations. From a cultural materialist perspective, the reconstruction of the technological subsystem is of primary importance because it has been argued that technology is the basis of culture and determines the characteristics of other cultural subsystems (see White 1949, 1959) (Toom and Root 1983b:47).

Technological considerations derived from the ethnographic background are summarized in Table 1. Column headings identify a variety of social, subsistence, technological, and ritual activities. Information itemized under each activity emphasizes physical remains which might be detectable archeologically and includes (1) materials required for the activity, (2) tools, utensils, and facilities required, (3) products of the activity, and (4) archeological remains which, alone or in combination, may be direct evidence for the activity.

Skins, hides, and furs were very important to all of the tribes living in this geographic area. A family could easily use several deer, elk, or sheep hides each year for clothing. Nearly everyone had a buffalo robe; several more buffalo robes were needed for bedding and other robes wrapped some of the deceased at burial. A tipi cover required seven to 20 dehaired, tanned, and tailored buffalo skins. Several more hides and scraps would be needed for rawhide and to satisfy other recurrent needs for moccasin material, tipi liners, parfleches, drums, bags, quivers, shields, stone boiling pit liners, rawhide lashing, rope, etc. (Driver 1961:139, 192). The Hidatsa tipi cover, seeing only intermittent use, would typically last only a year or two (Wilson 1934:418). The tipi cover in full-time use by the nomadic hunter-gatherers was replaced annually, if possible. Old covers were recycled for other uses.

Table 1. Prehistoric cultural activities and associated materials and features.

	Cooking Food and Preparing Food	Drying and Storing Food	Lodge Construction and Maintenance	Logging/Woodworking
Required Raw Materials	fuel (firewood, chips, bone), boiling stones	poles posts	poles posts skins (tanned hides) bark clay soil sod rocks rawhide lashing	wood from felled trees, deadfalls, or driftwood
Tools, Utensils, and Facilities Required	hearth area grinding slabs manos/pestles boiling pits ceramic vessels skin containers jig pits wooden/bone pegs	parfleches cache/storage pits post/pole framework cairns	wooden/bone pegs	chipped/ground stone axes, controlled fire adzes chisels gouges
Products	food for consumption	dried food (storable food surplus)	tipi earthlodge domed, skin covered lodge, post and pole hunting lodge	pegs, dart shafts, scraper hafts, other tool hafts, posts, bowls, spoons, mortars, boats, birch bark vessels, bows
Archeological Remains	carbonized food remains, FCR, faunal remains hearths	cache/storage pits	post mold patterns living floors tipi rings timber lodge remains prepared floors	axes adzes chisels gouges (with diagnostic use-wear)

Table 1. (continued)

	Hunting	Butchering	Skin Preparation (Leather, Rawhide, Furs)	Bone and Antler Processing and Toolmaking
Required Raw Materials	game	animal carcasses	skins brains urine selenite fuel for smoking white clay	bone antler stones for boiling
Tools, Utensils, and Facilities Required	spear bow-and-arrow traps throwing stick snare pitfalls drive lines pound, whistles (game calls)	choppers knives (biface or flake)	wood/bone pegs fleshers scrapers knives beaming tools needles/awls smudge pits smoking frame	stone hammers and anvils, sawing tools, graving tools
Products	animal carcasses	bone horn meat hide sinew gut	tanned skins (lodge covers, clothing, foot gear, and quiver cases) rawhide (rope, thongs, parfleches, drum heads, skin baskets) furs (clothing, decoration), hair (cordage, rope)	pegs, bows, marrow, horn spoons, grease, horn, antler and bone tools, ornaments, scraper hafts, other tool hafts
Archeological Remains	kill sites/bone beds, drive lines, pitfalls dart points atlatl weights/ hooks	disarticulated faunal remains, cut marks on bone, butchering tools	scrapers smudge pits edge ground cobbles fleshers beamers wood/bone pegs selenite crystals	modified bone and antler

Table 1. (continued)

	Fishing	Eagle Trapping	Gardening	Plant and Plant Food Collecting
Required Raw Materials	fish poles/withes rawhide thong cordage	eagles thong/cordage withes/brush bait	seeds	plant resources wood, bone, horn, and antler
Tools, Utensils, and Facilities Required	seines weirs traps hook and line bow and arrow	trapping pit	digging stick garden plot scapula hoe antler rakes	containers threshing sticks drying racks; bison horn, bison bone, wood, and elk antler digging implements
Products	food catfish spines fish bait	eagles eagle feathers eagle bone	corn beans squash gourd sunflower	plant foods medicines smoking materials ornamentation purification buckbrush brooms thorns
Archeological Remains	fish remains (bones, scales) fishhooks	eagle parts eagle trapping pits	charred remains of cultigens, scapula hoes, antler rakes	seeds nut hulls pollen concentrations polish on cutting and digging tools

Table 1. (continued)

	Weaving, Basketry, and Quillwork	Shell Working	Ceramic Manufacture	Artwork, other Ornamentation
Required Raw Materials	plant fibers inner bark strips birch bark	shell	clay temper (pulverized granite, sand, shell, grog) water, fuel for firing	beads ochre teeth skins pigments bone antler wood sinew thread white clay
Tools, Utensils, and Facilities Required		abrading stone drill	cordage fabric decorating tools surface hearth area paddle anvil	paint brushes (wood or hair) knives gravers needles
Products	mats baskets fiber bags	beads, other shell ornaments	pottery vessels pipes	ornamented articles necklaces bracelets
Archeological Remains	perishables	shell beads, shell ornaments, worked shell debris	ceramic remains cached clay pulverized granite pulverized shell	ochre beads elk incisors drill/scored teeth

Table 1. (continued)

	Warfare/Conflict (Inter- or Intragroup)	Ceremonies/Feasting	Water Hauling and Storage	Sweatbathing
Required Raw Materials			water snow	poles/withes skins fuel for fire rocks rawhide thong
Tools, Utensils, and Facilities Required	spears bow and arrows controlled use of fire stone club heads	ritual structures bundles	ceramic vessels paunch buckets	sweat lodge, chopping/sawing tools
Products	booty/spoils captives		water	
Archeological Remains	damaged/mutilated human remains, burned lodges, exotic goods	extraordinary features		rock piles PCR surface hearths

Table 1. (continued)

	Chippable Stone Procurement	Chipped Stone Toolmaking, Maintenance, and Recycling	Ground Stone Toolmaking
Required Raw Materials	chippable stone source	chippable stone	grindable stone cobbles/ slabs
Tools, Utensils, and Facilities Required	hammerstones, quarry pits, pole/antler prying bars	hammerstones abraders flakers (antler, bone, wood)	pecking stone abrading stone
Products	cores biface blanks flake blanks	chipped stone tools	axes mauls pipes war club heads grinding slabs pestles/manos
Archeological Remains	tested raw material cores decortication flakes biface blanks flake blanks quarry pits worked outcrop strata	chipped stone tools chipped stone flaking debris hammerstones abraders flakers anvil stones	ground stone tools pecking stones abrading stones

Table 1. (concluded)

	Intergroup Trade	Burial
Required Raw Materials	trade goods	bodies dirt posts and poles rawhide lashing rocks
Tools, Utensils, and Facilities Required	exchange site	scaffold mound grave pit rock piles digging stick scapula hoe
Products	exchanged goods	burial mounds
Archeological Remains	exotic goods	burial mounds graves

The work effort associated with procuring, processing, and using hides, skins, and furs was significant. It probably exceeded the work effort associated with subsistence activity at times. Because of the great work effort involved and also because of the preservation of tools, debris, and features associated with this work effort, the archeologist should be familiar with hideworking techniques and the potential evidence for hideworking in archeological context.

Depending on (1) the quality of the skin, (2) damage to the skin from the kill, butchering, handling, or transporting, and (3) individual or group needs, a particular skin might be used for rawhide, dehaired and tanned, or tanned with the hair on. Whatever the intended use, the first step was defleshing, using either the favorite elk or bison metatarsal flesher, or other bone or stone scraper. The handled scraper with a chipped stone bit was a traditional, heavy duty scraping tool. "The end bladed tool had an elbow handle, wood or antler. It was used something like a hoe. The worker bent over the buffalo hide staked out on the ground and cut away toward her body" (Driver 1961:173). A frozen or dried skin was difficult to deflesh and easily damaged. Defleshing and subsequent processes involved stretching the skin by staking to the ground with bone or wooden pegs or lashing to a portable or fixed frame.

Dehairing appears to have been done by simple scraping of the green hide in some cases, but soaking in a solution of water and ash (lye solution) made it much easier. Defleshed and dehaired, the skin was ready for use as rawhide.

If a hide with fur or hair was desired, the step after defleshing was tanning. If tanned leather was desired, a dehaired skin was tanned.

A concoction of three or four buffalo brains, pieces of flesh from near the small ribs near the kidneys, and a buffalo horn spoon full of bone grease and gray sage was boiled together in a pottery or wooden vessel, and when ready, was thoroughly rubbed into both sides of the skin [the defleshed side only when fur or hair was retained]. After three or four days, in warm weather, the skin was well saturated with this brain and grease compound. The hide was then soaked in warm water and wrung out, ordinarily by two women, who by means of a short stick twisted it around a post set upright in the ground (Wilson 1934:416-417).

The tanning process fixed the organic nature of the skin so it would be resistant to rotting. The more supple and smooth the skin desired, the more it would be worked (grained) subsequent to tanning. "Breaking the grain" made the tanned skin smooth, a task accomplished by much work rubbing the hide against a fixed object such as a post, or rubbing the fixed hide with a tool such as a scraper or the characteristic edge ground cobble of the Northwestern Plains.

The goals of this section have been (1) to sketch historically documented strategies which are potentially relevant to modeling prehistoric adaptive strategies in the western North Dakota study region, and (2) to identify historically documented cultural materials and features which have potential for aiding with interpretations of prehistoric cultural materials and features encountered in archeological sites. Considerations now turn to the prehistory of the study region.

ARCHEOLOGICAL CLASSIFICATION AND CHRONOLOGY FOR WESTERN AND CENTRAL NORTH DAKOTA

by Michael L. Gregg

Introduction

It is necessary to be familiar with the varieties of material remains, settlement patterns, lifeways, and other cultural characteristics documented for a particular study area in order to meet the objectives of contemporary archeology: chronology building, lifeways reconstruction, and understanding human behavior. The variety of cultural characteristics is described through the application of standardized classification systems and standardized units of classification. Named units, defined by following a recognized framework of implicit rules, are organized into historical sequences by means of temporal models known as chronologies.

A chronology for any given study area requires latitude for considering lifeways characteristic of adjacent geographic areas. Since there is often (if not always) overlap in group territories, there is exchange of information concerning lifeways, settlement systems, and material culture of various group adaptations to different geographic areas/resource bases. The ethnohistoric records illustrate, for example, that Hidatsa and Assiniboin territories overlapped in southeastern Saskatchewan, southwestern Manitoba, and northwestern North Dakota at least during the period ca. 1737-1837. While the core area (Syms 1977) for most (if not all) Hidatsa was in central and western North Dakota at that time, the Assiniboin core area included parkland to the north. There was contact and exchange of information between the Hidatsa and Assiniboin such that there were some similarities between the groups with respect to material culture (e.g., metatarsal fleshers), settlement types (e.g., tipi work camps near bison kills), and other cultural characteristics (e.g., use of prairie turnips). Just as it is necessary to consider Assiniboin lifeways in order to more fully understand Hidatsa lifeways, it is necessary to consider group interaction throughout prehistory which resulted in information flow into western and central North Dakota from adjacent geographic areas (Syms 1977).

Because classifications and chronologies of archeological remains ordinarily apply to specific geographic areas, there is usually need for geographic areas to be identified and named for reference. A standardized series of spatial unit terms has developed in American archeology to satisfy this need. These terms were identified and defined by Willey and Phillips in 1958, and continue in use in Northern Plains archeology basically unchanged from the original. From smallest to largest they are: site, locality, region, subarea, and area (Willey and Phillips 1958:18-20).

Lehmer and Caldwell suggested the Plains area be divided into the Northern Plains and Southern Plains subareas for prehistory (1966:512) as Kroeber (1939:76-84) had proposed for historic native cultures. Lehmer and Caldwell's Northern Plains subarea was comprised of the Northwestern Plains, Central Plains, and Middle Missouri regions (1966:512). Lehmer revamped these spatial units, retaining the Plains area, scrapping the Northern and Southern Plains subareas, and naming a new series of Plains subareas including the Northwestern Plains, Middle Missouri, and Northeastern Periphery (1971). In 1981, the Northeastern Periphery was renamed the Northeastern Plains by unanimous accord of participants in a symposium entitled "Recent Research in the Northeastern Periphery" at the 39th Annual Plains Conference in Bismarck, although some investigators had been using the term informally for years (cf. Chomko and Wood 1973). Current terminology is followed here by recognizing a Plains area with Northwestern Plains, Northeastern Plains, and Middle Missouri subareas. However, the old "Northern Plains" term is retained to take in the three northernmost subareas of the Plains area (Figure 9).

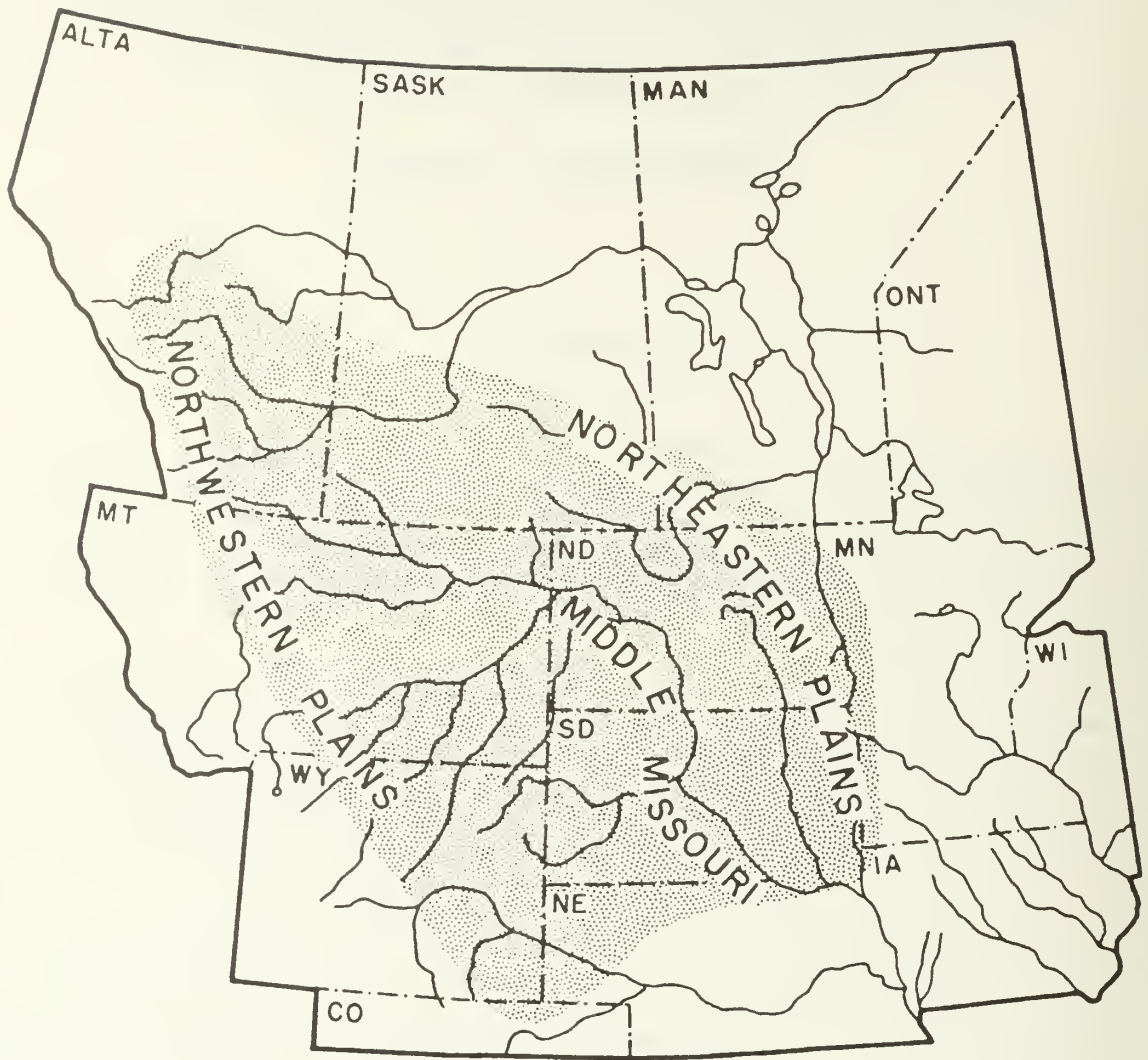


Figure 9. Subareas of the Northern Plains, combining terminology from Griffin (1952), Lehmer (1971:28-29), Lehmer and Caldwell (1966:512), and Wedel (1961:23).

Environmentally the Northern Plains can be fairly well defined. It is bordered on the north by the Aspen Parkland of Saskatchewan, Alberta, and Manitoba, and the east by the Woodlands of Manitoba, Minnesota, and Iowa, on the west by the Rocky Mountain front ranges of Colorado, Montana, Alberta, and the Continental Divide in Wyoming. The southern boundary more or less corresponds to the Pine Ridge Escarpment in southern South Dakota-northwestern Nebraska (Reeves 1970b:4).

The Northwestern Plains, Middle Missouri, and Northeastern Plains subareas may each be divided into regions and localities based on specific research problems and site information. A number of regions have been defined for each subarea, but only the Middle Missouri subarea is characterized by a generally accepted series of named regions (Figure 10).

The study area for this background chapter is western and central North Dakota; it contains portions of the Northwestern Plains, Middle Missouri, and Northeastern Plains subareas. Named regions of direct concern are the Garrison, Knife-Heart, and Cannonball regions of the Middle Missouri subarea and the Little Missouri region of the Northwestern Plains subarea (Loendorf et al. 1982). The Little Missouri region takes in all lands within the Little Missouri River drainage (Figure 10).

Two cautionary notes must be kept in mind when dealing with named spatial units: (1) the precision with which boundaries for areas, subareas, regions, and localities are demarcated depends on the purpose of the researcher, and (2) most named units have utility for only part of prehistory. Taking the second point, there was very little grassland in the Northeastern Plains from 9500-7500 B.C. (Schneider 1981a).

Returning now to classification and chronology, material remains of human activities are the fundamental elements from which prehistoric chronologies are built. However, contemporary prehistoric chronologies are more than sequences of time diagnostic material remains. They are also less than orderings of sequential and contemporaneous societies. Archeological chronologies are comprised of named archeological units, some of which are defined primarily with reference to distinctive material remains (i.e., artifact types and associated remains), and others of which are defined primarily with reference to lifeway patterns/general adaptive strategies. All archeological units, however, are "arrived at by combining three sorts of data: formal content, distribution in geographical space, and duration in time" (Willey and Phillips 1958:14).

A number of chronologies have been formulated which apply, in part, to western North Dakota (e.g., Frison 1978; Irwin-Williams et al. 1973; Lehmer 1971; Lovick and Ahler 1982; MacNeish 1958; Mulloy 1958; Reeves 1970b; Wood n.d.). However, chronologies are formulated with reference to study areas. The study area of concern for Mulloy, Reeves, and Frison is the Northwestern Plains; for Lehmer it is the Middle Missouri subarea; for MacNeish it is southeastern Manitoba; for Irwin-Williams et al. it is the Hell Gap group of localities; for Lovick and Ahler it is the upper Knife-Heart region. While none of these chronologies can be extended for direct application to the western and central North Dakota study area, they all involve some named archeological units characterized by distinctive material remains and/or lifeway patterns which are encountered in the archeology of western and central North Dakota.

Archeological Unit Terms

The archeological unit terms used here in classification are component, tradition, phase, complex, variant, aggregate, and period. The definition of each term gives consideration to cultural content, geographic distribution, and duration in time while differing in the emphasis or restrictions placed on these variables. These terms can be used together to organize a considerable variety of prehistoric lifeways information and material remains in western North Dakota. The definitions follow with some discussion of problems inherent in their use.

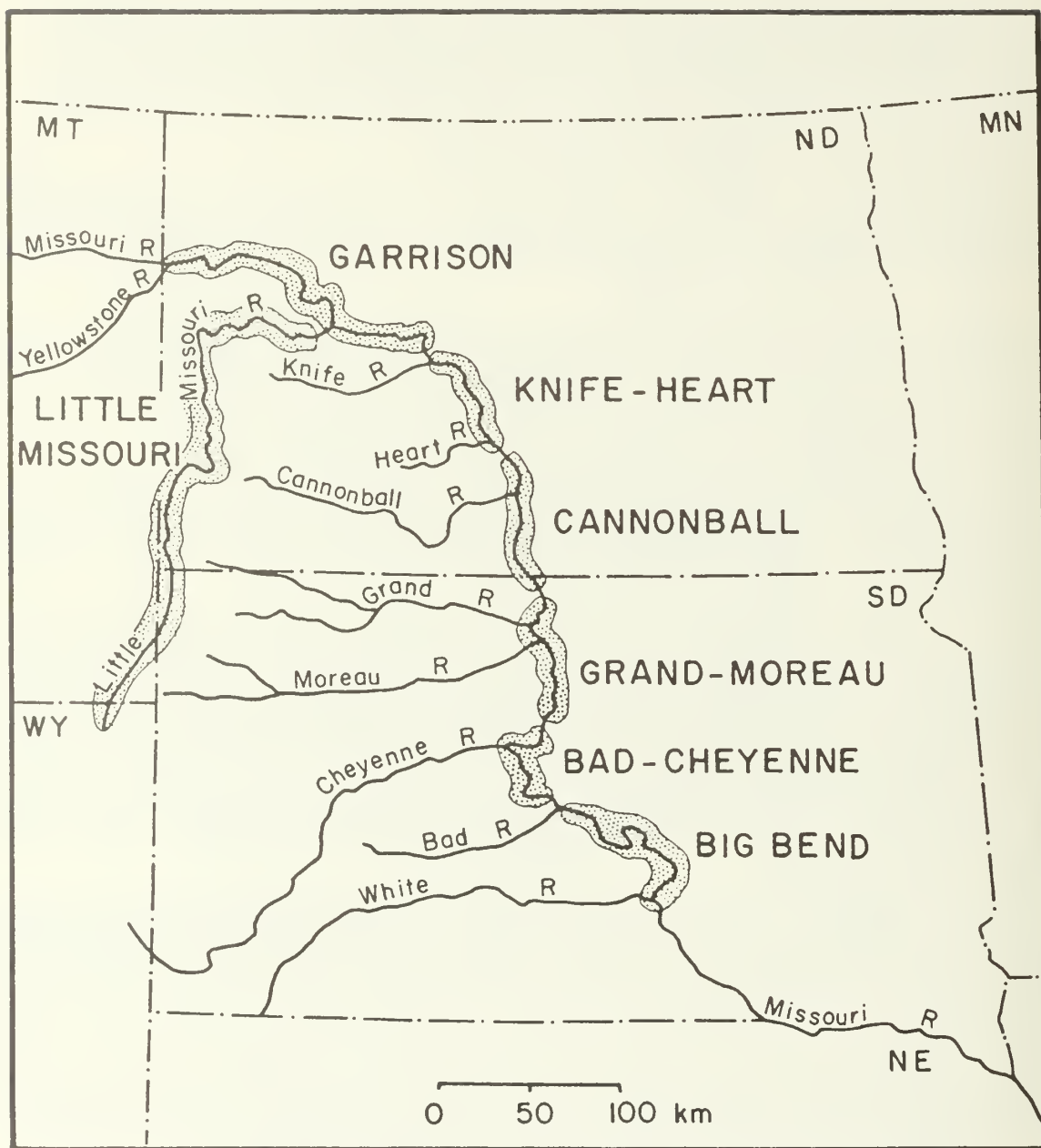


Figure 10. Regions of the Middle Missouri subarea from Lehmer (1971:29) and the Little Missouri region of the Northwestern Plains subarea from Loendorf et al. (1982).

Component

A component is defined here as the remains of an occupation or occupations left at a single site by a single group or several groups with the same or similar material culture; the period of time involved is of such brevity that either vertical stratification of occupations is lacking or material cultural differences between cultural strata cannot be demonstrated. In dealing with a single component site it is often difficult or impossible to demonstrate the number of occupations or groups involved in the deposition of the physical remains. Where intrasite cultural levels are stratified and cultural materials from each stratum are the same or similar, those cultural levels may or may not be considered as individual components depending on the objective of the investigator.

Groups with different overall lifeways and overlapping territories may be expected to apply similar or indistinguishable exploitive techniques to the same resource base in the same locality resulting in deposition of similar occupational residues at a single site. This characteristic mitigates against involving concepts like "society" or "social group" in defining the archeological unit term "component." Regardless of whether one or more occupations or societies were involved in the formation of a component, a component potentially contains information regarding past lifeways at one settlement type of one or more settlement systems.

Given the historic and prehistoric native lifeways and settlement systems known for the study area, any individual component should not be expected to yield information representative of the entire range of either material remains or cultural activities of any groups. McKean bison kill sites, for example, do not typically yield grinding stones, grinding slabs and other evidence for plant food processing, yet such material remains and this cultural activity are characteristic of McKean in at least some parts of the Northern Plains. As another example, the material remains and cultural activities represented in a Besant hunting camp in the Little Missouri Badlands should be expected to be restricted in comparison with material remains and activities represented in a recurrently occupied Besant base camp along the Missouri River. A number of Besant components, representing the full range of known Besant settlement types, must be analyzed in order to empirically characterize the broad range of Besant material remains and cultural activities.

Since components are often (if not usually) comprised of the material remains of several occupations with overlapping activity areas, remains from a component cannot be used uncritically to reconstruct activities characteristic of a single occupation. For example, consider the possibility of recurrent, overlapping, Nailati phase Plains Village camps on a Spring Creek terrace: a three day occupation by a small group processing antelope and a one day occupation by a large group en route from a main village to a hunting camp near the Killdeer Mountains. While a wide range of camp activities are likely to be represented, the activities associated with the individual occupations would be difficult to separate.

Additional confusion may occur because the material remains recovered from a component may not be representative of the entire content of that component. This involves problems of sampling, preservation, and field recovery.

Even if the archeologist is certain that a component represents a single occupational episode and the recovered material remains are representative of the total material content of the component, there is the problem of the material content of the component with respect to the material content of the functioning occupation. Most artifacts recovered from a component represent what was no longer wanted or could not be transported to the next camp. Caution should be exercised in equating archeologically recovered artifacts "with functioning tool kits or the full range of lithic manufacture" (Jelinek 1976:21).

Tradition

A tradition is defined here as a lifeway pattern/general adaptive strategy operating within a specified geographic area over a specified period of time. Willey and Sabloff (1973:175) define a tradition as an archeological unit emphasizing the persistence of certain cultural traits or elements in the same area over a relatively long span of time. Since groups with differing adaptive strategies are characterized by different settlement patterns and by some differences in material cultural inventories, the definition used here is viewed as essentially congruent with that of Willey and Sabloff.

Named traditions utilized here are Paleo-Indian, Plains Archaic, Plains Woodland, Plains Village, and Equestrian Nomadic. Some Assiniboin, Ojibwa, and Santee Dakota represent the historic emergence of the Plains Woodland tradition. The ethnographically documented horticultural-hunter-gatherers (Mandan, Hidatsa, and Arikara) represent the historic emergence of the Plains Village tradition. Nomadic hunter-gatherers such as the Crow, Cheyenne, Shoshoni, and Teton Dakota represent the historic emergence of the Equestrian Nomadic tradition. From an ecological perspective which emphasizes the importance of subsistence resource base reliability in biological and cultural adaptation (cf. Hayden 1981), cultural traditions may be viewed as the most reliable adaptations possible in a given geographic area for the human population size and technology of the time.

On the Northern Plains the inception of the Plains Archaic tradition is on a 7000-5000 B.C. time level. Plains Woodland tradition origins are on a ca. 100 B.C. time level in North Dakota. The Plains Village tradition originates ca. A.D. 900-1100 throughout most of the Middle Missouri subarea. The Equestrian Nomadic tradition is a late and distinctive lifeway pattern/general adaptive strategy involving groups with Plains Woodland, Plains Archaic, and Plains Village backgrounds.

The history of a cultural tradition may ordinarily be expected to involve numerous socially distinct groups or societies separated geographically and temporally. For example, the Mandan, Hidatsa, and Arikara are ethnically distinct groups late in the history of the Plains Village tradition.

Beginning and/or ending dates given for traditions are like those given for most phases. They most commonly represent periods of transition rather than distinct time lines. The periods of transition from Paleo-Indian to Plains Archaic and from Plains Archaic to Equestrian Nomadic are examples in the study area.

More than one tradition may be represented within a specified geographic area at one point in time. Historical records document co-occurrence of different traditions in the study area, e.g., Assiniboin (Woodland), Crow (Equestrian Nomadic), and Hidatsa (Plains Village), and co-occurrence should be anticipated in prehistory as well.

Phase

Willey and Phillips define a phase as:

. . . an archaeological unit possessing traits sufficiently characteristic to distinguish it from all other units similarly conceived, whether of the same or other cultures or civilizations, spatially limited to the order of magnitude of a locality or region and chronologically limited to a relatively brief interval of time (1958:22).

A phase is a regional expression of a cultural tradition. It is defined on the basis of some cultural content (material or other traits) which is found to be either (1) temporally distinctive through comparison with immediately antecedent and subsequent components in a region, or (2) geographically distinctive through comparison with other contemporary components. A phase thus defined is usually designated with a name. Gross distinctions in cultural content identified through intercomponent analyses may indicate adaptive strategies sufficiently dissimilar to be classified in different cultural traditions (earlier, later, or in a different geographic area). Where interregional comparative analyses fail to demonstrate distinctions in cultural content between contemporary components, named phases are sometimes extended through several regions.

The definition of phases is usually an inductive classification process used in chronology building. However, chronological modeling for an area with a poorly developed archeological information base often involves postulating the existence of named phases defined for nearby regions when contemporary adaptations are anticipated to have been essentially similar. It then becomes a deductive process to verify or reject the hypothesized presence through intercomponent analyses.

Phases defined for the Northern Plains have temporal durations ranging ca. 100-1500 years. Beginning and ending phase dates are specified, but such dates ordinarily indicate periods of transition to or from phases or other named units with differing cultural content. Sometimes, however, the identification of a new phase in a region may represent immigration (unit intrusion) which may potentially be dated precisely.

Complex

A complex is defined here as a group of similar and distinctive material remains with repeated co-occurrence demonstrated by intercomponent analyses; temporal and geographic extents are restricted only by the dates and locations of member components. As knowledge increases within a region regarding the range of settlement types and lifeway pattern/general adaptive strategy associated with a particular complex, it may become feasible to identify and describe the archeological manifestation as one or more phases. For example, Folsom complex artifacts are known from western North Dakota, but little is known regarding regional Folsom settlement types or the regional Folsom lifeway pattern/general adaptive strategy. If future research fleshes out the Folsom artifact inventory and identifies the Folsom settlement types and adaptive strategy characteristic of some region in western North Dakota, it would be feasible to describe a phase representative of the Folsom complex in the development of the Paleo-Indian tradition in that region.

Variant

The unit term "variant" is used here only because it is fundamental to the chronology established for the Plains Village tradition throughout most of the Middle Missouri subarea. Lehmer defines a variant as "... a unique and reasonably uniform expression of a cultural tradition which has a greater order of magnitude than a phase, and which is distinguished from other variants of the same tradition by its geographic distribution, age, and/or cultural content" (1971:32). Lehmer apparently resurrected and revitalized the variant concept to organize within-tradition material cultural distinctions that were relatively uniform across a geographic area larger than a region. With reference to the other definitions used here, a variant is equivalent to a multiregional phase.

Aggregate

An aggregate is defined here as a group of similar material remains which cannot be satisfactorily classified within any existing named unit; extents in time and space are not established. An aggregate is a trial formulation used in classifying components which cannot be otherwise satisfactorily classified. The material remains suggest that some form of relationship exists between the components, and the components are classified together because it may be of heuristic value to do so. The Mortlach aggregate is one example from the study area (Schneider and Kinney 1978:35).

Period

The "period" concept has been used in many different ways. However, most archeologists would agree that periods "are horizontal time bands marked off on the chronological chart in years, centuries, or millennia" (Willey 1966:7). Beyond this, periods have been characterized in terms of material cultural traits, developmental or evolutionary trends or stages, distinctive lifeways, and otherwise.

The six unit terms defined above are sufficient to classify archeological remains and build a chronology for the study area. Periods are superfluous with respect to increasing the capability to refine the analytical value of a classification. But the use of named periods is a convenient way to reference a general block of time. In this overview, a "period" carries no connotation beyond that of a horizontal time band. Beginning and ending dates for a given period may be variable across the study area. There may be any number of named classification units within a period.

Discussion

Figure 11 illustrates a hypothetical application of the unit terms component, phase, aggregate, complex, and tradition. Components 7 and 8 in region I and components 9-13 in region II are classified within complex A because they manifest repeated occurrences of similar and distinctive material remains and have produced a range of dates which supports some sort of association, but knowledge of settlement types and lifeway pattern/general adaptive strategy is insufficient to identify and describe the manifestation as one or more regional phases of a tradition.

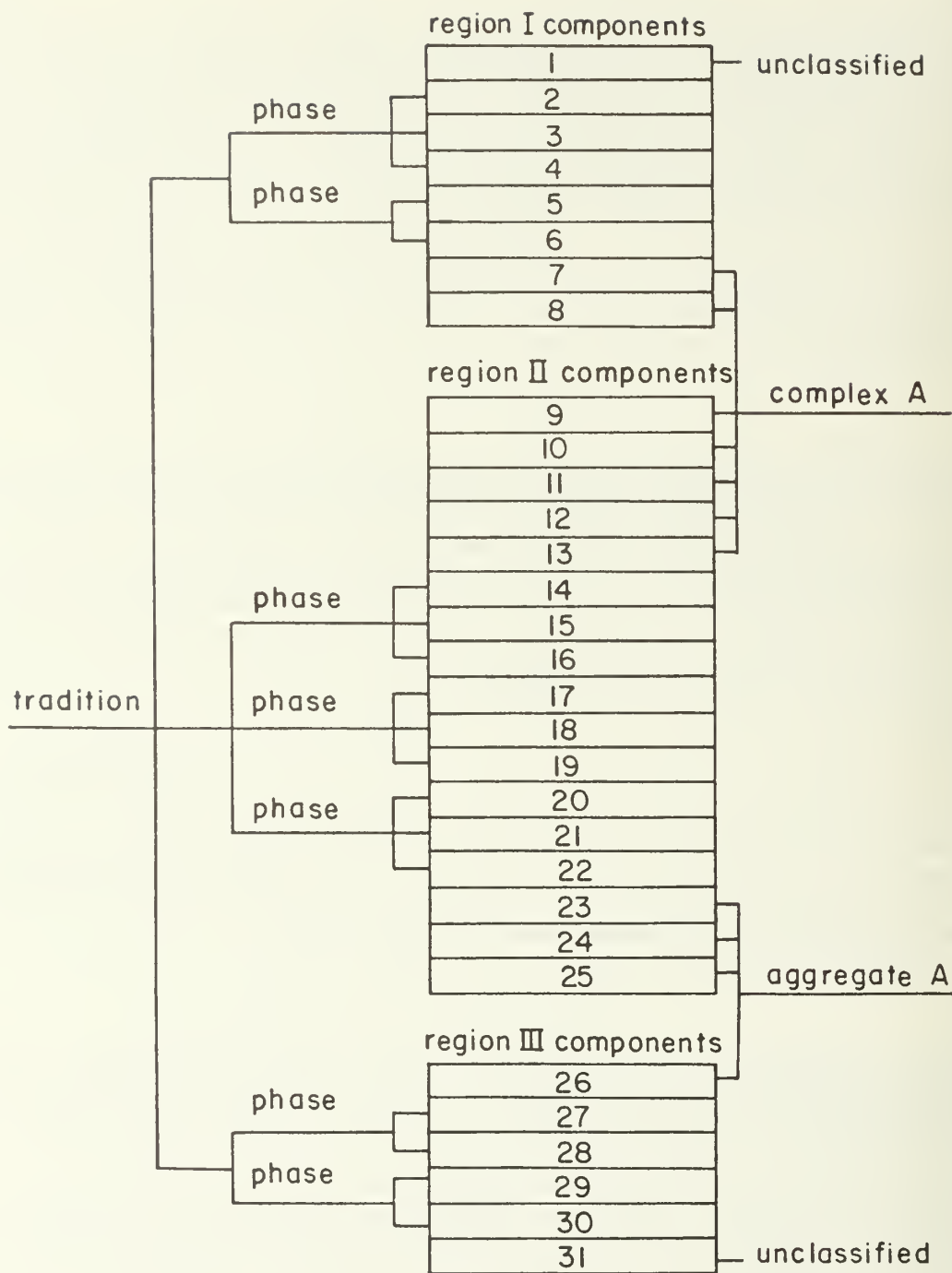


Figure 11. Hypothetical application of archeological unit terms to a sample of 31 components in three regions.

Components 23-25 in region II and component 26 in region III are classified within aggregate A because they each manifest similar material remains, but temporal and/or geographic extents are not established and none of the components can be satisfactorily classified within any existing named unit.

All but two of the other components are classified within different phases of the same cultural tradition. They are all representative of a single lifeway pattern/general adaptive strategy. They are classified within different phases either because (1) they represent a particular manifestation which is regionally distinctive, or (2) intraregional variation in material remains or settlement types in combination with good temporal control facilitates distinction of subsequent and/or antecedent phases within a region. This example illustrates some phases represented by just two or three components in a sample drawn from three regions. Other reported (but unillustrated) components from these regions would also be classified in these phases. Two or three components are ordinarily insufficient to form the basis for defining a phase. Component 1 in region I and component 31 in region III are unclassified.

The unit terms discussed above have been used in a number of different ways by Northern Plains archeologists, often without adequate definition. Willey and Phillips suggested subphase units be used for making finer temporal distinctions within regional phases (1958). The subphase concept has been used in another way in the Northern Plains. Reeves (1969) wanted to apply the tradition-phase-subphase classes to the last 5000 years of Northern Plains archeology, but was initially foiled by Willey and Phillips' restriction of applying the phase concept to a geographic area no larger than a region. It was clear to Reeves that archeological units like Pelican Lake and Avonlea were each characterized by components with sufficiently similar cultural content and sufficiently restricted temporal ranges to warrant phase designations (1970b). Pelican Lake and Avonlea are, however, characterized by geographic distributions which not only transcend numerous archeological regions and subareas, but even extend outside the Plains area. Reeves' solution was to modify the phase and subphase concepts by removing geographic extent limitations on a phase and shifting them to the subphase. With phase designations applying to extensive geographic areas, regional variations were identified and named with subphase designations. So, in some Northern Plains archeological classifications and chronologies, subphases are defined to identify regional, rather than temporal, variations within a phase.

Formulation and refinement of unit descriptions is a never ending process:

The working procedure . . . is initial formulation, investigation of spatial and temporal dimensions, reformulation, reinvestigation of spatial and temporal dimensions, and so on indefinitely. The operation is immensely complicated by the fact that the fixing of these *internal* dimensions is, more often than not, dependent on *external* relationships. We have only to recall certain essential conditions of our unit's existence. In the same place, but before or after it in time, were similar units whose contents intergrade with its content in so-called transitional periods that are almost impossible to establish with precision; beside it in space were other contemporaneous units with similar intergrading at frontiers equally difficult to draw (Willey and Phillips 1958:14).

The unit terms which are stressed here for chronology building and organizing the variety of prehistoric lifeways and material remains of western North Dakota are phase, complex, and tradition. Traditions emphasize lifeways while complexes emphasize material remains, and phases emphasize both material remains and temporal distribution within a region. Chronology building is viewed as related to and involving, and not distinct from, considerations of past lifeways and cultural processes. The prehistorian working with a cultural ecological perspective evaluates repeated occurrences of similar material remains with reference to the adaptations they represent in the study area. Stability and change in material remains represent information potential for identifying and explaining cultural processes.

Artifact Types, Style, and Ethnicity

Complex and phase descriptions involve an artifact type or types (morphological types) and associated artifactual material and/or features. A morphological artifact type is a "composite description of

many artifacts, each of which is quite similar" (Thomas 1979:216). This similarity is defined in a composite description which identifies the distinguishing attributes, including ranges in variation in each distinguishing attribute. If morphological types are characteristic of a restricted range of time, they are considered temporal types (Thomas 1979:222).

It is important to consider morphological artifact types in the context of functioning cultural systems in order to gain perspective concerning temporal artifact types, named archeological units, and societies or ethnic groups. It is understood that artifact types, specifically projectile point types and ceramic types, are predominantly stylistic phenomena: specific or characteristic designs in the material products of a society. The designs are maintained by patterned behavior in any or all of the fundamental subsystems (technological, sociological, ideological). That is, there are characteristic designs maintained by the technological subsystem (e.g., thrusting spear haft design), the sociological subsystem (e.g., some ceramic decorations), and the ideological subsystem (e.g., Southern Cult design motifs). The patterned behavior may be maintained either consciously or unconsciously by individuals or groups of individuals.

It is further understood that projectile point types and ceramic types (styles) must be intentionally maintained in teaching-learning situations by individual craft workers or production workers in order to endure in preliterate societies. It would not be possible to maintain a style over a geographic area as large as a region or subarea without craft workers maintaining, by some form of interaction, a shared mental template of the style. This interaction need not be uninterrupted. However, lacking a shared mental template a development sequence will be initiated whereby styles will change (Newcomb 1976).

Michlovic (1981:44) identifies "two fundamental aspects of human behavior, recognizable in the activity of individuals, which have relevance to the production of artifact styles:" (1) a desire for prestige, and (2) reciprocity. He suggests that one mechanism for establishing and maintaining prestige is to give hand crafted items of a style which has proven not only to be acceptable, but which guarantees that the craftworkers will maintain themselves "in the most favorable possible relationship with other individuals." Reciprocity, he suggests (1981:44-46), might stimulate artifact similarities because reciprocity creates a social situation "wherein individuals find that their manufactured goods enter into an interaction that postulates some sort of obligation on their part for maintaining certain standards of workmanship." Once the standards are established, they are most surely maintained by "imitation and convention." By maintaining a style, individuals are "insuring their position in a small way in relation to another person."

Under the rubric suggested here ethnic boundaries and social structural arrangements may certainly have something to do with the generation of style, but they are only examples of a more basic pattern of human behavior and in many cases they may not be involved in the production of artifact styles (Michlovic 1981:46).

Michlovic (1975) suggested the widespread uniformity of projectile point styles in the eastern Woodlands "was probably the cumulative result of a complex network of individual exchange relationships" (Snow 1980:161). Snow views projectile point types functioning similarly:

In the first place, the spatial boundaries of projectile point types are not necessarily coterminous with social groups. Individuals exchanged finished pieces as a means of maintaining social connections through reciprocity. In the course of doing this they criticized each other's work either implicitly or explicitly, an activity that enhanced prestige and enforced uniformity in what was considered excellence (1980:161).

Networks of individual exchange relationships can be manifested archeologically as exchange networks or interaction spheres. "What is essential to the concept of an interaction sphere is that it denotes a situation in which there is a regular cultural means of institutionalizing and maintaining intersocietal interaction" (Binford 1972:204). If exchange of stylized goods is manifested archeologically by the geographic distribution of an artifact type or types, then the geographic distribution may represent the extent of prehistoric intersocietal interaction on the time level during which the artifact type was exchanged. Most of the archeologically documented interaction spheres likely involved participants from more than one ethnic group or society.

The extensive nature of some interaction spheres is characterized by this Native Australian example:

... trade and transport of lithic raw materials reflect the importance of long-distance contacts in traditional Aboriginal desert life. Along with widely ramified kin-sharing networks, the rule of preferred second cross-cousin marriage, and the eight-subsection system, we find exchange behavior that serves to maintain the widest possible range of social contacts over the largest possible area. These social contacts serve as important risk-minimizing mechanisms by allowing socially adult males and their families to gain access to resources and share food in regions distant from their own in times of extreme drought. Social networks, with their associated obligations of food sharing and access to resources, may extend as much as 350 to 400 miles in any one direction from a particular person's own Dreaming sites, encompassing a radius of direct contacts of up to around 800 miles, with indirect contacts extending even beyond that distance (Gould 1978:287).

Establishing and maintaining artifact types (styles) may also be grounded in the realm of ritual/religion. Cook Islanders worship an artifact type, a "superbly fashioned adze" which is an ideal of their basic tool (Hoebel 1966:294): this ceremonial adze represents "the god of a cult of craftsmen."

During the period ca. A.D. 1250-1500 various highly conventionalized motifs (styles) "took on a universal meaning" founded in religious symbolism through the U.S. Southeast from northern Florida to Oklahoma (Walthall 1981:21). The Southern Cult involved a variety of societies, ethnic groups, and language families.

Frison and Bradley suggest the Folsom "fluting process was an art form or was performed in the realm of ritual" (1981:15):

Arguments can be made that the flutes provide a superior means of hafting. On the other hand, not all Folsom points were fluted and the unfluted varieties can be hafted successfully. It does seem to have been a wasteful process considering the number of preforms destroyed in the fluting process. On the other hand, well-fluted preforms were on occasion abandoned. There were also attempts at delusion, as evidenced by projectile points that were given the appearance of fluting but in reality were nothing more than thin, flat flakes with a flaking process applied to accomplish an outline form.

While styles sometimes cut across ethnic boundaries, there are also situations where stylistic differences in adjacent areas at one point in time are material manifestations of ethnic territorial boundary signalling/maintenance strategies (Hodder 1979:446, 452; 1981). Intentional boundary signalling/maintenance may relate to economic, ideational, and/or sociological motives; similarity in aspects of material culture is used to "communicate within-group corporateness in reference to outsiders" (Hodder 1979:446). Binford has also been:

... convinced that much of the variability noted between the material products of distinct sociocultural units known ethnographically results not from unconscious "drift" but from a conscious response to selective advantages accruing to the maintenance and explicit recognition at the cognitive level of group identities and individual identities (1972:290-291).

It is likely that such selective advantages might in some situations just as well accrue to aggregates of distinct sociocultural units where "group identity" is multi-ethnic in nature.

Archeologically, the total geographic distribution of some artifact types need not be congruent with the total geographic distribution of a single complex or phase. Just as types can crosscut ethnic groups, they can crosscut archeological units.

In the Baringo area, spear styles cover wide regions, crossing ethnic boundaries, because they are used by young men as symbols to support their common conflict with the elders in the different tribes. Items of young female attire, on the other hand, are generally restricted within Baringo ethnic groupings ... (Hodder 1981:669).

Chronological work in archeology requires dealing with the stylistic dimensions of artifacts (Cook 1976:4). Attribute and typological analyses are objective, straightforward, and empirical in nature. When

explanations of stylistic attributes are sought, however, "the total adaptive context of the sociocultural system [or systems] in question must be investigated" (Binford 1972:25).

It is important to be aware that artifact types are often diagnostic traits of named archeological units and may signify either intersocietal or intrasocietal patterned behavior. Artifact types may or may not correlate with social groups, ethnic groups, or societies.

NAMED ARCHEOLOGICAL UNITS IN A CHRONOLOGY FOR CENTRAL AND WESTERN NORTH DAKOTA PREHISTORY

by Michael L. Gregg

Introduction

There is no single, existing chronology which is adequate for the central and western North Dakota study area. An adequate chronology is one which identifies all named (described) aggregates, complexes, phases, variants, and traditions with components known or anticipated in the area of concern. The ethnographic and ethnohistoric records indicate it is necessary to consider a large geographic area in order to understand native adaptations in western North Dakota during the Historic period. A large geographic area must also be considered in order to understand the *prehistoric* native adaptations. The Knife River flint (KRF) quarry heartland and source area likely witnessed tertiary use by groups with core areas far to the northwest, north, northeast, east, and southeast where fine-grained cryptocrystalline silicas required for toolmaking are considerably less common. Named archeological units from an extensive geographic area should be represented by components in western North Dakota, especially in and near the KRF quarry heartland.

Named archeological units with components known or anticipated in the area of concern are considered in chronologies for the Northwestern Plains (Frison 1978; Mulloy 1958; Reeves 1970b), Middle Missouri subarea (Lehmer 1971), upper Knife-Heart region (Lovick and Ahler 1982), Northeastern Plains subarea (Syms 1977), and western fringe of the Eastern Woodlands (Buchner 1979; Johnson 1969). The chronology presented here (Figure 12) draws from all of these temporal models.

Four clearly different native lifeways/adaptive strategies are evident from the archeological, ethnohistoric, and ethnographic records for the Northern Plains: (1) nomadic settlement with hunting and gathering subsistence focused on terminal Pleistocene and Pleistocene-Holocene transitional resource species (Paleo-Indian tradition), (2) nomadic settlement with hunting and gathering focused on essentially modern resource species (Plains Archaic tradition), (3) semisedentary settlement with subsistence balanced between horticulture and hunting-gathering (Plains Village tradition), and (4) horse dependent nomadic settlement and hunter-gatherer subsistence (Equestrian Nomadic tradition). This accounts for four of the five traditions represented in the chronology. The Plains Woodland tradition is identified for heuristic purposes. The Plains Woodland lifeway in the study area appears to have been similar to the Plains Archaic lifeway, but the use of ceramics, practice of mound burial ceremonialism, and possible intensification in the use of indigenous seedy plants and grasses for food suggests that Plains Woodland components be classified apart from components of the other traditions so that the Plains Woodland lifeway will be a focus of research attention.

The following narrative provides further introduction to each of the five traditions and gives cursory coverage to each of the named complexes, aggregates, and phases classified within these traditions with components known or anticipated in western North Dakota. In order to offer this sort of introduction it is frequently necessary to consider information from throughout the Northern Plains, and in some cases it is necessary to go farther afield. Radiocarbon dates are presented in abbreviated form, giving only a date B.C./A.D. and citation for the source of the date. All dates are uncorrected.

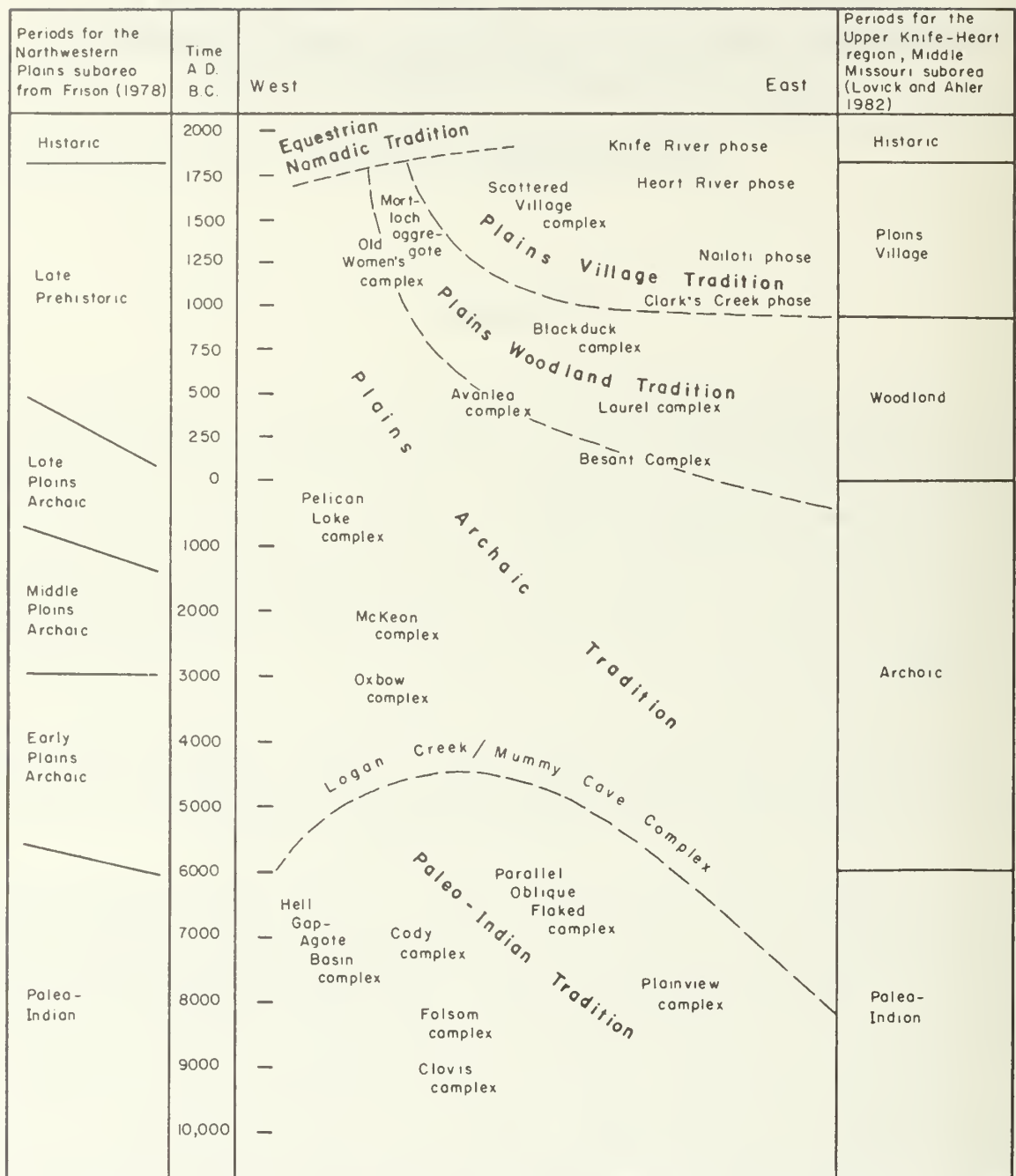


Figure 12. Chronological model for the Northern Plains depicting named archeological units with components known or anticipated in western and central North Dakota.

Paleo-Indian Tradition

Paleo-Indian (Roberts 1940) occupations are dated ca. 9500-5500 B.C. on the Northern Plains by most archeologists. The beginning date correlates with the initial peopling of the area. The end date, correlating with the transition of the Paleo-Indian lifeway into the Plains Archaic lifeway, appears to vary geographically. The Paleo-Indian tradition is characterized by a variety of hunting and gathering adaptive strategies, each with a strong focus on big game. Early in the history of the tradition this big game focus was on a variety of Pleistocene fauna, including some very large species (megafauna). Late in the history of the tradition the focus was on bison species intermediate in form between late Pleistocene and modern forms. These adaptive strategies, none of which are yet described in detail, along with a variety of lanceolate point technologies and geographically extensive interaction networks (Hayden 1982), are the defining characteristics of the Paleo-Indian tradition. The Paleo-Indian tradition as used here is coterminous with the Big-Game Hunting tradition (Willey 1966:37-51).

The view of an emphasis on big game hunting for this tradition is not intended to underrate the Paleo-Indian adaptive capacity (Fitting 1970:65). Both floral remains and milling stones have been recovered from Paleo-Indian sites and linked to Paleo-Indian subsistence economies (Agogino 1962:246). It is proposed, however, that the emphasis in these varied hunting and gathering strategies was on big game and that big game was a staple. The extensive intergroup interactions evidenced by stylistic uniformity in projectile points and widespread distribution of rare raw materials is viewed by some as supporting evidence for big game being a staple (Hayden 1982). A focal subsistence economy (Cleland 1976) oriented toward early Holocene big game has been characterized as unreliable in comparison to most diffuse subsistence economies typical of subsequent Archaic tradition adaptations (Hayden 1982). Hayden argues that "the cause for the widespread cultural homogeneity [characteristic of the Paleo-Indian tradition] was . . . poor or unreliable resources and the need to maintain an elaborate, far-reaching alliance network to fall back upon in times of resource failure" (1982:118).

A great deal of attention has focused on Paleo-Indian projectile points. This attention is well deserved because of the information potential the points hold. Considerations have proliferated recently regarding the function of these artifacts in interaction spheres. Their occurrence as mortuary offerings in burials (e.g., at the Anzick, Browns Valley, and Renier sites) substantiates their importance in the ideological realm.

The earlier discussion and definition of archeological unit terms indicates the most refined within-tradition distinctions are made at the levels of phases and subphases. However, phase and subphase definition requires detailed, regional, intercomponent analyses, and since there are few excavated Paleo-Indian components in the Northern Plains and in western North Dakota, the focus here is on the level of complexes.

The Paleo-Indian tradition is subdivided into six complexes: Clovis, Folsom, Hell Gap-Agate Basin, Cody, Plainview, and Parallel Oblique Flaked (Figure 13). These six complexes differ, minimally, with regard to projectile point stylistics. A study of entire chipped stone tool assemblages from a small number of components suggests further differences between the complexes (Irwin and Wormington 1970).

The Clovis complex is defined on the basis of the Clovis point type and associated material remains and is dated ca. 9500-9000 B.C. (Haynes 1966:107). The big game emphasis was on a variety of terminal Pleistocene fauna, most notably the mammoth.

The Folsom complex is defined on the basis of the Folsom point type and associated material remains and is dated ca. 9000-8000 B.C. (Haynes 1966:107). The Folsom big game emphasis was on *Bison antiquus*, a variety of other soon-to-be-extinct Pleistocene fauna, but not including mammoth and mastadon.

The Hell Gap-Agate Basin, Cody, Plainview, and Parallel Oblique Flaked complexes (often referred to as Plano complexes) are defined on the basis of a variety of lanceolate point technologies. The big game emphasis was on one or more varieties of bison intermediate in form between the late Pleistocene and modern species. The point variations, along with increasing numbers of dated components, form the basis for defining four, more or less contemporaneous complexes within the period ca. 8000-5500 B.C.

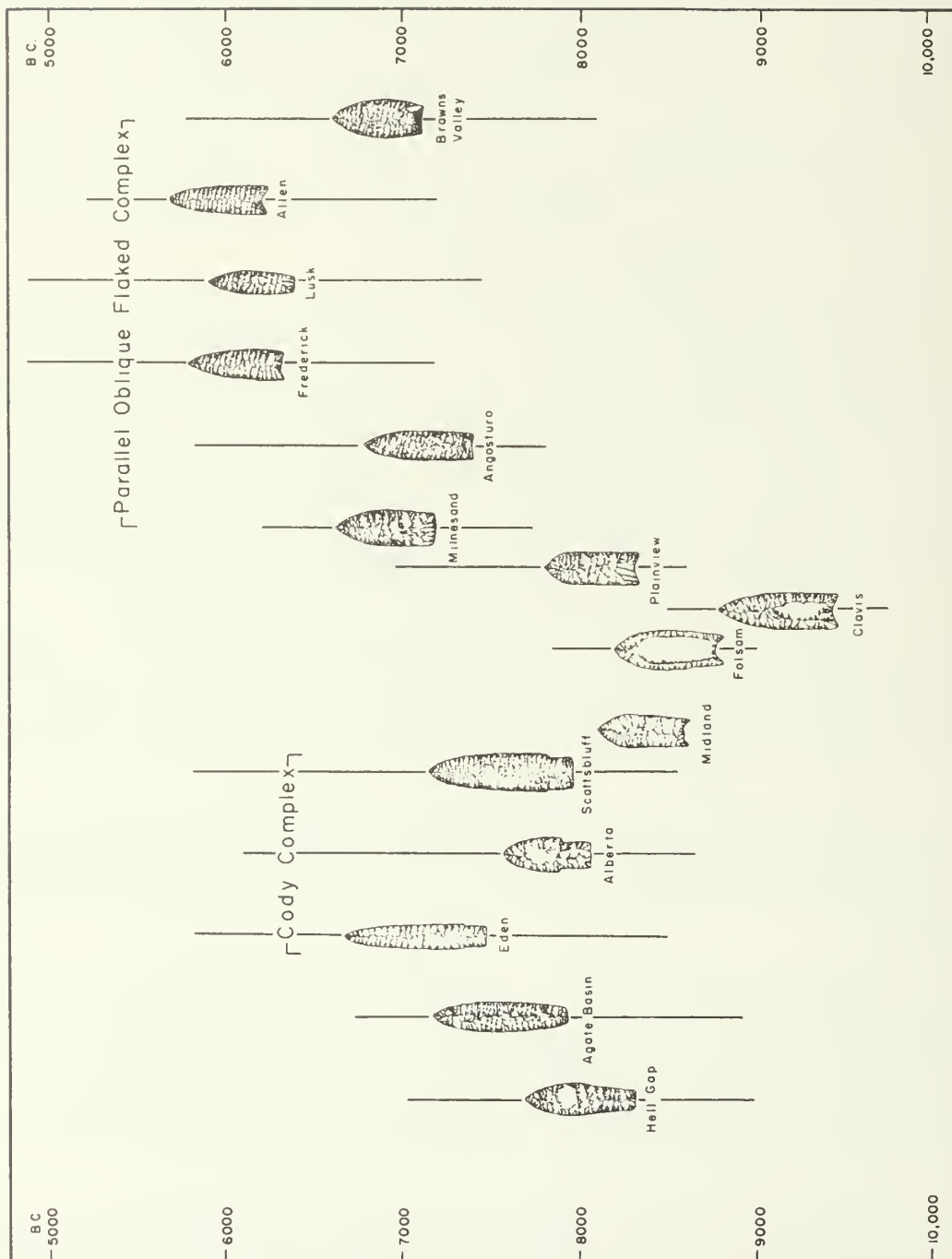


Figure 13. Tentative chronology and distinctive point styles of the Paleo-Indian tradition in the study region.

By late in the history of the Paleo-Indian tradition, regional adaptive strategies on the Northern Plains had evolved to the point that they presently appear indistinguishable from Plains Archaic adaptive strategies. For example, Anderson (1980:197) observed "only minor variations on the hunter-gatherer theme" based on the analysis of late Paleo-Indian and Archaic stone tool assemblages from the Cherokee Sewer site in northwestern Iowa. No differences "were discernable between the late Paleo-Indian and Archaic horizons of a magnitude to suggest different economies or adaptive strategies were employed" (Anderson et al. 1980:257). However, lithic analyses were not detailed and the site investigators noted they were dealing with winter camp occupational debris and components deposited in other seasons would need to be investigated for possible differences in subsistence activities (Anderson et al. 1980:257).

Paleo-Indian tradition components in the study area are minimally expected to span a period of 4000 years. Variations are anticipated in settlement types and systems, but there has been little speculation by North Dakota archeologists. New England is quite far afield, but Snow's (1980:150) modeling for the Northeast may apply in part to the study area. He suggests the initial populations were free wandering communities (Beardsley et al. 1956:135) "that moved frequently and without restriction, their direction, persistence, and territory covered being controlled by game movements and the abundance of other wild food resources" (Snow 1980:150). He proposes a pattern of seasonal round movements within band territories developed commensurate with increased human population density (1980:150), but he does not indicate what that critical level of population density might have been. There are at least three group sizes indicated by Paleo sites in New England: "(a) a band subset or special task group; (b) a complete band of several nuclear families; and (c) multiband congregations" (Snow 1980:152).

Fred Schneider of the University of North Dakota has recently focused research attention on North Dakota Paleo-Indian remains. As of early 1982 there were "still no excavated Paleo-Indian artifacts, no radiocarbon dates or documented stratigraphic associations of PaleoIndian artifacts, and no documented associations of extinct fauna with Paleo-Indian artifacts in North Dakota" (1982a).

As a result of examining numerous private surface collections and documenting Paleo-Indian projectile point finds, Schneider has been able to generalize that 95% "of the recorded Paleo points from North Dakota are from west of the Missouri Coteau," and further, "it is believed that the Paleo occupations in the state are concentrated in the counties bordering the Missouri River" (Schneider 1982b). He suggests this distribution of points reflects the distribution of occupations and the distribution can be explained with reference to the potentials and limitations of the natural environment during the Paleo-Indian period:

The archaeological and paleoenvironmental data provide an interpretation suggesting that the late periglacial and early post-glacial environments of eastern North Dakota were not conducive to this region's occupation of large numbers of grassland herbivores and their Paleo-Indian predators. [Spruce-aspen woodland covered much of the state during the period ca. 11,050-8050 B.C.] In addition, much of eastern North Dakota in immediate post-glacial times was covered with glacial lakes Agassiz, Souris and Dakota, large meltwater streams, and numerous ponds and marshes (Schneider 1982b).

The southwestern portion of the state was not glaciated during Wisconsinian times and likely was a location of early transition from boreal forest to grassland. Wendland (1978:276) shows western North Dakota with grassland cover during the period ca. 9550-8550 B.C. Boreal forest was replaced by grassland in central North Dakota ca. 7050 B.C. (Bickley et al. 1971; Cvancara et al. 1971). The Leonard paleosols of the Aggie Brown member of the Oahe formation date ca. 11,000-6550 B.C. (Clayton et al. 1976:11) and it "is suggested that the environment of this time was cool and humid with grassland covering much of the state during the latter portion of this period" (Schneider 1982b). Information from northeastern Montana, North Dakota, and southwestern Manitoba (e.g., Jerde 1981:21; Schneider 1982a, 1982b; Syms 1976 respectively) suggests that grassland or parkland environments adjacent to lakes and rivers were favored Paleo-Indian site locations.

As of April 1982, Schneider had recorded 212 North Dakota Paleo points. Clovis, Folsom, and all four Plano complexes are represented. Folsom "is the most frequent type, accounting for 23% of the recorded specimens. Other Paleo points, in descending order of frequency, are: Agate Basin, Scottsbluff, Eden, Plainview, Milnesand, Hell Gap, the Angostura/Lusk/Frederick group, Alberta, Cody Knives, Browns Valley, Clovis" (Schneider 1982b).

Schneider has also made some summary observations regarding chipped stone raw materials that were utilized (Table 2).

Many of these projectile points are composed of a dark, almost black flint [KRF], one relatively free of internal fractures, fossils or inclusions, and the specimens appear to be derived from relatively large homogeneous blocks of Knife River Flint. A subjective observation is that Paleo-Indian peoples had greater access to large pieces of "high" quality flint than perhaps did late Native American populations (Schneider 1982a:35).

Table 2. North Dakota Paleo-Indian points and lithic raw material types (from Schneider 1982a:34).

Artifact	KRF	POR	CHT	CHL	SLS	JSP	AGT	Other	Total
Clovis	2	1	2	—	—	—	—	—	5
Folsom	42	2	—	1	—	—	—	—	45
Milnesand	8	1	—	3	—	—	—	1 unknown	13
Plainview	14	—	—	—	—	—	—	1 unknown	15
Agate Basin	19	4	6	—	1	1	1	1 flint, 1 quartzite	34
Hell Gap	6	1	—	—	—	1	—	—	8
Scottsbluff	16	—	4	2	2	—	1	2 unknown	27
Eden	13	—	—	—	—	—	—	1 unknown	17
Alberta	4	2	—	0	0	0	0	1 rhyolite	7
Cody Knife	3	—	—	—	—	—	—	—	3
Angostura	7	1	—	—	—	—	—	—	8
Browns Valley	2	—	—	—	—	—	—	—	2
Fragments	7	1	—	—	—	—	—	—	8
TOTAL	132	13	12	7	4	3	2	3 known, 5 unknown	192
PERCENTAGE (based on n = 187)	76.5	7.0	6.4	3.7	2.1	1.6	1.1	0.5/known	
KRF — Knife River flint POR — porcellanite CHT — chert CHL — chalcedony					SLS — silicified JSP — jasper AGT — agate unknown surface painted or burned				

Clovis Complex

The name derives from Blackwater Draw locality 1 near the town of Clovis, New Mexico where the direct association between Clovis points and mammoth bone was documented (Sellards 1952).

TEMPORAL DISTRIBUTION

The complex is currently dated ca. 9500-9000 B.C. (Haynes 1966:107). There are sites with associated mammoth and cultural remains with earlier and later dates, but lacking Clovis diagnostics. The Lindsay mammoth site in eastern Montana is an example (Davis 1982:7). Pre-Clovis human occupation has not yet been identified in the Northwestern Plains (Frison 1978:27), or elsewhere in the Northern Plains. "The transition from the use of Clovis points to Folsom points approximately 11,000 years ago coincides with the extinction of mammoths, horses and several other members of the Pleistocene megafauna" (Haynes

1969:710). There are no dated Clovis sites in Montana (Davis 1982), North Dakota, or the Canadian prairie provinces. The closest radiocarbon dated site to the study area is Lange/Ferguson in western South Dakota (ca. 8720 B.C.) (Hannus 1981).

GEOGRAPHIC DISTRIBUTION

Components of the Clovis complex have "been found in every one of the mainland states of the U.S." (Haynes 1966:107) and are "widespread on the Northwestern Plains" (Frison 1978:27). All surface finds documented in North Dakota are west of the Missouri Coteau (Schneider 1982a) (Figure 14). Mammoth teeth and bones are recorded throughout North Dakota (Halverson 1981; Schneider 1982a), but none are associated with cultural material.

CONTENT

Settlement Types: kills and camps.

Faunal and Floral Remains: mammoth; bison (Haynes 1966:111); horse (Haynes 1969:711); mastadon and extinct antelope; tapir, sloth and jackrabbit; camel, coyote, prairie dog, rabbit, snails, mussels, and hackberry seeds at Lewisville (Wormington 1957:58).

Feature Types: hearths (Lehner site), stacked mammoth bone (Colby site), pit features (Blackwater Draw); fire pit for heat treating chert at Debert (MacDonald 1968).

Burial: red ochre covered burials with chipped stone and bone artifact offerings at Anzick (Lahren and Bonnicksen 1974; Taylor 1969).

Chipped Stone: Scrapers, graters, choppers, perforators, flake knives (Haynes 1966:110); Clovis point (see Wormington 1957:263 for type description) and smaller points of the same general shape with basal thinning, but lacking flutes; blade technology; fabricating biface blanks at quarry sites (Haynes 1966:107); large biface choppers; large biface knives/preforms with straight or convex bases or bipoined.

Ground Stone: hammerstones, granite slab chopper, sandstone abrader, sandstone grinding stone.

Modified Bone: bone and ivory points (Haynes 1966:108); bone cores and bone flake tools (Hannus 1981); bone foreshafts (Lahren and Bonnicksen 1974); shaft wrench; flesher and chopper.

Pigments: red ochre associated with flintknapping activity at the Agate Basin site (Frison 1982); red ochre at Anzick.

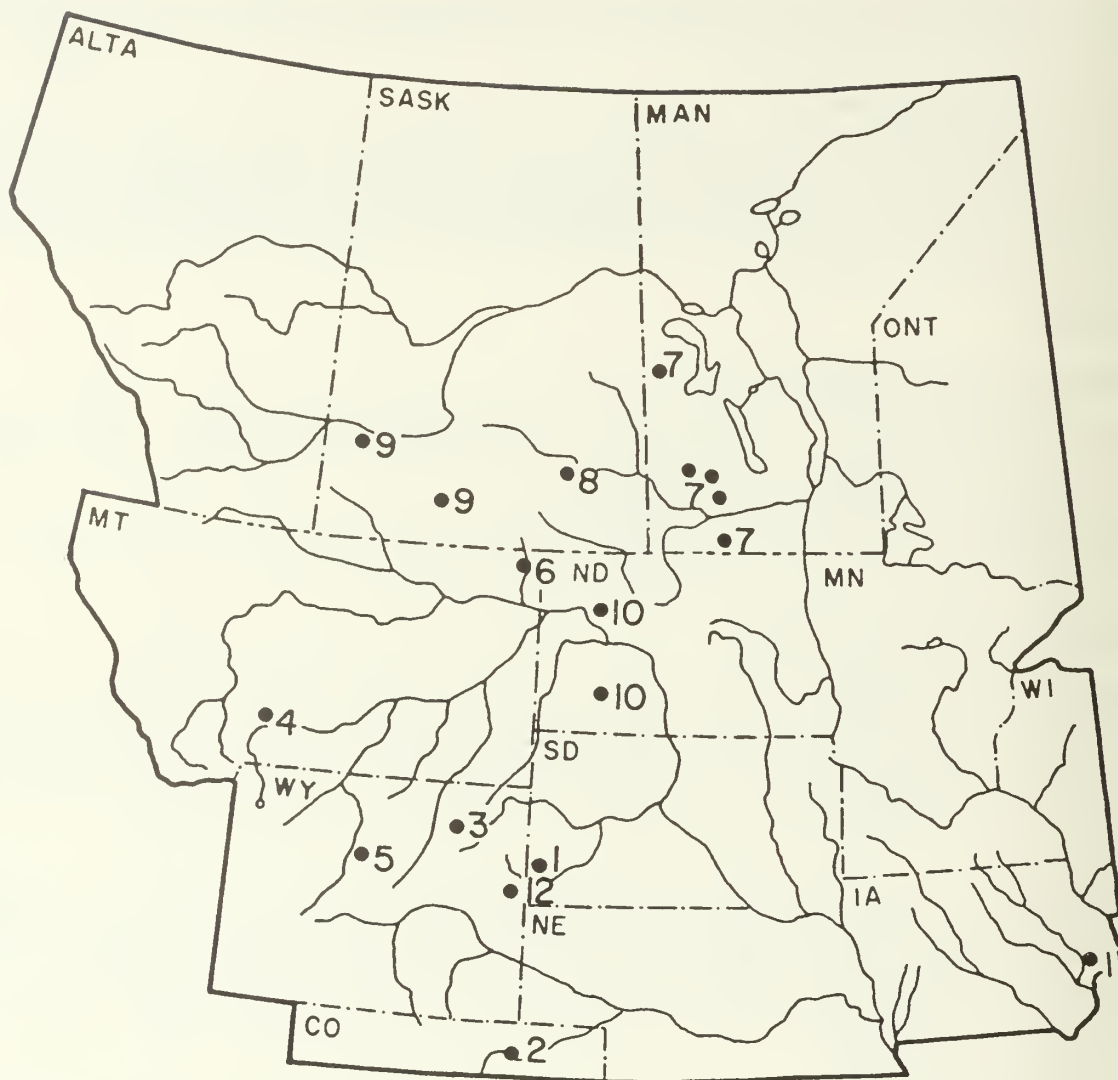
DISCUSSION

Clovis population densities are impossible to estimate since there is not a reliable sample of sites. No one has calculated the amount of terrain remaining unaltered by severe erosional processes from the period 9500-9000 B.C.; the remnant Clovis landscape has neither been identified nor covered by sampling survey.

Sociopolitical organization may have taken the form of bilateral/bilocal bands. On the basis of the number and distribution of activity areas at the Holcomb site in Michigan, Fitting suggests the typical Holcomb band with Clovis material culture numbered 30-60 individuals (1970:47, 56).

Subsistence remains from Clovis components are dominated by large Pleistocene fauna. Favorite stalking grounds "seem to have been shallow lakes and swamps" (Willey 1966:112). The age distributions of mammoths from Clovis kill sites indicates Clovis hunters were "dispatching small groups of mammoths. Among living elephants such small groups are natural, and represent family groups consisting mainly of the adult females and the young at all stages of growth" (Saunders 1979:9). Exploiting the mammoth resource may have involved some scavenging in addition to hunting. "Murray Springs and Blackwater Draw, with their non-natural groupings of older individuals, seem to suggest natural death of older elephants at water sources, some of which were scavenged, but not killed, by man" (Saunders 1979:10).

Hackberry seeds and sandstone grinding stones indicate plant foods were utilized (Wormington 1957:58). Future use of fine scale recovery techniques at Clovis camps will certainly yield further evidence for floral resources in the subsistence economy.



- 1 — Lange/Ferguson (Hannus 1981)
- 2 — Dent (Wormington 1957:43-44)
- 3 — Carter-Kerr McGee (Frison 1978)
- 4 — Anzick (Lahren and Bonnicksen 1974)
- 5 — Colby (Frison 1978)
- 6 — surface (Jerde 1981)
- 7 — surface (Pettipas, personal communication, 11/30/82)
- 8 — Gryba and Gryba (1980)
- 9 — surface (Kehoe 1966a)
- 10 — surface (Schneider, personal communication (7/19/82)
- 11 — Rummells-Maske (Anderson and Tiffany 1972)
- 12 — Agate Basin (Frison and Bradley 1983)

Figure 14. Some reported Clovis surface finds and excavated components.

Clovis spear points represent a widespread horizon style and are important to understanding the social organization of populations with Clovis complex material culture. A very strong tradition was maintained through at least 25 generations (about 500 years). Assuming male point making (allowing for considerable female flintknapping of other items), males across an immense geographic area were linked by a fairly rigid stylistic tradition. Only interaction would seem to have guaranteed maintenance of such a stylistic tradition within a society with presumably low population density. Perhaps ritualized exchange relationships linked the total population in order to broaden potential for mates or subsistence resources. Perhaps point making ritual was coupled with high male residence mobility associated with bilateral descent and bilocal residence and these phenomena acted together to maintain the Clovis horizon style. Red ochre associated with Clovis flintknapping activity at the Agate Basin site (Frison 1982) supports an interpretation of Clovis flintknapping ritual.

Irwin and Wbrmington's study of Paleo-Indian chipped stone tools from the Plains indicates Clovis "differs in a number of significant respects" from later Paleo-Indian complexes, "but there are enough similarities to provide some confirmation of the theory that it is ancestral to other Paleo-Indian cultures of the Plains" (1970:30). The Clovis chipped stone tool assemblage from Blackwater Draw contains about 19% points, slightly more than 50% scrapers, and small percentages of large thin biface knives, spurred flake tools, and notched flake tools (Irwin and Wormington 1970:30). Of the scrapers, 75% are side scrapers, 19% are end scrapers, and 7% are raclettes ("a special kind of scraper commonly found in Paleo-Indian assemblages" characterized as "very thin flakes with a fine, light, evenly executed retouch that differs from random removals characteristic of utilized flakes") (Irwin and Wormington 1970:28, 30). Two-thirds of the end scrapers are spurred. "Blades were more commonly used in Clovis times than in succeeding periods" (Irwin and Wormington 1970:30). The Clovis chipped stone technology sometimes involved thermal pretreatment (heat treating) of raw materials (Bonnichsen 1977:217; Fitting 1970:45; MacDonald 1968).

The Anzick site is a Clovis burial (Lahren and Bonnichsen 1974; Taylor 1969). Human remains and grave goods were placed in a small rockshelter. "The burial assemblage contained the red ochre-covered remains of two sub-adults and over 100 stone and bone artifacts" (Lahren and Bonnichsen 1974:148).

Folsom Complex

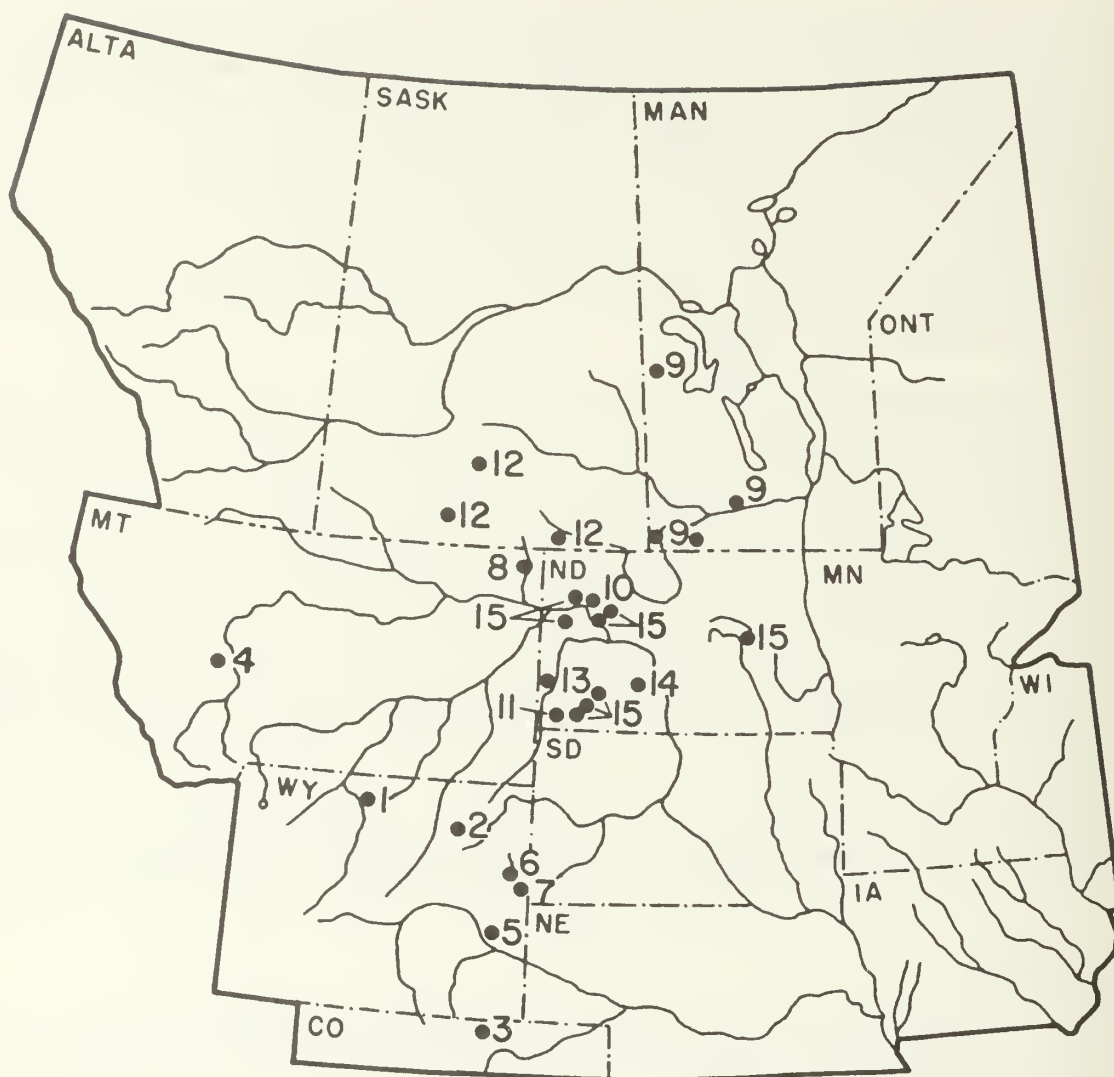
The name derives from the Folsom site, New Mexico (Cook 1927; Figgins 1927). Midland points and associated remains are considered along with Folsom assemblages here in the Folsom complex. The Midland type site is near Midland, Texas (Wendorf and Krieger 1959). The appropriateness of this lumping scheme is debatable. "The thinness of Midland points may well have served the same function as the fluting of Folsoms; however, the manufacturing process involved is evidently distinct, and Midland points should not be considered simply Folsoms which proved too thin for fluting" (Irwin-Williams et al. 1973:47).

TEMPORAL DISTRIBUTION

Folsom components are currently dated ca. 9000-8000 B.C. (Haynes 1966:107). Folsom dates on the Northwestern Plains are consistent with those from elsewhere in western North America.

GEOGRAPHIC DISTRIBUTION

The geographic distribution of Folsom components is more limited than Clovis (Willey 1966:42). Folsom surface finds and excavated components, characterized by Folsom and/or Midland points, are distributed throughout the Plains from Texas to Manitoba, southern Alberta and Saskatchewan, and along the western slope of the Rockies (Wormington 1957:29). Folsom remains are more common than Clovis in some areas (such as North Dakota) and no more common than Clovis in other areas (such as southwestern Manitoba). Figure 15 illustrates approximate locations of some reported Folsom surface finds and excavated components. All but a few North Dakota Folsom finds are from west of the Coteau (Schneider 1982a).



- 1 - Hanson (Frison 1978)
- 2 - Carter-Kerr McGee
- 3 - Lindenmeier (Wilmsen 1974)
- 4 - MacHaffie (Forbis and Sperry 1952)
- 5 - Hell Gap (Irwin-Williams et al. 1973)
- 6 - Brewster (Agogino 1972)
- 7 - Agate Basin (Frison and Bradley 1983)
- 8 - surface (Jerde 1981)
- 9 - surface (Pettipas, personal communication, 11/30/82)
- 10 - Moe (Schneider 1975), surface
- 11 - Rhame (Simon, personal communication, 6/17/82), surface
- 12 - surface (Kehoe 1966a)
- 13 - Beach (Davidson, personal communication 7/9/82), surface
- 14 - Richardton (Davidson, personal communication, 7/9/82), surface
- 15 - Schneider (personal communication, 7/19/82), surface

Figure 15. Some reported Folsom surface finds and excavated components.

CONTENT

Settlement Types: small group kills and mass kills (traps and jumps); base camps (e.g., Lindenmeier); workshops; armament sites and processing sites (Judge 1973:199-208).

Faunal and Floral Remains: *Bison antiquus*; camel; deer, wolf, and rabbit at MacHaffie (Forbis and Sperry 1952); mountain sheep, marmot, cottontail rabbit, mule deer; pronghorn, coyote, swift fox, red fox, jackrabbit; seeds at Lindenmeier (Agogino 1962:246); muskrat and turtle at Lubbock (Reeves 1969:22).

Feature Types: circular, hard packed floors at the Hanson site indicate recurrently occupied structures (Frison 1978); circular post mold patterns of dwelling wall members in Midland component at Hell Gap.

Design Motifs/Ornamentation: hematite bead with carved design; canel coal bead; incised bone discs; tubular bone beads; powdered hematite; red ochre frequently associated with flintknapping debris (Frison 1982; Frison and Bradley 1980).

Chipped Stone: Folsom point and Midland point (see Wormington 1957:362 for type descriptions); a variety of end and side scraper forms (some spurred), graters, utilized channel flakes, flake knives, Folsom points used as knives, spokeshaves, large leaf shaped biface utility tools, cores recycled for other uses (e.g., choppers) "chisel-graver," drills; blade technology; heat treatment.

Ground Stone: hammerstones, grinding stones for pulverizing hematite, sandstone abraders, large hammerstone/chopper.

Modified Bone: awls, knives/fleshers, possible spear points, needles.

Modified Antler: elk antler knapping tool.

DISCUSSION

The Folsom complex is generally considered to be a development out of the Clovis complex (e.g., Judge 1973:69). Judge notes the occurrence of point styles intermediate between the two types and suggests this occurrence is "evidence strong enough to warrant further investigation of a possible widespread 'proto-Folsom' complex from which a relatively specialized Plains 'classic' Folsom was derived" (1973:69). Further, comparative analyses of Clovis and Folsom assemblages demonstrate the presence of similar tool types in similar frequencies (Irwin and Wormington 1970:33).

Lindenmeier is perhaps the most heavily sampled Folsom site. Wilmsen (1974:34) calculates there are at least 15 separate Folsom camp occupations (units) represented. He was able to isolate materials from five of them for comparative analysis. "The units were occupied by groups who made their artifacts in the same way and who made the same sets of tools" (Wilmsen 1974:103). They also structured their living space and activity areas in similar ways. The similar sizes of the occupation areas indicate comparable sizes for the resident groups: 15-20 people per camp (Wilmsen 1974:110-113).

Some Folsom occupations at Lindenmeier contained artifacts of Yellowstone obsidian, others contained artifacts of obsidian from central New Mexico (Wilmsen 1974:114). Wilmsen suggests that Folsom bands were widely dispersed, yet linked by some mechanism which involved circulating exotic stone material (1974:119).

Schneider (1982a) has documented 48 Folsom points from North Dakota. Seven of the 48 are fluted on only one face (Schneider 1982a). Frison and Bradley suggest that fluting was a nonessential technological process and was most frequently performed with carefully controlled pressure (1980, 1981).

There are about 15 times as many Folsom points recorded for North Dakota as there are Clovis points. This indicates increased human use during Folsom complex times over Clovis complex times for the study region in general. There is indication of at least one regional exception. Sufficient survey work has been done in the Little Missouri region to form the basis for postulating "a minor and intermittent use, if not virtual avoidance, of the region by early man" (Loendorf et al. 1982:48).

Plano Complexes

In Plano times:

... the chronological picture is more difficult to follow. Apparently there were concurrent Paleo-Indian occupations, some of which seem to have been more oriented toward an open plains, part-time bison hunting way of life whereas others seem to have favored an existence more strongly oriented toward hunting and gathering in foothill and mountain slope areas (Frison 1978:33).

Frison is noting a regional adaptation seen at the western margin of the Plains. Another adaptation to the east has been termed Aqua-Plano by Quimby (1959). Krieger (1962:258), with a southern perspective, notes regionalization in Plano: "... some camp sites and especially cave deposits do show longer occupation of favored spots, indicating more restricted seasonal movements in search of food." Witthoft (1962:270) notes an increase in numbers of sites, an increase in regional diversity between "industries," and some reduction in the long distance movement of "exotic flints." He suggests these changes "reflect population growth, proliferation of bands, and decline in the intensity of free-ranging ... trends toward Archaic territorialism" (Witthoft 1962:270).

Four Plano complexes are considered here based on projectile point types: Hell Gap-Agate Basin, Cody, Plainview, and a Parallel Oblique Flaked complex. This is a chronological trial formulation and it is not without problems. "Not only is there frequent difficulty in identifying Plano ... point types, but there is also the problem of distinguishing preforms or stages of manufacture of one type from other point types or their preforms" (Schneider 1982b). The Plano complexes in this chronology are formulated on the basis of projectile point stylistics, temporal association, and geographic proximity. There is "an obvious intergradation between Hell Gap and Agate Basin points, and between Scottsbluff and Eden points. The Angostura-Lusk-Frederick continuum is an example of frustration in the extreme" (Schneider 1982a:35).

There appears to be temporal and geographic overlap between all four complexes, but the earliest components generally seem to belong to the Hell Gap-Agate Basin, Cody, and Plainview complexes and the latest components generally seem to belong to the Parallel Oblique Flaked complex. However, fluted parallel flaked points occur in Saskatchewan (Kehoe 1966a) suggesting some parallel flaking is early or some fluting is late. Radiocarbon dates from early Plano components indicate contemporaneity with Folsom. Late dates indicate contemporaneity with components of the Plains Archaic tradition. Pettipas assumes male Plano point making and suggests individual point types were traditionally made by regional bands or band aggregates (1982:62). He notes that point assemblages from most components are characterized by a single point type, but assemblages from some components have two point types. He suggests this pattern of point type occurrence indicates "throughout most of Plano prehistory, the populations adhering to the respective point traditions by and large drew their [male] membership from within" (Pettipas 1982:62). But, the few components with multiple point types indicate limited male mobility between bands adhering to different regional point style traditions (Pettipas 1982:62-63).

Pettipas (1982:48) also offers a general characterization of Plano on the Plains. Groups with material culture classified as Plano concentrated on "bison as their prime, but not the only, source of food" (Pettipas 1982:48). Kill strategies often involved mass drives utilizing natural features such as arroyos (Wheat 1967), ponds (Sellards et al. 1947), and parabolic sand dunes (Frison 1978). "Campsites and game watches were situated on well-drained knolls, dunes, ridges, rock shelters, and terraces located a short distance from a water supply (Wendorf and Hester 1962:166)" (Pettipas 1982:48).

The geographic distribution of Plano materials is increased significantly northward over that of the Folsom complex. The Laurentide continental glacier was receding during Plano times. "The recession of the glacial lakes and the appearance of grassland prairies at circa 7050-6550 B.C. is associated with the spread of Plano cultures into the eastern one-half of North Dakota" (Schneider 1982b).

HELL GAP-AGATE BASIN COMPLEX

The Hell Gap-Agate Basin complex is comprised of components with Hell Gap and/or Agate Basin points and associated remains. Both type sites are in Wyoming: Agate Basin (Roberts 1951, 1962) and Hell Gap (Agogino 1961). Opinions differ on the origins of this complex. Irwin and Wormington suggest

all of the Paleo-Indian complexes of the Plains “evolved from Clovis” (1970:25). Bryan proposes Hell Gap-Agate Basin origins may derive from earlier leaf shaped points of the Old Cordilleran tradition in the Basin-Plateau area (1965).

Temporal Distribution. Radiocarbon dates on Hell Gap components indicate a temporal range of ca. 8900-6800 B.C. Radiocarbon dates on Agate Basin components indicate a temporal range of ca. 8500-5600 B.C. Irwin-Williams et al. (1973) differentiate between Agate Basin and Hell Gap components at the Hell Gap site. They date Agate Basin at ca. 8500-8000 B.C. and Hell Gap at ca. 8000-7500 B.C.

There appear to be problems with the late continuity of Agate Basin points. The Agate Basin type description (e.g., Roberts 1951; Wormington 1957:141) is too loosely construed to allow for objective differentiation of an apparent variety of lanceolate point forms with a long history in the Northern Plains. Lanceolate points endure for an especially long time northward into the boreal forest. Ebell (1980:93) suggests the early Shield Archaic “will be found to have developed from the Agate Basin complex” around 4000 B.C. Ebell sees “a south to north cline in dates for Agate Basin sites, those in the south being as much as 4000 years older than those in the north” in response to a similar time-transgressive northward movement of environmental zones. As the grassland to the south of them dessicated during the Altithermal, groups with Agate Basin technological assemblages pushed northward and their subsistence base gradually shifted from a plains based focal subsistence economy oriented toward bison to a boreal based diffuse economy oriented toward a variety of forest resources (Ebell 1981).

Geographic Distribution. The distribution of Agate Basin material is on the Plains from Texas to south-central Canada and east to Wisconsin, Illinois, Michigan, Indiana, and Ohio. The Hell Gap distribution is more limited: southern Alberta, Montana, Wyoming, the Dakotas, Nebraska, and Colorado. There is a Hell Gap site in the New Town vicinity, Mountrail County, North Dakota (Schneider 1981b). Figure 16 shows Hell Gap-Agate Basin complex sites in and around the study region.

Content

Settlement Types: camps and kills (corrals? parabolic dune trap).

Faunal and Floral Remains: *Bison antiquus*, *Bison occidentalis*; seeds in Agate Basin levels at both Brewster and Hell Gap (Agogino 1962:246) and Hell Gap component at the Hell Gap site; elk at the Agate Basin site; antelope, mule deer, and porcupine at Sister's Hill (Agogino and Galloway 1965:192).

Feature Types: three circular post mold patterns in Agate Basin component at the Hell Gap site; large solitary post in bison pound (Jones-Miller).

Chipped Stone: Agate Basin point [see Roberts (1951) or Wormington (1957:141) for type description]; Hell Gap point [see Agogino (1961) for type description]; blade technology with Hell Gap and Agate Basin; side and end scrapers; miniature points; “spokeshave graters” at Sister's Hill (Agogino and Galloway 1965:191); very large, thin, ovate biface knife in Agate Basin component at the Hell Gap site (Irwin-Williams et al. 1973:47); asymmetrical and single shouldered biface knives in Hell Gap component at Hell Gap site.

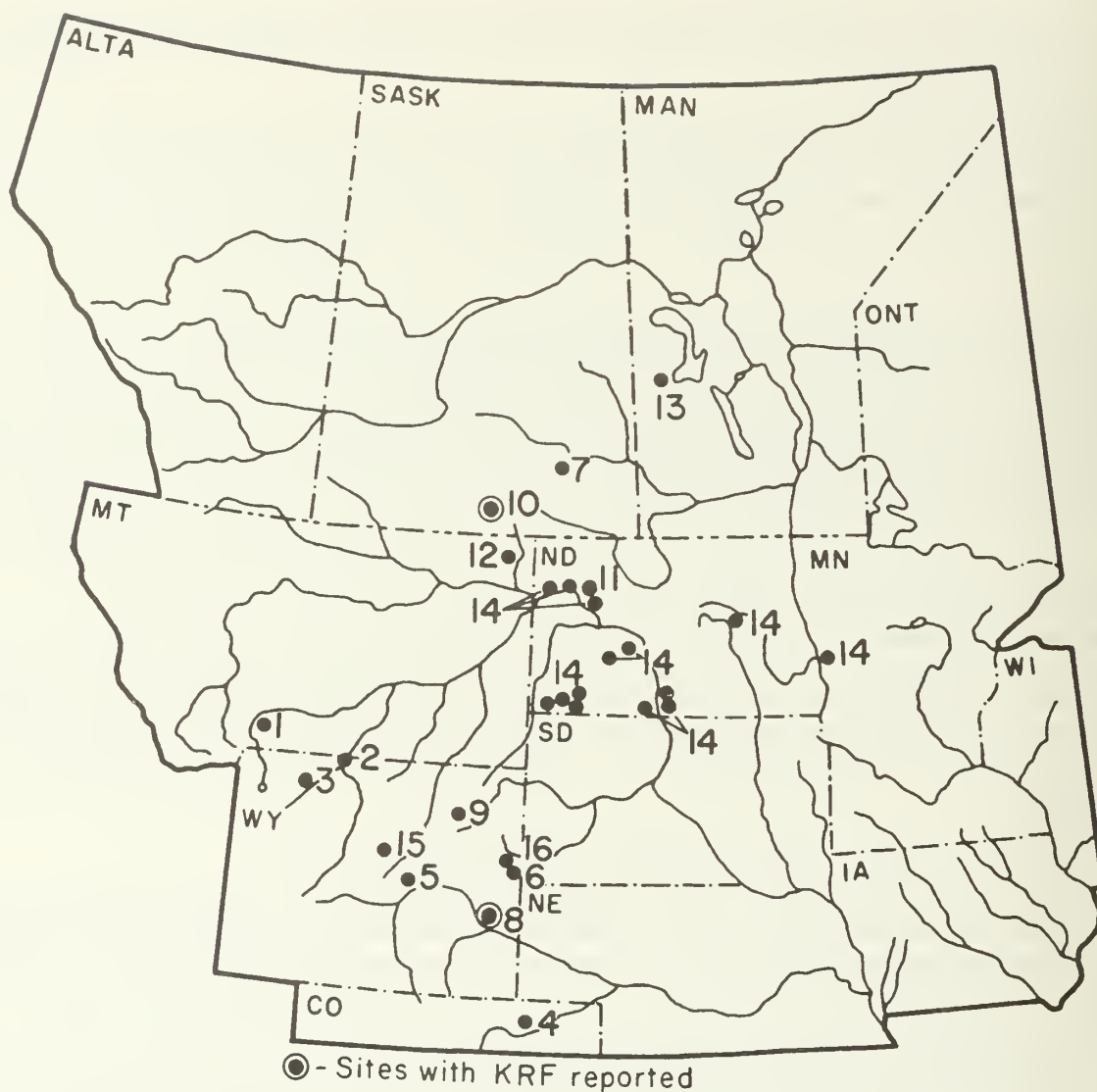
Ground Stone: hammerstones, grinding stones, metate.

Ornamentation/Design Motifs: stone beads in Hell Gap component at Hell Gap site; bone ornament at Jones-Miller.

Modified Bone: mandible, tibia, and femur choppers; humerus scrapers; various modified rib tools at Jones-Miller (Stanford 1978:93); flakelet, awl; eyed needle and notched spatulate tool in Agate Basin component at Hell Gap (Irwin-Williams et al. 1973:47).

Modified Antler: flakelet.

Discussion. Stanford postulates the Jones-Miller site represents recurrent bison pounding and associated ritual not unlike that documented historically on the Northern Plains. The butchering and bone processing at Jones-Miller is thorough and intense (Stanford 1978:91). Fauna exploited in addition to bison are represented by elk at the Agate Basin site, and antelope, mule deer, and porcupine at Sister's Hill (Agogino and Galloway 1965:192). “At the Agate Basin level at Hell Gap seeds were found in burned clusters and were doubtless utilized as a food supplement” (Agogino 1962:246).



- 1 - Meyers-Hindman (Lahren 1976)
- 2 - Bighorn Canyon caves 24CB202, 24CB221, 48BH206 (Husted 1969)
- 3 - Mummy Cave (McCracken et al. 1978; Wedel et al. 1968)
- 4 - Jones-Miller (Stanford 1978)
- 5 - Casper (Frison 1974b)
- 6 - Agate Basin (Roberts 1943)
- 7 - surface (Gryba and Gryba 1980)
- 8 - Hell Gap (Irwin-Williams et al. 1973)
- 9 - Carter-Kerr McGee (Frison 1978)
- 10 - Parkhill (Ebell 1980; Nero 1959), surface
- 11 - Moe (Schneider 1975), surface
- 12 - surface (Jerde 1981)
- 13 - Jalowicka (Mayer-Oakes 1970)
- 14 - surface (Schneider, personal communication, 7/19/82)
- 15 - Sister's Hill (Agogino and Galloway 1965)
- 16 - Brewster (Agogino and Frankforter 1960b)

Figure 16. Some reported Hell Gap-Agate Basin surface finds and excavated components.

Lithic source identification for chipped stone in the Jones-Miller assemblage indicate a total source area with dimensions of approximately 320 x 960 km (200 x 600 mi) (Stanford 1978:93). The dimensions of this area are significant and give some indication of the territory involved in travel and/or exchange. The Hell Gap band or bands involved in Jones-Miller site activities traveled and/or exchanged within an area with a minimum size of 307,000 km² (120,000 mi²).

Irwin and Wormington (1970) analyzed chipped stone tool assemblages from two Agate Basin components (from the Hell Gap and Frazier sites). The same tool types were present in both assemblages and occurred in similar frequencies, but assemblage composition would be expected to be more variable within a larger sample of sites representing a variety of settlement types. Side scrapers make up ca. 40% of the assemblages, projectile points 10-11%, and biface knives ca. 6% (Irwin and Wormington 1970:31). Most of the biface knives are "medium-sized ovals, but there are some very large specimens" (Irwin and Wormington 1970:31). The "most conspicuous difference between the samples" is the frequency of occurrence of end scrapers: 9% of the Hell Gap site Agate Basin assemblage and ca. 18% of the Frazier assemblage (Irwin and Wormington 1970:31). Angle edge and beaked end scrapers predominate in both assemblages. There is a single drill in the Agate Basin assemblage from the Hell Gap site (Irwin and Wormington 1970:31). In terms of overall chipped stone tool assemblage characteristics, Irwin and Wormington note the "Hell Gap and Agate Basin curves are virtually identical, and, as they represent a fairly large sample, it seems reasonable to infer the two groups were very close in terms of their industrial assemblages" (1970:33).

CODY COMPLEX

The Cody complex was originally named by Jepsen (1953) to identify materials from components with Scottsbluff points and Eden points in association with Cody knives. More recent work by Agenbroad (1978a, 1978b) indicates Alberta points and associated remains are also part of the complex. Indications are the Cody complex is a Plains development. The type locations are the Scottsbluff Bison Quarry in Nebraska (Schultz and Eisley 1935), the Eden site in Wyoming (Howard et al. 1941), and the vicinity of Cereal, Alberta (Wormington and Forbis 1965).

Temporal Distribution. Alberta components range in age from ca. 8500-6600 B.C. Scottsbluff components range ca. 8200-6000 B.C. on the Plains. Bonnicksen and Keyser (1982:137) use a range of ca. 7550-5550 B.C. for the Cody complex. Contemporaneity between Cody and the Logan Creek complex is indicated to the east. For example, a Simonsen point was associated with Scottsbluff points at the Renier site in Wisconsin (Mason and Irwin 1960:47-48).

Geographic Distribution. Scottsbluff surface finds or excavated components are reported from Saskatchewan, Alberta, British Columbia, Washington, Wyoming, Montana, the Dakotas, Colorado, New Mexico, Nebraska, Texas, Oklahoma, Arkansas, Louisiana, Manitoba, Minnesota, and Wisconsin. Eden is reported from the Plains from Canada to Texas, east to eastern Oklahoma and Wisconsin, and west to western Wyoming. Alberta is reported from Alberta, Saskatchewan, and south. to Nebraska and Colorado. Figure 17 displays Cody complex site locations in and around the study region.

Content

Settlement Types: Short-term and long-term camps, kills (arroyo traps, arroyo jump, sand dune trap), processing areas/butchering stations.

Faunal and Floral Remains: *Bison antiquus*, *Bison occidentalis*; antelope, rabbit, ground squirrel at MacHaffie (Forbis and Sperry 1952); mule deer, elk.

Feature Types: unknown.

Chipped Stone: Alberta point [see Wormington (1957:134) for type description]; Scottsbluff point, Eden point, and Cody knife [see Wormington (1957:267) for type description]; end and side scrapers, biface knives, flake perforators, denticulates, choppers, graters, spurred end scrapers, drills; blade technology with Eden and Scottsbluff at MacHaffie site, but not common on the Northern Plains (Knudson 1973:145); miniature points (Bonnicksen and Keyser 1982); spurred side scrapers at Fletcher (Forbis 1968:6).

Ground Stone: hammerstones, grooved sandstone abraders; stone tube (pipe?) at Jergens site; grinding slabs, grinding stones; grooved maul at Fletcher (Forbis 1968:7).

Modified Bone: humerus chopper; grooved and cut bone; variety of expedient tools.

Modified Antler: pressure flakers, hammer (baton) at Jergens (Wheat 1979:136), atlatl hook.

Modified Tooth: bison molar core atlatl hook (Jergens site).

Ornamentation/Design Motifs: ochre; engraved ulna at Jergens site.

Burial: cremation at Renier (Mason and Irwin 1960).

Discussion. Hudson-Meng is an Alberta bison jump in northwestern Nebraska (Agenbroad 1978a); the jump was used in the fall of the year and an estimated 80 people were involved in the butchering activities. The predominant raw material used for making the points is subjectively identified as KRF. Agenbroad postulates Alberta artifacts are ancestral to Scottsbluff and Eden, and documents the Alberta-Cody knife association at Hudson-Meng.

Cody complex settlement types include short-term and long-term camps, kills (arroyo traps, arroyo jump, and sand dune trap), and bison processing areas/butchering stations. Small game was also hunted as evidenced by antelope, rabbit, and ground squirrel at the MacHaffie site in western Montana (Forbis and Sperry 1952). Occasional finds of grinding slabs and grinding stones are evidence for plant food processing associated with the Cody complex.

The Cody complex chipped stone tool assemblage from the Hell Gap site is 38% scrapers, 12% points, and 9% knives (Irwin and Wormington 1970:31-32). End scraper types predominate in the scraper category and only a few are spurred (Irwin and Wormington 1970:31). Knife forms are more variable than earlier assemblages analyzed by Irwin and Wormington; some are made on asymmetrical flakes and others resemble Cody complex points, but are "more markedly stemmed" and have "wider bodies" (1970:31). Cody complex bipolar core reduction technology is documented in the Minocqua phase, northern Wisconsin (Salzer 1974:45).

Wheat presents a detailed consideration of Cody materials and concludes that not one, but three complexes should be recognized:

... a northern and central Plains complex (the Cody complex), characterized mainly by Classic Eden points, Scottsbluff types I, II, and III, and Cody knives; a central and southern Plains complex (the Firstview complex), characterized by San Jon and Firstview points, large flake knives, with Milnesand and Plainview points sometimes associated; and a northern and eastern Plains-Prairie complex (which may be termed the Renier complex), consisting primarily of outsized point types resembling very large Eden and Scottsbluff II points, and a type here designated as Scottsbluff I, Renier Variety, associated with early Archaic projectile points (Wheat 1972:163-164).

Wheat suggests the Firstview complex dates ca. 8200-7200 B.C. or slightly later, and the Cody complex dates ca. 7000-6000 B.C. (1972:163-164). Future investigations will assess the merits of further subdividing the Alberta, Scottsbluff I, Scottsbluff II, and Eden types. Perhaps a greater range of Cody complex point types will enable refined studies of Plano regionalization and variation in adaptive strategies.

PLAINVIEW COMPLEX

The definition of the Plainview complex is based on materials recovered from a bison kill site at Plainview, Texas (Sellards et al. 1947). This complex includes materials recovered from components with Plainview and/or Meserve points. Meserve points are generally regarded as Plainview points with edges modified by retouch above the haft element.

A thorough appraisal has not been made concerning the inclusion of the study area within the geographic distribution of the Plainview complex. Some consider the Plainview point type description to be too broadly construed to be adequate for designating either morphological or temporal types (e.g., Knudson 1973). Johnson and Holliday (1980:103) state that "reconsideration of supposed Plainview points and sites indicates that the type is part of a Southern Plains cultural tradition." Wheat suggests Plainview and Firstview indicate regional or band variation in a common pattern (1972:148) and Firstview people were securing KRF from western North Dakota either through "trade or travel" (1972:126). This would seem to indicate at least some potential for a Plainview presence here.

Temporal Distribution. Most Plainview dates range ca. 8300-7100 B.C. The Goshen complex at the Hell Gap site "displays numerous similarities in projectile point typology and has other parallels with the Plainview Complex," and dates ca. 9000-8800 B.C. (Irwin-Williams et al. 1973:46, 52).

Geographic Distribution. Plainview materials have been described throughout the Plains from Texas to south-central Canada, northward to Alaska, eastward to Missouri, Arkansas, Louisiana, and beyond. Holliday and Johnson, however, see Plainview as "a regional (Southern Plains) manifestation within a restricted time range (around 10,000 years B.P.)" (1981:252). Figure 18 illustrates several surface finds in the study region and two excavated components close by.

Content

Settlement Types: small and large kills.

Faunal and Floral Remains: *Bison occidentalis*, *Bison antiquus*; muskrats, ducks.

Chipped Stone: Plainview and Meserve points [see Wormington (1957:265) or Wheat (1972:145-146) for type descriptions]; blade technology; points used and resharpened as knives; scrapers and utilized flakes; heat treatment likely.

Feature Types: hearths.

Ground Stone: unknown.

Modified Bone: scapula knife; rib expediency butchering tool; other expedient tools.

Discussion. Wheat notes two varieties of the Plainview point type which he refers to as Modes I and II (1972:146). In Mode I, "the greatest width is near the midpoint of the blade; [in Mode II] the greatest width of the point is at the base. This latter shape characteristic is virtually unique to the Plainview type among the known Paleo-Indian projectile point categories" (Wheat 1972:146). Just as Midland points are regarded by many as unfluted Folsoms (or a thin unfluted point characteristic of the Folsom complex), some Mode I Plainview points are sometimes regarded as unfluted Clovis points. Other Plainview points "show a type of flaking which to some observers appears to be partial fluting" (Wilmsen 1974:43). Plainview may be an unfluted type originating in the Clovis complex and persisting into Plano times. Further, it is sometimes difficult to distinguish between Clovis and Plainview. Five points associated with early Holocene bison at the Rex Rodgers site in north Texas dating ca. 7160 B.C. resemble both Clovis and Plainview; three of the points also have shallow side notches (Speer 1978:127).

Two "different levels of social organization" are indicated by remains from three Plainview sites in the Southern Plains according to Johnson and Holliday: (1) a residential group "comprised of two or three families or an extended family," and (2) a band of 30-75 people (1980:105).

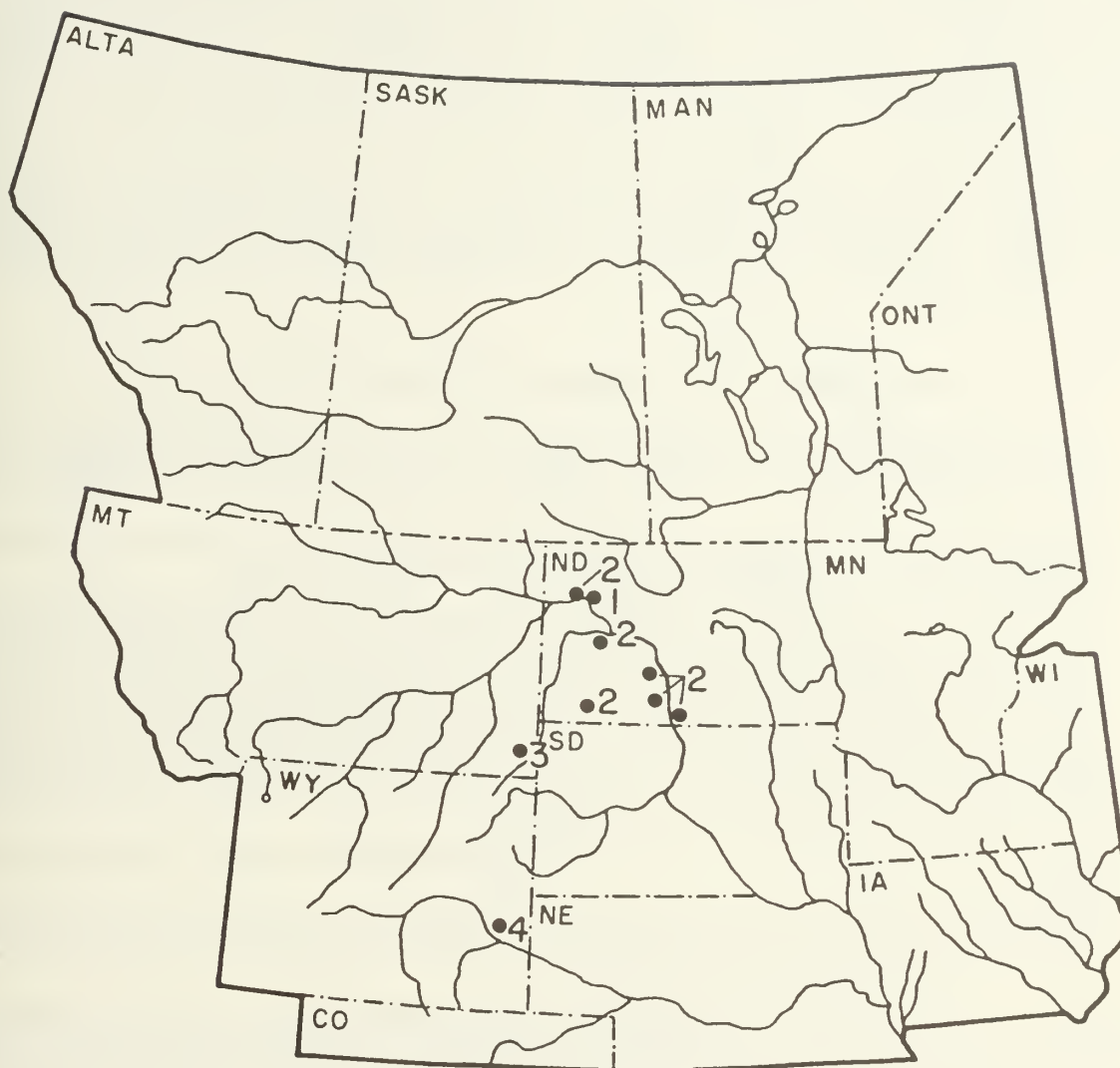
PARALLEL OBLIQUE FLAKED COMPLEX

The Parallel Oblique Flaked complex unit name is resurrected for purposes of expediency to deal with a wide range of point types and associated remains.

When Wormington (1948) proposed that the term Yuma be considered obsolete and the various varieties known be given individual names as their cultural distinctiveness warranted, she suggested that the oblique, parallel flaked points be left unnamed and simply referred to as "points with oblique, parallel flaking" (Mulloy 1959:113).

The points included in this complex here are Angostura, Milnesand, Browns Valley, Lusk, Allen, and Frederick. In 1968, Greene said the "oblique-flaked point problem . . . has become increasingly complex in recent years." It has not become any less complex since then.

Milnesand was originally reported from New Mexico by Sellards (1955); Allen from the James Allen site in Wyoming by Mulloy (1959); Frederick and Lusk from different levels of the Hell Gap site in Wyoming by Irwin-Williams et al. (1973); Angostura from the Ray Long site at the Angostura Reservoir in South Dakota by Hughes (1949) and Wheeler (1954); and, Browns Valley from the head of the Red River basin in western Minnesota by Jenks (1937).



- 1 — Moe (Schneider 1975), surface
- 2 — Schneider (personal communication, 7/19/82), surface
- 3 — Mill Iron (probably Plainview or Midland, Jerry Clark, personal communication, 7/26/82)
- 4 — Hell Gap (Irwin-Williams et al. 1973)

Figure 18. Some reported Plainview complex excavated components and surface finds.

Temporal Distribution. Lanceolate points with parallel oblique flaking were found in numerous cultural levels dating ca. 7280-6020 B.C. at Mummy Cave (McCracken et al. 1978:79-82). Loendorf et al. note Allen, Frederick, Angostura, and Lusk are found in Wyoming and South Dakota around 6000 B.C. (1981:105). Wormington (1957:144, 146) and Mulloy (1959:113) note the similarity between the Browns Valley points from Minnesota and Allen points dated ca. 5950 B.C. in Wyoming.

Geographic Distribution. The distribution of Milnesand ranges throughout the Plains from Texas and New Mexico to Alberta and Saskatchewan. The distribution of Allen is throughout the western Plains from New Mexico to Alberta (Mulloy 1959:112). The other forms appear to have similar widespread distributions. Figure 19 shows the locations of some excavated components and surface finds in and around the study region.

Content

Settlement Types: open air and rockshelter camps; kill sites.

Faunal and Floral Remains: *Bison occidentalis* or *Bison antiquus* at James Allen; deer, "numerous small mammals," and freshwater mussels in Frederick component at Hell Gap (Irwin-Williams et al. 1973:51).

Feature Types: stone ring in Frederick level at the Hell Gap site (Irwin-Williams et al. 1973:51); prepared hearths; surface hearths at Ray Long site (Hughes 1949:270).

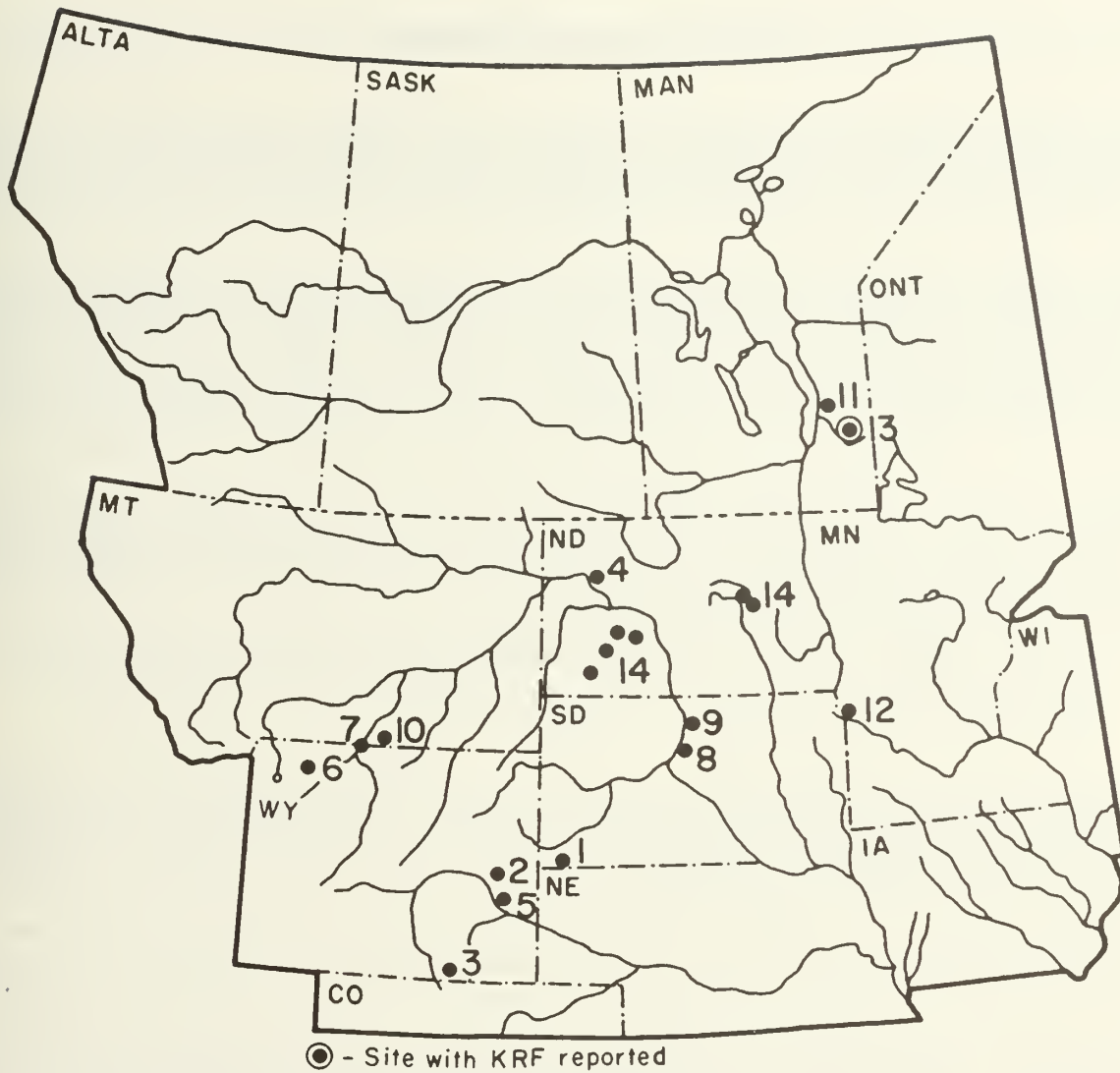
Chipped Stone: See the following for type descriptions: Milnesand (Wheat 1972:146; Wormington 1957:265), Angostura (Wheeler 1954; Wormington 1957:139-140), Allen (Mulloy 1959), Lusk (Greene 1968:63-64); Browns Valley (Jenks 1937). Blade technology; end scrapers, side scrapers, broken points recycled as graters; choppers; large cores; drills at Ray Long site (Hughes 1949:270); oval butt drill at Milnesand (Warnica and Williamson 1968:23); end scraper morphology at James Allen ranges from "triangular through ovoid and pyriform to subrectangular" (Mulloy 1959:115).

Ground Stone: grinding stones and slabs (metates); sandstone palette; grooved sandstone abrader.

Modified Bone: awls, beads, needles; awls and incised bone beads from Frederick component at Hell Gap (Irwin-Williams et al. 1973:51).

Discussion. The chipped stone tool assemblage from the Frederick component at the Hell Gap site analyzed by Irwin and Wormington (1970:32) contains 19% points, 18% side scrapers, 18% end scrapers (only a few with angle edges or spurs), 11% graters (more common than in any other Paleo-Indian complex represented at the Hell Gap site excepting Folsom), 9% knives, ca. 8% notched flakes, and a trace percentage of burins. The knives are characteristically thin ovoid bifaces or "made on random flakes, but there are also the distinctive Frederick knives" (Irwin and Wormington 1970:32). The "distinctive Frederick knives" resemble the Frederick projectile point, are 6-9 cm long, 2.0-2.5 cm wide, often have one beveled edge, have bases "thinned by multiple flake removals, and the lower part of the lateral edges and the base are ground" (Irwin and Wormington 1970:29). While the points of this complex typically show parallel oblique flaking, other flaking patterns also occur. For example, two Browns Valley points from eastern Manitoba show collateral flaking (Buchner 1979:28). There is only a slight tendency toward parallel oblique flaking in the Milnesand points from the Milnesand locality (Sellards 1955:340-342).

Parallel Oblique Flaked complex components are known from open air and rock shelter camps and kill sites. *Bison* predominate faunal assemblages, but deer, "numerous small mammals," and freshwater mussels are present in the Frederick component at the Hell Gap site (Irwin-Williams et al. 1973:51). The occurrence of grinding stones and slabs is evidence for use of plant foods.



- 1 — Ray Long (Hughes 1949; Wheeler 1954)
- 2 — Betty Greene (Greene 1968)
- 3 — James Allen (Mulloy 1959)
- 4 — Moe (Schneider 1975), surface
- 5 — Hell Gap (Irwin 1971; Irwin-Williams et al. 1973)
- 6 — Mummy Cave (Wedel et al. 1968)
- 7 — Mangus (Hulsted 1969)
- 8 — Walth Bay (Ahler et al. 1974)
- 9 — Travis II (Ahler et al. 1977)
- 10 — Benson's Butte (Fredlund 1979)
- 11 — Caribou Lake Project (Buchner 1979)
- 12 — Browns Valley (Jenks 1937)
- 13 — Sinnock (Buchner 1981)
- 14 — surface (Schneider, personal communication, 7/19/82)

Figure 19. Some reported Parallel Oblique Flaked surface finds and excavated components.

Plains Archaic Tradition

The transition in subsistence economies from an emphasis on big game to more diversified resource exploitation is documented in various (although not all) areas of the world (cf. Hayden 1981). The diversified subsistence economies are referred to as Mesolithic in the Old World and Archaic in the New World.

Archaic adaptations in North America vary regionally, reflecting differences in the potentials of the natural environment. For example, Archaic adaptations in the Tennessee River Valley, Texas gulf coast, and Garrison region are characterized by the exploitation of different spectrums of plant and animal species. These regional adaptations were also initiated on different time levels, correlating with regional extinctions of Pleistocene fauna. Further, differences in Archaic adaptations are demonstrated within various regions through time, reflecting developmental changes in the natural and/or cultural environments.

Mayer-Oakes (1955) applied the term Plains Archaic to Plains hunting and gathering subsistence economies. The Plains Archaic tradition is defined here as any hunting and gathering adaptation to the Plains grassland biome with essentially modern flora and fauna. Johnson and Wood distinguish a Western Plains Archaic and an Eastern Plains Archaic:

The Western Plains Archaic . . . continues to emphasize the earlier Paleo-Indian pattern of big-game hunting, while the Eastern Plains Archaic, known from sites in and along the river valleys, manifests an eastern United States Archaic-like pattern of deer hunting, fishing, and nut and seed collection . . . (1980:38).

Available evidence indicates that Archaic adaptations within the study area are generally characterized by an emphasis on big game hunting in the subsistence economy; however, the various Plains Archaic subsistence strategies are yet to be explicated in any detail, and this section continues with the more generalized concept of the Plains Archaic tradition.

Frison states that human adaptations on the Northwestern Plains during the last 4000 years of prehistory were largely dependent on bison (1971:89). Reeves states that Northwestern Plains "subsistence techniques and settlement patterns as basic cultural adaptations have remained essentially unchanged over the past 10,000 years" (1969:37). These sorts of observations support the theme of a generalized Plains Archaic tradition while variations are anticipated both spatially and temporally. This view of the Plains Archaic tradition facilitates incorporation of a range of adaptations to the Plains grassland biome with essentially modern flora and fauna, including those focused on bison as well as those directed toward diversified fauna and flora (cf. Clark and Wilson 1981:72).

The Paleo-Indian and Plains Archaic traditions are differentiated here on the basis of dissimilar adaptations. There are also differences in projectile point stylistics, flintknapping craftsmanship, lithic raw material utilization, and extent of regional interaction of human populations (Hayden 1982:114-115). Hayden has argued that all of these characteristics are linked as dependent variables to a single independent variable: resource reliability. He argues that terminal Pleistocene-early Holocene subsistence resources were unreliable, necessitating extensive alliance networks "to fall back upon in times of resource failure" (1982:114). Highly stylized and finely crafted points, as well as exotic lithic raw materials, were involved in the maintenance of those alliance networks (Hayden 1982:118). In his view, regionalization in point stylistics, decrease in quality of flintknapping craftsmanship, and decrease in the use of "rare" lithic raw materials correlate with the inception of regional Archaic adaptations, indicating resource reliability had improved to the point that extensive interaction networks were no longer necessary in order to maintain the viability of human populations (1982:119). This proposition remains to be tested.

Information presently available suggests when viewing the Plains as a whole, the time of Plains Archaic tradition origins is best viewed as a period of transition from the Paleo-Indian tradition. The transition from Pleistocene to essentially modern flora and fauna occurred earlier in the Southern Plains than in the Northern Plains. However, "the majority of the Pleistocene megafauna living in herds . . . became extinct

about 8000 years ago" (Hester 1960:66). In the study region there are no excavated components dating to this time of transition.

The termination of the Plains Archaic tradition is also variable. It is likely that some human groups using the study region with this adaptation made a transition to a Woodland adaptation as early as 100 B.C. Other groups, like the Algonkian Blackfeet, developed Equestrian Nomadic tradition adaptations from a Plains Archaic base late in Northern Plains prehistory.

The major goal here is to provide brief descriptive statements for most of the named complexes of the Plains Archaic tradition with primary, secondary, or tertiary use known or anticipated in the study region. There are components encountered in western North Dakota with cultural content incomparable with the named units considered here because: (1) there are many unsampled, poorly sampled, and incompletely analyzed complexes of enduring material culture involved in the archeology of the study region, and (2) the KRF source area certainly attracted task groups from distant territories whose use of the study region was so resource specific and ephemeral that identifications have not yet been made.

The named units considered here are the Logan Creek/Mummy Cave complex, Oxbow complex, McKean complex, and Pelican Lake complex. West of the study region in the central and western portions of the North-western Plains subarea the Besant, Avonlea, and Old Women's complexes would also be classified in the Plains Archaic tradition because they represent hunting and gathering adaptations to the Plains grassland. In central and western North Dakota, however, the Besant, Avonlea, and Old Women's complexes are better classified in the Plains Woodland tradition because of the heavier use of ceramic vessels and close affinities with Woodland complexes in the parkland to the north and east.

Logan Creek/Mummy Cave Complex

The name derives from the Logan Creek site in Nebraska (Kivett 1962) and the Mummy Cave site in Wyoming (McCracken et al. 1978; Wedel et al. 1968). The unit includes the earliest side notched points and associated remains. For the study region, the temporal distribution of components considered within this complex (ca. 5500-3300 B.C.) is entirely within the Atlantic climatic episode (5600-2730 B.C.) (Bryson and Wendland 1967; Bryson et al. 1970). There are relatively few excavated components reported, probably indicating periods of low intensity use of the more arid parts of the Plains by native groups.

Northwestern Plains archeologists tend to use the unit term "Mummy Cave complex" while Northeastern Plains and Middle Missouri archeologists tend to use the term "Logan Creek complex." Other terms in use for these materials are "early side notched" (Gryba 1980), "Altithermal period side-notched" (Frison et al. 1976:28), and "Simonsen," after a site in northwestern Iowa (Agogino and Frankforter 1960a; Frankforter and Agogino 1959, 1960).

The first radiocarbon dated component of this complex, ca. 6400 B.C., was from the Simonsen site in western Iowa, and it has been suggested the typological name Simonsen be adopted for the side notched points associated with the complex (Agogino 1962:247). The terminological approach taken here is to use the archeological unit term "Logan Creek/Mummy Cave complex" in combination with the Simonsen point type name. Future work will certainly refine considerations of this complex, identifying regionally and temporally distinctive material traits, adaptive strategies, and demographics.

TEMPORAL DISTRIBUTION

Gryba suggests the early side notched point type was widespread on the Northern Plains ca. 5000 B.C. (1977:15). The temporal range suggested for the study region is ca. 5500-3300 B.C.

Logan Creek complex levels at the Logan Creek site date ca. 5300 and 4700 B.C. The Hill site also dates ca. 5300 B.C. The date for the Simonsen site is ca. 6471 B.C. Three dates from Indian Creek near Helena, Montana range ca. 5040-4200 B.C. (Davis 1982:6; Davis et al. 1980). The Stampede site (DjOn-26) in southeastern Alberta dates ca. 5295 B.C. (Gryba 1976). The Hawken site dates ca. 4500-4300 B.C. (Frison et al. 1976). At Sorenson IV, a cultural level with large side notched points dates ca. 3525 B.C. (Husted 1969). Dates at Mummy Cave range from ca. 5680-3300 B.C. (Wedel et al. 1968:185). The Gowen site in

central Saskatchewan has three dates ranging ca. 3810-4200 B.C. (Schroedl and Walker 1978). A component at Tysver-Olson in northwestern Dunn County dates ca. 3395 B.C. (D. Kuehn, personal communication, 7/13/82).

The Raddatz Notched type from Wisconsin and Illinois is similar and appears on about the same time level. While Raddatz Notched points are most popular in levels dating ca. 4300 B.C. at Modoc Rockshelter, they are present as early as 7900 B.C. and are present in significant numbers throughout the period ca. 6000-3000 B.C. (Fowler 1959:20-21, 23, 67). The circumstance here is that very little typological work has been done with the early side notched points and without typological refinement the generalized point morphology is found to be temporally persistent and geographically widespread.

GEOGRAPHIC DISTRIBUTION

Figure 20 indicates a geographic distribution throughout the Northern Plains and into the Prairie Peninsula (Borchert 1950), Eastern Woodlands, and Parkland. Syms suggests a movement of the point style northwestward from the east-central or midwestern U.S. (1969:174). Husted recognizes the Simonsen point style in the Rocky Mountains on the western periphery of the Northwestern Plains (1969:88).

CONTENT

The extended temporal duration and extensive geographic distribution of Logan Creek/Mummy Cave complex components, as reflected by Simonsen points, indicates the complex relates to numerous ethnic groups and Plains Archaic adaptive strategies. There is practically no information on archeologically recovered material traits, settlement systems, or adaptive strategies associated with this complex from the study region.

Settlement Types: bison kills (e.g., during winter at Hawken); transient camp (e.g., Lungren); base camp (e.g., Logan Creek); tipi ring camps (Quigg and Brumley 1982:148).

Faunal and Floral Remains: bison, antelope, mule deer, and wolf at Hawken; *B. occidentalis* at Simonsen; freshwater mussels and "nearly all species common to the area at a later period appear to be present" at Logan Creek (Kivett 1962:1); elk at Stampede; "concentration of hackberry seeds and several wild plum pits" and unidentified small birds at Simonsen (Agogino and Frankforter 1960a:414).

Feature Types: ash beds, fire pits, and post molds at Modoc; circular basin shaped hearth at Lungren and Stampede; hearths (unprepared basin form, circular rock enclosed forms, and stone platforms), pits, small shallow basins, and post molds at Logan Creek; pits in caves and rockshelters interpreted as food storage features (Frison 1978:360).

Design Motifs/Ornamentation: red, yellow, and white pigment stones at Logan Creek; gastropod shell beads at Turin; tubular bone beads and serrated shell at Logan Creek.

Chipped Stone: points, perforators, choppers; side notched scrapers from Hill, Logan Creek (1.5-4.9 cm long), and Modoc; grinding on bases and inside notches of points at Lungren and Hawken; biface knives, flake knives; ovate to rectangular and triangular plano-convex end scrapers and bifacial cores at Lungren; large "crudely flaked" and "delicately flaked" bifaces rare at Logan Creek (Kivett 1962:3); T-form drill at Logan Creek; bipolar reduction at Stampede (Gryba 1976:97).

Ground Stone: hammerstones, possible grinding stone at Modoc; "clinker"/scoria slot abraders at Lungren and Logan Creek; "artificially rounded pebbles could be bola weights" at Logan Creek (Kivett 1962:3).

Modified Bone: bison tibia choppers and humerus tools at Hawken; bison rib and antelope metapodial knapping tools at Hawken; serrated rib spatulas common at Logan Creek; splinter awls, polished flakes, shaft wrench, fishhook, and needles at Logan Creek.

Modified Antler: worked antler from Modoc; "drift" at Logan Creek.

FCR: heavy use of quartzite at Logan Creek.

Burial: primary interments in prepared pits at Turin site, Iowa (Krieger 1956), but a late date of ca. 2700 B.C. makes association with Logan Creek complex questionable.



- Undesignated Nebraska sites reported by Carlson and Steinacher as Logan Creek and Logan Creek-like (1978).

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DISCUSSION

Kivett suggested the defining characteristics of the Logan Creek complex are side notched points similar in form to those from the Logan Creek site in combination with side notched end scrapers (1962:6). The Simonsen points from the Logan Creek site are small to medium in size; the general form is triangular with convex blade edges. They are usually side notched, but sometimes unnotched. Bases are usually concave, but sometimes straight. Total length ranges 1.7-4.9 cm (Kivett 1962:2).

Logan Creek/Mummy Cave complex occupations correlate with the Atlantic climatic episode or Altithermal climatic period. Reeves proposes there was no occupational hiatus during the Atlantic on the Northern Plains (1973). He contends that although the carrying capacity of the grasslands may have been somewhat reduced with reference to the Holocene norm, bison and human populations were relatively unaffected. He acknowledges the lack of recorded Atlantic age sites on the open Plains, but suggests that the lack of recorded sites is the result of projectile point misidentification and the instability of landforms on which the purported sites were situated. Some of the Simonsen points are very small and identifiable as arrow points. There is definitely a need for interregional, interassemblage, point attribute analysis focused on Early Plains Archaic period, Late Woodland period, Plains Village tradition, and Old Women's complex components.

There was poor vegetative cover in parts of North Dakota during at least some of the Atlantic. Sand dune areas formed in the Souris and Sheyenne basins (Schneider 1981b). The bison remains at the Hawken site present a variety of valuable information, some of which relates to environmental conditions in the Black Hills region at about 4400 B.C. The infrequency of tooth anomalies and postcranial pathologies (Frison 1978:198) indicate good grazing conditions, which in turn indicate generally favorable climatic conditions in the middle of the Atlantic episode for the Black Hills region. Frison suggested the Black Hills was an "oasis" area during the Atlantic. Certain other areas of the Plains, like the Missouri Trench and surrounding environs in the study area, undoubtedly supported resident human groups.

From the extensive geographic and temporal distributions Shay infers that Logan Creek/Mummy Cave groups were comprised of "mobile bands using large territories within a thinly populated region" (1971:72). The total reliance on local lithic resources evident in the Hawken assemblage (Frison et al. 1976:48) is evidence for territoriality within the Black Hills region for the group responsible for the Hawken site deposit, at least during part of their history. Grosser also suggests that "populations were small and widely scattered, with occupations temporary, offering little chance for deep midden deposits" (1977:160).

Excavated components are few in number and little is known regarding the role of floral subsistence resources. However, several investigations "indicate what can be interpreted as a marked improvement in grinding tools especially in the manos, which begin to acquire more of the classic keeled forms of the Middle and Late Plains Archaic periods" (Frison 1978:354). The grinding slabs are made of both sandstone and limestone, are larger overall, and have "deeper grinding depressions" (Frison 1978:354).

Frison et al. describe the "Altithermal period Side Notched" point "technological production sequence . . . Flakes were reduced by percussion flaking to preform stages and finally pressure flaked to side-notched forms . . ." (1976:34). They also suggest the points from Hawken "could be regarded as nothing more than the late, local Paleo-Indian styles such as Frederick and Lusk with added side-notches" (1976:55). However, none of the illustrated points from Hawken have parallel oblique flaking. [One point from the Lungren site is oblique flaked (Brown 1967:121).] Frison is still developing this line of thought and has more recently suggested that the early side notched point styles developed from different Paleo-Indian bases (1981).

Loendorf et al. (1982:49) infer from a data base of "few discoveries" that the early stages of the Plains Archaic tradition "are not well represented in the Little Missouri region." However, one Logan Creek/Mummy Cave excavated component is presently documented for the study area, and several other isolated finds are currently being evaluated. Kuehn reports a component at the Tysver-Olson site in the Killdeer Mountains locality, Dunn County (1982c). A large side notched point, other chipped stone tools, flaking debris, and burned sandstone, along with small quantities of charcoal and burned bone were recovered from an intact buried component dating ca. 3395 B.C.

The location of the Tysver-Olson component is consistent with suggested demographic patterns which would have favored river valley and refugium areas for most subsistence and technological resource procurement activities. However, much of the Tysver-Olson site activity may have been related to KRF procurement and toolmaking. Sparsely vegetated, eroding land surfaces away from the Killdeer Mountains proper may have enhanced surface collecting of KRF nodules at certain times during the Atlantic. This phenomenon may be pertinent to other localities where KRF would have been available near the surface; it may also be pertinent to periods of extended drought in pre- and post-Atlantic times.

Charcoal from two hearths at the Moe site in the Missouri Trench in Mountrail County were radiocarbon dated ca. 4045 B.C. and 4320 B.C. (Schneider 1975:17, 25). These dates are in accord with their stratigraphic positions below the Riverdale member of the Oahe formation. Associated cultural remains were sparse and no affiliation is suggested with any named archeological unit.

In contrast with alluvial settings, many ridge top settings may have very low potential to hold intact Early Plains Archaic period cultural deposits. Under the arid climatic conditions of the Atlantic climatic episode, many ridge top settings were probably eroded to parent material. Some pre-Atlantic and Atlantic age cultural remains may be expected right on the surface of the underlying parent material, but integrity of association may be expected to be a problem in such contexts.

Oxbow Complex

The name derives from the Oxbow Dam site in Saskatchewan (Nero and McCorquodale 1958). The unit includes Oxbow type projectile points and associated remains. Based on the presence of Oxbow points, it has been suggested that regular utilization of the Little Missouri region was initiated ca. 3050 B.C. (Loendorf et al. 1982:50). However, practically nothing is known of Oxbow archeological assemblages in western North Dakota, much less adaptive strategies or demographics.

TEMPORAL DISTRIBUTION

The Oxbow component at the Oxbow Dam site dates ca. 3250 B.C. (Wormington and Forbis 1965:49). Dates for the complex have been estimated by Syms to span the period 3500-1000 B.C. in southwestern Manitoba (1980:365). Reeves estimates the temporal range at ca. 3200-2600 B.C. (1973). Wormington and Forbis suggest a date range of 3400-2600 B.C. for Alberta (1965:188). Dated components at the Castor Creek site range ca. 3000-2600 B.C. (Wormington and Forbis 1965:52-54).

The Oxbow components at Long Creek date ca. 2663 B.C. and 2693 B.C. (Wettlaufer 1960a:52, 59). Dates from Whitemouth Falls are ca. 2860 B.C. and 2675 B.C. (Buchner 1979:81). There are no dated Oxbow components in Montana (Davis 1982) or North Dakota.

Other Oxbow dates are significantly more recent and have not yet been rejected. Two dates on charred bone from Harder are ca. 1475 and 1410 B.C. (Dyck 1977:31); there is a date of ca. 2150 B.C. for Moon Lake and 1100 B.C. for Carruthers (Dyck 1977:31).

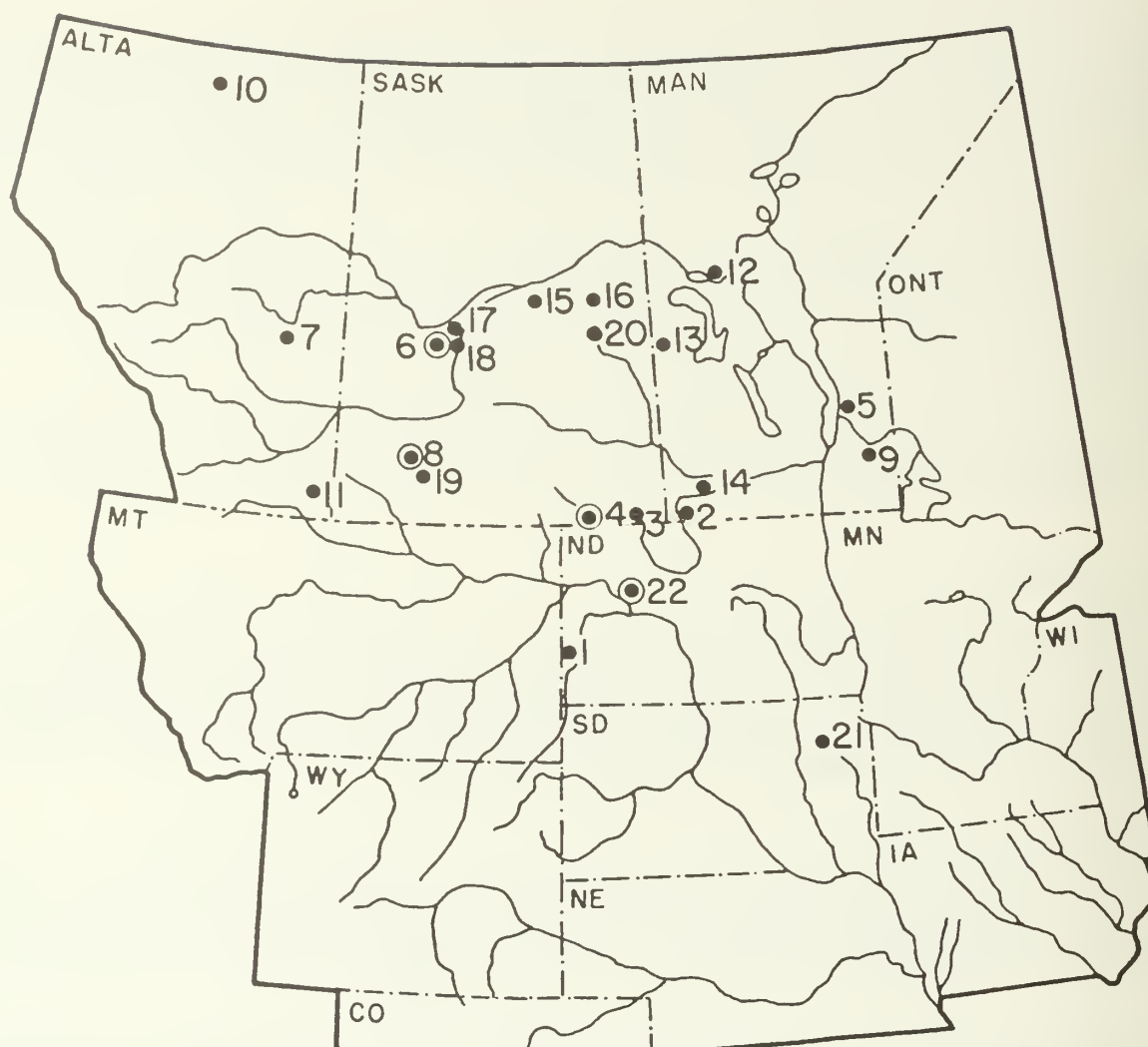
GEOGRAPHIC DISTRIBUTION

The Oxbow type site is directly north of the study region (Figure 21). Components are concentrated north of the Missouri River in northern Montana, Alberta, Saskatchewan, and southwestern Manitoba (Reeves 1969:32). But Oxbow point finds indicate components in North Dakota (East et al. 1981:16), South Dakota, Wyoming, western Nebraska (Carlson and Steinacher 1978), the fringe of the boreal forest in eastern Manitoba (Buchner 1979:80-96), the boreal forest of Saskatchewan and Alberta (Dyck 1977), and deep into the boreal forest of Alberta (Buchner 1978).

CONTENT

Settlement Types: bison traps, pounds, and jumps; camps situated on stream terraces (Reeves 1969:32); camps/bison processing areas distant from water (e.g., Harder); tipi ring camps (Adams 1978).

Faunal and Floral Remains: seeds ("hackberry or other cherry-like fruit"), bison, dog, *Canis* sp., and freshwater mussels at Long Creek; elk, wolf, coyote, rabbit, marten, and goose [from Oxbow summary table in Buchner (1979:82)]; wolves at Harder (Dyck 1977:55); kit fox at Oxbow Dam; golden eagle at Gray (Millar 1978:372-373).



● - Sites with KRF reported

- 1 - Cinnamon Creek Ridge (East et al. 1981:42), surface
- 2 - Nash survey (Syms 1980), surface
- 3 - Oxbow (Nero and McCorquodale 1958)
- 4 - Long Creek (Wettlaufer 1960a)
- 5 - Caribou Lake Project (Buchner 1979)
- 6 - Harder (Dyck 1977)
- 7 - Castor Creek (Forbis 1970)
- 8 - Gray (Foster 1972; Millar 1978)
- 9 - Whitemouth Falls (Buchner 1979)
- 10 - Tukwakin (Buchner 1978, 1979)
- 11 - EcOr-34 (Brumley 1972:27)
- 12 - Tailrace Bay (Mayer-Oakes 1970)
- 13 - Swan River (Gryba 1968)
- 14 - Cherry Point (Haug 1976; Syms 1974)
- 15 - Klein (Nero 1957)
- 16 - Connell Creek (Meyer and Dyck 1968)
- 17 - Carruthers (Dyck 1972)
- 18 - Moon Lake (Dyck 1970)
- 19 - East Pasture (Wilson 1972)
- 20 - Greenwater Lake (Hartney and Walker 1974)
- 21 - 39DA201 (McNerney 1970)
- 22 - Moe (Schneider 1975), surface

Figure 21. Some Oxbow complex sites.

Feature Types: circular pattern of small diameter post molds around a surface hearth at Long Creek; ash concentration in an area inferred to have functioned in hide working at Long Creek; processed bone refuse piles, elliptical smudge pits, and living floors at Harder (Dyck 1977); small basin shaped hearths [from summary table in Buchner (1979:82)].

Design Motifs/Ornamentation: drilled freshwater musselshell at Long Creek; perforated shell pendant at Oxbow Dam (Nero and McCorquodale 1958:86-87).

Chipped Stone: Oxbow point (see Dyck 1977:72-86 for type description and other considerations); end scrapers, ovoid and circular bifaces at Long Creek; ovate point preforms, lanceolate bifaces, asymmetrical perforators, irregular base drills, crude choppers, and irregular polyhedral cores [from summary table in Buchner (1979:82)].

Ground Stone: hammerstones at Long Creek; anvil stones and abrading stones [from summary table in Buchner (1979:82)]; grooved mauls at Gray (Millar 1978:305).

Modified Bone: large mammal long bone fragments with use-wear, awls, scrapers, beaming tools, hide grainers, and other worked fragments (some polished and some flaked) of unknown function at Long Creek; knapping tools and choppers (from Buchner summary table).

Burial: single burials (Greenwater Lake) and mass burials in extensive cemetery at Gray site (Foster 1972; Millar 1978).

Metal: copper crescent at Castor Creek (Wormington and Forbis 1965:Figure 45); rolled copper and copper sheet at Gray (Millar 1978:335-338).

DISCUSSION

Wormington and Forbis postulate "the Oxbow complex is derived from some as yet unidentified Archaic culture of the prairie-woodland border zone, well to the east of the Great Plains" (1965:190). Reeves, on the other hand, sees no evidence for eastern Archaic affiliations. He argues that Oxbow represents Plains continuity, perhaps developing out of the Mummy Cave complex (1973:1245). Both positions may be viewed as complementary when seen from the perspective of an earlier Logan Creek/Mummy Cave complex existing throughout the area of Oxbow complex distribution, and beyond to the west, south, and east. Buchner feels that differences in Oxbow material culture from the western grasslands and eastern forest of Manitoba are "slight" (1979:81).

Occurrences of KRF in chipped stone assemblages across the northern extent of the range (Figure 21) give some indication of exchange and territoriality in societies with Oxbow complex material culture. Trace occurrences of KRF in eastern Manitoba indicate information and material flow between these two areas. Wettlaufer reports a significant amount of KRF in level 8 of the Long Creek site, enough to "indicate an active trading relationship, or possible movement through and around the region of Knife River, North Dakota" (1960a:56). Some copper artifacts in Oxbow components in Saskatchewan and Alberta may indicate long distance east-west exchange relations.

The hunting and gathering subsistence strategies represented at Oxbow components vary with the environmental setting. "Oxbow faunal inventories are dominated by bison in the grasslands and around the forest edge, while moose, caribou and a variety of smaller game animals predominate at Oxbow sites in the forest" (Buchner 1979:85). Faunal and floral remains from the Long Creek site, situated in a Northwestern Plains setting just northwest of the study region, give some indication of the range of subsistence resources that should have been utilized in the study region: berries, freshwater mussels, dog/coyote, and bison (Wettlaufer 1960a).

The range of Oxbow site types reported from the Northwestern Plains, while limited, is representative of the Plains Archaic tradition lifeway: bison traps, jumps, and surrounds, camps situated on stream terraces (Reeves 1969:32), tipi camps (Adams 1978), and bison processing camps (Dyck 1977).

The Oxbow complex is the earliest named unit in the Northern Plains associated with significant numbers of archeologically recovered human skeletal remains. There is an extensive cemetery at the Gray site in south-central Saskatchewan (Foster 1972; Miller 1978). Gray is thought to be a traditional band burial ground and contains an estimated 500 individuals (Millar 1978).

The Oxbow complex correlates in time with the transition from the Atlantic to Sub-Boreal climatic episodes. Perhaps with increasingly favorable climatic conditions the subsistence resource potential improved uniformly to the point that prehistoric groups resumed regular utilization of the entirety of western North Dakota. If "xeric effects . . . were at work until 5000 years ago, then it is possible that up until this time [many parts of the Little Missouri region] were not particularly attractive in terms of resource potential" (Loendorf et al. 1982:49).

McKean Complex

The name derives from the McKean site in northeastern Wyoming (Mulloy 1954) (Figure 22). This taxonomic unit includes McKean Lanceolate points, Mallory points, Duncan points, Hanna points, Yonkee points, and associated remains. The associated remains include several other unnamed point varieties (cf. Frison 1978:50). Some McKean complex point types display stylistic overlap among themselves (Mulloy 1954:445) and stylistic continuity with later types in the Northwestern Plains. Some components contain a single type; others contain two or more. The most frequently occurring types in the study region seem to be McKean Lanceolate, Duncan, Hanna, and Yonkee. All four of these types appear to be present in the point assemblage from the lower component of the McKean site as illustrated by Mulloy (1954).

Components classified in this complex are distributed over about 2,500,000 km² (a million square miles) of central North America, and persist for about 2500 years in the archeological record (125 generations). It is suggested that many ethnic groups, adaptive strategies, and distinctive material traits will be found to characterize the numerous regional groups whose projectile point stylistics we classify in the McKean complex.

Reeves has used stylistic overlap and continuity in point types and other chipped stone tool forms as the basis for defining a TUNAXA' cultural tradition with four sequent phases over much of the Northern Plains. The first two phases involve McKean complex materials. The McKean phase (2500-1500 B.C.) is characterized by the McKean Lanceolate type; the Hanna phase (1500-1000 B.C.) by the Hanna type; the Pelican Lake phase (1000 B.C.-A.D. 200) by the Pelican Lake type; and, Avonlea (A.D. 200-700) by Avonlea, Head-Smashed-In-Corner Notched, and Timber Ridge Side Notched arrow point types (Reeves 1970b). A number of Northern Plains archeologists follow this classificatory/chronological model. Others consider these named phases within the Plains Archaic tradition or within the periods named by Mulloy.

A McKean phase has not yet been described for the study region. No comprehensive set of temporally or geographically distinctive traits have been identified to form the basis for describing such a phase. There are but a few reports or regional intercomponent analyses which consider sites in or near the study region (Keyser 1982; Syms 1969).

TEMPORAL DISTRIBUTION

The McKean Lanceolate and Duncan point types mark the appearance of the McKean complex in the Northern Plains at ca. 3000 B.C. Some see origins of the complex in the Colorado Front range in components dating ca. 4000 B.C. (Benedict and Olson 1973, 1978).

The oldest dates of about 3000 B.C. are found primarily in the mountain ranges that encircle the Big Horn Basin. . . . The dates in the Bowman-Haley Reservoir area and Black Hills area vary between 2280 and 1680 B.C. Farther north and south the dates tend to be even later. The two dates in Saskatchewan are about 1400 B.C.; the dates for Signal Butte, Nebraska, are 1450-1200 B.C. (Syms 1969:165).

Yonkee material is dated ca. 2470 B.C. at Mummy Cave (Frison 1970:28) and ca. 2500 B.C. at the Powers-Yonkee Bison Trap (Bentzen 1962b). Other Yonkee components date very late. Dates for the Mavrakis-Bentzen-Roberts site in northern Wyoming are ca. 650 and 510 B.C. (Bentzen 1962a; Frison 1978:47). A Yonkee component at the Mondrian Tree site (32MZ58) dates ca. 800 B.C. The Tree site date may support Syms' proposition that the McKean complex persists as late as 1000-600 B.C. in the extreme Northern Plains (1970:131).

At the Cactus Flower site in Alberta, Brumley sees cultural continuity through seven stratified McKean "occupations" dating ca. 2250-1650 B.C. (1975:72). A date of ca. 1445 B.C. is reported for the "Thunder Creek culture" at Mortlach (Wettlaufer 1955:71). Dates from Manitoba include ca. 910 B.C. and 880 B.C. at Cherry Point (Haug 1976), ca. 1240 B.C. at Carrot River (Long and Tamplin 1977), ca. 1180 B.C. at Steeprock Lake (Simpson 1970), ca. 1455 B.C. at Whitemouth Falls (Buchner 1979:95), and ca. 1780 B.C., 1750 B.C., and 1585 B.C. from the Caribou Lake Project (Buchner 1979:95).

Radiocarbon dates from South Dakota include four dates clustering around 1900 B.C. on three stratified Duncan components at Lightning Spring (Keyser 1982). A McKean Lanceolate association at Sitting Crow dates ca. 2450 B.C. (Neuman 1964:477).

GEOGRAPHIC DISTRIBUTION

The McKean complex has an extensive geographic distribution: the Plains of Alberta, Saskatchewan, Manitoba, the Dakotas, Montana, Wyoming, northern Colorado, western Nebraska, and into the Parkland of Saskatchewan and Manitoba (Figure 22). Components are also documented in the mountains of central and western Wyoming and western Montana. McCullough says there is no evidence that people utilizing either McKean or Duncan projectile points "effectively penetrated the Boreal Forest" (1982:27-82), yet a McKean component at the Tukwakin site is "over 300 km north of the [present] southern margin of the Boreal Forest" (Buchner 1979:84). People equipped with McKean complex technology "occupied many environmental niches including mountains, grasslands, aspen parklands and boreal forests" (Syms 1969:ii).

Components in southeastern Manitoba characterized by McKean complex materials were classified in an archeological unit named the Whiteshell focus by MacNeish (1958:55-57, 74, 78). The term appears to have fallen into disuse in recent years. These northeasternmost McKean components are characterized by McKean Lanceolate and Nutimik Concave projectile points. The McKean Lanceolate is often in the form of a "fish-shaped" variant (Buchner 1979:95). Nutimik Concave may be a Hanna preform.

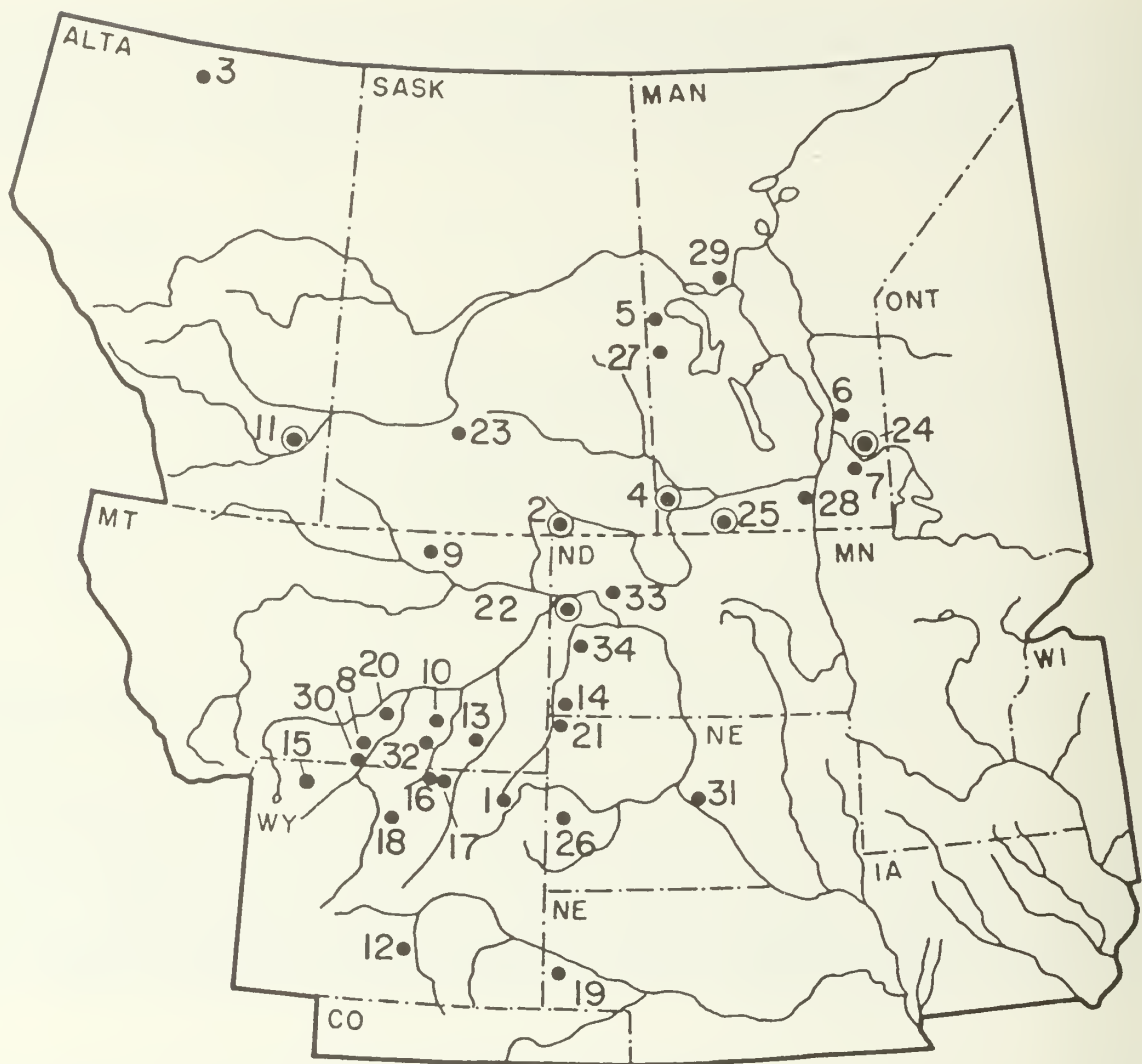
Several named archeological units can be identified as partly contemporaneous with McKean in adjacent geographic areas: The Old Copper complex to the east and the Nebo Hill phase to the southeast (Reid 1980). The McKean complex may persist in the study region well beyond the initial appearance of the Pelican Lake complex in adjacent regions. It seems that these two complexes, or perhaps more properly the point types and styles which characterize them (Hanna and Yonkee), are both present in the study region from ca. 1300-800 B.C.

CONTENT

Settlement Types: winter camp at Dead Indian Creek (Frison 1978:271-273; Smith 1970); base camps; bison kills (jumps, arroyo traps, corrals/pounds); tipi ring camps (Frison 1978:51); lithic cache (Dodge site).

Faunal and Floral Remains: bison, elk, antelope, beaver, fish (Joyes 1970:211); bird, canid, rabbit at McKean site (Mulloy 1954:453); mule deer and mountain sheep at Dead Indian Creek (Frison 1978:54); domestic dog and cottontail rabbit at Long Creek; bear (Buchner 1979:94); gray squirrel, coyote, wild onion, chokecherry, limber pine seeds, and buffalo berry at Leigh Cave; catfish at Bottleneck Cave IV; freshwater mussels at Cactus Flower.

Feature Types: square depressions (possible residential structure) at Fisher site, Bowman County (Syms 1969); burned rock and charcoal midden with rock lined hearths in the Black Hills; pot shaped storage pits in Signal Butte I (Strong 1935:279), possibly similar to shallow conical pits with rock lined bottoms at Lightning Spring and Red Fox; small and large, sandstone lined and filled, basin shaped hearths at the McKean site (Mulloy 1954:441); cache pits at the McKean site; three rock piles in camp area at McKean site (Mulloy 1954:442); wide variety of roasting pits (Frison 1978:47); post corrals (Frison 1978:210-211); shallow, unlined, steep sided, flat bottom hearth pits at Lightning Spring and Red Fox; basin shaped hearths (some with associated post molds), basin shaped pits, surface hearths, ash concentrations, and large pits (probably roasting pits) at Cactus Flower (Brumley 1975:20-37); tipi ring at Cactus Flower.



● Sites with KRF reported

- | | |
|---|--|
| 1 - McKean (Mulloy 1954) | 18 - Leigh Cave (Frison and Huseas 1968) |
| 2 - Long Creek (Wettlaufer 1960a) | 19 - Signal Butte (Strong 1935) |
| 3 - Tukwakin (Buchner 1978, 1979) | 20 - Pictograph Cave (Mulloy 1958) |
| 4 - Cherry Point (Haug 1976) | 21 - Lightning Spring (Keyser 1982) |
| 5 - Steeprock Lake (Simpson 1970) | 22 - Mondrian Tree (32M258) |
| 6 - Caribou Lake Project (Buchner 1979) | 23 - Mortlach (Wettlaufer 1955) |
| 7 - Whitemouth Falls (Buchner and Pujo 1977) | 24 - Cemetery Point (MacNiesh 1958) |
| 8 - Sorenson (Husted 1969) | 25 - Avery (Joyes 1970) |
| 9 - Johnson Bison Kill (Deaver, in Davis 1982:11) | 26 - Gant (Hurt 1960) |
| 10 - Dodge (Davis 1976) | 27 - Filuk (Syms 1969) |
| 11 - Cactus Flower (Brumley 1975, 1978) | 28 - Larter (MacNeish 1958) |
| 12 - Scoggin (Lobdell 1974) | 29 - Tailrace Bay (Mayer-Oakes 1967) |
| 13 - Powers-Yonkee (Bentzen 1962b) | 30 - Bottleneck Cave IV (Husted 1969) |
| 14 - Fisher and Red Fox (Syms 1969) | 31 - Sitting Crow (Neuman 1964) |
| 15 - Dead Indian Creek (Smith 1970) | 32 - Kobold (Frison 1970) |
| 16 - Mavrakīs-Benson-Roberts (Bentzen 1962a) | 33 - Moe (Schneider 1975), surface |
| 17 - Powder River (Frison 1968a) | 34 - Ice Box Canyon (Simon and Borchert 1981b) |

Figure 22. Some McKean complex sites.

Design Motifs/Ornamentation: incised design of lines and dots on bison rib section and cylindrical bone beads with incised design at McKean site (Mulloy 1954:449); shell beads at Mummy Cave; dot-incised and polished canid canine tooth at Long Creek.

Chipped Stone: see the following for type descriptions and/or illustrations: McKean Lanceolate (Syms 1969; Wheeler 1952), Duncan (or McKean Stemmed) (Mulloy 1954; Syms 1969; Wheeler 1954), Hanna (Syms 1969; Wheeler 1954), Yonkee (Bentzen 1962b; Frison 1978:55, 204), Mallory (Frison 1978:204c; Lobdell 1973:124).

Small and large, ovoid to triangular to irregularly rectangular, plano-convex end scrapers at McKean site (Mulloy 1954:445); some McKean scrapers are large and thick; spokeshaves, ovoid to pyriform biface knives; perforator and quartzite chopper at Long Creek; polyhedral cores (Buchner 1979:94); thin end scrapers on "thinning flakes," preforms, blanks, and denticulate at Lightning Spring; split pebble scrapers at Mortlach; *pieces esquillees* at Cactus Flower.

Ground Stone: sandstone grinding stones and slabs at McKean site (Mulloy 1954:449); hammer-stones, anvil stones, disk, and pipe at Cactus Flower.

Modified Bone: deer carpal awls at Leigh Cave; use-polished rib fragment at Long Creek; needle at Powder River (Frison 1968a:34); awls, blunt ended tools, polished tool fragments, and beads at Cactus Flower.

Modified Antler: harpoon point at Cemetery Point; fragments at Cactus Flower.

Modified Shell: beads at Mummy Cave; beads and disks at Cactus Flower.

Wood and Other Perishables: spear foreshafts and main shafts, sinew, hide, wads of grass (wild rye) and deer and sheep hair, milkweed and juniper bark two-strand twisted cordage at Leigh Cave (Frison 1978:55; Frison and Huseas 1968); coiled basketry at Mummy Cave (Wedel et al. 1968:184).

Burial: skull in a cache pit at the McKean site (Mulloy 1954:442).

DISCUSSION

The widespread McKean presence on the Northern Plains has been described as "explosive" (Wormington and Forbis 1965:190) and "almost dramatic" (Frison 1978:46). This presence correlates with the beginning of the essentially modern Sub-Boreal climatic episode (cool and moist in comparison with the Atlantic). Faunal and floral resource potentials are believed to have been similar to those of the early Historic period. Sub-Boreal resource potential should have been greater than that of Atlantic resource potential throughout most of the study region, but especially in the Coteau and Little Missouri regions which are characterized overall by shortgrass prairie vegetation and ephemeral water sources.

Overall, the resource base of the Northern Plains (and the study region) should have been relatively stable, presenting more uniform potential for hunting and gathering adaptations. Certainly there were extended drought periods during the last 5000 years as evidenced by thick layers of windblown silt in the Riverdale member of the Oahe formation (Clayton et al. 1976). But, a generally more stable resource base for the late Holocene might mean that effective hunter-gatherer responses to changing environmental potentials during the ca. 3000 B.C.-A.D. 1725 time range were in a more limited range than during the preceeding 3000 years.

No regional McKean complex hunter-gatherer adaptations have been described in any detail, but there is information related to this topic from many individual site reports and a few McKean summary statements. Brumley points to a subsistence economy focally adapted to bison "in the area of the Canadian Plains and northern Montana" where there is a general absence of "grinding stones or other implements which were utilized in the processing of vegetable foods" (1975:98). A fishing adaptation is suggested for the Canadian North (Syms 1970:136).

In Manitoba, "a seasonal round of subsistence based on summer bison hunting in the grasslands and winter bison hunting in the adjacent parklands may be inferred" (Buchner 1979:97). McKean sites in Manitoba are concentrated in the south and west where the environment would have been prairie, aspen parkland, and mixed forest (Syms 1969). As of 1969 there were 64 surface components and five excavated

components recorded in western Manitoba (Syms 1969:128). Sites are concentrated along major waterways. Small artifact inventories, shallow occupation zones, and small site areas may indicate small family groups living in temporary camps (Syms 1969:128). "The sites with large numbers of tools represent either multi-component sites or bison kills in which larger numbers of individuals had combined to trap bison" (Syms 1969:169). Syms suggests McKean groups may have "lived much of the year in small groups and combined into larger groups during the summer for buffalo hunts" (1969:169).

Lithic raw material utilization provides some limited insight into Middle Plains Archaic period regional exchange. Syms noted that most Manitoba McKean points are made from Swan River chert or Selkirk chert. Similar use of local lithic resources (porcellanite and quartzite) is indicated at the McKean site (Mulloy 1954:444). Keyser notes a focus on "locally available agatized wood" and Tongue River silicified sediment (TRSS) at the Red Fox and Lightning Spring sites (1982). Restricted interregional exchange may be found to characterize most of this period, perhaps an indication of increased regional subsistence resource reliability (Hayden 1982) and increased human population density. However, KRF is reported from the Cactus Flower site in Alberta (Brumley 1975, 1978) and the Cemetery Point site in extreme eastern Manitoba (MacNeish 1958), so there was certainly some long distance exchange during the Middle Plains Archaic period. Further, the extensive geographic distributions of the McKean point styles also indicate interregional interaction.

It is not likely that all of the named and unnamed McKean complex point types were present in consistent relative frequencies throughout any given region during the entire period ca. 3000-600 B.C. A number of investigators in different areas have inferred a trend involving the McKean Lanceolate, Duncan, and Hanna types. They see an early dominance of McKean Lanceolate, a shift to dominance of the Duncan type during the approximate period 2000-1500 B.C., and dominance of the Hanna point during the approximate period 1500-1000 B.C. (e.g., Brumley 1975:72-73; Reeves 1970b:74).

The Yankee point style may have a more restricted geographic distribution within the overall extent of the McKean complex. Yankee points are reported from northeastern Wyoming, central and eastern Montana, and western North Dakota. Yankee bison kills indicate "a strong reliance on fall and winter communal bison procurement," but little is known "of the economic activities that took place during the remainder of the year" (Frison 1978:210). A bison butchering procedure characteristic of Yankee sites involved "stripping meat from carcasses and leaving the skeletal parts intact" (Frison 1978:203).

The McKean complex "may represent the earliest intensive use" of the Little Missouri region (Loendorf et al. 1982:51) and the study region as a whole. Duncan and Hanna points are reported from Cinammon Creek Ridge (East et al. 1981:64). There is a McKean component at Ice Box Canyon dated ca. 2180 B.C. (Simon and Borchert 1981b:56). There is good temporal control on a series of McKean components at Lightning Spring in extreme northwestern South Dakota (Keyser 1982). Work conducted in the area of the Bowman-Haley Reservoir in Bowman County by SIRBS crews under the direction of Oscar Mallory in 1964-1965 is reported by Syms, including a component dated ca. 1820 B.C. (Syms 1969:134).

Pelican Lake Complex

The name derives from Wettlaufer's (1955) identification of a "Pelican Lake culture" in several of the lower cultural zones at the Mortlach site in south-central Saskatchewan, a short distance north of the international boundary. Components of the Pelican Lake complex follow those of the McKean complex throughout most, if not all, of the geographic extent of McKean. Few, if any, differences have been noted in adaptive strategies between McKean and Pelican Lake. The primary difference appears to be in the projectile points, but some early Pelican Lake varieties approximate the Hanna type of the McKean complex.

There is considerable taxonomic confusion with the Pelican Lake point type and varieties. Any corner notched or corner removed point dating ca. 1500 B.C.-A.D. 400 is frequently classified as Pelican Lake. Syms makes a distinction within this range for southwestern Manitoba of "Archaic Barbed" points dating ca. 1200-100 B.C. and "Plains Middle Woodland Pelican Lake" points dating ca. 400 B.C.-A.D. 800 (1980:364-365, 370). He identifies Archaic Barbed points as larger, shallow corner notched forms, and the Pelican Lake points as smaller, with deep notches (1980:365). He suggests that because Hopewellian

influences reached Pelican Lake populations, the Pelican Lake components in question should be classified in the Plains Woodland tradition (1980:365). He also suggests that a general diminution of corner notched points through time in Pelican Lake may relate to a point diminution trend noted in Illinois Middle Woodland components (1980:365).

Most Northern Plains archeologists agree that Pelican Lake developed out of the McKean complex (cf. Joyes 1970:212; Reeves 1970a:167). In the Little Missouri region within the study area, "it appears there was a continuous transition, in terms of exploitation of the region," from McKean to Pelican Lake (Loendorf et al. 1982:52).

TEMPORAL DISTRIBUTION

Reeves places the "transition from Hanna to Pelican Lake at ca. 1300 B.C. to 750 B.C." with regional variation (1970b:330). He places the Upper Miles-Besant interphase boundary at ca. A.D. 100-200 (1970b:33), the boundary between the Mortlach subphase and Besant at ca. A.D. 150-250, the boundary between the Mortlach subphase and Avonlea at ca. A.D. 150-250 (1970b:336), the Larter subphase-Laurel boundary at ca. A.D. 1, and the Larter subphase-Besant boundary at ca. A.D. 1-100 (1970b:336). The temporal range suggested for the Pelican Lake complex in the study region is 1500 B.C.-A.D. 250.

Dates in Saskatchewan include 480 B.C. at Walter Felt (McCallum and Wittenberg 1968:376) and ca. 293 B.C. at Long Creek (Wettlaufer 1960a:47). In Manitoba, seven samples from the Bjorklund site ranged ca. 1175-775 B.C. (Buchner 1976a).

Dates in Montana include ca. 1580 B.C. at Pilgrim (Davis et al. 1982a), ca. 470 B.C. at Upper Miles (Reeves 1970b), ca. 230 B.C. at the Ayers-Frazier Bison Trap (Clark and Wilson 1981), ca. 110 B.C. at Holmes Terrace (Davis et al. 1982b), and A.D. 230 at Stark-Lewis (Fehyl 1972). Sixteen dates from the Schmitt Chert Mine fairly well fill the time range from ca. 1290 B.C.-A.D. 315 (Davis 1982:5-6).

There are a variety of large and small, corner notched and side notched points in the upper level of the McKean site dated ca. 1337 B.C. (Mulloy 1954). Farther west in Wyoming there is "a relatively intense occupation in the Bighorn Mountain and basin areas about A.D. 200 to A.D. 500" (Frison 1978:59).

GEOGRAPHIC DISTRIBUTION

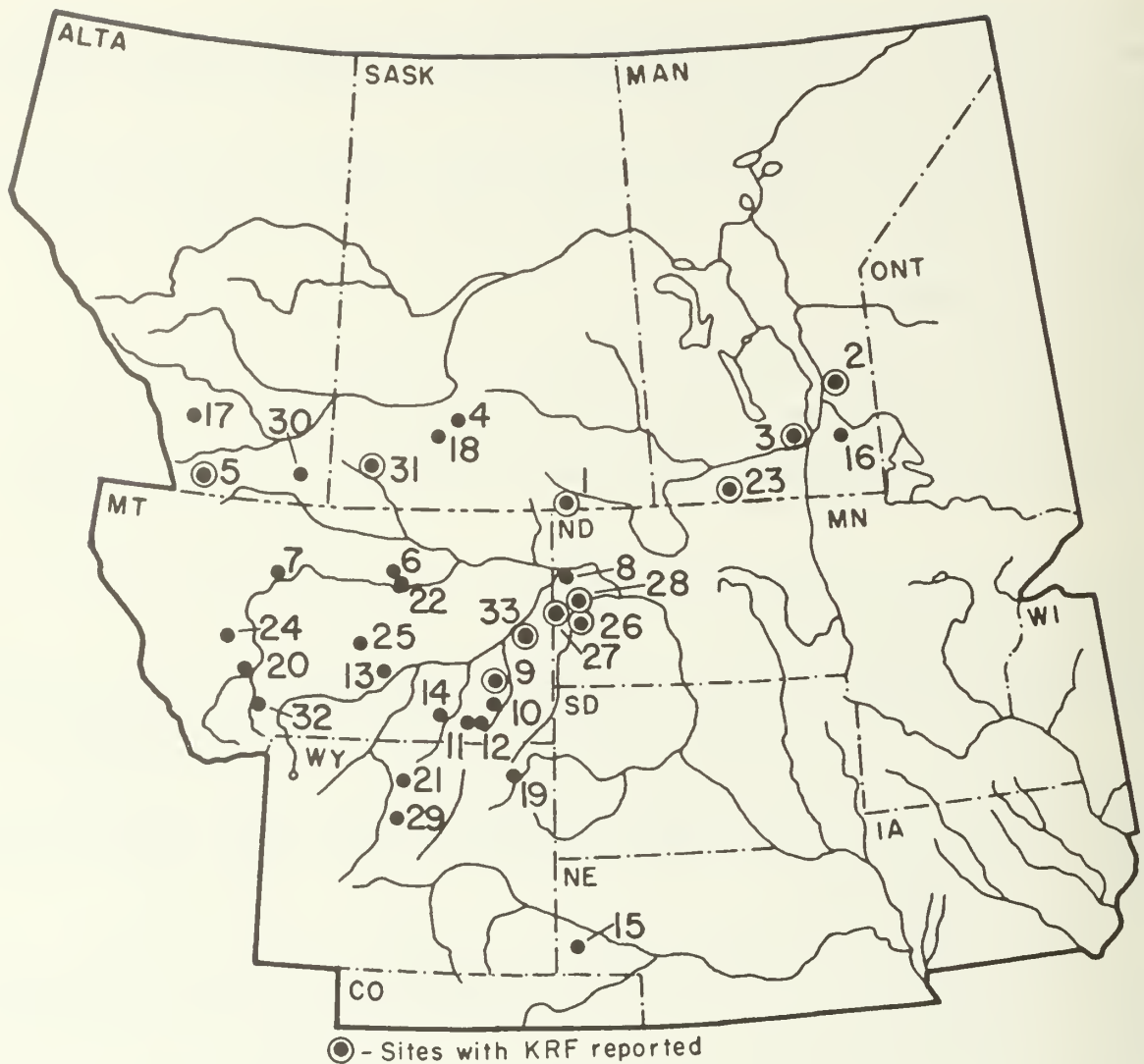
The geographic distribution of Pelican Lake components includes (1) the plains, parklands, and into the southern boreal forest of Alberta, Saskatchewan, and Manitoba, (2) the plains of Montana, the Dakotas, Wyoming, northern Colorado, and Nebraska, and (3) into the Rocky Mountains of Alberta, Montana, and Wyoming (Figure 23).

Reeves has proposed a number of areally limited, contemporaneous "subphases" to account for regional differences in Pelican Lake material culture, including projectile point styles (1970a, 1970b). "Regional variation within Pelican Lake suggests that it may be conceptualized as representing a series of local adapted nomadic hunting-gathering populations, each of which participates in an ongoing unifying cultural tradition — TUNAXA" (Reeves 1970a:167). Four of Reeves' regional "subphases" bear directly on the study area (Reeves 1970b:Figure 3). A Keaster "subphase" is identified for central Montana, including the Missouri and Yellowstone drainages east to the North Dakota border. A Mortlach "subphase" is identified for the grasslands of Alberta, Saskatchewan, Manitoba, and fringe of the adjacent U.S. A Larter "subphase" is identified for the Parkland of southern Manitoba. An Upper Miles "subphase" is identified for southeastern Montana, northeastern Wyoming, northwestern South Dakota, and the extreme southwestern portion of the study area. In western North Dakota, affinities might be anticipated with any or all of these named archeological units.

CONTENT

Settlement Types: tipi ring camps (Adams 1976; Davis et al. 1982a); other habitation sites on stream terraces or in rockshelters (Reeves 1970b:83); bison kills (traps, pounds, and jumps) (Reeves 1970a:161); chert quarry or mine at Schmitt.

Faunal and Floral Remains: bison, dog, and freshwater mussels at Long Creek; fish at Holmes Terrace; white-tailed deer, grizzly bear, muskrat, and birds at Larter; antelope, elk, and sheep at Spring Creek Cave; "evidence of fowling is present in most subphases" (Reeves 1970b:86); fauna at Daugherty



- | | |
|---|---|
| 1 - Long Creek (Wettlaufer 1960a) | 18 - Walter Felt (Kehoe 1968; McCallum and Wittenberg 1968) |
| 2 - Caribou Lake Project (Buchner 1979) | 19 - McKean (Mulloy 1954) |
| 3 - Larter (MacNeish 1958) | 20 - Schmitt Chert Mine (Davis 1977) |
| 4 - Mortlach (Wettlaufer 1955) | 21 - Spring Creek Cave (Frison 1965) |
| 5 - Head-Smashed-In (Reeves 1978) | 22 - Holmes Terrace (Davis 1981; Davis et al. 1982b) |
| 6 - Keaster (Davis and Stalloop 1955) | 23 - Avery (Joyes 1970) |
| 7 - Carter Ferry (Shumate 1967) | 24 - Pilgrim (Davis et al. 1982a) |
| 8 - Mondrian Tree (32MZ58) | 25 - Stark-Lewis (Febyl 1972) |
| 9 - Ayers-Frazier (Clark and Wilson 1981) | 26 - Anderson Divide (Simon et al. 1982) |
| 10 - Bentley (Reeves 1970b) | 27 - Cinnamon Creek Ridge (East et al. 1981) |
| 11 - Upper Miles (Reeves 1970b) | 28 - Ice Box Canyon Ridge (Simon and Borchert 1981b) |
| 12 - Charlotte (Reeves 1970b) | 29 - Daugherty Cave (Frison 1968b) |
| 13 - Billings Bison Trap (Mulloy 1958) | 30 - Cactus Flower (Bramley 1975) |
| 14 - Kobold (Frison 1970) | 31 - Bracken Cairn (King 1961) |
| 15 - Signal Butte (Strong 1935) | 32 - Antonsen (Davis and Zeier 1978) |
| 16 - Bjorklund (Buchner 1976a) | 33 - 24DW87 (Fraley 1982a, 1982b) |
| 17 - Old Women's Buffalo Jump (Forbis 1962) | |

Figure 23. Some Pelican Lake complex components.

Cave include Great Horned owl, flicker, crow, porcupine, marmot, mule deer, and cottontail (Frison 1968b:292); swift fox, bear, and beaver at Bracken Cairn (King 1961:49).

Feature Types: basin shaped and bucket shaped hearths, some rock filled (Reeves 1970a:161); amorphous roasting pits, surface burns (Brumley 1975:20), stone platform surface hearths, and a stone ringed surface hearth (Reeves 1970b:83); prepared, basin shaped hearth with possible roasting platform of sandstone slabs (Aivazian 1981:22).

Chipped Stone: for Pelican Lake Corner Notched point type descriptions see Reeves (1970b:45-47); projectile point varieties in addition to Pelican Lake Corner Notched identified by Reeves in subphases directly relevant to the study region are Hanna Corner Notched, obtuse shouldered forms, Stemmed Atlatl, and flake points (1970b:76-77); end scrapers, side scrapers, "chisels," small and large ovoid bifaces and choppers at Long Creek; large, corner notched bifaces in Larter subphase (Reeves 1970a:161); T-butt, irregular flake butt, and oval butt drills, irregular flake butt and ovate perforators, notched and tit gravers (Reeves 1970a:161); pieces esquillees at Cactus Flower.

Ground Stone: grooved and ungrooved hammerstones (MacNeish 1958:75); grinding stones and grinding slabs "very frequent" in the Upper Miles subphase and "virtually absent" in the Keaster, Mortlach and Larter subphases (Reeves 1970b:80); possible atlatl weights at Daugherty Cave; pestle at Bracken Cairn (King 1961:51).

Modified Bone: flaked bone tools at Mortlach; awls, beamers, hide grainer, scrapers, knapping tools, bison and antelope mandible scrapers, and other miscellaneous items at Daugherty Cave (Frison 1968b:280-282, 286).

Modified Antler: deer and elk antler knapping tools, antler wedges, and other unidentified artifacts at Daugherty Cave.

Modified Horn: unidentified artifacts at Daugherty Cave.

Modified Shell: gorgets and beads from Bracken Cairn (King 1961).

Wood and Other Perishables: box elder shafts and leaves, wild onion bulbs, sagebrush fire drills and leaves, milkweed bast fibers and cordage, juniper fire drill hearth and bark, cactus leaves and spines, ponderosa or yellow pine needles, narrow leaf cottonwood knife haft, chokecherry foreshafts and main shafts, wildrose seeds, willow foreshafts and main shafts, willow basketry splints, and more at Daugherty Cave (Frison 1968b:290-291).

Burial: to the south of the study region, primary, flexed, single or multiple pit interments with a few associated utilitarian and ornamental grave goods (Reeves 1970a:162); primary, extended interment with grave offerings (Steege 1960); secondary burials with heavy use of ochre in an excavated pit covered with rock at the Bracken Cairn (King 1961).

Ceramics: "have only been found in one clear association with a component assignable to Pelican Lake" (Upper Miles subphase, Mule Creek Rockshelter) (Reeves 1970b:80); comparable to Sonota, Besant, and Valley ceramics (Reeves 1970b:81).

Metal: "folded" copper bead at Bracken Cairn (King 1961:49).

DISCUSSION

A number of investigators have noted evidence for arid conditions in the Central and Northern Plains on an early Late Plains Archaic period time level. Wormington and Forbis suggested that human populations with McKean material culture declined until approximately 1300 B.C. (1965:191). They noted that in 1965 there were no components dated to the period 1300-700 B.C. in the Northern Plains (1965:191). There are currently 16 dates in this time range for Montana, including McKean and Pelican Lake components (Davis 1982). Although there are now dates in this time range, there are indications of some drought, and heterogeneity in projectile point styles may be indicative of constricted regionalism. However, Fraley (1982a, 1982b) argues at least part of eastern Montana was characterized by increased effective moisture during the period ca. 1050 B.C.-A.D. 50.

Based on natural stratigraphic units characterized by greater rates of deposition in combination with radiocarbon dates at the Long Creek and Mortlach sites, Wettlaufer suggests dates for 10 drought periods between 3040 B.C. and A.D. 1573-1593 (1960b:85). Four of these dates may bear on considerations of evolving Pelican Lake adaptations: 1382 B.C., 367 B.C., A.D. 12-60, and A.D. 162-181.

The variation in subsistence resources and practices represented in Pelican Lake components is expectable given the extensive geographic and temporal distributions of components. Bison were the focus of attention wherever they were available in exploitable numbers (Reeves 1970b:87). Wild plant foods were collected and ground (Reeves 1970b:87).

There is a great deal of variation in Pelican Lake projectile point sizes and shapes. In "some instances the differences between Besant and Pelican Lake are not clear cut . . ." (Keyser 1979:9). Quality of manufacture and raw material utilization are also highly variable in the points. Reeves (1970b) notes that Pelican Lake flake points occur infrequently, but are present in the Mortlach "subphase" (Head-Smashed-In and Old Women's sites) and Keaster "subphase" (Billings Bison Trap). Several Pelican Lake complex flake points are also illustrated from Kobold (Frison 1970:17) and Cactus Flower (Brumley 1975:165).

Projectile point corner notching, like side notching, originated on an early time level. In fact, corner notched point forms may predate the side notched forms of the Logan Creek/Mummy Cave complex. Corner notching, like side notching, was an enduring technological trait, being utilized with apparent varying frequencies through most of the prehistoric past.

Corner notched and lanceolate points are found together in Level IV of Graham Cave, Missouri ca. 7400 B.C. (Klippel 1971). A corner notched point is associated with Cody complex materials at the Fletcher site in Alberta (Forbis 1968:5). Corner notched points and side notched points are found together in a Pretty Creek site component dated ca. 5735 B.C. in south-central Montana (Loendorf et al. 1981:187, 189). Corner notched and Mummy Cave complex side notched forms are found together in Sorenson IV, Montana dating ca. 3525 B.C. (Husted 1969). One of the two points from a ca. 7200-4800 B.C. context at the Itasca site, Minnesota is corner notched (Shay 1971:89-90). Corner notched points were found in all four levels at Pictograph Cave, Montana, and were most numerous in Pictograph Cave I, the earliest level (Mulloy 1958:31-33, 145).

Like the Simonsen points, the early corner notched points can be confused with later forms. The potential for confusion in the study region is enhanced by the relatively common occurrences of a variety of large corner notched points in the Pelican Lake complex (Reeves 1970b).

Beyond the problem of differentiating between some early corner notched forms and some Pelican Lake varieties, there are corner notched forms from other time levels which introduce further potential for confusion. As noted above, corner notching is represented in all three levels at Pictograph Cave. Corner notching is present over a span of 6414 years at Mummy Cave as reported by McCracken et al. (1978). Frison has guess dated corner notched points from Level I at the Kobold site, Montana at 3500-3000 B.C. (1970). Cross dating on the basis of most corner notched point morphological groups is presently on tenuous ground.

Grosser suggests that small corner notched points might be a time marker for the period beginning about 1000 B.C. in the Northern and Central Plains, correlating with the inception of the Sub-Atlantic climatic episode (1977:177). He feels this small point is "probably indicative of the use of the bow and arrow in the Great Plains in general" in conjunction with the continuing use of the atlatl (1977:177). As indicated above, Syms also notes a trend to smaller sized Pelican Lake points, but dates the beginning of the trend about 600 years later than Grosser (ca. 400 B.C.). Reeves believes the bow and arrow was initially introduced in the Northern Plains ca. A.D. 200 with the Avonlea complex (1970b:70).

The Ayers-Frazier Bison Trap, just west of the study region, is a winter (December) bison kill/processing site dated to ca. 230 B.C. It is classified in the Upper Miles "subphase" (Clark and Wilson 1981). Both corner notched and unnotched points appear to have been used in the kill. Excavated samples indicate that more butchering was done with bone tools than with stone tools.

KRF is a preferred raw material in a number of places outside the source area. Most chipped stone tools in the Pelican Lake component at the Long Creek site are KRF (Wettlaufer 1960a:44). There are also several KRF points in Larter "subphase" components in eastern Manitoba (Buchner 1979:42). It has been generalized that KRF is the most common lithic material type in Manitoba and Saskatchewan Pelican Lake components (Reeves 1970a:161).

There are several radiocarbon dated components in the study region. Simon reports a date of ca. 90 B.C. on charcoal from a slab lined pit at the Marsh Hawk site (32B1317) on Anderson Divide in the Little Missouri region, McKenzie County (personal communication, 2/3/82). To the east of the Marsh Hawk site on Anderson Divide, a Pelican Lake component at 32B1249 is radiocarbon dated ca. 1330 B.C. (Simon et. al 1982:153-155).

32B1272 is a multicomponent, ridge top site near the western terminal end of Anderson Divide (Aivazian 1981). Four activity areas were excavated, each with an artifact scatter averaging ca. 3 m in diameter. One activity area centered on a 65 cm diameter, 13 cm deep prepared hearth. Sandstone slabs in the upper level of the hearth had been set on the fire or coals. Aivazian proposed the sandstone slabs may have served as a platform for roasting (1981:22). One projectile point was recovered from the artifact scatter surrounding the hearth. Aivazian suggests it is classifiable as either Hanna or Pelican Lake. Material from the hearth was radiocarbon dated ca. 1300 B.C. One flake of Obsidian Cliff obsidian from the associated artifact scatter was hydration dated at ca. 1232 B.C. (Aivazian 1981:55).

Simon and Borchert report a date of ca. A.D. 125 from a hearth associated with corner notched points at the Ice Box Canyon Ridge site (32MZ38) (1981b:52). Pelican Lake points are reported from Cinammon Creek Ridge in McKenzie County (East et al. 1981:64), and throughout the study region. However, as mentioned above, cross dating based on the trait of corner notching alone is tenuous in the Northern Plains.

Unclassified Late Plains Archaic Period Components

Late Plains Archaic period components are frequently encountered in the Northern Plains which do not fit with Pelican Lake on the basis of projectile point style. This point style diversification may be accounted for by relatively high Late Plains Archaic period human population densities and increased regionalism. Lessened post-Sub-Boreal erosional and depositional landscape modification means increased potential for encountering archeological components from this period.

Because they are numerous, components from this period should provide an opportunity to more soundly formulate named archeological units through intraregional, intercomponent analyses. Better formulations should result from considerations of demographic variables and subsistence-settlement systems in addition to broadly construed lithic assemblages.

Keyser and Davis' report on the One Bear site in southeastern Montana illustrates a sound approach to a Late Plains Archaic component which is unclassifiable within existing chronological models (1981). One Bear is a short-term campsite. All projectile points are side notched dart points and the occupation is dated ca. A.D. 710.

Plains Woodland Tradition

The concept of the Plains Woodland tradition as a distinctive lifeway/adaptive strategy in the study region has not been fully developed. The Plains Woodland tradition is used here to classify and temporally order named archeological units characterized by the regular use of ceramic vessels and/or mound burial ceremonialism. This conforms with Johnson and Wood's characterization of Plains Woodland as Plains Archaic with pottery and burial ceremonialism (1980:38). There may or may not be qualitative differences between Woodland and Plains Archaic subsistence economies in North Dakota.

Perhaps hunter-gatherer adaptations are characteristic of the study region early in the history of the Woodland tradition and hunter-gatherer-horticultural adaptations developed later through contact with

Plains Villagers. It is conceivable that pottery making, mound building people in the study region never developed horticulture to a degree that their lifeways/adaptive strategies were qualitatively different from those of the nomadic hunter-gatherers. Perhaps horticulture or intensified use of indigenous seedy plants and grasses for food is not essential for the Plains Woodland tradition lifeway to have been somehow qualitatively different from the Plains Archaic lifeway. Ceramic vessel production is more than just a technological trait. It represents a significant technological innovation in the Northern Plains. Use of ceramic vessels created ramifications throughout societal systems by providing vermin-proof food storage and a new range of food preparation capabilities. In-depth considerations of the demographic and other indirect effects of the use of ceramics in Northern Plains prehistory are yet to be developed. This section considers the Besant, Sonota, Laurel, Avonlea, Old Women's, and Blackduck complexes, and the Mortlach aggregate.

Besant and Sonota Complexes

Besant is presently the earliest named archeological unit with ceramics known or anticipated in the study region. The name derives from Wettlaufer's identification of a "Besant Culture" at the Mortlach site (1955). The unit includes components with Besant Side Notched and Samantha Side Notched projectile points and/or Besant ceramics and associated remains. Besant Side Notched is an atlatl dart point and Samantha Side Notched is an arrow point. The arrow point appears as early as ca. A.D. 415 in Besant components and predominates in terminal Besant (ca. A.D. 700) (Reeves 1970a:162).

Prior to 1975, Besant was conceptualized as incorporating components which were later to be assigned to the Sonota complex by Neuman (1975). Reeves (1970a, 1970b) defined Besant to include components with (1) a geographic distribution from east to the Missouri Trench in the Dakotas to Alberta and western Montana, (2) subsistence economies with incipient horticulture on the southeastern end of the distribution and nomadic bison hunting on the Northwestern Plains end of the distribution, and (3) burial mound ceremonialism ranging from fully developed in the east to absent in the west. However, no cultigens have been recovered to date from any Besant components.

TEMPORAL DISTRIBUTION

Reeves suggests a Besant temporal range of A.D. 1-700 or 800 in the Northern Plains (1970b).

Dated about A.D. 1 Besant is earliest on the Middle Missouri . . . It appears approximately 100 years later in the Upper Missouri and Saskatchewan Basins where the earliest Besant dates overlap with the latest Pelican Lake dates. The phase terminates differently across the area (Reeves 1970b:149).

With a date of ca. 85 B.C. from the Naze site (32SN246) in the James River valley (Schneider 1981c), the temporal range suggested for the study region is ca. 100 B.C.-A.D. 750.

Montana dates include ca. A.D. 20 and A.D. 40 at 24DW85 (Davis 1982:7), three dates ranging ca. A.D. 110-200 at Wahkpa Chu'gn (Davis 1982:8), and ca. A.D. 400 at Whiskey Hill (Johnson 1977a).

Alberta dates include ca. A.D. 310 at the Old Women's Buffalo Jump (Forbis 1962), and ca. A.D. 610 at Morkin. The cultural level at Morkin with a point assemblage including both Besant and Avonlea types has two dates: ca. A.D. 745 and 760 (Adams 1977:128). Dates in southwestern Manitoba include ca. A.D. 710 from the Richards Kill and ca. A.D. 845 from the Maxwell area, Calf Mountain (Reeves 1970a:159). There is a date of ca. A.D. 377 just north of the study region at Long Creek (Wettlaufer 1960a).

GEOGRAPHIC DISTRIBUTION

Reeves' description of the distribution of Besant includes the spatial extent of Sonota:

Spatially Besant is confined to the Plains area of the provinces of Alberta, Saskatchewan, and Manitoba; the states of North Dakota and adjacent South Dakota . . . , the western part of the Blackhills and adjacent Little Missouri-Belle Fourche drainages, and the Musselshell-Missouri-Milk drainage areas of Montana. It may extend to the Upper Yellowstone and Powder River area. It is also present in part of the mountainous area at the Avon quarry [western Montana] (1970b:90).

Besant is partially contemporary with late Pelican Lake on the Northwestern Plains and with Laurel to the east and northeast. Besant and Laurel share a number of traits including dentate stamp and punctate ceramic decoration and use of beaver incisor tools. Projectile point and ceramic similarities have also been noted with the partially contemporary Valley focus of the Central Plains (Wood 1956:24). Besant is also partially contemporary with Avonlea (Johnson 1977a; Reeves 1970b:91). The Hopewellian Interaction Sphere (Caldwell 1964) was ongoing during a portion of the Besant temporal range. Figure 24 illustrates the locations of some Besant components.

CONTENT

Settlement Types: small and large, summer and winter tipi ring camps (Brumley 1972; McIntyre 1975; Reeves 1970a:165; Schneider 1982c); bison kills (jumps and pounds), habitation sites on stream or river terraces (Neuman 1975:3-37; Reeves 1970b:95; Scheans 1957); some habitation sites are very large (e.g., Stelzer covers a 42.8 ha area).

Faunal and Floral Remains: bison, deer, snowshoe rabbit, and freshwater mussels at Long Creek; elk, antelope, bear, badger, grouse, fish, snake, turtle, dog, coyote, bobcat, skunk, prairie dog, kangaroo rat, beaver, cottonwood, cedar, and oak (Neuman 1975:88-90).

Feature Types: bison pounds; ceremonial structures associated with pounds (e.g., at Ruby); possible house at Mortlach with circular, paired post molds and wedged bone in some post holes; cairns (Brumley 1972); occasional cache pits, "rock filled and stone platform surface hearths," basin shaped hearths, bone uprights, and FCR piles (Reeves 1970a:165); trough shaped hearths (Van Hoy 1982); middens, post molds, 5 ft diameter and 3 x 4 ft elongate roasting pits, cylindrical pit, conical hearth, 0.7-0.9 ft diameter post molds, and probable stone boiling pits at Stelzer (Neuman 1975); rock lined depression at Sprenger (Schneider 1982c); 2 ft diameter stone ringed surface hearths and turtle effigy intaglio at High Butte (Wood and Johnson 1973).

Chipped Stone: Besant Side Notched and Samantha Side Notched points [see Reeves (1970b:41-45) and Johnson (1970) for type descriptions]; flake points are common (Reeves 1970a:162); end and side scrapers, perforators, and large ovoid biface at Long Creek; semilunar biface knife at Mortlach; distinctive pentagonal and triangular drills, ovate and triangular perforators, "tit" and notched gravers (Reeves 1970a:164); "attenuated, prepared core technology" producing "prepared lamellar or rectangular flakes" retouched on one or more edges documented in Alberta (Reeves 1969) and Manitoba (Joyes 1970:213); lamellar end scrapers (Wood 1956); obsidian graver and drills from the Porcupine component; bipolar and non-bipolar cores at Sprenger (Schneider 1982c).

Ground Stone: grinding stones and slabs (uncommon) (Reeves 1970a:164); "polishing stones, mauls, and abraders" (Reeves 1970b:94); grooved maul and sandstone pipe in Porcupine component.

Modified Bone: bone pendant at Mortlach; bison metapodial condyle chopper and bison bone upright anvil at Fresno (Keyser 1979:61, 65); spatula and scapula hoe fragment (?) at Porcupine component; see Sonota below.

Modified Antler: knapping hammer at Ruby (Frison 1971); see Sonota.

Modified Shell: bead at Long Creek; see Sonota.

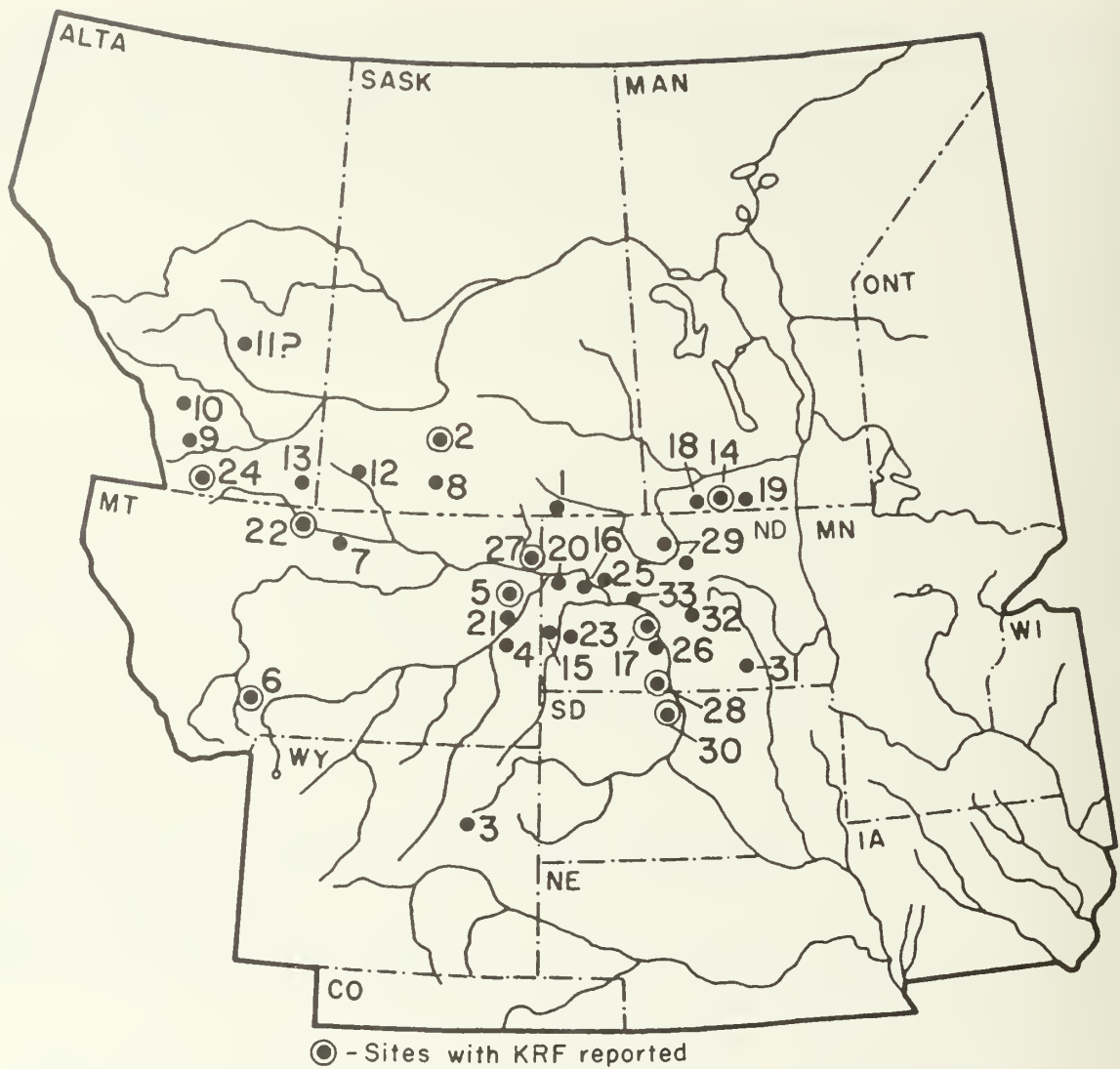
Wood and Other Perishables: see Sonota.

Burial: "The Tufton Burial in northeastern Montana suggests that the dead may have been exposed and secondarily buried under small rock cairns in that area" (Joyes 1970:215); Sonota complex mound burial.

Ceramics: see "Discussion."

DISCUSSION

Besant ceramics occur in the study region, but are less common to the west (Reeves 1970b:100). There "is not one single example of the undoubted association of pottery in a Besant phase occupation in the plains area north of the Missouri Coteau" (Byrne 1973:449). The Besant ceramic vessel form is basically conoidal. Manufacture was by lump modeling with a cord wrapped or grooved paddle and anvil technique (Wood and Johnson 1973:42). Coil breaks have never been noted although Laurel ceramics are



- | | |
|--|---|
| 1 - Long Creek (Wettlaufer 1960a) | 18 - Richards (Hlady 1967) |
| 2 - Mortlach (Wettlaufer 1955) | 19 - Calf Mountain (Reeves 1970a) |
| 3 - Ruby (Frison 1971; 1978:58, 61-62) | 20 - 32M22 (Wood 1950) |
| 4 - 24DW85 (Fraley, in Davis 1982:7) | 21 - South Bank (Vao Hoy 1982) |
| 5 - Whiskey Hill (Johnson 1977a, 1978) | 22 - Fresoo (Keyser 1979) |
| 6 - Aotonsen (Davis and Zeier 1978) | 23 - Sunday Sage (Simon and Borchert 1981a) |
| 7 - Wahkpa Chu'gn (Brumley 1976a; Davis and Stallcop 1966) | 24 - Head-Smashed-In (Reeves 1978) |
| 8 - Walter Felt (Kehoe 1973) | 25 - Moe (Schneider 1975) |
| 9 - Morkio (Byrne 1973) | 26 - Bundlemaker (Ahler, Lee and Falk 1981) |
| 10 - Old Womeo's Buffalo Jump (Forbis 1962) | 27 - Dune Buggy (Johnson 1977b) |
| 11 - Muhlbach (Gruhn 1971) | 28 - Porcupine component (Scheans 1957) |
| 12 - Bakken-Wright (Adams 1975) | 29 - Buffalo Lodge Lake and Towner localities (Wood 1962) |
| 13 - EcOp-22 (Brumley 1972:50) | 30 - Stelzer (Neuman 1975) |
| 14 - Avery (Joyes 1970) | 31 - Naze (Schneider 1981c) |
| 15 - Cinnamon Creek Ridge (East et al. 1981) | 32 - Sprenger (Schneider 1982c) |
| 16 - Highway 8 (Good and Hauff 1977) | 33 - Nightwalker's Butte (Lehmer, et al. 1978) |
| 17 - High Butte (Wood and Johnson 1973) | |

Figure 24. Some Besant complex components.

partly contemporary to the northeast and were usually manufactured by coiling. Crushed granite (Neuman 1975) and sand temper (Wood and Johnson 1973) are reported. Exterior surface treatment is usually fine, medium, or coarse cord marking up to or including the lip; it may be oriented vertically, diagonally, or horizontally. A small percentage of exterior surfaces are plain or display smoothed over cord marking (Floodman et al. 1982). Wood and Johnson also document simple stamping (1973:42). Interior surface treatment is usually plain, but some rim interiors are cord marked (Neuman 1975; Scheans 1957:51; Van Hoy 1982). Lip forms may be rounded, rounded and bevelled to the exterior, flat, or flat and sloping to the exterior. The most common decoration involves a row of punctates on the exterior rim, sometimes creating slight nodes on the interior (Neuman 1975). Sometimes a band of dentate stamps or other impressions occurs with the punctates on the exterior rim. Other decorative modes include cord impressions on the lip (Neuman 1975), cord wrapped object impressions on the lip (Johnson 1977a), and transverse or oblique tool impressions on the lip (Wood and Johnson 1973:43). At the Porcupine component there are interior bosses without exterior punctates and some lips are incised (Wood 1967:118). At High Butte there are interior punctates creating exterior bosses (Wood and Johnson 1973:43). Lip thicknesses range 6-11 mm and body thicknesses range 4-15 mm (Neuman 1975; Wood and Johnson 1973:43). Carbonaceous encrustations sometimes occur on interior surfaces (Neuman 1975). The Avery Corded type has been named in southern Manitoba (Joyes 1970). Arpan Punctate was defined from a Sonota burial context (see below).

Besant lithic resource utilization is characterized by the extensive use of Knife River flint. For example, 112 out of 117 points at the Richards Kill [southern Manitoba] are made of Knife River flint. "At Muhlbach . . . in Central Alberta, 52 of 62 points are manufactured from Knife River Flint" (Reeves 1970a:164). KRF also appears to have been preferred in the "blade-like flake industry" (Joyes 1970:213). Reeves suggests that KRF entered the Hopewellian Interaction Sphere (H.I.S.) through Besant and that Besant interaction indicates qualitative differences in transportation systems, communication systems, and social organization in comparison with other Northwestern Plains hunter-gatherer societies (1970a:172-173).

There is strong evidence to link Besant into the H.I.S. (Caldwell 1964) and later, long distance exchange systems of the Middle Woodland period in the Midwest. Braun et al. identify Besant stylistics in some Middle Woodland KRF mortuary offerings in the upper Mississippi Valley (1982:86). The presence of obsidian in Besant and Sonota components from Alberta to northern South Dakota correlates in time with the flow of obsidian in the H.I.S. Some atlatl points in both Besant and Hopewell display parallel oblique flaking (Braun et al. 1982:167; Neuman 1975:17). The appearance of mound burial ceremonialism correlates in time with the H.I.S. Some of the mortuary offerings in Sonota are items which flowed through the H.I.S. (e.g., copper, conch shell, and perhaps catlinite).

The bone upright features from Besant components have never been described and analyzed in detail. These features are typically single or multiple fractured long bones and scapulae set vertically into the ground leaving the undamaged articular ends protruding just above ground surface (Neuman 1975). Chipped stone flaking debris and/or bone chips are often associated with the surrounding living floor (Neuman 1975). Neuman suggested the upright ends functioned as anvils, but noted that the working ends of the uprights usually lack use-wear. He suggested that the upright ends were covered with a material like leather or rawhide, then used as an anvil for certain flintknapping tasks and for breaking up bone preparatory to rendering grease (1975:30-33). These features are distributed throughout the Besant range; Reeves lists them as a Besant trait in southern Alberta and Keyser reports "bone upright anvils" from northern Montana (1979).

There are some indications of human population increase in Besant. For example, Joyes notes that "Besant phase campsites appear to represent fairly lengthy or repeated occupations by moderately large groups" in comparison to Pelican Lake temporary occupation by fairly small groups" (1970:212, 214).

In the study region there is a radiocarbon date of ca. A.D. 250 on charcoal from a basin shaped hearth at the multicomponent Sunday Sage site, situated on a stream terrace above Ash Coulee Creek in Billings County (Simon and Borchert 1981a:33, 36). No temporally diagnostic cultural material was directly associated with the feature, but a Besant point was recovered from the site. A Besant component with ceramics at the High Butte site dates ca. A.D. 350 (Wood and Johnson 1973:70).

The Sonota complex was defined by Neuman on the basis of a comparative study of five sites along 35 km of the right bank of the Missouri River in southern North Dakota and northern South Dakota (1975). "Sonota burial mounds offset the Complex from other known Besant sites" (1975:93).

Sonota components have a limited geographic extent within the total geographic extent of Besant. The mound sites worked by Neuman are all along the Missouri River in northern South Dakota and southern North Dakota. They are typically situated at the edges of high terraces or benches, often with long vertical drops to the valley bottoms. He also includes the Baldhill Mounds along the Sheyenne River in eastern North Dakota. Schneider feels that other burial mounds in the James and Sheyenne valleys are also attributable to Sonota (1981c). Syms would also include southern Manitoba (1977:134). See Figure 25 for a distribution map depicting locations of known and suggested Sonota components.

Neuman estimates the date range for Sonota as A.D. 1-600, rejecting an earlier date of ca. 250 B.C. from Boundary Mound 3 and a later date of ca. A.D. 1300 from Grover Hand Mound 1 (1975:88).

Reported Sonota mounds range 55-90 ft (17-27 m) in diameter and 1.3-5.7 ft (0.4-1.7 m) in height (Neuman 1975). These mounds cap grave pits ranging from 8.3-11.5 ft (2.5-3.5 m) in maximum horizontal dimension and 1.4-4.2 ft (0.4-1.3 m) in depth (Neuman 1975). Males and females of all ages are represented with no apparent distinctions in the mortuary offerings accompanying them (Neuman 1975). Children and 30-45 year old males appear to be present in greater numbers than they would have been in the general population (Vehik 1981).

Interments are typically multiple, incomplete, and fragmentary secondary burials placed in the bottoms of the grave pits (Hewes 1949c; Neuman 1975). That is, the mortuary activity was focused on the burial of skeletal remains. But a minority of primary interments indicates this mortuary activity also included the recently deceased that were not defleshed. There is a primary burial in a sitting position at Alkire (Henning 1965). An extended primary burial was placed over a filled burial pit at Swift Bird prior to loading on the mound fill (Neuman 1975).

Structural remains in the form of burned or unburned logs are typically present in the burial pit or on the premound surface. Hewes interpreted the oak logs at Baldhill as a burial pit cover (1949c:325). Wood refers to "log-covered tombs" under the four Boundary Mounds (1967:118). Neuman reports various logs from the Sonota sites he analyzed, but concludes the logs were present in insufficient quantities to indicate a pit cover. He refers to them as structural remains but does not suggest a function. It is possible these are the remains of scaffold structures where some primary burials were placed to await secondary interment in the final phase of burial ceremonialism. Scavengers could have scattered human bone around the general area of the scaffolds and the bone would have become incorporated in soil matrix later to be used as mound fill. Bass and Phenice report articulations of human bone from burial pits and mound fill (1975:106).

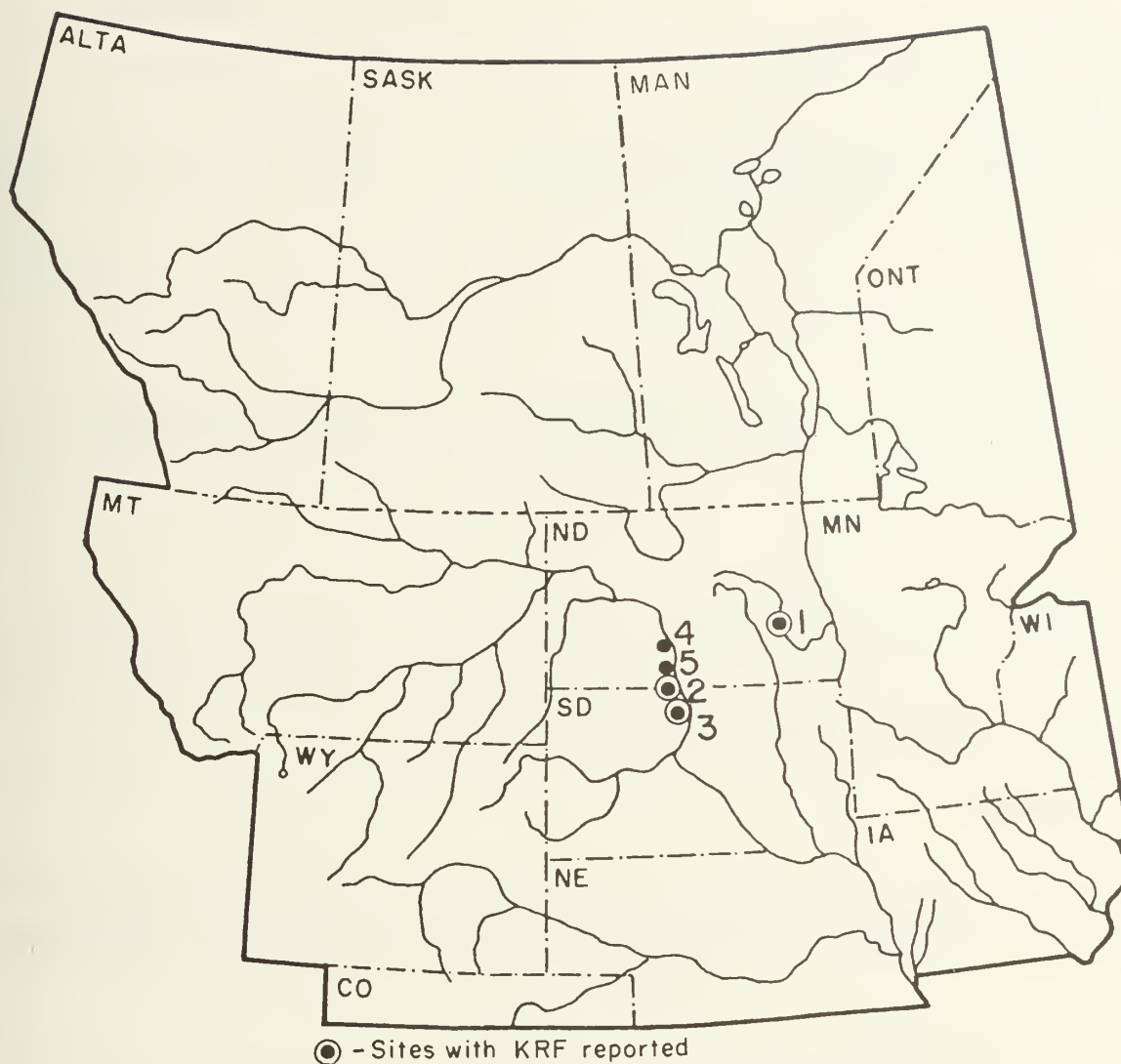
Mortuary offerings are seldom abundant, but there is a considerable range represented from excavated components. They include a copper bead, cylindrical clay bead, KRF points, a beaver incisor, a fresh-water mussel shell disc ornament, a bird bone tube, and a carnivore canine at Baldhill (Hewes 1949c). Wood reports stone pendants, modified bear teeth, and atlatl spurs from the Boundary Mounds (1967:118). Neuman reports the following Sonota artifacts (1975):

Modified Bone, Antler, and Teeth: fleshers, awls, rib pressure flakers, deer or antelope phalange tinklers, long and short tubular beads, beaver incisors, bear canine pendant, antler pins, worked bear maxillae, beaver incisors, bear canine tooth pendant, worked beaver mandibles, antler handles, and worked human bone.

Modified Shell: disc beads, conch columellum atlatl weight, thunderbird motif pendant, *Olivella*, *Marginalla*, and *Dentalium* beads, partial conch whorl pendant.

Chipped Stone: side notched and corner notched points; expanded base, triangular, buttless, and notched drills; graters, ovoids, triangular, and lanceolate biface knives; end scrapers with keeled or completely flaked or concave dorsal surfaces; flake tools.

Metal: small pieces of sheet copper.



- 1 — Baldhill (32BA1) (Hewes 1949c)
- 2 — Boundary Mound Group (Neuman 1975; Wood 1960)
- 3 — Swift Bird, Grover Hand, and Arpan (Neuman 1975)
- 4 — Schmidt (32M020) (Neuman 1975)
- 5 — Alkire (32SI200) (Henning 1965)

Figure 25. Sonota mortuary sites.

Ground Stone: grooved mauls, clinker abraders, catlinite and other atlatl weights, mealing stones, and hammerstones.

Pigments: frequent coverings and concentrations of hematite; "greensand," magnetite, and yellow ochre.

Perishables: bark matting with burial at mound 2, Swift Bird; grass (?) matting, bark matting, and coiled basketry with burials at mound 1, Grover Hand.

Ceramic artifacts were infrequently included as Sonota mortuary offerings. There is a ceramic pipe bowl from mound 2, Grover Hand (Neuman 1975). Neuman defined the ceramic vessel type Arpan Punctate on the basis of one fragmented vessel of the floor of the burial pit under Arpan mound 1 (1975:62). It has the Besant vessel form, size, thickness, and punctate decoration, with a plain (smoothed) exterior surface treatment.

A final distinctive Sonota trait considered here is the occurrence of articulated and disarticulated bison skeletal remains in association with other remains from the mortuary activities (Hewes 1949c; Neuman 1975). The bison remains typically occur on the premound surface beyond the limits of the burial pit. The importance of bison in Sonota ritual underlines their importance to societies with Besant material culture. Besant on the Northwestern Plains displays "the most sophisticated bison procurement methods" in that subarea's prehistory (Frison 1978:223).

The use of a bison skull as a sacred or ceremonial object was also characteristic of the historic Hidatsa (Bowers 1965) and Assiniboin (Smith 1980:32). This does not imply either genetic relationships between Sonota and Hidatsa or Assiniboin or the uninterrupted continuity of this trait for 1800 years of North Dakota prehistory. It indicates a material trait linked with the ideological subsystem of society that is archeologically recoverable and deserving of research attention.

Laurel Complex

The name derives from the former town of Laurel on the Rainy River in northern Minnesota and was first applied by Wilford (1941) (Stoltman 1973:1). The Laurel complex core area is east of the study region, but the high frequency of KRF in Laurel chipped stone assemblages and the recent recognition of Laurel ceramics in eastern North Dakota indicate Laurel components should be anticipated in the KRF source area.

TEMPORAL DISTRIBUTION

Syms suggests an overall Laurel date range of ca. 100 B.C.-A.D. 1100 with most dates in the A.D. 200-800 range (1977:81, 132). Stoltman rejects beginning dates earlier than 200-300 B.C. (1973:3). Vehik suggests a data range of ca. 100 B.C.-A.D. 600 to 900 (1981). There is potential for a Laurel presence in the KRF source area contemporary with Pelican Lake, Besant, Avonlea, and perhaps Old Women's complex components. There are also other, as yet unclassified Woodland units in the study region during this time period (e.g., Ahler et al. 1982:241-247).

It has been suggested that Laurel was involved in the Hopewellian Interaction Sphere (H.I.S.) (Stoltman 1973:3). It is likely that most KRF moved into the H.I.S. by way of Minnesota and the upper Mississippi Valley (Braun et al. 1982:86; Clark 1982). About 26% of the chipped stone tools from Laurel components in northern Minnesota reported by Webster are KRF (1973:102). It was a favored material for points and flake scrapers in these assemblages, but "large numbers" of waste flakes are also present (Webster 1973:102). In western Minnesota, if "the chalcedony at Lake Bronson is in fact from the Knife River quarries, it would suggest established communication routes between western North Dakota and Minnesota in Laurel times" (Anfinson et al. 1978:52). The interaction of Laurel groups with groups in the study region, most notably those with Besant complex material culture, may be characteristic of a temporally restricted portion of the history of the Laurel complex.

GEOGRAPHIC DISTRIBUTION

The first comprehensive work on Laurel (Stoltman 1973) described a geographic range for the complex extending from the eastern margins of the Plains in east-central Saskatchewan, across southern Manitoba, northern Minnesota and contiguous Ontario, northern Wisconsin and the upper peninsula of Michigan, and northern Michigan. Laurel has since been identified in the prairie-forest ecotone region of west-central Minnesota (Anfinson et al. 1978; Wattrall 1982) and the prairie of eastern North Dakota (McMillan 1982; Schneider 1981c, 1982d; Vehik 1981). Figure 26 illustrates some Laurel component locations close to the study region.

CONTENT

Faunal and Floral Remains: from a Laurel summary table by Buchner: bison, moose, caribou, white-tailed deer, elk, gray wolf, dog, bear, snowshoe hare, cottontail rabbit, ground hog, beaver, muskrat, porcupine, martin, fisher, striped skunk, river otter, lynx, bobcat, mink, wolverine, chipmunk, loon, swan, ducks, passenger pigeon, crow, fish, turtle, hazelnuts, chokecherries (1979:106); grizzly bear (Anfinson et al. 1978:39); shattered and processed bone (Anfinson et al. 1978:39); freshwater mussels (MacNeish 1958:60).

Feature Types: burial mounds.

Design Motifs/Ornamentation: steatite pendant and conch columella bead from Caribou Lake Project; discoidal shell bead necklaces, bone pendants, bone beads, tooth ornaments, bald eagle talon pendants, moose incisor pendants (Buchner 1979:105); copper disc bead, copper tubular beads, copper bangles, and copper pendants (Buchner 1979:106).

Chipped Stone: from a Laurel summary table by Buchner (1979:105): large isosceles triangular, large and small side notched, small triangular, and stemmed projectile points; variety of end scrapers; prismatic flake perforators with ovate or asymmetrical bases; parallel side, ovate-triangular, and asymmetrical bifaces; pieces esquillees; cleavers and choppers; blade cores (Buchner 1979:110).

Ground Stone: notched net sinkers, pitted pebble hammerstones and anvils, mortars, pestles, manos, abraders, and pendants (Buchner 1979:105).

Modified Bone: harpoons, beaver incisor tools, awls, bird bone tubes, needles, perforated moose and caribou phalanges, needles, mat sewing shuttles, pendants, beads, pottery markers, bald eagle talon pendants, moose incisor pendants, fleshers (Buchner 1979:105).

Modified Antler: flakers (Buchner 1979:105); harpoons (Stoltman 1973:105-106).

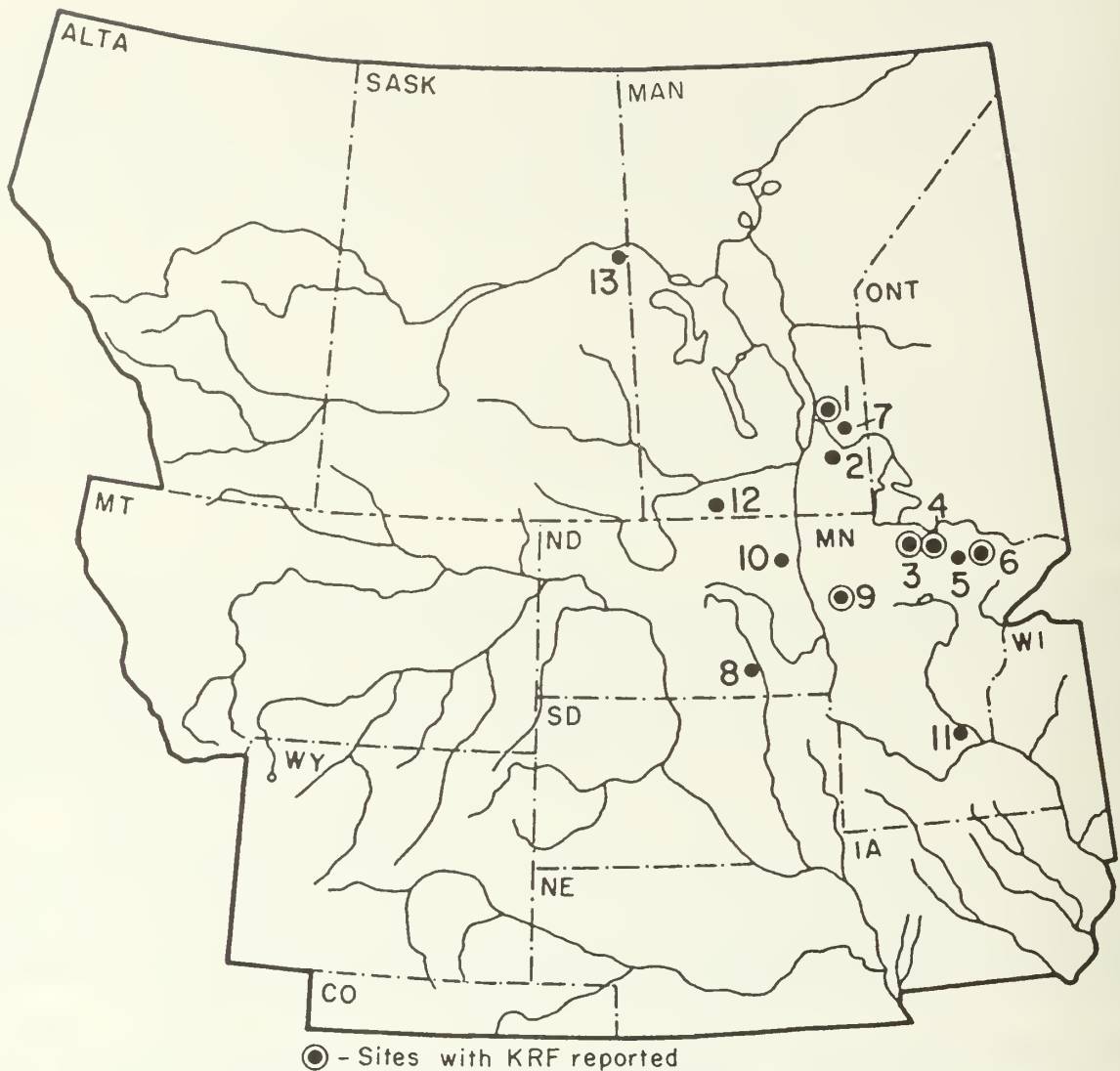
Burial: "secondary bundle burials accompanied often by red ochre" and covered by mounds (Stoltman 1973:113).

Ceramics: "a distinctive ceramic industry whose hallmark is a simple, conoidal-based, grit-tempered vessel decorated with a variety of dentate stamps, including pseudo-scallop shell, that may be impressed in a rocked, push-pull, or more conventional fashion" (Stoltman 1973:113); "absence or extreme paucity of cord marking of any kind" (Stoltman 1973:114); fabricated by the coil method (MacNeish 1958:61); some late fabric/net impression (Byrne 1973:384).

Copper: rods, gorgets, bars, awls, chisels, scrapers, nuggets, fishhooks, and knives (Buchner 1979:106).

DISCUSSION

Activities of people with fundamentally Laurel material culture in the study region should have been on the level of tertiary use or less, and it is not likely that such components will be readily identifiable. Other than ceramic traits, and perhaps the use of copper tools (Buchner 1979:106) and very limited copper mortuary offerings, there appears to be little to aid with distinguishing Laurel components in the Plains. Based on analysis of assemblages from the Lake Bronson site, Anfinson et al. (1978:52) state: "It would seem that the participants in Laurel and Blackduck culture were also participants in Prairie material culture."



- 1 — Caribou Lake Project (Buchner 1979)
- 2 — Bjorklund (Buchner 1976a, 1976b)
- 3 — Smith (Lugenbeal 1976, 1978; Stoltman 1973)
- 4 — McKistry (Stoltman 1973)
- 5 — Pearson (Stoltman 1973)
- 6 — Pike bay (Stoltman 1973)
- 7 — EgKx-1, Wanipigow Lake (Saylor 1976, 1977)
- 8 — Beeber (Schneider 1981c)
- 9 — Lake Bronson (Anfinson et al. 1978)
- 10 — Blasky Mounds (McMillan 1982; Vehik 1981)
- 11 — Maplewood (Watrall 1982)
- 12 — Avery (Joyes 1970)
- 13 — Pelican Narrows (Campbell 1962)

Figure 26. Distribution of some Laurel components.

The Laurel lithic artifact inventory appears indistinct and regionally variable. The transition from predominant use of the atlatl to predominant use of the bow and arrow occurred about midway through Laurel. Both the chipped stone dart points and arrow points are stylistically variable. While very few components are dated to the time range when intergroup exchange should have been at a peak with involvement in the H.I.S., Laurel seems to represent a situation where intensified intergroup exchange does not correlate with stylistic uniformity in projectile points or other chipped stone tools.

Laurel ceramic vessels are typically conoidal in shape with slight shoulders and rims with slight and simple curvatures (Stoltman 1973:113). Stoltman's seriation of Laurel ceramic types for northern Minnesota (1973) has been confirmed by subsequent work there (Lugenbeal 1978) and successfully extended to southeastern Manitoba (Buchner 1976a). The prospects seem good for cross dating components in the study region through use of temporal types identified in northern Minnesota.

The Laurel lifeway/adaptive strategy appears to have been based on hunting and gathering, with little or no horticulture. Syms notes the lack of permanent settlement and no evidence of intensive resource utilization based on native or tropical plants (1977:81). However, there are indications that wild rice was a staple in Laurel. The westward expansion of the Laurel complex into northern Minnesota and southern Manitoba correlates with the initial appearance of wild rice in lake sediments in those areas (Buchner 1979; McAndrews 1969).

Vehik has examined selected aspects of human skeletal remains from Laurel and Sonota mounds for comparison with Hopewell Middle Woodland mortuary practices in Illinois (1981). Laurel mounds are usually situated on river flood plains or low terraces. Mound groups are generally small and there are few grave goods (Vehik 1981). Sometimes there are accretional episodes of burial and attendant mound enlargement (Vehik 1981). She concludes from the ages and sexes of Sonota and Laurel mound burials that inherited status was poorly developed to nonexistent. In other words, personal achievement was probably the most important factor in elevating an individual to a status in the group sufficient to warrant the group effort of Sonota or Laurel mound burial.

Avonlea Complex

The name derives from Wettlaufer's identification of an "Avonlea Culture" at the Long Creek site (1960a) and the Avonlea site in southcentral Saskatchewan (Kehoe and McCorquodale 1961). General consensus follows Reeves' proposition that Avonlea developed in place out of Pelican Lake (1970a). The geographic range of Avonlea complex components, entirely within the Pelican Lake range, is in accord with this proposition. This taxonomic unit includes the Avonlea, Head-Smashed-In Corner Notched, and Timber Ridge Side Notched projectile point types (Reeves 1970b:50-51) and associated remains in components characteristic of both Plains Woodland and Plains Archaic tradition lifeways.

TEMPORAL DISTRIBUTION

Reeves suggests an initial date in the range ca. A.D. 150-250 to the west, and A.D. 400-500 for the Black Hills and southwestern Manitoba (1970a:159). He suggests terminal dates of ca. A.D. 700 for the Saskatchewan-Alberta area, ca. A.D. 650-700 for southwestern Manitoba, and ca. A.D. 900 for the "Upper Missouri Basin-Black Hills area" (1970a:160). Avonlea "seemed to develop in the Saskatchewan Basin between A.D. 150 and 250, then spread westward to the foothills and south to the Montana-Wyoming border" (Adams 1977:139-140). This statement refines an earlier proposition by Husted that "Avonlea sites appear to be oldest in the north, suggesting a southward movement or expansion of the Avonlea complex between about A.D. 400 to 700" (1969:93).

Ruebelmann proposes a ca. A.D. 500-1000 range for central Montana (1982:62). He reviewed Avonlea radiocarbon dates and found that only five are earlier than A.D. 450.

Four of these dates are from components also having dates after A.D. 450; or having a Besant component situated beneath it with a later date (Reeves 1978); or from a mixed Avonlea-Besant component (Kehoe 1973). The fifth date is the earliest for an Avonlea occupation in the U.S. and cannot be explained (Kehoe 1973). However, the details of what was recovered in the component are not available (Ruebelmann 1982:71).

Dates in Alberta include a range from ca. A.D. 25-620 through the 1.7 m thick cultural level at Head-Smashed-In (Adams 1977:125; Reeves 1978), and A.D. 570-875 at Manyfingers (Quigg 1975). Dates in Saskatchewan include ca. A.D. 450 at the Avonlea type site (Adams 1977:123; Kehoe and McCorquodale 1961). Level 31a at the Gull Lake site produced one of the earliest Avonlea dates: ca. A.D. 210 (Kehoe 1973).

Montana dates include ca. A.D. 970 at Timber Ridge (Davis 1982:5), four dates ranging ca. A.D. 830-910 at Henry Smith (Davis 1982:11), and two dates of ca. A.D. 680 and 870 at Goheen (Fraleigh and Johnson 1981). Avonlea components in Bighorn Canyon date ca. A.D. 650-900 (Husted 1969:93). The temporal range suggested here for the study region is ca. A.D. 450-1000.

GEOGRAPHIC DISTRIBUTION

Reeves suggested a distribution from southwestern Manitoba westward through the Canadian plains and parkland to the foothills of the Rockies, south to the Bighorn Basin, and eastward to the western Dakotas (1970b) (Figure 27). Reeves further states that "Avonlea is not present in the Besant area of the Middle Missouri" (1970a:166). But there may have been late interaction between groups with Avonlea material culture and groups in the Middle Missouri subarea in South Dakota:

Collections from Initial Middle Missouri sites include a few arrow points which closely resemble Avonlea points (Davis, 1966; Kehoe and McCorquodale, 1961). Their presence suggests some sort of contact between the Initial Middle Missouri villagers and contemporary migratory hunters of the Northwestern Plains. *Dentalium* beads found in Middle Missouri Tradition villages must have come to the Missouri Valley from the Pacific Coast by way of intermediate groups in the western Plains (Lehmer 1971:99).

Early Avonlea components appear to be contemporary with late Besant, other Plains Woodland components on the Northwestern Plains, and Laurel on the Northeastern Plains and into the parkland. Late Avonlea is also contemporary with Blackduck on the upper Northeastern Plains and into the parkland; other unclassified Woodland manifestations are also contemporary.

CONTENT

Settlement Types: tipi camps (Brumley 1972); bison kills (pounds, jumps, and traps); habitation sites on stream terraces or in caves and rockshelters (Reeves 1970b:106).

Faunal and Floral Remains: bison, swift fox, dog, fish, and freshwater mussels at Long Creek; ground squirrel at Estuary; antelope at Lost Terrace.

Feature Types: bison pounds; earth and rock wall constructed on one side of pound at Ramillies site (Brumley 1976b); burned bison bone beds at bison kill sites; large (ca. 70 cm diameter x 30-45 cm deep) basin shaped hearth at Mangus 111; drive lines; bucket shaped hearths (Reeves 1970b:106).

Chipped Stone: Avonlea point [see Kehoe (1966b:829-830) or Davis (1966:106-112) for type descriptions]; unnotched points (Avonlea Triangular) and flake points occur infrequently (Reeves 1970b:103); plano-convex end scrapers, side scrapers, and large ovoid bifaces at Long Creek; drills, lanceolate bifaces, and large rectanguloid bifaces at Morkin; biface knives with one straight edge "a diagnostic Avonlea trait" (Adams 1977:133); diamond shaped bifaces (Reeves 1970b).

Ground Stone: hammerstones, pecked stone balls, pecked cobbles, and bell shaped pestles at Gull Lake; anvil stones at Head-Smashed-In and Estuary Bison Pound; grinding stones and slabs likely in Montana (Davis 1966:104).

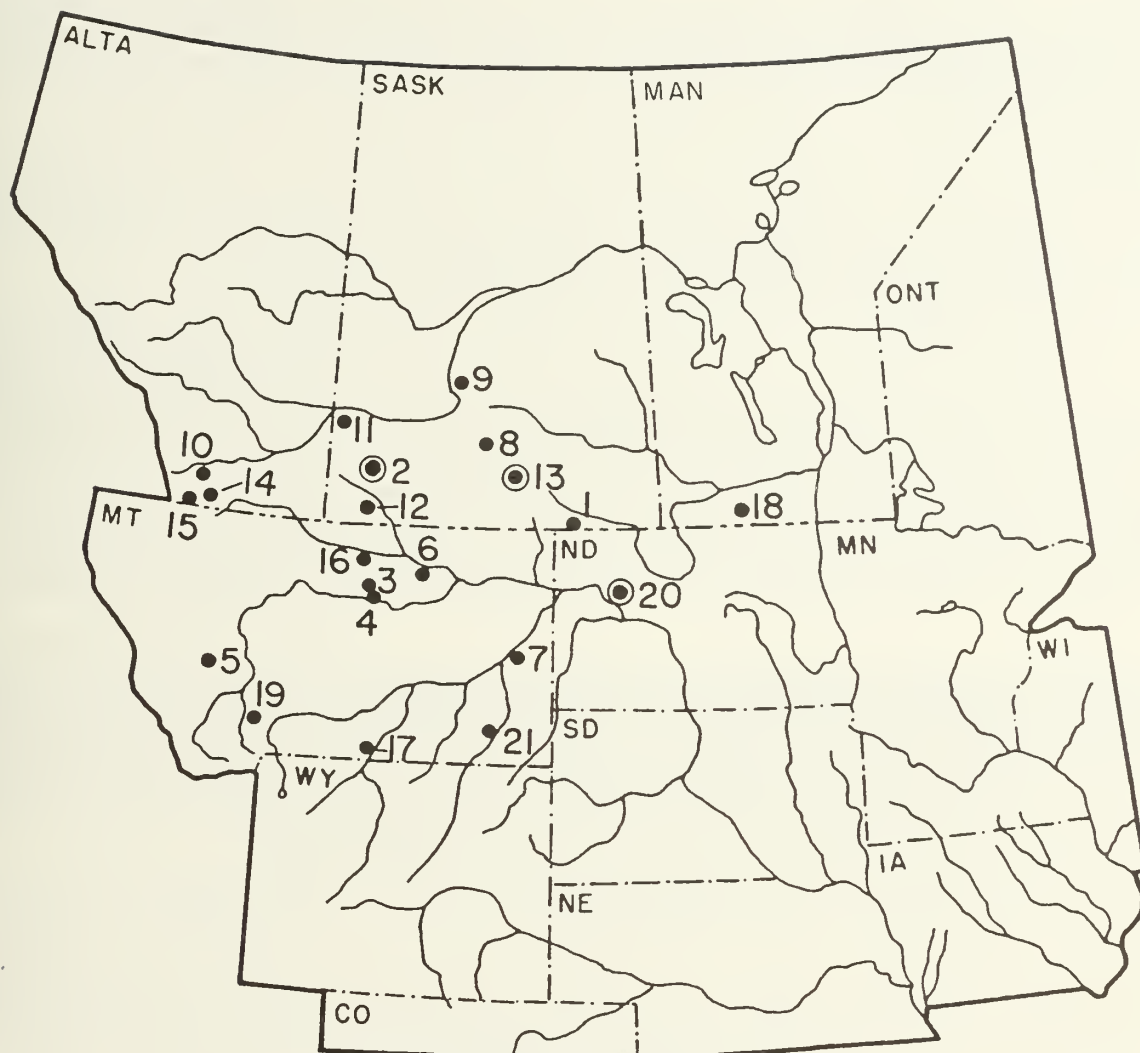
Modified Bone: circular bone disc at Goheen.

Modified Antler: unknown.

Modified Shell: *Olivella* beads at Goheen.

Wood and Other Perishables: coiled basketry, plant fiber cordage, and juniper bark from Mangus III.

Burial: "In the Powder River area, Avonlea burials are characterized by primary pit burials with considerable quantities of ornamental and utilitarian grave goods" (Reeves 1970a:167).



● - Sites with KRF reported

- 1 - Long Creek (Wettlaufer 1960a)
- 2 - Gull Lake (Kehoe 1973)
- 3 - Timber Ridge (Davis 1966; Reeves 1970b)
- 4 - Lost Terrace (Davis and Aaberg 1978a, 1978b)
- 5 - Pilgrim (Davis et al. 1982a)
- 6 - Henry Smith (Ruebelmann 1981)
- 7 - Goheen (Fraley and Johnson 1981)
- 8 - Garratt (Morgan 1979)
- 9 - Sjøvold (Dyck 1979)
- 10 - Morkin (Byrne 1973)
- 11 - Estuary (Adams 1977)
- 12 - Bakken-Wright (Adams 1975)
- 13 - Avonlea (Kehoe and McCorquodale 1961)
- 14 - Head-Smashed-In (Reeves 1978)
- 15 - Manyfingers (Quigg 1975)
- 16 - Wahnkpa Chu'gn (Brumley 1976a; Davis and Stallcop 1966)
- 17 - Mangus III (Husted 1969)
- 18 - Avery (Joyes 1970)
- 19 - Antonsen (Davis and Zeier 1978)
- 20 - Evans (Schneider and Kinney 1978)
- 21 - Powder River drainage in Montana (Jerry Clark, personal communication)

Figure 27. Some Avonlea complex sites.

Ceramics: at Long Creek, exterior surface treatment is cord marked or smoothed over cord marked; decoration includes net impression, large punctates, and small oblique cord wrapped rod impressions on the lip (Wettlaufer 1960a:38-39); fabric impressed conoidal vessels with bosses or punctates (Reeves 1970b); see discussion.

DISCUSSION

There are a number of Avonlea components with ceramics. It is necessary to briefly consider a few of these components, their dates, and the ceramic traits in order to make comparisons with other ceramic assemblages and identify some likely sources of ceramic influence on Avonlea.

It appears that initially Avonlea was aceramic. In southern Alberta and Saskatchewan, Avonlea ceramics are classified in the Early variant of the Saskatchewan Basin ceramic complex with a suggested initial date of A.D. 500 (Byrne 1973). Adams suggests that Avonlea ceramics "always postdate A.D. 700" or else are found in components which can be dated to late in the Avonlea complex temporal range due to co-occurrence of Avonlea and Prairie Side-Notched points (1977:145). The earliest ceramics from Bakken-Wright (Adams 1975) and the Estuary Bison Pound (Adams 1977) are from components with both Avonlea and Prairie Side-Notched points. Dates from the Garratt site in Saskatchewan are ca. A.D. 500 and 670 (Morgan 1979). Dates from Goheen, just west of the study region in Montana, are ca. A.D. 400, 680, and 870 (Fraley and Johnson 1981). In the study region, Avonlea points and ceramics were recovered from component I at the Evans site (32MN301), dated ca. A.D. 590 and 750 (Schneider and Kinney 1978).

The earliest Avonlea ceramics appear to have been in the temporal range ca. A.D. 600-700. There are two named archeological units characterized by distinctive ceramics and contemporary with Avonlea in this temporal range: Besant and Laurel. There are certainly other as yet undesignated or unidentified contemporary ceramic units. Byrne suggests Avonlea ceramics derive from Laurel (1973). Reeves is less specific, but also suggests they derive from the boreal forest to the east of Avonlea (1970b). Fraley and Johnson note resemblances between Besant and Avonlea ceramics, but go no further than to suggest that the problem of Avonlea ceramic origins "remains to be resolved" (1981:15).

Avonlea ceramics appear to display some Besant traits, some Laurel traits, and yet other traits not characteristic of either Besant or Laurel. There are indications of both lump modeling with paddle and anvil (Byrne 1973:332) and coil manufacture techniques (Fraley and Johnson 1981:14), characteristic of Besant and Laurel respectively. Vessel form is characteristically globular; both Besant and Laurel vessels are typically conoidal. Exterior surface treatment may be fabric/net impressed, smoothed over fabric/net impressed (Byrne 1973), parallel grooved (a variant of simple stamping?), cord marked, smoothed, or plain (Fraley and Johnson 1981). Besant exterior surface treatment is characteristically cord marked, but plain and simple stamped surfaces are also common (Wood and Johnson 1973). Laurel exterior surfaces are usually plain (Stoltman 1973) with some late net impression (Byrne 1973:384). The distinctive Laurel dentate stamp decorations are unreported in Avonlea. Punctate decorations are common in Avonlea, typical of Besant, and uncommon in Laurel.

The presence of KRF in Avonlea lithic assemblages to the west and northwest indicates interaction between people with Avonlea material culture and people in the study region. However, very few Avonlea components are reported from North Dakota, so it appears to have been uncommon for groups with Avonlea material culture to have maintained core or secondary areas in the study region. Simon is aware of no Avonlea components in the Little Missouri region after several years of survey (personal communication, 2/3/82).

West of the study region, available information from Avonlea components indicates a hunting and gathering subsistence base coupled with nomadic settlement patterns, reflecting a Plains Archaic lifeway. Reported Avonlea settlement types include bison pounds, jumps, and traps, camps on stream terraces and in caves and rockshelters, and tipi camps (Brumley 1972; Reeves 1970b:106). Subsistence remains are dominated by fauna such as bison, fox, dog, fish, freshwater mussels, ground squirrel, and antelope (e.g., Adams 1977; Davis and Aaberg 1978a, 1978b; Schneider and Kinney 1978; Wettlaufer 1960a). There is limited evidence for ground stone plant food processing tools (Davis 1966:104).

Old Women's Complex

The name derives from the Old Women's Buffalo Jump in Alberta (Forbis 1962). The Old Women's complex may have developed from an Avonlea base (Adams 1977), or from an amalgamated Avonlea-Besant base (Byrne 1973:470). The unit includes Prairie Side-Notched points, Plains Side-Notched points, and associated remains. Prairie Side-Notched points appear ca. A.D. 700 and dominate point assemblages until ca. A.D. 1300 when the Plains Side-Notched type becomes predominant (Kehoe 1966b, 1973:56-78).

For southwestern Manitoba, Syms classifies these materials in a "Plains Late Woodland period" because of the occurrence of ceramics (1980:372). In the Northwestern Plains, Old Women's components also yield ceramics but reflect the settlement types and subsistence pursuits of a nomadic, hunting and gathering lifeway.

TEMPORAL DISTRIBUTION

Reeves (1972) sees the Old Women's complex originating in the Canadian Plains around A.D. 750 and persisting until Euro-American contact. The Algonkian Blackfeet appear to have carried an Old Women's complex material culture into the Historic period (Byrne 1973:530; Keyser 1979:148). Radiocarbon dates from Alberta suggest a temporal range of ca. A.D. 760-1850 (Adams 1977:125, 128; Reeves 1978). Radiocarbon dates suggest a range of ca. A.D. 900-1800 in Montana (Davis 1982:8, Davis and Aaberg 1978b; Davis et al. 1982a; Davis and Zeier 1978).

GEOGRAPHIC DISTRIBUTION

Figure 28 shows the distribution of some reported Old Women's complex components. Late Prehistoric period components postdating A.D. 1000 in the western Dakotas and eastern Wyoming remain largely unclassified and unnamed. In this time period it becomes a problem to distinguish between the camps of the nomadic hunter-gatherers and the hunting and gathering camps of the Plains Villagers.

Contemporary with the Old Women's complex to the east are Blackduck and Selkirk. To the southeast, the various phases of the Plains Village tradition are contemporary in the Middle Missouri subarea. Components representative of any of these units are to be expected in the study region.

CONTENT

Settlement Types: tipi ring camps (Brumley 1972).

Faunal and Floral Remains: freshwater mussels, fish, turtle, rabbit, muskrat, beaver, dog, swift fox, wolf, bear, antelope and bison at Stendall (Rushowick 1975).

Feature Types: bison pounds; surface hearths; 3.5 m diameter pit feature filled with cobbles and bison bone, particularly skulls, at Morkin (Adams 1977:127); vertical bone features, often in post molds, frequently used in pound corral construction; ash pit at Boarding School; drive lines; cairns (Brumley 1972).

Design Motifs/Ornamentation: unknown.

Chipped Stone: for Prairie Side-notched and Plains Side-notched point type descriptions see Kehoe (1966b:830-834); unnotched triangular points; pointed bifaces, awls, chisels, large bifaces, end scrapers, side scrapers, graters, spokeshaves; irregular, triangular, and ovoid bifaces at Stendall (Rushowick 1975).

Ground Stone: unknown.

Modified Bone: awls and scraper handle at Stendall.

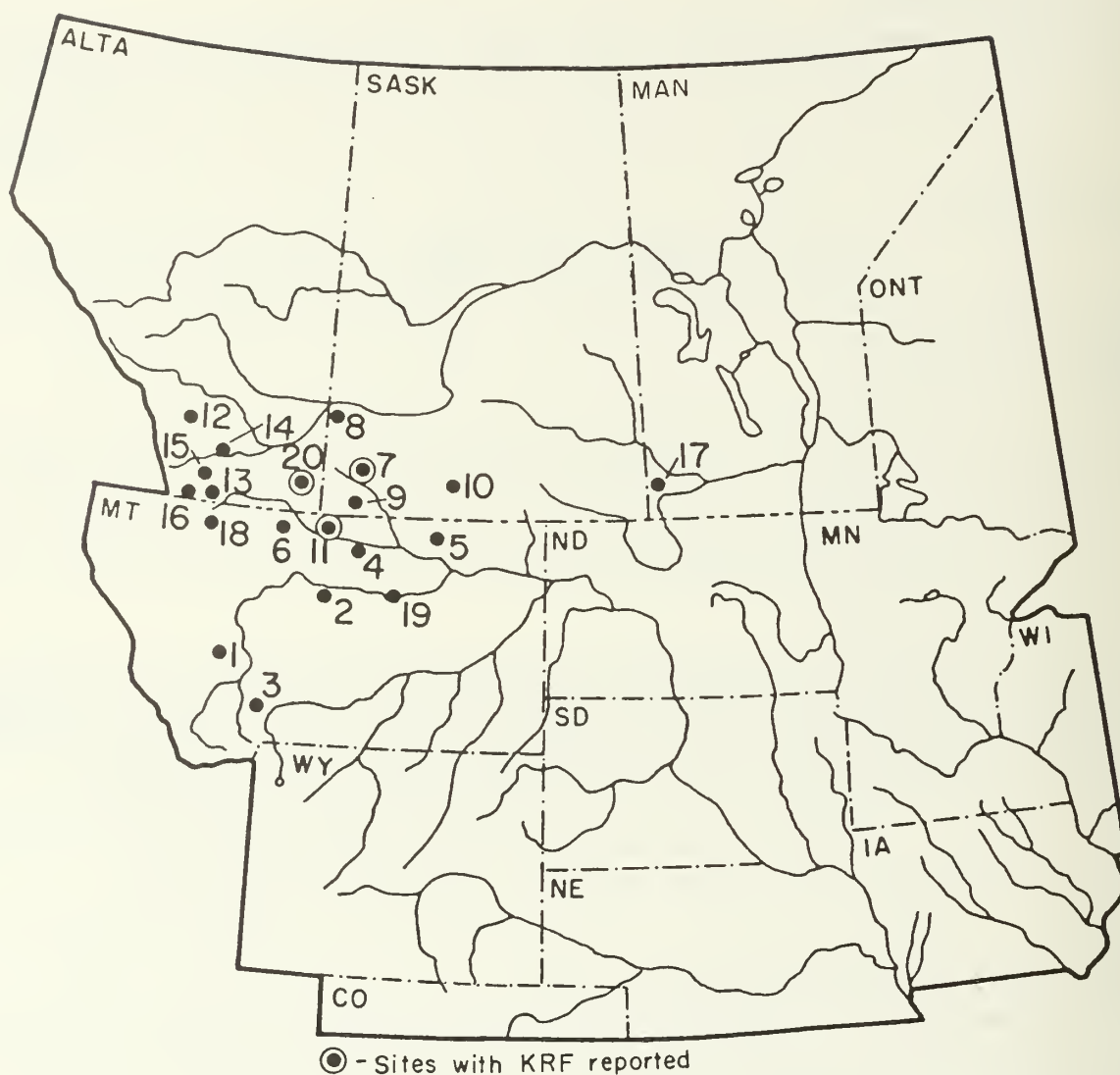
Modified Antler: unknown.

Modified Shell: unknown.

Wood and Other Perishables: unknown.

Burl: unknown.

Ceramics: see Discussion.



- 1 - Pilgrim (Davis et al. 1982a)
- 2 - Thompson Bottom (Davis and Aaberg 1978b)
- 3 - Antonsen (Davis and Zeier 1978)
- 4 - Wahnkpa Chu'gn (Brumley 1976a; Davis and Stallcop 1966)
- 5 - Johnson Bison Kill (Deaver, in Davis 1982:11)
- 6 - Bootlegger Trail (Roll and Deaver 1980)
- 7 - Gull Lake (Kehoe 1973)
- 8 - Estuary (Adams 1977)
- 9 - Bakken-Wright (Adams 1975).
- 10 - Walter Felt (Kehoe 1973)
- 11 - English Bison Kill, Kremlin, Avocet, Fresno, Cache, and Milk River (Keyser 1979)
- 12 - Old Women's Buffalo Jump (Forbis 1962)
- 13 - Head-Smashed-In (Reeves 1978)
- 14 - Ross (Forbis 1960)
- 15 - Morkin (Byrne 1973)
- 16 - Manyfingers (Quigg 1975)
- 17 - Stendall (Rushowick 1975)
- 18 - Boarding School (Kehoe 1967)
- 19 - Holmes Terrace (Davis et al. 1982b)
- 20 - Ramillies (Brumley 1976b)

Figure 28. Some Excavated Old Women's complex components.

DISCUSSION

Pottery vessels of the Saskatchewan Basin ceramic complex, Late variant (Byrne 1973:331-406) are reported from Old Women's components in southern Alberta and Saskatchewan (Byrne 1973) and northern Montana (Keyser 1979:97-102). From extensive intercomponent analyses, Byrne concludes that "many of the paste, surface finish, vessel form, and decorative modes" of Late Saskatchewan Basin ceramics "actually originated far to the east in Manitoba and Minnesota" (1973:405-406). Similarities between Blackduck, Selkirk, and Old Women's complex ceramics are evident. It is certain that a number of wares and types will eventually be defined for the Old Women's complex.

Ceramic vessels from Old Women's components were lump modeled by the paddle and anvil technique. The temper is grit, usually crushed granite, but crushed quartzite is reported (Keyser 1979). Vessel forms are predominantly globular and conoidal pots with rounded bottoms, but flat bottoms also occur (Byrne 1973; Keyser 1979:97). Shoulders range from absent to indistinct to pronounced (Byrne 1973; Keyser 1979). Rim forms are inverted, straight, and everted; complex rims with compound curvatures (e.g., S-rims) also occur. Narrow fillets (or pronounced horizontal ridges) are sometimes present on the exterior rim above the shoulder (Byrne 1973). Exterior surface treatment is usually vertically cord marked or plain (smoothed); check stamping and fabric impression appear infrequently. Lips are typically flat (frequently bevelled to the exterior) or rounded, and often thickened (Byrne 1973; Keyser 1979). Vessels are frequently undecorated, but a variety of decorative techniques are reported (Byrne 1973): tool impressed lips, cord wrapped rod impressed lips, finger pinched lips, incised exterior rims (infrequent), and exterior rim punctates (usually arranged in bands).

The Old Women's complex ceramics indicate east-west interaction from northern Minnesota to southern Alberta in the Late Prehistoric period. Human population densities should have been fairly high during this period, and the increased complexity created by presently unclassified Woodland components (e.g., Ahler et al. 1982; Michlovic 1982b) and Plains Village components in the Middle Missouri, Northeastern Plains, and Northwestern Plains subareas indicates the archeology of this time period in the study region will challenge the interpretive/explanatory capabilities of investigators.

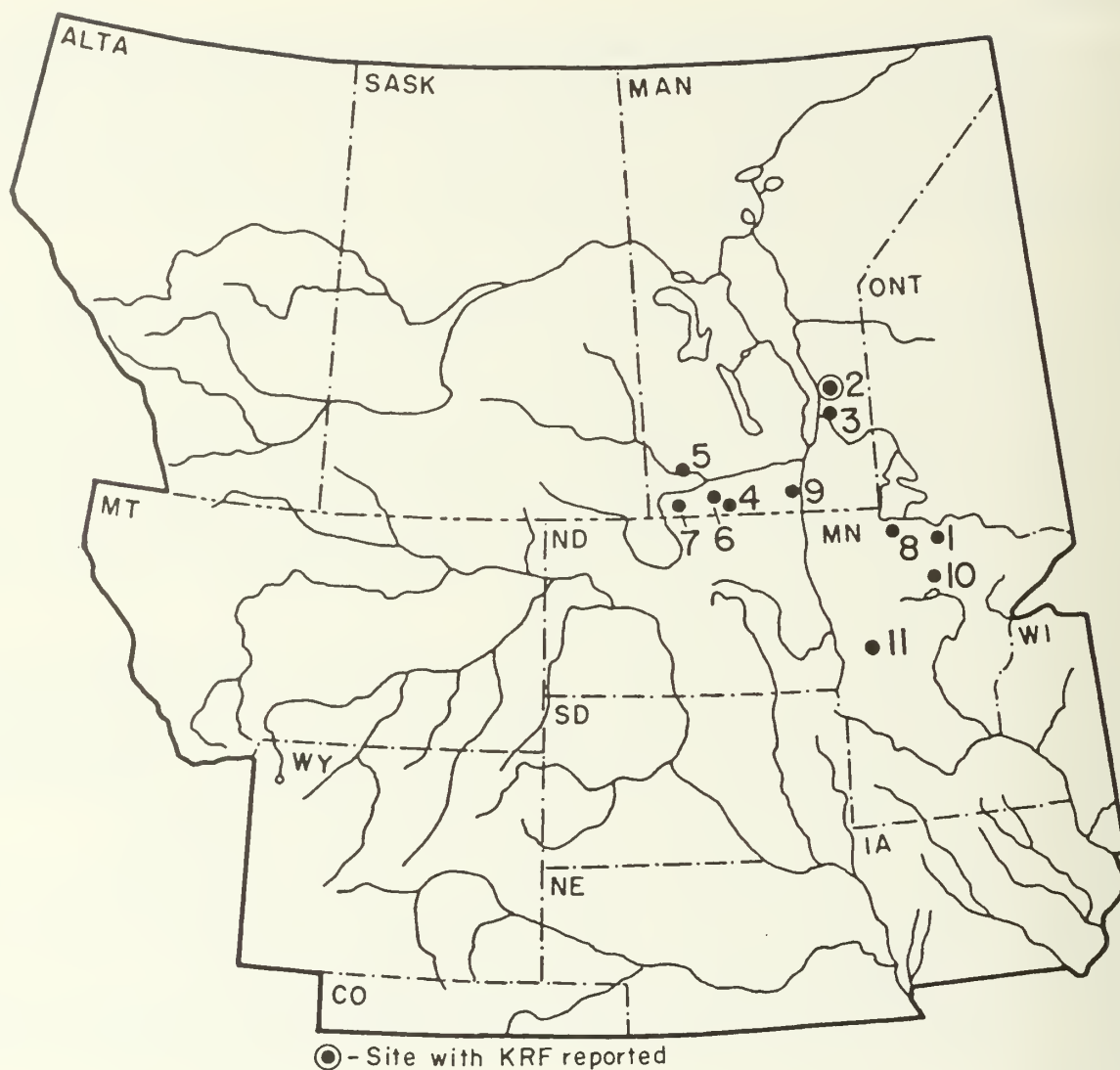
Forbis defined seven arrow point types from successive cultural strata in the upper member of the Old Women's Buffalo Jump: Washita, Pekisko, Paskapoo, Nanton, Lewis, Irvine, and High River (1962). The type definitions involve a number of nominal, ordinal, and interval scale attributes (Forbis 1962:96-102). He suggests that large samples of Old Women's arrow points can be cross dated with reference to the relative frequencies of these types in the successive Old Women's Buffalo Jump cultural strata. There has been some limited use of the individual types in descriptive work in the prairie provinces (e.g., Brumley 1976b), but apparently no work at testing the potential applicability of the seriation offered by Forbis for cross dating.

Blackduck Complex

The name derives from a site in northern Minnesota where cord marked ceramics were associated with burial mounds (Wilford 1945). The geographic distribution of Blackduck components covers southern Manitoba, northern Minnesota, and adjacent southwestern Ontario (Figure 29). The temporal extent of the Blackduck complex over most of this range is ca. A.D. 800-1500 (Buchner 1979:117; Syms 1977:101-102), but extends into the historic period in Ontario (Syms 1977:101). Considering the geographic and temporal ranges and material content, Blackduck may be a development out of the Laurel complex (Buchner 1979:115).

The Blackduck complex is contemporary with late Avonlea components and early Old Women's components. It is also contemporary with Extended and Terminal Middle Missouri components. Plains Village tradition sherds at the Avery site in southern Manitoba "may indicate trade with the Middle Missouri tribes" (Joyes 1970:217). Coiled and tubular copper beads and sheet copper ornaments are present in Blackduck assemblages. Trace amounts of worked copper in Plains Village tradition components may have resulted from interaction with groups having Blackduck material culture.

Typological studies of Blackduck ceramics "are not at the same stage of sophistication as are those for Laurel" (Buchner 1979:61). However, work by Carmichael in southeastern Manitoba is comprehensive.



- 1 — Smith (Lugenbeal 1976)
- 2 — Caribou Lake Project (Buchner 1979)
- 3 — Wanipigow (Carmichael 1977)
- 4 — Avery (Joyes 1970)
- 5 — Stott (MacNeish 1954, 1958; Tisdale 1978)
- 6 — United Church (MacNeish and Capes 1958)
- 7 — Lowton (Reid 1972)
- 8 — Various sites (Evans 1961a, 1961b, 1961c)
- 9 — Lord (Goshorn 1970)
- 10 — Blackduck (Wilford 1945)

Figure 29. Locations of some Blackduck complex components.

Carmichael considers Blackduck ware, with the “combination of cord wrapped object impressions in vertical to oblique or horizontal positions and punctates” to be “the most distinctive prehistoric ceramic ware found in Manitoba” (1977:5). Blackduck vessels are primarily globular jars with rounded bases; miniature vessels were also made (Carmichael 1977:5, 48-50). Two methods of manufacture are indicated: lump modeling with paddle and anvil, and molding inside a woven container (Carmichael 1977:5). Shoulders are rounded and rims are everted. Lips are thickened, “usually being 2-4 times thicker than the body” (Carmichael 1977:5). Exterior surfaces are usually completely cord marked. Decoration occurs on the exterior rim, lip, and occasionally the interior rim. “Various forms of stamping, appearing as secondary elements, are also common. Incised and trailed lines seldom appear, but are present on some minor types. The motif is applied over a smoothed or brushed surface” (Carmichael 1977:5).

Mortlach Aggregate

The unit terminology derives from the upper two cultural levels at the Mortlach site (Wettlaufer 1955:19-23) and Schneider and Kinney’s (1978) work on the Evans site in Mountrail County (32MN301). This named unit is classified as an aggregate because of poor control over geographic and temporal parameters (Schneider and Kinney 1978). Components are reported from northwestern North Dakota, northeastern Montana, southern Saskatchewan, and southwestern Manitoba (Syms 1980:376-377). Other components beyond this area are also considered possible candidates (Syms 1977:125). Figure 30 illustrates the locations of some of the reported components.

There is only one radiocarbon date from a Mortlach component, ca. A.D. 1520 at the Evans site (Schneider and Kinney 1978). Syms estimates the temporal range to be A.D. 1500-1780 (1980:376). European trade goods may be present in several components, but associations are uncertain (Schneider and Kinney 1978).

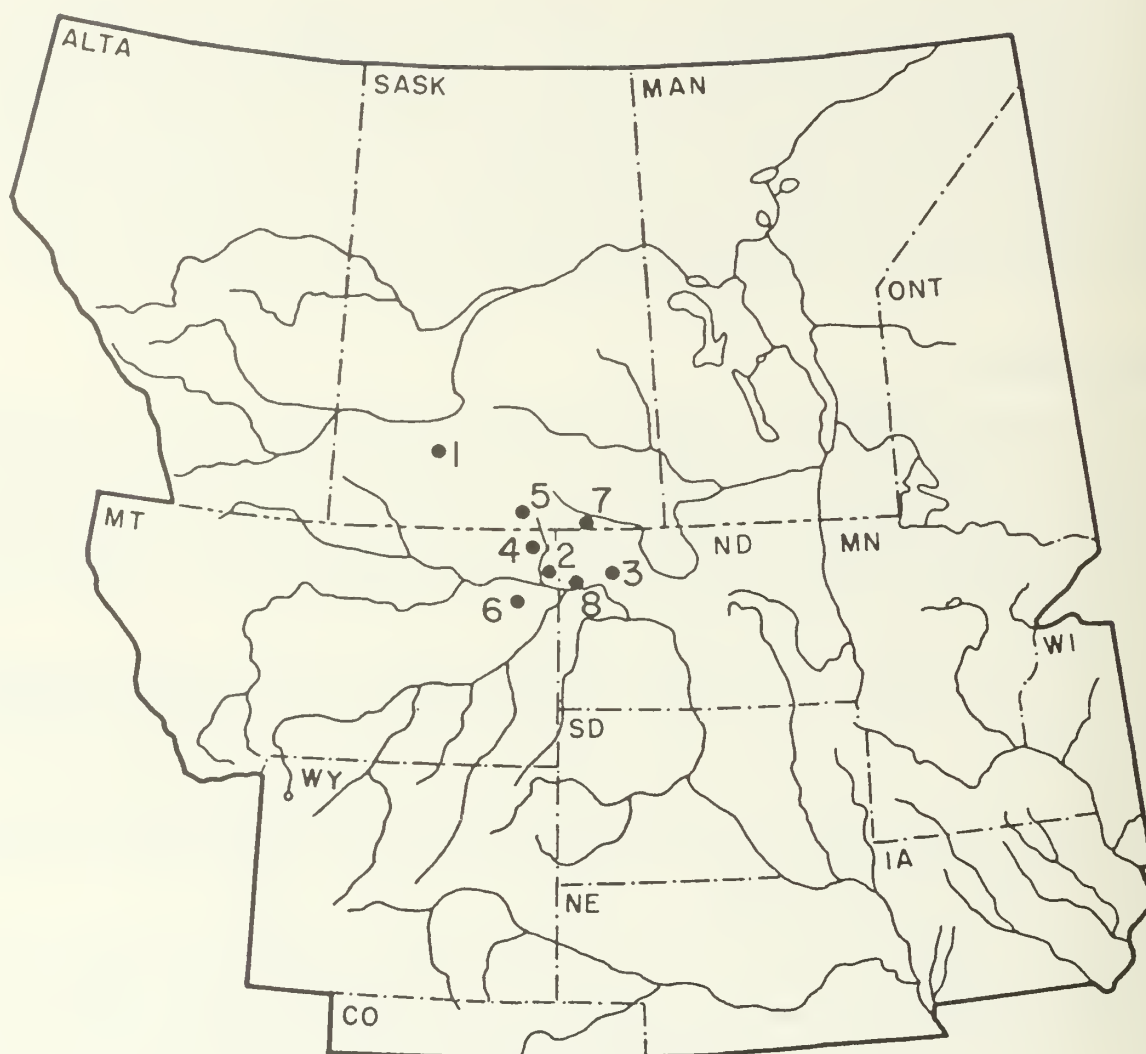
The Mortlach aggregate is contemporary with the Heart River phase of the upper Knife Heart region and the Scattered Village complex of the Plains Village tradition (Lovick and Ahler 1982), the One Gun complex (Byrne 1973), the Absaroka complex (Brown 1968), and late Blackduck. Mortlach ceramics have both Woodland and Plains Village affinities.

Mortlach ceramic assemblages derive from a small number of components, and most samples are small. However, there is a lot of variation in exterior surface treatment, rim form, lip form, and decoration (Johnson 1977b:41-48; Schneider and Kinney 1978; Syms 1977:125, 1980:376). A globular jar vessel form is known. Rim forms are straight, excurved, and S-shaped. Exterior surface treatment is highly variable: plain, cord marked, fabric impressed, smoothed over fabric impressed, simple stamped, and check stamped vessels are reported. Lip forms include rounded, flat, bevelled to the interior, and bevelled to the exterior. Decoration is reported on the inner lip, lip top, lip-rim juncture, and rim exterior. Decorative techniques include dentate stamping, oblique incising on the lip, cord impression on the lip, tool impressions, cord wrapped rod impressions, punctates, tool gouging, thumb/finger impressions, exterior lip notching, and trailing. Some vessels are undecorated.

Known components of the Mortlach aggregate are located at the interface of the Northwestern Plains, Middle Missouri, and Northeastern Plains subareas. There are material cultural affinities in all directions. Faunal and floral remains indicate only hunting and gathering subsistence activities at the camps represented by the excavated components.

Plains Village Tradition

Plains Village archeology is the most advanced in the study region in a number of respects. There are a large number of important ethnographic and ethnohistoric reports documenting various aspects of the Plains Village lifeway. There is a large archeological data base as the result of intensive salvage work in Missouri Trench earthlodge village sites with rich cultural deposits. Finally, some of the most capable archeologists in the area have focused their research efforts on prehistoric and historic Plains Village components.



- 1 — Mortlach (Wettlaufer 1955)
- 2 — Dune Buggy (Johnson 1977b)
- 3 — Evans (Schneider and Kinney 1978)
- 4 — Shippe Canyon (Joyes 1973)
- 5 — Big Beaver (Joyes 1973)
- 6 — East Redwater Creek (Taylor 1960)
- 7 — Long Creek (Wettlaufer 1960a)
- 8 — 32W112 (Metcalf 1963)

Figure 30. Locations of some Mortlach aggregate components.

The Plains Village lifeway is known primarily from information collected in the Missouri Trench. However, it may be assumed that all of western and south-central North Dakota witnessed Plains Village cultural activities. With a lifeway based on a horticultural-hunter-gatherer subsistence economy and a lithic technology, off-Trench subsistence and technological resources were important.

Lovick and Ahler (1982) organize the culture history of the Plains Village tradition in the upper Knife-Heart region by means of a series of sequent phases and one complex which is contemporary with one of the phases (Figure 31). Lehmer begins with a Plains Village pattern comprised of two traditions (Middle Missouri and Coalescent), each of which is in turn comprised of a series of sequent variants (with the exception of a temporal overlap between the Initial and Extended variants of the Middle Missouri tradition) (Figure 32). [Lehmer's "pattern" and "tradition" classificatory units are not used elsewhere in this background. See Lehmer (1971:27-28, 32-33) for an understanding of his use of these unit terms.] It is necessary to use both classification systems and chronologies at the current stage of development in Plains Village archeology in North Dakota because the tradition-phase-complex classification offered by Lovick and Ahler currently applies only to the upper part of the Knife-Heart region.

The concepts of a Plains Village pattern (Lehmer 1971:27) and a Plains Village tradition (Lovick and Ahler 1982:55) are essentially congruent, but the pattern is defined primarily in terms of traits and the tradition is defined largely in terms of a lifeway. In Lehmer's view, "all of the villages of the Northern Plains represented a single basic cultural configuration . . . the Plains Village Pattern" (1971:27). The diagnostic traits of this pattern include subsistence practices based about equally on horticulture and hunting-and-gathering; fixed, semipermanent villages near the flood plain of the Missouri; earthlodges; large storage/refuse pits; distinctive ceramics; large numbers of end scrapers and arrow points; bison scapula hoes; and a well developed bone tool industry (Lehmer 1971:27).

In Lovick and Ahler's view, the "distinguishing feature of the Plains Village lifeway was the practice of intensive horticulture focusing on the staple maize as well as beans, squash, and sunflowers grown in garden plots scattered along the flood plain of the Missouri" (1982:55). The subsistence base was also focused on bison, and involved other products from hunting and gathering. The key element in the Plains Village adaptive strategy was the production of a dependable, storable, surplus food supply (Lovick and Ahler 1982:55).

Lehmer's Classification and Chronology

The earliest Plains Village sites are located in the Grand-Moreau, Bad-Cheyenne, and Big Bend regions of the Middle Missouri subarea in South Dakota (Figure 32). They are classified by Lehmer (1971) in the Initial variant of the Middle Missouri tradition. [The phrases "Initial Middle Missouri variant" and "Initial Middle Missouri" are synonymous.] The Middle Missouri tradition has two other variants: Extended and Terminal. The Extended variant covers the period of time when Middle Missouri groups "extended their dominance throughout the subarea;" the Terminal variant covers the period of time when Middle Missouri groups "retracted to the north under conflict and territorial competition with their Coalescent tradition neighbors to the south" (Lovick and Ahler 1982:60-61). The hallmarks of all three variants within Lehmer's "Middle Missouri tradition are houses with rectangular floor plans and use of pottery with a relatively porous fabric and with straight and S-shaped rim profiles and tool- and heavy cord-impressed decorations" (Lovick and Ahler 1982:59-60).

The Initial Middle Missouri variant dates ca. A.D. 900-1400 or 1500 and was probably transported into the Middle Missouri subarea by a migration of people from Mill Creek, Cambria, and/or Great Oasis villages in southwestern Minnesota and/or northwestern Iowa (Lehmer 1971:97-98). The prehistories of the Mandan and possibly some Hidatsa originate here (Lovick and Ahler 1982:59; Wood 1967). This migration of horticultural people into the Middle Missouri subarea was probably facilitated by the warm, moist climatic conditions of the Neo-Atlantic climatic episode creating favorable conditions for extending an established horticultural base (Lehmer 1971:105). The Initial Middle Missouri variant is the only named unit of the Plains Village pattern in the Middle Missouri subarea during the period ca. A.D. 900-1000 (Lehmer 1971:98). There are no Initial Middle Missouri variant sites presently recognized in North Dakota. However, heavy utilization of KRF at Initial variant villages in the lower Bad-Cheyenne and Big Bend regions (Lehmer 1971:77) indicates interaction with groups in the study region on this early time level.

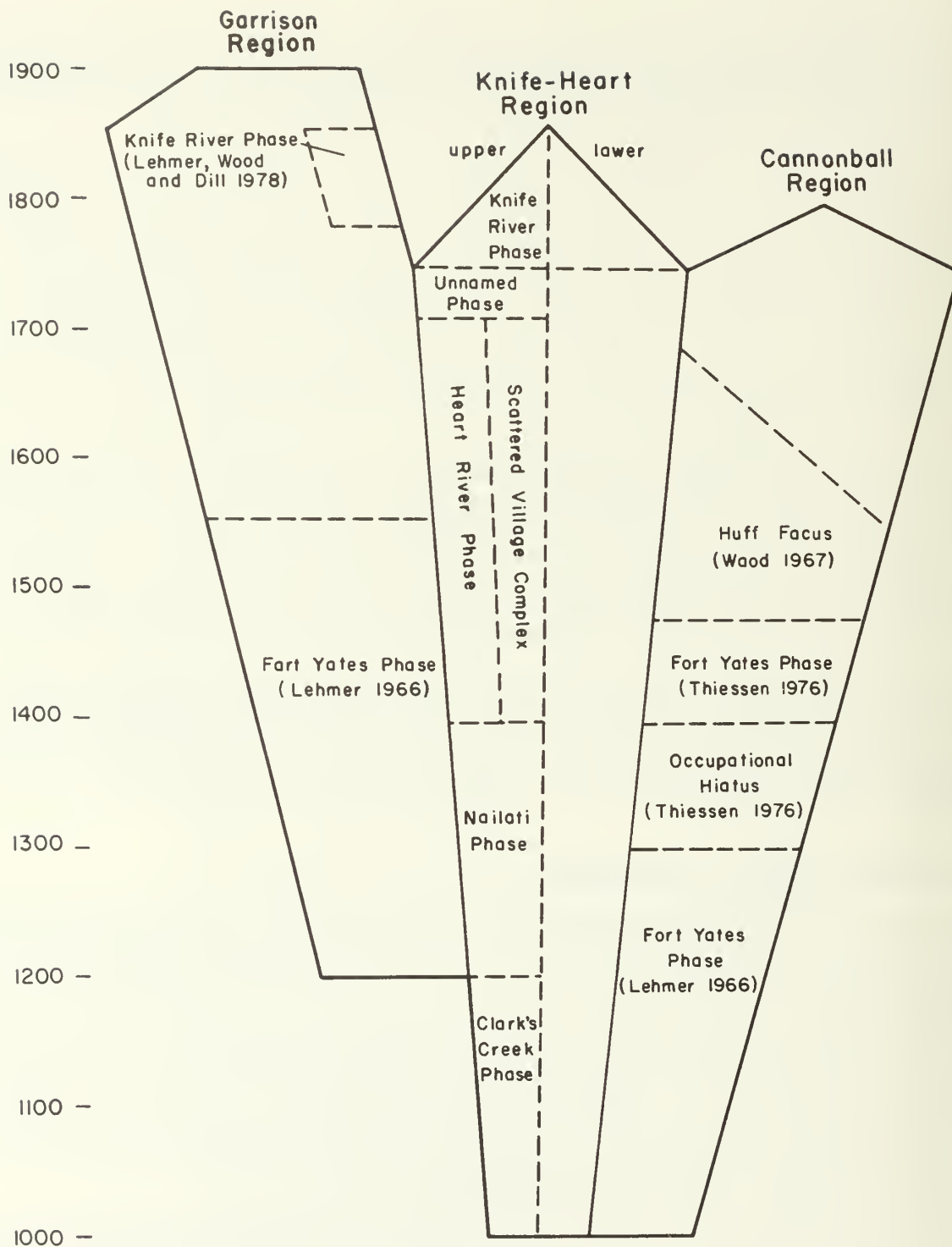


Figure 31. Regions of the Middle Missouri subarea in the study region with the complex and phases of the Plains Village tradition in the upper Knife-Heart region after Lovick and Ahler (1982:66).

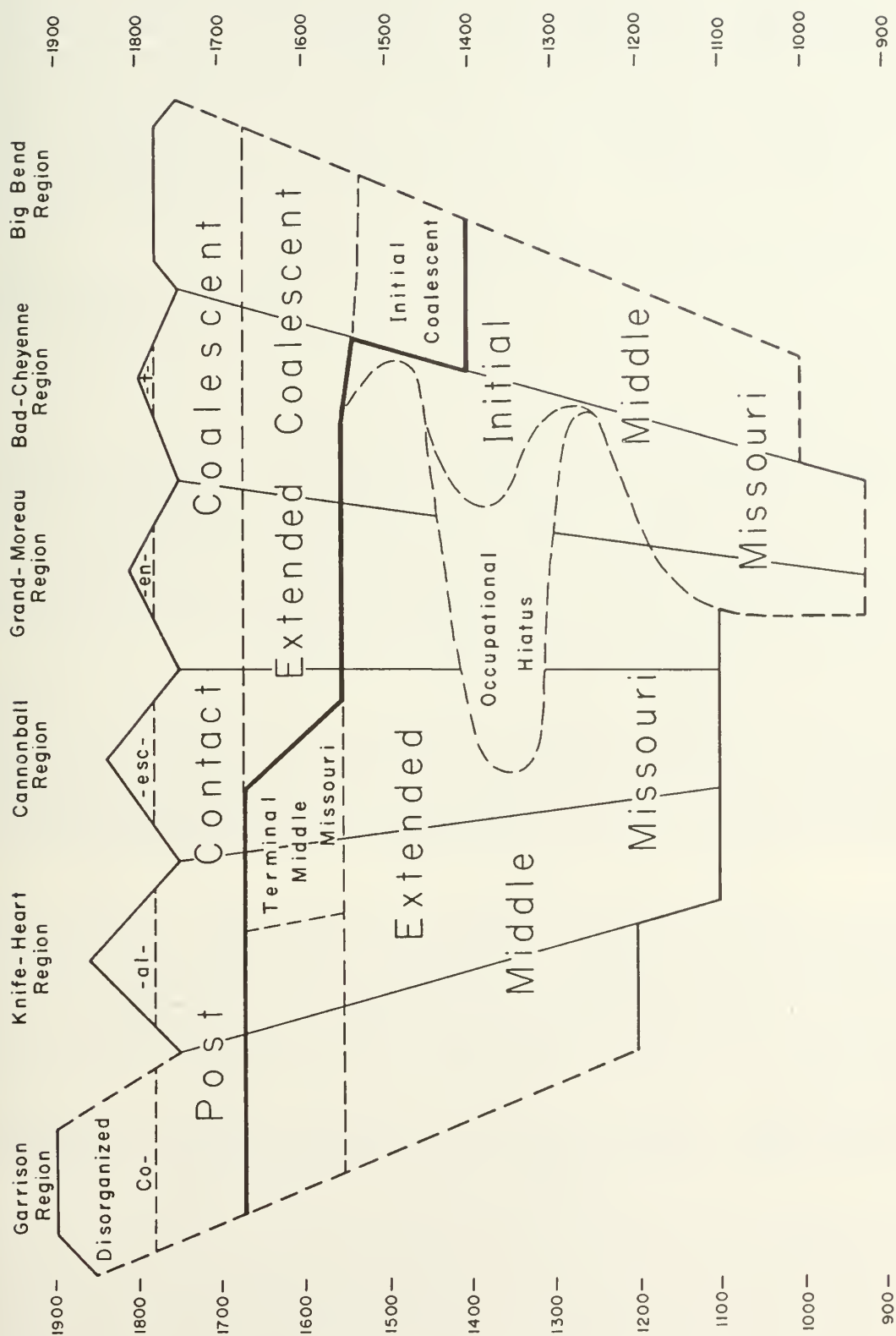


Figure 32. Middle Missouri and Coalescent tradition variants, Plains Village pattern, after Lehmer (1971).

The Extended Middle Missouri variant appears in the archeological record of the Middle Missouri subarea ca. A.D. 1000-1050 to the north of the Initial Middle Missouri geographic range. Extended Middle Missouri occupations were initiated in the Knife-Heart, Cannonball, and Grand-Moreau regions during this period of time. These are the earliest Plains Village occupations presently documented in the study region. Later expansion of the Extended Middle Missouri variant extended the distribution upstream into the Garrison region and downstream into the Bad-Cheyenne region in South Dakota (Lehmer 1971:66).

The Initial and Extended variants are closely related; the only consistent differences are in ceramics, but even these differences are indistinct in the Initial-Extended contact zones in South Dakota. The origins of the Extended Middle Missouri variant are unclear; this variant may have been the result of fissioning Initial Middle Missouri groups or another major population movement into the Trench from the northwestern Iowa — southwestern Minnesota area (Lehmer 1971:99-100). Cultural transformation of indigenous Woodland groups to a Plains Village lifeway is also possible.

Lehmer feels that sometime after ca. A.D. 1100, Extended Middle Missouri groups living along the Trench in North Dakota expanded southward into the Bad-Cheyenne region and forced groups with an Initial Middle Missouri material culture out of their territory (1971:100). Conflicts between groups with these two different material cultural inventories are evidenced by fortification systems around contemporary villages (Lehmer 1971:100).

Occasional conflict between Initial and Extended Middle Missouri villagers appears to have lasted from ca. A.D. 1100-1250, or perhaps as late as 1400 (Lehmer 1971:105). The terminal date may correlate with arid climatic conditions of the Pacific episode (Lehmer 1971:105). Initial and Extended Middle Missouri villagers apparently also had peaceful encounters during this period of time, perhaps analogous to the historically documented Mandan-Arikara relationships during the period ca. 1790-1830. Some Initial variant house construction traits were incorporated into the Extended variant, and the Extended variant ceramic traits of simple stamping and S-rim form became popular in the Initial variant (Lehmer 1971:105). Extended variant occupation appears to have been continuous in the study region throughout this ca. 250 year period of Extended variant-Initial variant interaction in South Dakota.

In the 1300s, there was a population influx from the Central Plains into the Big Bend region. The Central Plains tradition (ca. A.D. 900-1500) had been contemporaneous with the Middle Missouri tradition in the adjacent areas of western Iowa, eastern Nebraska, and northern Kansas (Lehmer 1971:108). This new influence represents the initiation of Lehmer's Coalescent tradition in the Middle Missouri subarea, and the first stage of coalescence between the Central Plains and Middle Missouri traditions (Lehmer 1971:111) (Figure 32). Where the Middle Missouri tradition represents ancestral Mandan and perhaps some Hidatsa, the Coalescent tradition represents ancestral Arikara (Johnson 1979:18; Lehmer 1971:156).

The 1300s may have been droughty and may have put stresses on some, and perhaps all of the horticultural cultures in the Middle Missouri subarea. Zimmerman and Bradley (1982) suggest Initial Coalescent population pressures on limited amounts of land suitable for horticulture, combined with unfavorable climatic conditions, led to "internecine" warfare such as that represented by the "Crow Creek massacre." Skeletal analysis of the remains of nearly 500 massacred individuals from that site reveal bone pathologies indicative of disease and other problems associated with malnutrition (Zimmerman and Bradley 1982).

In the 1400s, the Extended Middle Missouri variant again moved back southward into the southern Cannonball, Grand-Moreau, and Bad-Cheyenne regions. This presence was terminated beginning ca. A.D. 1500 by northward expansion of the Initial and Extended Coalescent variants (Figure 32).

The Terminal Middle Missouri variant coexisted with the Extended Coalescent variant during the period ca. A.D. 1550-1675. Extended Coalescent variant sites are located in the southern part of the Middle Missouri subarea, whereas the Terminal Middle Missouri sites are distributed northward from the Grand River in the Cannonball region (Lehmer 1971:121). The Terminal Middle Missouri variant sites are fewer in number, larger, and strongly fortified in comparison with the preceding Extended Middle Missouri sites. Some Terminal variant villages (e.g., Huff in Morton County) had plaza areas and over 100 houses arranged in rows (Wood 1967). The Demery site, just below the North Dakota — South Dakota line, is the northernmost known Extended Coalescent village, and Lehmer classified the Helb site, a few

miles downstream from Demery as the southernmost Terminal Middle Missouri village. He suggested this was evidence for a slight overlap in the maximum Extended Coalescent and Terminal Middle Missouri ranges (Lehmer 1971:127). However, both Helb and Jake White Bull (also just south of Demery and classified by Lehmer as Terminal Middle Missouri) are now classified as Extended Middle Missouri (Falk and Calabrese 1973 and Ahler 1977b respectively). This leaves Tony Glas (32EM3) as the southernmost recorded Terminal Middle Missouri village. There is presently no evidence for overlapping distribution between Terminal Middle Missouri and Extended Coalescent villages. There are suggestions the southern Terminal Middle Missouri villages were abandoned during the period 1600-1650 and the southern Cannonball region became an unoccupied buffer zone between Terminal Middle Missouri and Extended Coalescent occupations (Lehmer 1971:127) (Figure 32).

Interaction between groups with Terminal Middle Missouri variant and Extended Coalescent variant material culture in the Cannonball region and southward "led to the final crystalization of the Coalescent Tradition and to the disappearance of the Middle Missouri Tradition as a recognizable cultural entity" (Lehmer 1971:127).

It is at this point in Lehmer's Plains Village chronology (ca. A.D. 1675) that all sedentary horticultural groups in the Middle Missouri subarea are classified together in the Post-Contact variant of the Coalescent tradition of the Plains Village pattern (Post-Contact Coalescent) on the basis of material culture (Figure 32). Lovick and Ahler (1982:64) point to the Coalescent tradition as a "potentially serious flaw in the Lehmer model." It is likely that there was coalescence of material cultural inventories throughout most of the Middle Missouri subarea during this period of time, but there are other important examples of coalescence in the Plains Village tradition (Lovick and Ahler 1982:64).

The Post-Contact Coalescent is characterized by the incorporation of European innovations into the native village cultural systems (Lehmer 1971:131). This period of time was also characterized by a favorable climate for horticulture and introduction of the horse. The Plains Village cultures appear to have developed to a peak of power and influence over the Northern Plains during Post-Contact Coalescent times. This power and influence was terminated abruptly by incursions of devastating European diseases.

Lehmer's classification and chronology paints the broad picture as well as facilitating detailed considerations down to the level of subphases, but uses five levels of classification in the process. Ahler's concentrated work in a small part of the Knife-Heart region is adding further levels of classificatory and chronological refinement. The cultural scene appears much too complex to be explicable with reference to five or more levels of classification without following taxonomic principles.

Classification and Chronology in the Upper Knife-Heart Region

The Clark's Creek phase (Wood n.d.) is the earliest named Plains Village tradition subunit in the upper Knife-Heart region and is broadly equivalent to the Fort Yates phase represented by several sites in the Cannonball region (Helb, Jake White Bull, Paul Brave, Bendish, and Fire Heart Creek) (Ahler and Swenson 1980:109). Clark's Creek phase villages are unfortified, comprised of long rectangular houses, and yield "high frequencies of Riggs ware (straight rim) and Fort Yates ware (S-rim) pottery" (Lovick and Ahler 1982:70). Dates from the only radiocarbon dated component, the Clark's Creek type site (32ME1), indicate a temporal placement of ca. A.D. 1200-1300. However, a range of ca. A.D. 1000-1200 is suggested by Lovick and Ahler based on a large series of dates in the A.D. 1200s from components of the subsequent Nailati phase in conjunction with the high frequency of Riggs ware and low frequency of Fort Yates ware in Clark's Creek phase components (1982:70-71) (Figure 31).

The Nailati phase (ca. A.D. 1200-1400) is also characterized by unfortified villages with long rectangular houses (Lovick and Ahler 1982:71). There are more components known for this phase than the preceding Clark's Creek phase. The Cross Ranch site (320L14) on the Cross Ranch is the type site. "Ceramics from the Nailati phase sites are distinguished by relatively equal frequencies of Riggs ware (straight rim) and Fort Yates ware (S-rim) and significant amounts of check-stamping on body sherds" (Lovick and Ahler 1982:71-72).

The Heart River phase (ca. A.D. 1400-1710) is characterized by circular earthlodges, "relatively compact villages with large numbers of houses, deep middens indicating long periods of occupation, frequent use of fortification systems, and a high percentage of LeBeau S-rim pottery with cord-impressed decorations" (Lovick and Ahler 1982:72). The terminal date correlates with the initial appearance of European trade goods in archeological context in the upper Knife-Heart region. Both the Mandan and Hidatsa are "almost certainly" represented by Heart River phase components, "with Mandan-related sites being more concentrated in the lower part of the Knife-Heart Region, and with Hidatsa-related sites being more concentrated in the central and northern part of the region" (Lovick and Ahler 1982:73). It is not yet possible to identify either Hidatsa or Mandan components based on material cultural traits alone (Dill 1975).

The Scattered Village complex (ca. A.D. 1400-1700) has been defined to classify components with "scattered village plans, a lack of fortifications, imprecise site boundaries, little surface expression of house locations and house types," and relatively brief occupations (Lovick and Ahler 1982:73). Scattered Village complex components also display one or more of the following characteristics: (1) approximately equal frequencies of S-rim and straight/excurvate rim pottery vessels; (2) "frequent use of incised, trailed, and stab-and-drag tool-impressed decorations on pottery lips and rims;" (3) a high frequency of unusual rim and lip forms, including T-shaped lips and application of fillets; (4) high frequency of check stamped exterior surface treatment, and (5) significant amounts of chippable stone other than KRF, most notably Yellowstone agate (Lovick and Ahler 1982:73).

An Unnamed phase (ca. A.D. 1710-1750) is used to classify occupational debris from a single component at the Lower Hidatsa Village (32MEIO) (Lovick and Ahler 1982:75). It covers the time from the initial appearance of European trade goods until the first major plague disrupted normal cultural development in the upper Knife-Heart region. Unnamed phase ceramics are "dominated by Le Beau S-rim ware but including a significant amount of what is termed a transitional S-rim ware having characteristics of both LeBeau ware and later Knife River ware" (Lovick and Ahler 1982:75).

The Knife River phase (ca. A.D. 1750-1861) includes all Mandan, Hidatsa, and Arikara occupations in the upper Knife-Heart region from the time of the first major epidemic (as reflected by changes in the villagers' material culture) until the Arikara joined the Mandan and Hidatsa in Like-a-Fishhook Village (Lehmer et al. 1978; Lovick and Ahler 1982:76-77). Knife River phase ceramics are "characterized by outflared and thickened rims and cord-impressed decorations and low technological quality" (Lovick and Ahler 1982:76). Other major epidemics in 1780-1781 and 1837 resulted in drastic reductions in the populations of the villagers. There was heavy contact with Europeans and there were serious hostilities with the equestrian nomads. Knife River phase components, most notably the major village sites, can frequently be associated directly with either the Mandan, Hidatsa, or Arikara through ethnohistoric accounts.

Temporal Distribution

Fort Yates phase and Clark's Creek phase components in the study region are expected to date as early as the 11th century (Lovick and Ahler 1982:71). A residential base component at the Flaming Arrow Village site (32ML4) is radiocarbon dated ca. A.D. 1100 and may be classifiable in the Plains Village tradition (Toom and Root 1983a). Occupation was continuous from then to the Historic period. Many radiocarbon dates have been reported. Thiessen (1975:225-226, 228) lists some Fort Yates phase, Huff phase, Clark's Creek phase, and Nailati phase dates from the Cannonball and Knife-Heart regions.

Dendrochronology (Caldwell and Snyder 1983; Weakly 1971; Will 1946) and thermoluminescence (Lovick and Ahler 1982) are two other absolute dating techniques which have been used in Plains Village archeology. Ceramic type occurrence and frequencies are commonly used in cross dating.

Geographic Distribution

Plains Village tradition components are known throughout most of the study region, but are definitely concentrated in the Missouri River valley. There were Plains Village ceramic influences in southern Manitoba (Syms 1977:11), but no Plains Village tradition occupations have yet been described. To the

northwest, the One Gun complex (discussed below under the Equestrian Nomadic tradition) takes in a distribution of components with Plains Village material traits across southern Saskatchewan and into Alberta (Byrne 1973:479-498).

To the west, the Nollmeyer (A. Johnson 1982) and Hagen (Mulloy 1942) sites on the Yellowstone River in eastern Montana are in an area with the westernmost permanent village sites. Wood and Downer suggest that Hagen may date to early Post-Contact Coalescent times (1977). Some consider it an early Crow village. Late in prehistory the Crow appear to have carried many more Plains Village traits further west than was characteristic earlier in the Plains Village period. Even the Garrison region was mainly an area of hunting camps and other temporary settlement types, with very few permanent villages (Lehmer 1971:38).

Plains Village prehistory appears to be very complicated to the east of the Missouri River in North Dakota. Cultural classification and chronology are poorly developed to handle the complexity. Hidatsa oral traditions hold that much of their prehistoric development occurred throughout eastern North Dakota (Bowers 1948; 1965). The Biesterfeldt site in the Sheyenne Valley is classifiable in the Plains Village tradition and was probably a Cheyenne village (Wood 1971).

Surveys and test excavations along the James River found Plains Village components at 10 sites (Franke 1981:41). Plains Village components there date ca. A.D. 1245-1525 and intercomponent analyses indicate "Plains Village cultures developed simultaneously throughout the Northeastern Plains and the Middle Missouri subareas" (Schneider 1982d:125).

Figures 33-36 illustrate most of the major village sites along the Missouri Valley and a few camps away from the Trench in the study region. There are individual distribution maps for the Extended Middle Missouri, Terminal Middle Missouri, Post-Contact Coalescent, and Disorganized Coalescent variants. Most of the classifications and site locations are drawn directly from Lehmer (1971). Refer to Figures 32 and 33 for an estimation of equivalency between these classifications and the phases of the upper Knife-Heart region. It is noted that many of these sites would be classified differently today, but it is hoped that the locational information will be useful and the general patterns of site distribution and density will give some feeling for village settlement variability in the Plains Village period.

Content

Some of the material remains at Plains Village sites are distinctive, especially in the main villages (in contrast with camps). For example, there are ceramics with distinctive vessel forms and decoration, semipermanent houses, and large cache pits. However, there are many "close similarities between the material cultures of the villagers and the nomads," and much of this similarity can be accounted for by trade (Wood 1980:106). The diffusion of cultural elements through trade and other forms of contact and interaction "contributed to cultural uniformity among alien groups and provided a means of leveling cultural differences over wide areas" (Wood 1980:106).

CERAMICS

Pottery sherds are enduring physical traces of prehistoric ceramic technology. They also hold stylistic information regarding the potters' preferences for overall vessel form, rim form, lip form, surface treatment, and decoration. This stylistic information is heavily utilized in Plains Village archeology for classification and chronology building. It is also drawn upon in considerations of intrasite, intersite, and interregional interaction; social organization; demography; and settlement system reconstruction.

It is not possible to conduct research in Plains Village archeology without a detailed understanding of the ceramics. However, a specialization in the field is required to gain a detailed understanding. Comparative ceramic analyses in Plains Village archeology are either by attribute clusters or by types and wares. Data on 73 attributes are currently collected for use in Woodland and Plains Village ceramic studies in the Knife-Heart region (Lee 1980:39-41). There were 180 named types in the Middle Missouri subarea when Lehmer stopped counting (C. Johnson 1977:33). Attribute analysis has greater potential than type-ware analysis for testing temporally/spatially refined propositions. "Typological comparisons are adequate only for defining between tradition and occasionally between phase differences" (Johnson 1977:34).

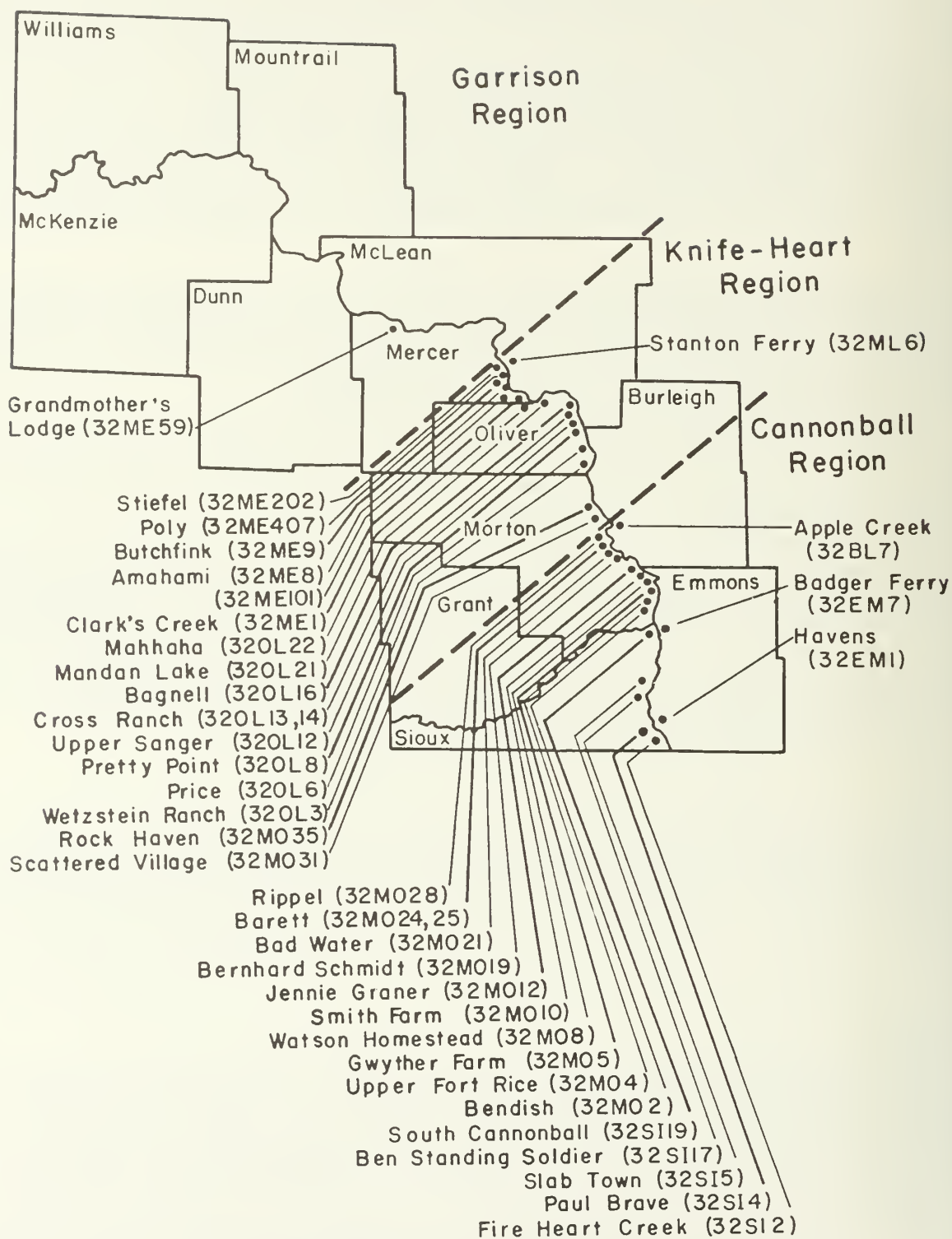


Figure 33. Extended Middle Missouri variant components in the study region, primarily from Lehmer (1971).

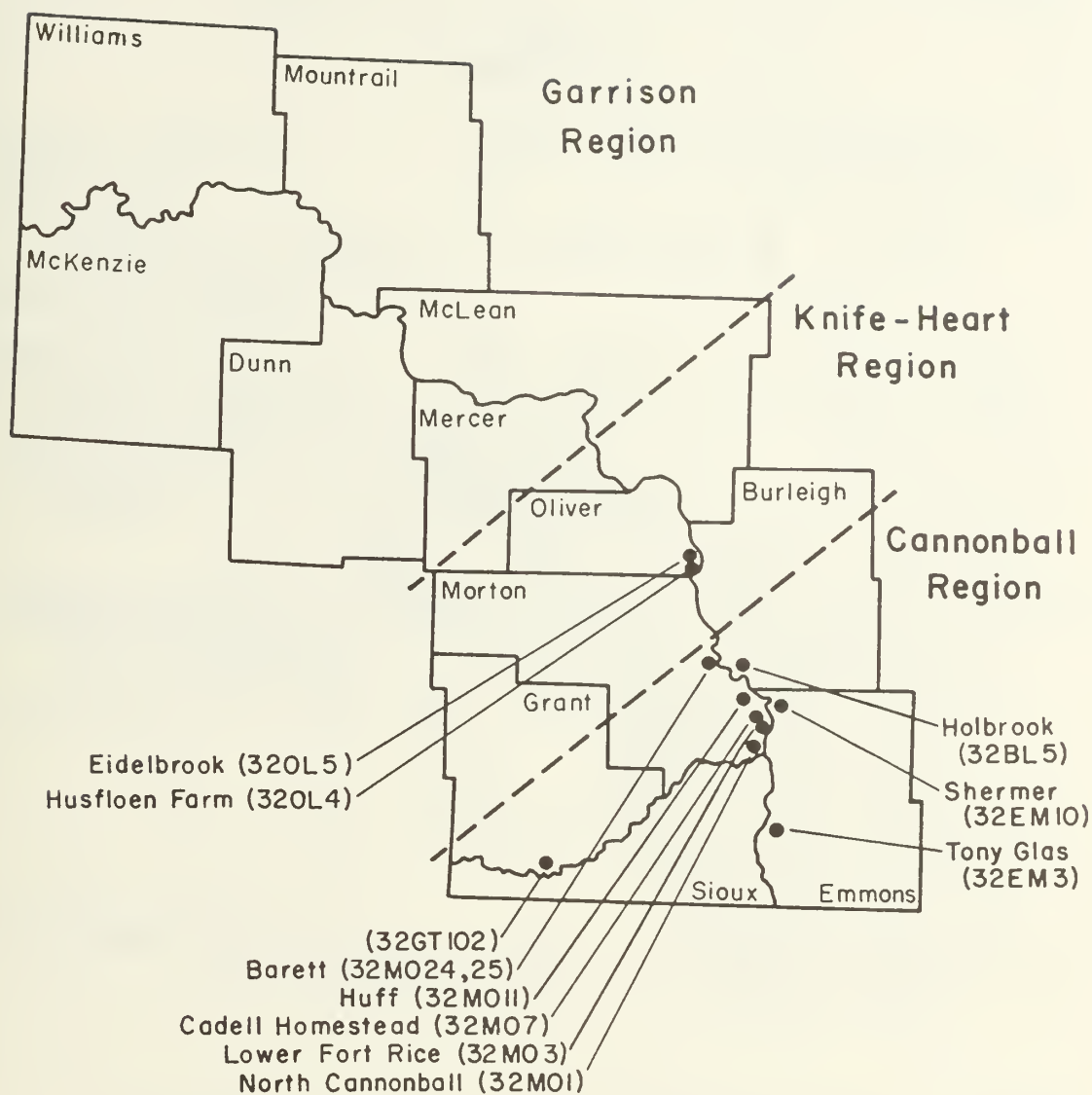


Figure 34. Terminal Middle Missouri variant components in the study region, primarily from Lehmer (1971).

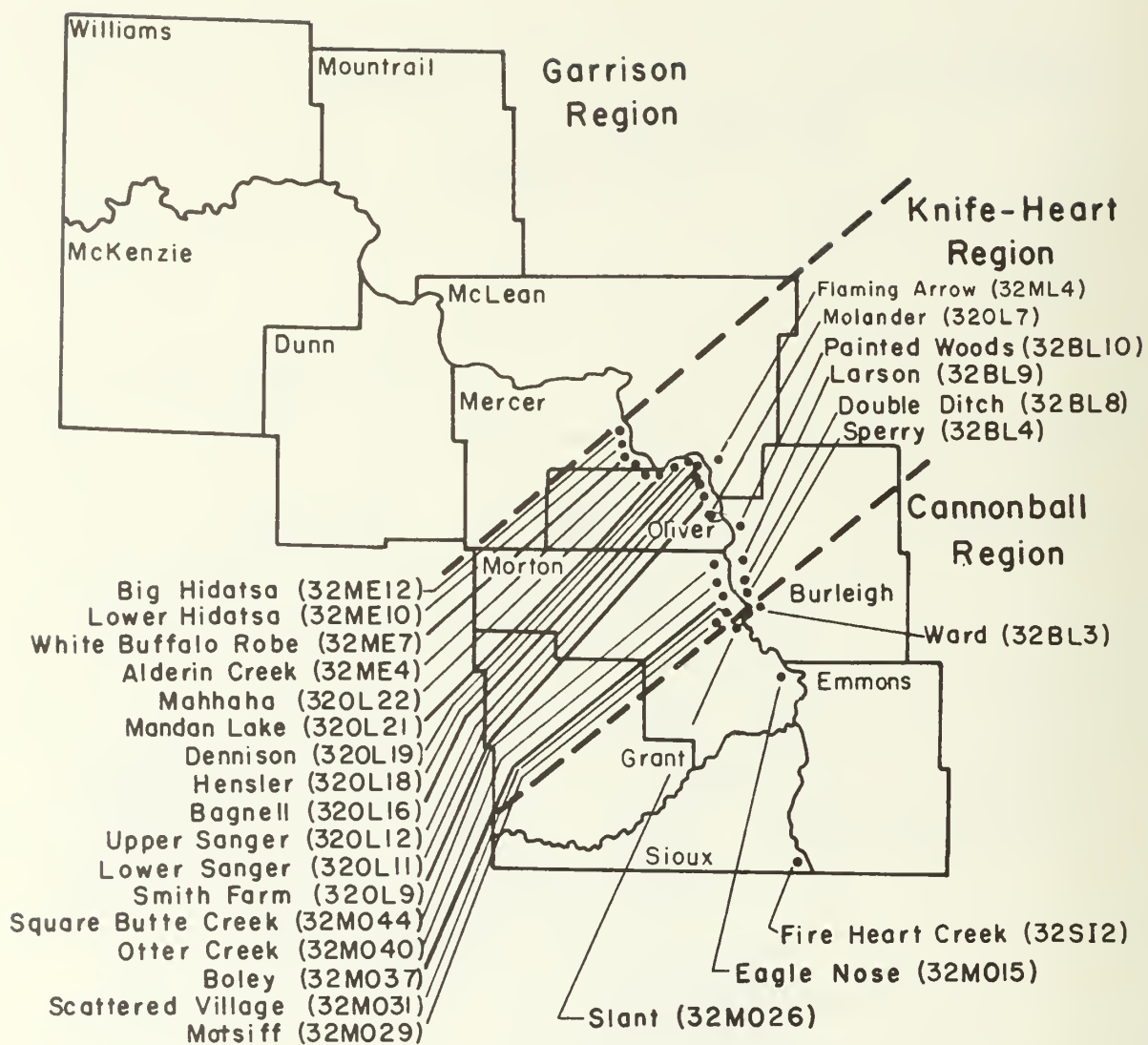


Figure 35. Post-Contact Coalescent variant components in the study region, primarily from Lehmer (1971).

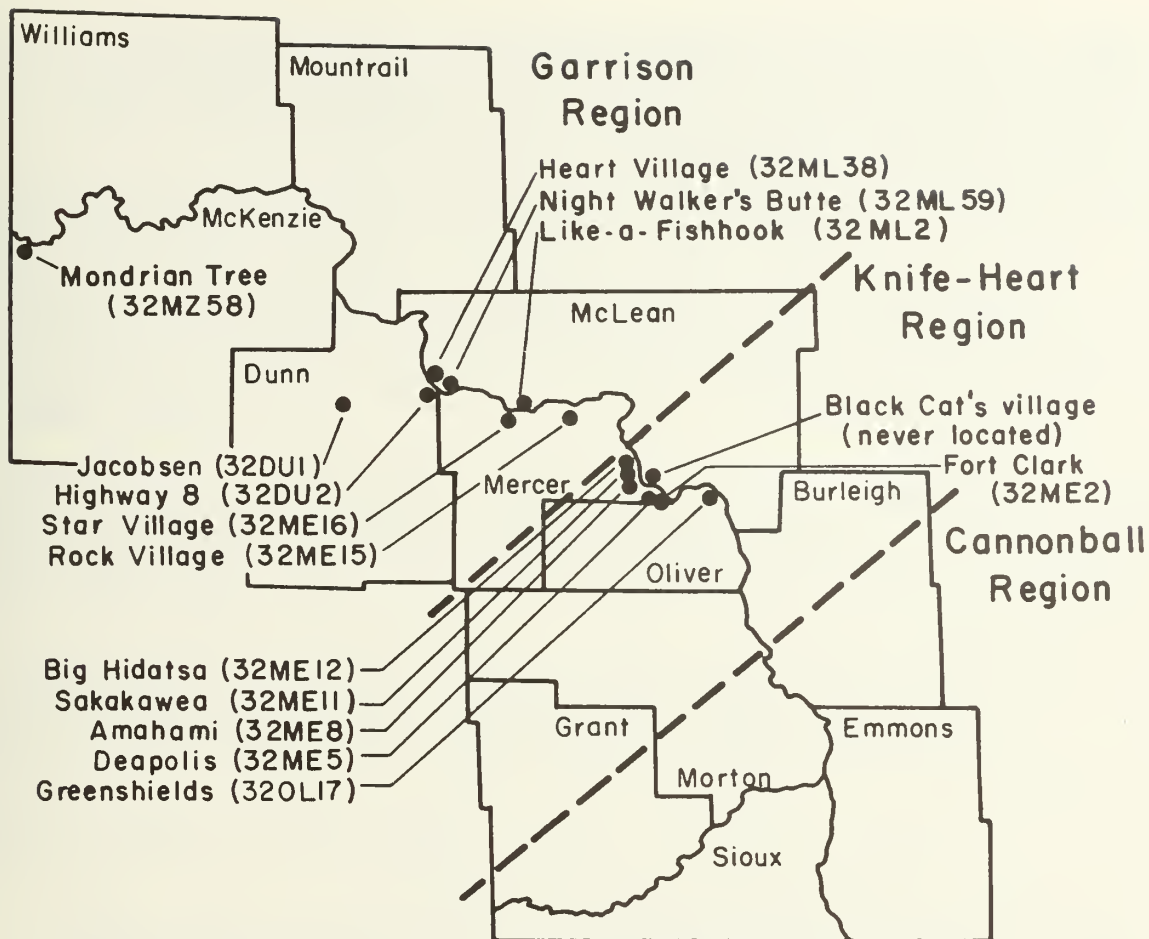


Figure 36. Disorganized Coalescent variant components in the study region, primarily from Lehmer (1971).

Wares . . . share such fundamental characteristics as the fabric of the pottery itself, the surface finish, the general vessel form, and the basic rim form. The types themselves have all of the characteristic features of the ware, but are distinguished by the decorative treatment and sometimes minor variations in form (Lehmer 1951:13).

The fabric of the pottery is almost exclusively local clay combined with grit temper (pulverized rotten or burned granite) (Howard n.d.). Vessel forms are predominantly round bottom jars. Interior surface treatment is plain (smoothed). Exterior surface treatments are primarily smoothed (plain), simple stamped, check stamped, and brushed. [Elsewhere, as in the southeastern U.S., the terms "simple stamped" and "check stamped" refer to decorative treatment, but they legitimately characterize the exterior surface treatment of Plains Village ceramics.] Simple stamping results from paddling with a grooved wooden paddle or thong wrapped paddle in the lump modeling process. A cross-grooved wooden paddle produces check stamping (Calabrese 1972:18). A cord wrapped paddle produces cord marking (cord roughening).

Extended and Terminal Middle Missouri variant exterior surface treatments are characteristically smoothed, simple stamped, or check stamped; Extended, Post-Contact, and Disorganized Coalescent variant exterior surface treatments are smoothed or simple stamped, and some rims are brushed (C. Johnson 1980:20). Cord marked exterior surface treatment in the study area is characteristic of Woodland ceramic assemblages.

Rim forms are S-shaped [sometimes thickened (or "collared") in the upper bend of the S], straight, or curved [sometimes thickened (or "braced" or "filleted") below the lip] (C. Johnson 1980:37). Johnson considers six decoration techniques sufficient for his Plains Village ceramic key to types and wares: cord impressed, cord wrapped tool impressed, incised or trailed, tool impressed, finger impressed, and stab and drag (1980:39).

The various wares and types, as stylistic phenomena, vary in frequency of occurrence through time. Herein lies their value for classification and chronology. For example:

It has been noted that sites which are early in the Middle Missouri Tradition such as Helb (Falk and Calabrese 1973), Jake White Bull (Ahler 1977a), Paul Brave (Wood and Woolworth 1964), Fire Heart Creek (Lehmer 1966), Clark's Creek (Calabrese 1972) and Bendish (Thiessen 1976) generally exhibit relatively high frequencies of Riggs Ware (ca. 75% or more) and proportionately small frequencies of S-rim wares. In contrast, sites falling chronologically later in the Middle Missouri Tradition such as Huff (Wood 1967), Shermer (Sperry 1968) and Cross Ranch (Calabrese 1972) exhibit greatly increased frequencies of S-rimmed LeBeau or Fort Yates Wares (approximately 35% or more) and proportionately decreased frequencies of Riggs Ware or other non-S-rim wares. In further contrast, our observations on small rim sherd collections from the yet later Coalescent Tradition, Heart River Phase, Sperry site (32BL4) and Hensler site (320L18) indicate that S-shaped LeBeau (?) Ware increases to 48-73% of the total, with straight rimmed wares comprising the remainder, and with at least half of the straight rims exhibiting bracing (Ahler and Swenson 1980:89, 91).

The occurrence of Plains Village ceramic wares and types outside the Middle Missouri subarea provides valuable evidence for identifying components of the settlement systems beyond the villages (e.g., work camps, transient camps, hunting stands, game kills, and eagle trapping locations). The occurrence of Plains Village ceramic traits in non-Plains Village components provides evidence for intergroup interaction. Keyser and Davis have defined a Powder River ceramic "tradition" which subsumes most of the ceramic variation previously considered under the rubric of "Crow" ceramics (1981:52-79).

Powder River pottery was "locally manufactured by groups inhabiting the High Plains area roughly bounded by the headwaters of the Powder River on the south, the Black Hills to the east, the Yellowstone River Valley to the north, and Absaroka-Beartooth Mountains to the west" (Keyser and Davis 1981:67). All attributes of the earliest Powder River ceramics (ca. A.D. 1050) have analogs in the Middle Missouri subarea (Keyser and Davis 1981:69). Keyser and Davis suggest that the groups making Powder River

tradition ceramics probably were either “immigrants from another area who had previous contacts with Middle Missouri groups or their ancestors, or a local Powder River Basin population who interacted with the Middle Missouri villagers” (1981:75). Continued interaction between groups in the Powder River region and the Middle Missouri subarea resulted in the persistence and evolution of the Powder River ceramics until “the introduction of the horse and gun which initiated a technoeconomic system emphasizing mobility and reliance on white traders [which] resulted in the rapid replacement of pottery with metal utensils” (Keyser and Davis 1981:76-79).

The case of Powder River ceramics is an excellent example of the complexity introduced into the archeological record of any study area by the ever present process of intergroup interaction. In the western North Dakota study area it will be a difficult task to separate some Plains Village components from the contemporary occupations of nomads who adopted a variety of Plains Village material traits.

SETTLEMENT TYPES

Ethnographically and ethnohistorically documented Plains Village tradition settlement systems were somewhat variable and provide a basis for modeling prehistoric Plains Village settlement systems. Villages with semipermanent houses, located on flood free Missouri River terraces, were the central settlement type. People were concentrated there at planting and harvest time and during several ceremonial periods throughout the spring, summer, and fall (Bowers 1950, 1965). In the winter the villagers typically moved into less permanent houses on the wooded flood plain near the summer village (Bowers 1965), but people sometimes wintered in the summer village (Tyrell 1916), and yet others wintered in distant hunting grounds like the upper Little Missouri drainage (Bowers 1965). Auxillary settlement types can be identified throughout the villages’ core, secondary, and tertiary areas (Syms 1977), mainly transient camps, base camps, and work camps associated with procuring a wide range of floral and faunal subsistence and technological resources. The kinds of settlement types and their configurations varied in response to population densities, the nature of intervillage and intertribal interaction, and resource availability, among other things.

The early (Fort Yates phase, Clark’s Creek phase, and Nailati phase) villages in the Cannonball, Knife-Heart, and Garrison regions were small and generally unfortified in comparison with later Huff phase and Heart River phase villages (Bowers 1948:95; Wood 1967:124). The Grandmother’s Lodge site (32ME59) in the Garrison region is an extreme example with a solitary long rectangular lodge detected by field work; it is similar to contemporary Fort Yates phase lodges in the Knife-Heart and Cannonball regions (Lehmer 1971:35; Woolworth 1956). Paul Brave (32S14) in the Cannonball region is a more typical small village of long rectangular structures (Hewes 1949a, 1949b; Wood and Woolworth 1964). In general, it appears that large and/or fortified villages are not anticipated in the study area in Extended Middle Missouri variant times. Small and unfortified residential areas may be encountered throughout the Plains Village period. There is an account of another solitary earthlodge east of the confluence of the Yellowstone and Missouri in the Historic period (Larocque 1910:51).

It has been suggested that the larger, later Huff phase and Heart River phase villages may represent an amalgamation for defensive purposes (Bowers 1948:94-95; Caldwell 1966:155; Wood 1967:150-155). Extended Middle Missouri villages contain 9-45 houses with a density of 13.8 houses/ha; Terminal Middle Missouri villages contain 79-115 houses with densities of 21.7-28.4 houses/ha (Calabrese 1972:38; Thiessen 1975:133; Wood 1967:154). The Terminal villages are fortified with bastioned palisades and the houses are arranged in “somewhat more regular rows” (Thiessen 1975:133). Tony Glas (32EM3) has been evaluated as a Fort Yates phase-Huff phase transitional village in the Cannonball region (Lehmer 1966:58, 62; Thiessen 1975:143; Wood 1967:150). It was a fortified village with about 48 houses and covered about 8 ha (Howard n.d.).

The pattern of large fortified central villages continued to characterize the Post-Contact Coalescent variant (Unnamed and Knife River phases in the upper Knife-Heart region). These villages are documented in the ethnohistoric record and several are being preserved by the National Park Service in the Knife River Indian Villages National Historic Site. Some Knife River phase settlements are situated atop defensible buttes (e.g., Kuehn et al. 1982).

There ought to be just as many, or more, winter villages as there were summer villages, but relatively few have been located, excavated, and reported. Incidentally, not all of the recent winter villages in the

Plains Village core area in the upper Knife-Heart region were occupied by Plains Village tradition groups. The Ice Glider site in Oliver County appears to be a Dakota Sioux winter camp (Wood n.d.).

Relatively little archeological work has been carried out at Plains Village settlement types other than the earthlodge villages. However, reported examples include Fire Heart Creek (Lehmer 1966) in the Cannonball region; 10 small Heart River phase sites at Heart Butte Reservoir in northern Grant County (Cooper 1958); Bowers' investigation of boulder turtle effigies; and, the Mondrian Tree site (Toom 1981b). Off-village activity areas, cemeteries, and trails within the KNRI have been discussed by Lovick and Ahler (1982). A temporary camp component is reported at the Bundlemaker site (320L159) (Ahler, Lee and Falk 1981:81).

FAUNAL AND FLORAL REMAINS

A fairly uniform pattern in subsistence resource procurement and utilization has been revealed by floral and faunal analyses of assemblages recovered from Plains Village tradition components in the study area and elsewhere. This adaptive pattern is one of the major defining characteristics of the tradition, extending from the Historic period "back through Terminal and Extended Middle Missouri occupation, with little obvious variation" (Calabrese 1972:67). Based on the recovery of corn, beans, squash, large quantities of bison bone, and grape, plum, and chokecherry seeds from the Nailati phase Cross Ranch site, Calabrese characterizes this pattern as "based primarily on horticulture and hunting" supplemented with wild plant food gathering (1972:67). He suggests that a dual focus on hunting and horticulture offered "alternative sources in the event of failure of one or the other" (1972:67).

This is not to say that floral and faunal subsistence resource procurement and use was invariable through the Plains Village period. Certainly the natural cycles of small mammal population densities affected resource utilization patterns. The possibly arid condition of the 13th and 14th centuries may have created horticultural problems and affected grazing conditions, and thus densities of large herd animals. The information base concerning specific anomalies is building. For example, freshwater mussel shell is especially dense at On-A-Slant Village in comparison with other reported Plains Village sites (Ahler, Schneider and Lee 1981:66).

Plains Village archeology has benefited from the work of zooarcheologists Theodore White and Carl Falk. Falk has instituted uniform data collection procedures which have been applied to many faunal assemblages from the Middle Missouri subarea. This data collection has laid the foundation for detailed intrasite, intersite, and interregional comparative analyses (Falk 1977). See Thiessen (1975) for a tabulation of vertebrate faunal remains from Middle Missouri tradition components in the Cannonball and Knife-Heart regions.

The implementation of standardized fine scale recovery techniques has resulted in the consistent collection of floral and microfaunal remains. Both cultigens and indigenous weedy plants and grasses were developed for their resource potential (Nickel 1974, 1977).

Bowers noted that at "the mouth of the Heart River where the wooded bottoms were most extensive, the villages show longest continuous occupation" (1950:23). The frequent occurrence of burned wood in village contexts has resulted in data enabling investigation of Plains Village timber resource utilization (Griffin 1977). Timber appears to have been a critical resource in prehistoric considerations of village placement and duration of occupation (Griffin 1977).

FEATURE TYPES

House remains are prominent features in Plains Village archeology. There is a considerable body of information on houses and other village features from excavated components (e.g., Ahler, Schneider and Lee 1981; Calabrese 1972; Deetz 1965; Lehmer 1971; Lehmer et al. 1973; Sperry 1968; Thiessen 1975, 1976; Wood 1967). The Middle Missouri tradition houses were typically rectangular with vertical wall posts, and set in shallow excavated pits or basins (Thiessen 1975:134). Howard suggests these Middle Missouri tradition structures were not earthlodges, but the same type of structure "which survived into historic times as the 'summer house' of the Central Algonquins and the 'tipi tanka' of the Santee Dakota" (n.d.:16). Differences between Fort Yates phase and Huff phase houses are minor (Calabrese 1972:39).

By about A.D. 1700, the Coalescent tradition circular earthlodge was the characteristic Plains Village tradition domestic structure in the study area (Bowers 1948:95; Lehmer 1971:136). The majority of the Arikara villages occupied during the 1700s seem to have averaged about 35 houses. The Mandan and Hidatsa towns of the same period were larger, apparently averaging over 90 houses (Lehmer 1971:141).

Other feature types encountered in the summer village contexts include fortification walls, bastions, and ditches (Bowers 1948; Howard 1962; Will and Hecker 1944; Wood 1967); hearth and pit features (Thiessen 1975); and middens (Ahler and Weston 1981). Nonvillage feature types include eagle trapping pits and lodges (Allen 1982), tipi rings, and a variety of simple and compound features involving surface hearths, small ash filled pits, prepared hearths, prepared pits, and associated post and pole structures.

CHIPPED STONE

As with ceramic and faunal studies, Plains Village chipped stone investigations in the study area are based on a uniform data collection program (Ahler 1975, 1978; Ahler and Weston 1981; Lovick 1980). Data are consistently recorded on technological class, morphological class, functional class, use-phase, raw material type, burning, heat treatment, patination, resharpening, recycling, use-wear, multifunctionality, cortex, and weight. A tremendous data base is building for addressing problems related to culture unit classification (Ahler 1977b), chronology (Calabrese 1973), and cultural processes (Goulding 1980).

Knife River flint was a fundamentally important technological resource for people in the study region during the Plains Village period. For example, throughout the occupation of Lower Hidatsa Village KRF constituted over 93% of the chipped stone tools and flaking debris, while "replaced to a minor degree by porcellanite in the latest time period" (Ahler and Weston 1981:190). Knife River flint is an important technological resource throughout the prehistory of the study region, but uniform data collection and large samples from numerous Plains Village components have produced a data base with potential for addressing refined research questions.

GROUND STONE

The Plains Village tradition ground stone tool technology was well developed. Grinding stones and slabs were used to grind foods and medicines; grooved mauls and other hammers were used to break up long bones for marrow extraction and for rendering bone grease; celts and axes of diorite and basalt were used in woodworking; sandstone and scoria slot abraders were in common use (Howard n.d.).

From cutbank profiling and limited test excavation at Sakakawea Village, Ahler et al. (1980:122) report smoking pipes, grooved mauls, polished symbolic or game pieces, grooved abrading tools (shaft smoothers), and a few partially manufactured spherical and cylindrical items of uncertain function. From the Bendish site, Thiessen reports celts, grooved mauls, metates, manos, pitted stones, stone sphere, clinker abraders, and sandstone abraders (1975). In addition to many of these items, Wood reports grooved ironstone nodules, beads, and pendants from Huff (1967:82-85). There was "a strong prejudice against the use of redstone pipes for ceremonial functions" among the Mandan, but not the Hidatsa or Arikara (Bowers 1965:488). Lovick (1983) provides important discussion on a variety of fire-cracked rock tools.

MODIFIED BONE, HORN, ANTLER, AND SHELL

The bone, horn, antler, and shell tool industries were also well developed. The bison scapula hoe was the main cultivating and excavation tool; root diggers were made of bison horn, bison long bone, and elk antler (Howard n.d.). Bone tools from Huff include scapula hoes, bison horn core-frontal bone scoops, scapula knives, shaft wrenches, elk cannon bone fleshers, bird bone tubes, bison humerus abraders (grainers), awls, game pieces, pottery modeling tools, bifacially flaked long bone sections, chisels, spatulas, polishers, punches, and a bison humerus gouge (Wood 1967:85-94). Additional artifact types from Bendish include bison rib and deer metapodial punches, a chisel, a knife handle, bands or bracelets, a bison tibia pick, and a fishhook (Thiessen 1975). Fishhooks "are a consistent item in the artifact assemblages from the Middle Missouri tradition sites" (Lehmer 1971:92).

Antler items from Huff are a scraper haft, bracelets, barrel shaped antler tools, and tine flakers (Wood 1967:94-96). An antler shaft wrench and bow guard can be added from Bendish (Thiessen 1975).

Shell items from Huff are scrapers, pendants, a ring, a thunderbird effigy, disks, disk beads, barrel shaped bead, gastropod beads, *Olivella* and *Dentalium*. *Dentalium* beads and artifacts of local freshwater mussel shell are also reported from Bendish. Many of these items continue in the Plains Village tradition inventory at least into the Protohistoric period (Ahler and Weston 1981:161-164).

WOOD AND OTHER PERISHABLES

Although it is not typical or characteristic, ordinarily perishable materials are not infrequently preserved in Plains Village sites, especially in the permanent villages. Three variables which enhance prospects for preservation of perishables in these sites are good drainage of cultural and underlying soil strata, relatively frequent occurrence of burned lodges, and the recency of some components.

Two coiled baskets and their contents were recovered from an Initial Middle Missouri house floor at the Fay Tolton site in South Dakota (Butler 1975). The contents of the baskets seemed complete and are described and interpreted as different tool kits. One basket contained "... four spatulate shaped bone objects commonly known as 'quill flatteners' or pottery modeling tools," awls, and flake tools (Butler 1975:54). The other basket contained one bone spatulate, an awl, a "bone punch or flaker," flake tools, end scrapers, a freshwater mussel valve, small worn shell objects, pebbles, and charred *Curcubita* seeds (Butler 1975:55). An elk antler scraper haft was lying on the floor next to this basket. Butler proposes that the tool kit in the first basket was used "for work on skins for apparel etc." and the tool kit in the second basket "was used for initial raw skin processing" (1975:58).

EUROPEAN TRADE GOODS

Trade is suggested to have been an important aspect of the prehistoric Plains Village lifeway (Wood 1967, 1972), but the appearance of European and Euro-American materials in the archeological record enables the formulation and testing of more refined research questions for the Protohistoric and Historic periods. Metal and glass artifacts can often be tied to a restricted period of manufacture and/or a likely trade source area. It is possible to address questions regarding intensity of trade, nature of materials traded, and direction of trade (Toom 1979).

Glass beads are often recovered from late components when fine scale recovery techniques are implemented (e.g., Ahler et al. 1980). Especially when working within a single site or locality, glass beads have potential for refined cross dating. At Sakakawea Village (32ME11), white beads decrease in frequency of occurrence through time while blue/turquoise beads show an increase (Ahler et al. 1980:199); beads have proven to be a sensitive temporal indicator at Sakakawea Village.

Other trade artifacts recovered from cutbank profiling and limited test excavation at Sakakawea Village include copper bangles, iron bangles, copper projectile point, iron projectile points, iron and brass gun parts, lead musket ball, brass wire coil, iron knife, iron hatchet, iron fire steel, iron awls, token or coin, iron bucket, and miscellaneous brass and iron items (Ahler et al. 1980:161-162). Knife River phase trade goods are discussed and illustrated in some detail by Lehmer et al. (1978).

BURIAL

There appear to have been differences in burial patterns from early to late in the Plains Village period in the study region. Early (Middle Missouri tradition) remains are so infrequently encountered that Lehmer says, "burial customs are not known for any of the Middle Missouri variants" (1971:70). Abundant "human remains have not been reported from excavated Middle Missouri tradition components in the Cannonball and Knife-Heart regions" (Thiessen 1975:121). Thiessen does report an infant burial from a pit dug through a house floor at the Bendish site (1975). Hilltop burials in shallow pits capped with large rock cairns are also indicated (Gregg 1983).

At the Terminal Middle Missouri Tony Glas site, fragments of disarticulated, split, and burned human skeletal remains were found scattered in refuse pits, around hearths, and with other debris under packed house floors (Howard n.d.). Additional fragments of 36 individuals of various ages and sexes were found in excavating two houses there. Howard suggests that these remains may be explained by the practice of cannibalizing enemy bodies. He notes that in historic times the villagers would sometimes eat part of the heart of a slain enemy, that the Mandan and Hidatsa sometimes mutilated slain enemies, and that these practices are not far removed from more cannibalistic practices. The point here is that the occurrence of human remains may not always be indicative of burial practices.

Cemetery areas are clearly depicted in early maps of the KNRI area (Lovick and Ahler 1982:88), indicating that the Hidatsa and perhaps Mandan practices some direct, in-ground interment in the Historic period. Burial grounds along the Missouri River on elevated settings like butte tops are also common in the Historic period in the upper Knife-Heart and Garrison regions.

Whenever human burials are encountered in archeological work, it is imperative to immediately inform the Archeology and Historic Preservation Division, State Historical Society of North Dakota. Further, intentional exposure and removal of native burials should be carried out only with the consent of local tribal organizations.

Equestrian Nomadic Tradition

The Equestrian Nomadic tradition is discussed here as any hunting and gathering adaptive strategy/lifeway that was dependent on horses. Fundamentally, the horse was a greatly improved energy source (Fredlund 1973:45-46) which increased "the capacity both to acquire food and to transport it" (Beardsley et al. 1956:148). The use of horses resulted in significant changes in subsistence economies, demographic characteristics, social organization, and settlement patterns with reference to prehorse cultures. Precedence for the use of the Equestrian Nomadic tradition as a named classificatory unit in Northern Plains archeology can be seen in Lehmer's "Equestrian period" for the Northwestern Plains and Middle Missouri subareas (1971:32).

Temporal Distribution

Native use of horses in the Southern Plains began about A.D. 1600 (Driver 1961:16). Lehmer suggests A.D. 1720 as a reasonable date "for the beginning of the florescence of the horse culture in the Northwestern Plains" (1971:32). Horses were in use in the extreme Northwestern Plains during the period A.D. 1730-1750 (Byrne 1973:489). In the study region, evidence of changing hunter-gatherer adaptive strategies resulting from use of horses should be evident beginning on an A.D. 1725-1750 time level.

Geographic Distribution

The Equestrian Nomadic tradition was successful lifeway throughout most of the Plains, in some portions of the prairies to the east, and in parts of the Rocky Mountains to the west. Further west, where horses were no aid to hunting patterns focused on small game, and competed with gatherers for plant foods, they were eaten and had little impact on lifeways (Driver 1961:34-35). Equestrian Nomadic components are anticipated throughout the study region.

Content

There has been relatively little attention focused on Equestrian Nomadic sites, in fact very few of these sites are identified archeologically. It may be assumed that horses were in use at many of the native sites with European trade items. But it should prove to be just as difficult to separate Equestrian Nomadic tradition components from protohistoric Plains Village tradition components as it is to separate Late Prehistoric period Plains Archaic tradition components from Plains Village tradition camp components away from the main villages.

SETTLEMENT TYPES

Very large tipi camps and historically documented patterns like the Cheyenne summer camp circle should be identifiable. Solitary bison kills and bison surrounds on the open plains with metal projectile points [e.g., the location near Epping in Williams County described by Halverson (1981)] and perhaps distinctive butchering patterns might correlate with hunting patterns involving the use of horses. The use of horses would have facilitated situating large camps atop defensible landforms such as high butte tops.

Many transient camps might have been occupied for shorter periods of time, generating less occupational debris, since it was easier to move camp with horses. Another variable intervening in considerations of amounts of occupational debris is the use of more durable metal tools and utensils by groups living an Equestrian Nomadic lifeway.

FAUNAL AND FLORAL REMAINS

Most of the differences between prehorse and posthorse faunal and floral assemblages at campsites ought to be primarily quantitative rather than qualitative. With horses it would have been possible to transport more body parts from the kill site to the camp for processing. Something of a qualitative nature may be evidenced by a solitary stand of limber pine in Slope County reported by Beckes et al. (1981). This stand appears to have been established by seeds culturally deposited ca. 1725. A supply of limber pine seeds may have been carried to this location by a group traveling from the Black Hills, the Bighorn-Pryor mountain area, or the Missouri Breaks in northern Montana (Beckes et al. 1981; Loendorf, personal communication, 2/10/82). While these seeds could certainly have been imported by foot, the horse facilitated the long distance transport of larger quantities of "exotic" items.

DESIGN MOTIFS/ORNAMENTATION

Northwestern Plains rock art captures a number of aspects of the Equestrian Nomadic tradition lifeway, including representations of horses (Conner 1980; Conner and Conner 1971). Personal designs and ornamentation predominate in much of this rock art done by individual warriors. Other information in this category was recorded by artists like Catlin and Bodmer, and early photographers like L. A. Huffman and Sumner Madison.

CHIPPED STONE

Study of changes in postcontact Plains Village lithic industries has begun (e.g., Goulding 1980; Toom 1979), but little has been done with the subject of the changing lithic technologies of the postcontact nomads. The bow and arrow continued to be the favored weapon for killing bison until the repeating rifle became available in the 1860s (Ewers 1970:12). Metal projectile points were available as a trade item at least by 1795 (Ewers 1970:8) and were also being made by Indian toolmakers, but chipped stone points continued in use among the Villagers (Goulding 1980:54). Perhaps the antler hafted chipped stone scraper was another item that was difficult to improve upon and persisted in postcontact lithic inventories.

GROUND STONE

Grooved mauls are noted in the ethnohistoric literature as a food processing tool and a heavy hammer to break up firewood from down timber or standing dead limbs. More heavyweight ground stone items could be curated with horses to carry the loads in moving camp.

MODIFIED BONE AND ANTLER

Bone and antler were used in saddle making by the Villagers (Wilson 1924) and should also have been used by the nomads.

BURIAL

The practice of sacrificing the favorite horse of the deceased at the mortuary site is documented for a number of the tribes identified with the Equestrian Nomadic tradition (see ethnographic sketches).

Discussion

Perhaps there is more ethnic diversity and material cultural diversity within the Equestrian Nomadic tradition on the Northern Plains than within any of the other four traditions. People living this lifeway were more mobile and intertribal encounters (information exchanges) were more frequent. European trade goods were adding to, and replacing, native material inventories. Further, the Equestrian Nomadic lifeway was taken up by a diversified lot of cultural groups. These cultural groups had their origins in the Plains Archaic (Algonkian Blackfeet), Plains Village (Crow), and Woodland (Middle Dakota) traditions. On the other hand, more intensive interaction over a broader geographic area may have acted to level cultural differences.

There are two named archeological units in the Northwestern Plains which are classified within the Equestrian Nomadic tradition: the Absaroka phase in the south and the One Gun phase in the north. Both of these units are identified over geographic areas larger than archeological regions. Therefore they are classified here as complexes. Brown (1968:91-92) defines the Absaroka complex to include archeological deposits generated by "mounted bison hunters" within historic Crow territory; he suggests A.D. 1800-1850 as the temporal range for the phase. The beginning date of A.D. 1800 was suggested as the earliest date when European trade goods — one of the defining artifact classes of the complex — should have first appeared in the area (Brown 1968:91-92). This date might be pushed back to A.D. 1725 or 1750. Brown characterizes Absaroka complex components as primarily small camps reflecting brief occupations (1968:91). Caves, rockshelters, tipis, and war lodge type pole structures were typically used for dwellings. Characteristic chipped stone tools include unnotched, side notched, and tri-notched triangular arrow points, expanding base drills, ovate knives, end scrapers, and a variety of side scrapers. Choppers, hammerstones, and an occasional ground stone mano also occur. Bone tools include metapodial fleshers, knapping tools, scapula knives, bone awls, and bone tubes (Brown 1968:91). "The well developed knife and scraper complex and abundant animal bones present in these components are indicative of a strong dependence upon large game animals for subsistence; there is little or no evidence of horticulture" (Brown 1968:91).

A recent consideration of Northwestern Plains ceramics by Ann Johnson (1981) resulted in the definition of Little Mountain ware; this ware includes ceramics that have previously been referred to as "Crow" by Frison, and appears to subsume Absaroka complex ceramics. These ceramics are present in the southern Northwestern Plains on both prehistoric and historic time levels. Ceramics in general, and Little Mountain ware in particular, persist through the transition from a prehistoric Plains Archaic tradition lifeway to the historic Equestrian Nomadic tradition lifeway represented by the Absaroka complex. However, Brown considers ceramics "not a significant item" in the Absaroka complex (1968:91).

Absaroka complex components are ethnohistorically documented for the study region (e.g., Hazlitt 1962). Archeological documentation is another matter. There is first the problem of differentiating the camps of equestrian nomads from those of the mounted Villagers. Then there is the seemingly insurmountable problem of ethnic identification of camp refuse (Absaroka complex components are linked with the Crow by definition). The Historic period Native American component at the Mondrian Tree site (32MZ58) is a case in point. It is nearly certain that the Tree site witnessed at least one Native American occupation during the period ca. A.D. 1800-1850, but ethnic identifications of the groups responsible for the archeological deposits are quite another matter.

The One Gun complex is geographically restricted to southern Alberta (and perhaps southern Saskatchewan), and temporally restricted to the period ca. 1720-1750 (Byrne 1973:498). Components classified in the One Gun complex represent the physical traces of groups with origins in the Middle Missouri subarea, "possibly representing an extreme and highly modified extension of the Post-Contact Coalescent" (Byrne 1973:478).

Cluny is one of the most reknown components of this complex. This named archeological unit is of no utility for classifying components in western North Dakota because it has been formulated to account for southern Alberta archeological remains. However, the mobile groups responsible for One Gun complex debris probably originated in the study region.

STUDY AREA OVERVIEWS

by David D. Kuehn and Michael L. Gregg

Introduction

This section provides individual considerations for six study areas within the study region. With the focus narrowed to smaller geographic areas within the study region, it is possible to present specific background information regarding physical settings and previous research in a more manageable and hopefully more comprehensible manner. This study area approach also facilitates discussion of information deficiencies specific to geographically restricted localities and enables formulating recommendations for some ways to reduce the deficiencies. Information deficiencies and recommendations for the entire study region are presented in the concluding subsection.

Many of the points made in the sections on information deficiencies derive from participants in a miniconference on information deficiencies in western North Dakota prehistoric archeology held at UND on November 30 and December 1, 1982. This miniconference was attended by Stan Ahler, Walt Bailey, Chris Dill, Dale Davidson, Mike Gregg, Dave Kuehn, Jeff Kinney, Larry Loendorf, Matthew Root, Fred Schneider, and Dennis Toom. Points made by these individuals and incorporated in this section of the Class I are cited by identifying the contributor's last name, followed by UND, e.g., (Bailey, UND).

The six study areas in the 22 county western North Dakota study region are the Northwest (Burke, Divide, Mountrail, and Williams counties), North-Central (Renville and Ward counties), East-Central (Burleigh, McLean, and Sheridan counties), Central (Dunn, Mercer, Morton, Oliver, and Stark counties), Southwest (Adams, Bowman, Grant, and Hettinger counties), and Little Missouri (Billings, Golden Valley, McKenzie, and Slope counties). Physical setting, previous research, information deficiencies, and recommendations and future directions are considered within each of the study area subsections.

Physical setting information includes a capsulization of the physiography, drainage, and natural resource potential. Natural resource potential (i.e., water, shelter, lithic raw materials, and floral and faunal resources) is important for understanding many of the variables affecting the nature and location of past human settlements. Previous research is capsulized for each study area. First, site densities, site types, site features, and cultural/temporal affiliations recorded in the site files maintained by the Archeology and Historic Preservation Division (AHPD), State Historical Society of North Dakota (SHSND) are identified. Site type designations are drawn directly from the state site form; CM scatter = cultural material scatter. Only those sites recorded through December 31, 1981 were used in the site record compilations by county and not all errors have been identified in the file and corrected, so site record information is not precise.

For most counties, the site records represent a small and biased sample of all sites present. Major survey projects, test excavations, and large-scale excavations are identified for each study area. These are generally the projects which have produced the most useful information regarding the nature, geographic extent, and time depth of human use of each study area. Information on small projects can be obtained from the manuscript collections covering all cultural resources work in North Dakota maintained by the AHPD, SHSND in Bismarck.

The Northwest Study Area

The Northwest study area is composed of Burke, Divide, Mountrail, and Williams counties in extreme northwestern North Dakota (Figure 37). Saskatchewan is immediately adjacent to the north and Montana to the west.



Figure 37. Northwest study area, Dickinson District Office—BLM study region (from the U.S.G.S. 1:500,000 North Dakota shaded relief map, 1965).

Physical Setting

The area is characterized by a variety of physiographic settings. Part of the area drains to Hudson Bay, part to the Missouri River and ultimately the Gulf of Mexico, and part is characterized by internal drainage.

PHYSIOGRAPHY

The study area includes portions of the Central Lowlands and Great Plains provinces of the Interior Plains major physiographic division (Fenneman 1946; Hansen 1967:5). The approximate north half of Burke County and the northeastern corner of Divide County are in the Drift Prairie district of the Central Lowlands province. The Great Plains province is represented by the Missouri Coteau, Coteau Slope, and Missouri River Trench districts (Bluemle 1977; Hansen 1967). The south half of Burke County, southwestern two-thirds of Divide County, northern one-fifth of Williams County, and northeastern one-third of Mountrail County are in the Missouri Coteau district. The southern four-fifths of Williams County and the southern two-thirds of Mountrail County are in the Coteau Slope district. The southern border of Williams County and southwestern border of Mountrail County are in the Missouri River Trench district.

While the topography and drainage of these different districts vary, all were modified by Pleistocene glaciation. The Drift Prairie is a gently rolling but largely flat plain. It presents the least topographic diversity in the study area. The Missouri Coteau is a hilly plain with moderate to high relief and numerous sloughs and depressions (Freers 1973). The topography of the Coteau Slope is a result of both glacial and erosional processes (Bluemle 1977:3). The Missouri River Trench is a broad valley formed since the late Pleistocene. Much of the valley wall terrain is upland breaks and badlands.

DRAINAGE

A subcontinental divide runs through the Missouri Coteau district. The 30-35 km wide district is largely a closed drainage system composed of numerous sloughs and potholes. Streams on the north and east side of the Coteau drain into the Souris River and on to Hudson Bay while those south and west of the Coteau drain into the Missouri (Clayton 1972:3). The principal streams south and west of the Missouri Coteau are the Little Muddy River, White Earth River, Little Knife River, and Shell Creek. North and west of the Coteau the principal streams are the Des Lacs River, Long Creek, and Stony Creek. There are also many intermittent drainages, most of them south and west of the Missouri Coteau.

Several spring fed or "gaining streams" are present. They usually have well defined banks and support thickets of vegetation including ash, quaking aspen, chokecherry, wild rose, and buffaloberry (Clayton 1972:34). As with the streams, the sloughs, potholes, and lakes also range from permanent to seasonal. Most of these are on the Missouri Coteau and are formed in glacial depression features. Some of the larger bodies of water include Powers Lake, Lostwood Lake, Thompson Lake, Cottonwood Lake, White Lake, and Shell Lake. Many of these lakes are brackish today, containing large amounts of salts or sodium sulfate (Clayton 1972:32-33). The lakes with fresh water are generally those at higher elevations; the ground water that feeds them is of local origin in contrast to the lakes at lower elevations which are fed by ground water which is deeper and has travelled further and accumulated more sediments in the process (Clayton 1972:32-33).

GEOLOGY

The entire Northwest study area is situated in the Williston Basin, a structural and sedimentary basin formed during the Late Cretaceous when the area was covered by an inland sea (Bluemle 1975:2). Surface visible bedrock is limited to the Tertiary sediments of the Bullion Creek, Sentinel Butte, and Golden Valley formations. These formations are composed largely of clays, sandstones, shales, and lignite; they are most exposed along the Missouri River Trench.

The most common geological features of the study area are composed of Coleharbor formation materials of Pleistocene origin. The formation consists of numerous layers of clay, silt, silty clay, sand, pebbly sand, and gravel (Clayton 1972:12). The Coleharbor formation is nearly 100 m thick in places and was deposited between 300,000 and 9000 years ago (Clayton 1972:12-17). Most of the Coleharbor material is classified as till and was deposited by melting glacial ice. The finer sediments (i.e., silts and

clays) were deposited in glacial lakes and outwash rivers (Clayton 1972:17). Glacial features such as ground moraines, dead ice moraines, kettle chains, outwash plains, and ice contact features dominate the Northwest study area landscape.

NATURAL RESOURCE POTENTIAL

Resource availability surely affected human use of the area. Resource locations are related to the physiographic variables discussed above. Subsistence and technological resource potential is discussed briefly for each county.

Lithic raw materials, primarily petrified wood and cherts, are present in Coleharbor formation gravels in Burke County (Freers 1973:11). Prehistoric use of these gravels is largely unknown, but may have been significant. Perhaps the most significant natural resource from an archeological perspective is the Des Lacs River in the eastern portion of the county. The Des Lacs is a perennial tributary of the Souris River. Recent dam construction has resulted in the formation of upper and lower Des Lacs lakes, modifying the natural setting and certainly inundating many prehistoric sites. The Des Lacs Valley contains deciduous trees, a variety of fauna, and fluvial gravels which should be similar to the Souris gravels. The Souris gravels include brown chalcedony, brown chert, petrified wood, moss agate, and jasper (Watrall 1976:21-23).

While bison were ubiquitous in the study region, bison densities may have been very high at times in the Burke County area. The flat glacial plains supported dense stands of native grass cover, undoubtedly conducive to supporting large numbers of bison. The Des Lacs Valley should have provided the shelter necessary to maintain bison populations year-round.

The natural resources of Divide County are similar to those in Burke. Glacial till gravels contain raw materials for chipped and ground stone tool technologies. Nonglacial gravels similar to the Flaxville gravels have also been identified in Divide County. These gravels contain quartzite and chert pebbles (Hansen 1967:27). Perhaps one of the most important lithic resources in the glacial till is granite; it was used for stone boiling and as temper for ceramics.

The only perennial stream in Divide County is Long Creek, a tributary of the Souris. The Long Creek Valley contains deciduous trees such as quaking aspen, providing important raw materials for prehistoric technological economies. The creek contains fish and freshwater mussels and the valley provides favorable habitats for white-tailed deer and other big game. Wettlaufer and Mayer-Oakes (1960:4) discuss the Long Creek Valley "micro-environment" and selected characteristics that would have made it a favorable area for prehistoric occupation.

The boulders and large cobbles in the glacial till were also utilized prehistorically. The boulders were used as a medium for rock art as evidenced at Writing Rock Historic Site. Small boulders and large cobbles were used extensively elsewhere for anvils, holding down the hide covers of conical skin lodges, covering food caches, marking trails, supporting posts, marking bison drive lanes, and numerous other things; all of these uses and more should be identifiable in the study area.

The Missouri River, now modified by Lake Sakakawea, might be considered the most significant natural resource of Mountrail County. The river was a focal point for settlement because of the concentration of subsistence and technological resources resulting from diversified ecosystems, bedrock exposures, and varied alluvial deposits.

The badlands within the Missouri River Trench district presented unique lithic resource availability and offered defensible locations for establishing camps and villages (Kuehn 1982a; Kuehn et al. 1982). The badlands are a kind of ecotone containing plant, animal, and lithic resources not found in the surrounding grasslands. Stands of Rocky Mountain juniper were an excellent fuel source. The badlands terrain attracted fauna such as eagles, bighorn sheep, mountain lions, and elk.

Other perennial water sources in addition to the Missouri River in Mountrail County are the White Earth River, Little Knife River, and Shell Creek. All originate on the Missouri Coteau and drain south or southwest to the Missouri. Glacial gravels are concentrated in the White Earth Valley (Clayton 1972) and the other valleys should contain similar deposits.

Like Mountrail County, most would consider the Missouri River the predominant resource in prehistoric Williams County. The southwestern corner of the county is near the confluence of the Yellowstone River with the Missouri. The confluence area has a long history of intensive human use; it was a focal point for hunting, trapping, fur trade activities, and military campaigns. The extensive alluvial bottom lands in the confluence locality supported dense and diversified floral and faunal resources.

An additional significant water source here is the Little Muddy River which empties into the Missouri near Williston. The county also contains badlands along the Missouri Valley, several other prominent streams, and abundant glacial rocks.

Previous Research

Sites from the Paleo-Indian period to the Historic period are known in the Northwest study area. There has been some federally funded cultural resources work, some recent work associated with transmission line construction, and a limited amount of small-scale, special purpose research work.

SITE RECORD COMPILATION BY COUNTY

At the end of 1981, 178 prehistoric sites were recorded in this study area with 122 in Mountrail County, 42 in Williams County, 11 in Burke County, and three in Divide County. Thirty-one site types are represented, ranging from cultural material (CM) scatters to early trading posts. The cultural/temporal affiliations of the recorded sites are varied, but like in most of the study region, the vast majority are recorded as unknown. This reflects a lack of excavated sites and a lack of temporally diagnostic artifacts observed or collected by site recorders. However, there are three Paleo-Indian, 11 Archaic/Woodland, one Plains Nomadic, seven Late Prehistoric, one Plains Village, and 27 historic sites recorded. This study area may contain the highest density of Paleo-Indian sites in the study region (Loendorf, UND).

The three Paleo-Indian sites are Moe (32MNIOI) (Schneider 1975), Iverson (32MN234) (Haberman and Schneider 1975), and 32WI122 (Schneider and Roberson 1981:7). Moe and Iverson have multiple Paleo-Indian components based on cultural cross dating using projectile point stylistics; both sites are on Lake Sakakawea west and north of New Town. There is a definite concentration of Paleo-Indian sites in the New Town area (Schneider, UND).

Sites with Plains Archaic and/or Plains Woodland components are also uncommon in the site file. However, it is suggested that many are represented in the large sample of temporally unclassified sites. Three of the recorded sites with Archaic/Woodland occupations are in Williams County and eight are in Mountrail County. All border, or are very close to, Lake Sakakawea, except the Evans site (32MN301), situated above the Little Knife River.

The seven Late Prehistoric sites are recorded in Williams (four) and Mountrail (three) counties. In Williams County, two are on Lake Sakakawea, one is near the Yellowstone-Missouri confluence, and one is several kilometers north of the confluence locality. In Mountrail County, two are on Lake Sakakawea and one is on the Little Knife River.

The single site recorded as "Plains Nomadic" is a stone ring site ca. 8 km west of the Little Muddy River in Williams County. The prehistoric Plains Village site is in the confluence locality. The Historic period is represented by such prominent sites as Fort Union Trading Post and Fort Buford on the Missouri River in Williams County, and Kipp's Post on Lake Sakakawea in Mountrail County.

A very general assessment of the cultural resources of the Northwest study area based on existing site records, and in terms of cultural/temporal affiliation and spatial distribution, is as follows. Paleo-Indian, Plains Archaic, Plains Woodland, and Late Prehistoric sites are likely to be concentrated in or along the Missouri River Trench district. Sites should be concentrated along the White Earth River, Little Muddy River, Long Creek, the Little Knife River, and the Des Lacs River, but in lower densities than along the Missouri.

Equestrian Nomadic sites are also likely to be more dense along the Missouri, but might make up a substantial percentage of sites away from the Trench, i.e., in the Coteau Slope, Missouri Coteau, and Drift Prairie districts.

Stone rings and/or stone features are expected to occur throughout the study area, but away from the Trench they are expected to be dominant site features.

Sites with unknown cultural/temporal affiliations are expected to be most highly represented among the stone ring/stone features sites. These sites should be most prevalent in the Coteau Slope, Missouri Coteau, and Drift Prairie districts.

PRINCIPAL PROJECTS AND WORKS

A linear transmission line survey was conducted through the study area in the Drift Prairie, Missouri Coteau, and Coteau Slope districts by UNDAR in 1979; 55 sites were recorded (Fox 1980). Sites include features such as stone rings, stone cairns, petroforms, earthen mounds and U-shaped features, and rock lined pits (Fox 1980). Results of this inventory tend to support the assessment that stone ring/stone feature sites dominate in the Drift Prairie and Missouri Coteau districts. None of these sites produced temporally diagnostic artifacts (Fox 1980); however, the project involved no excavation.

This 1979 survey encountered an estimated average density of 51.8 sites/km² in the Missouri Coteau district as compared to only 3.4 sites/km² in the Drift Prairie district. These density figures may have useful management implications for the Northwest study area. An additional interesting aspect of the survey results is the apparent concentration of stone ring sites near sloughs and lakes on the Missouri Coteau (Fox 1980).

The only other large-scale archeological investigation outside of the Missouri River Trench in the study area was at the Evans site. The Evans site (32MN301) is situated above the Little Knife River in the Coteau Slope district of Mountrail County. It was briefly tested by Thad Hecker in 1949. Hecker identified Evans site pottery specimens as "nomadic" rather than Mandan or Hidatsa (Garrett 1952:8). More formal, fairly small-scale excavations were conducted in 1977 by UNDAR. These excavations resulted in the identification of two major cultural components: (1) an unclassified Woodland component radiocarbon dated A.D. 590 ± 85 and A.D. 750 ± 85, and (2) a later Mortlach aggregate component radiocarbon dated A.D. 1555 ± 50 (Schneider and Kinney 1978). The Evans site is significant for the Northwest study area in that it represents the only excavated Mortlach aggregate site in North Dakota, and perhaps the only radiocarbon dated Mortlach site anywhere. In addition, its location in the Coteau Slope area may suggest the Northwest study area was utilized as a summer hunting area by nomadic groups that wintered in the parklands of Saskatchewan (Fred Schneider, personal communication, 1983).

In the Missouri River Trench portion of the study area, large-scale archeological investigations have been limited to those conducted by the federal Inter-Agency Archeological Salvage Program and the Smithsonian Institution, River Basin Surveys program (Lehmer 1971:1-7). Other small projects have been conducted along the Missouri River in the study area, but will not be summarized here.

Prior to the construction of the Garrison dam and the inundation of the Missouri River Valley, the Inter-Agency Archeological Salvage Program conducted investigations in the study area. Survey work was initiated in 1947 by Marvin Kivett for the River Basin Surveys (Metcalf 1963:5). Many of the large and well-known sites along the Missouri were visited and formally recorded. Metcalf (1963) presents a map showing sites recorded by the project.

In 1960, excavations were conducted at Kipp's Post (32MN1), situated near the mouth of the White Earth River in Mountrail County as part of the River Basin Surveys program. Kipp's Post, now under water, was a small trading post built in 1826 and abandoned in 1829-1830. The excavations uncovered the remains of a wooden palisade, a bastion, and three log cabins. A substantial collection of historic artifacts was also recovered (Woolworth and Wood 1960).

In 1973 and 1974, archeological excavations were conducted at the Moe site (32MN101) by UNDAR. The Moe site is situated above Lake Sakakawea a short distance northwest of New Town. The site, now largely destroyed by Lake Sakakawea shoreline erosion, contained cultural material from the Paleo-Indian to the protohistoric period. Intact Paleo-Indian cultural deposits were not encountered by excavation; they had probably been destroyed by erosion prior to field work. However, thorough documentation of well provenienced artifacts from shoreline surface collections demonstrated heavy Paleo-Indian use

of the site area (Schneider 1975). Recent research into the Moe site blade assemblage indicates Agate Basin complex affiliations and technological affinities to the Pelland site assemblage from Minnesota (Schneider 1982e).

Finally, radiocarbon dates from the Moe site are still the earliest ones from the entire study region. The dates were obtained from hearth materials and indicate Early Plains Archaic period use of the area. Artifact densities in the Early Archaic deposits were low and excavations were limited.

The most recent large-scale archeological project in the Northwest study area is the Northern Border Pipeline Project conducted by UNDAR. The pipeline transects the extreme southwestern corner of Williams County, crossing the Missouri River just downstream from the Yellowstone-Missouri confluence. Four prehistoric sites were recorded in Williams County. Three of these are stone ring sites on the R/W and one is a general debris scatter off the R/W at a pipe storage yard. All three stone ring sites were test excavated. One (32W149) produced a Late Prehistoric period side notched arrow point and a European manufactured gun flint. The general debris scatter (32W139) is located near the confluence of the Little Muddy and Missouri rivers. A Hanna point from the surface indicates a Middle Plains Archaic occupation. Other components may also be present (Matthew Root, personal communication, 1983).

Information Deficiencies

While there has been relatively little archeological work in the Northwest study area in comparison with other study areas to the south, present information on prehistoric sites and the geographic location of the study area indicate it has a rich and diversified cultural resource base. With parklands to the north, the Souris basin to the east, and the Missouri River Trench to the south, it should have been a crossroads for numerous prehistoric cultural groups. However, site records and previous research provide only sketchy information on occurrences of cultural remains attributable to named archeological units known or anticipated in the area.

Information from the Missouri Coteau in northeastern Montana (Joyes and Jerde 1970), the study area (Fox 1980), and southeastward into northwestern Iowa (Lensink 1971) indicate moderate site densities in the prairie pothole country. However, the settlement types and activities represented by these sites have not been described and explained.

Lithic resource utilization patterns have not been described for the Northwest study area. Small samples (mostly surface collections) and poor control on cultural/temporal affiliations of assemblages render studies of these patterns difficult or impossible at present. No descriptive analyses of lithic resources available in the glacial till have been conducted. Alluvially transported lithic materials have also not been described.

All of the recorded Plains Archaic and Plains Woodland sites are located along the major rivers and tributaries in the study area. Distributions of sites from these time periods away from the rivers are unknown. Linear transect surveys like those conducted for Saskatchewan Intertie and the Northern Border Pipeline have demonstrated the presence of sites away from the rivers, but Plains Archaic and Plains Woodland occupations have not been documented. It has been suggested that the Avonlea and Besant complexes should be represented here (Syms 1977). One stone ring site just north of Shell Creek, northeast of New Town, produced a single prehistoric ceramic sherd, indicating potential for Plains Woodland or Plains Village period, hunter-gatherer settlement types other than residential bases. The early component at the Evans site may have Avonlea affiliations and the upper component has been classified in the Mortlach aggregate (Schneider and Kinney 1978). Old Women's and Laurel components or influences should be anticipated. Lack of in-depth ceramic descriptions hinder formulation of reasonable hypotheses, much less cultural-historical interpretations.

Prehistoric Plains Village use of the upper Garrison region has been documented (e.g., Toom and Gregg 1983). Permanent Missouri River tributaries like the Cannonball, Heart, Knife, and Little Missouri rivers appear to have been regularly used by Plains Villagers as routes for transporting resources out of interior badlands and uplands areas back to permanent residential bases in the Trench. The major Missouri River tributaries in the Northwest study area should have been similarly utilized by these late prehistoric groups, but evidence in support of this pattern is presently lacking.

There has been limited work to identify historic tribal groups whose territories included the Northwest study area. Assiniboin and Hidatsa use of the area is indicated by ethnographic and ethnohistoric work (e.g., Bowers 1965; Denig 1961). G. Fox (1982) suggests 32WI18 was occupied historically by Hidatsa. Deficiencies in identifying historic tribal groups who used the area has a limiting influence on ethnographic modeling and use of ethnographic analogy to predict and interpret archeological remains.

The role of early trading posts such as Kipp's Post and Fort Union in modifying the settlement patterns and social structures of historic tribal groups is poorly understood. Few archeological sites contemporary with these posts have been identified (cf. Fox 1982). Increased site densities are anticipated in proximity to the posts dating to times when the posts were active.

In sum, information is deficient from the Northwest study area to address a host of important research problems related to topics like site density patterns, site locational factors, settlement types and site function, site seasonality, differences in intensity of use of the area through time, technological resource potential, and changing lithic technological patterns. This is just a sketch of study area deficiencies and is presented to illustrate the area's undeveloped research potential/cultural resources record. The undeveloped research potential is linked directly to the management of cultural resources by the concept of site significance. It is often impossible to evaluate site significance without reference to demonstrated information potentials with reference to cultural sites.

Limitations to Research

Several conditions can be identified which inherently limit archeological research here. As with information deficiencies, some limitations are universal throughout the study region while others have more specific geographic distributions. This section identifies a few limitations which are especially prevalent in this study area.

Downcutting and mass-wasting in the badlands along the Missouri Trench are continually impacting archeological sites by removing intact artifact deposits. No one has yet ventured to estimate the amount of landscape and numbers of sites that have been lost through the 11 millenia these processes have been affecting archeological contexts. Sites situated along the shores of Lake Sakakawea are being impacted at an alarming rate by erosion initiated by wave action. Shoreline erosion has worked back several hundred meters in about 20 years in the Moe site locality (Schneider 1975). Most of the Missouri River flood plain and lower terraces, and sites located on them, are now inundated. It may be impossible to empirically demonstrate ranges of settlement types for some named archeological units because these settlement types are no longer represented in the archeological record.

Sites located away from the Trench in the Drift Prairie, Missouri Coteau, and Coteau Slope districts continue to be adversely affected by field clearing, plowing, and other agricultural practices. These practices are certainly not unique to the Northwest study area, but may impact proportionately higher numbers of sites than in study areas primarily oriented to ranching (i.e., the Little Missouri and Southwest study areas).

In recent years, many sloughs and potholes have been drained and filled to increase farm acreage. This land leveling not only resulted in destruction of terrain known to have been favored for prehistoric settlement around potholes, but also may have distorted the beds of these potholes and the pollen and other paleoenvironmental indicators they hold.

Natural processes related to glaciation were active in and adjacent to the study area during at least the first 3500 years of prehistory. For example, glacial ice was present under the ground surface for thousands of years after the main glacial lobes retreated. As the ice melted, the landscape and any associated archeological deposits were altered (many were probably buried). Such postglacial processes surely modified much of the Paleo-Indian living surface.

Without excavation, noncultural cobble and boulder deposits in areas of dense glacial till are sometimes difficult to distinguish from cultural features such as stone rings, cairns, and drive lines. Patterned, noncultural rock distributions place limitations on cultural feature identifications by cultural resource surveyors in the Northwest study area.

Recommendations and Future Directions

The Northwest study area of Burke, Divide, Mountrail, and Williams counties is relatively unexplored archeologically. The scant background of previous archeological work, information deficiencies, and limitations to research combine to make site significance evaluations and other cultural resource management tasks difficult. The area is situated at the juncture of the Northwestern Plains, Middle Missouri and Northeastern Plains subareas; directions and intensities of prehistoric influences were undoubtedly variable through prehistory. Some basic work is needed to alleviate the deficiencies in the archeological information base.

Intensive inventory work is needed, both in the form of large block surveys and smaller sampling surveys. Any inventory work needs to be augmented with limited test excavation to provide some reliable data on occurrences, densities, and horizontal and vertical distributions of various artifact classes and features, and to provide much needed information on cultural/temporal affiliations of sites across the area. An archeological survey of the Missouri River Trench portion of the study area is scheduled for the 1983 field season, but similar work is not presently scheduled for the Coteau Slope, Missouri Coteau, and Drift Prairie districts. Future lignite development might eventually provide the stimulus and funding for such basic work, but as in many other areas, cultural resources work immediately ahead of large-scale development is often hurried and evaluations become biased by lack of adequate base line work and intervention of various special interest groups.

Smaller inventories of unsurveyed, high site potential areas, such as along the White Earth and Little Knife rivers, would almost certainly encounter fairly high site densities. Systematic surface collections and subsurface sampling would provide a variety of information with utility for addressing some of the research topics identified above.

Desperately needed are data from excavated stone ring sites, the dominant yet most poorly understood site/feature type in the study area. Stem family, multifamily, and band encampments (Hanson 1983b) affiliated with various named archeological units are surely represented. Deposits of cultural material are typically thin on these sites in comparison with other site types, but detailed chipped stone tool and flaking debris analyses almost invariably result in increased understanding of site function, cultural/temporal affiliation, and lithic technologies (e.g., Billeck 1983; Schneider 1982c).

North-Central Study Area

The North-Central study area consists of Renville and Ward counties (Figure 38). Saskatchewan is immediately adjacent to the north.

Physical Setting

There is less physiographic diversity here than in the Northwest study area. But like the Northwest area, the northern portion drains to Hudson Bay and southern portion to the Gulf.

PHYSIOGRAPHY

Two major physiographic provinces, the Central Lowlands, and the Great Plains, are represented in the study area. The Central Lowlands is represented by the Drift Prairie district in most of Renville and the northeastern half of Ward County. The Drift Prairie is largely a ground moraine plain, with low relief and numerous potholes (Pettyjohn and Hutchinson 1971). The Great Plains province is represented by the Missouri Coteau district, located in the extreme southwestern corner of Renville, and in the southwestern half of Ward County. The Missouri Coteau district is a hilly area composed of stagnation moraines, end moraines, and small areas of ground moraine (Pettyjohn and Hutchinson 1971:4). The Missouri Coteau contains a nonintegrated drainage pattern made up of numerous sloughs and depressions (Freers 1973). A major topographic district, the Souris-Des Lacs River Valley, is present in the approximate center of the

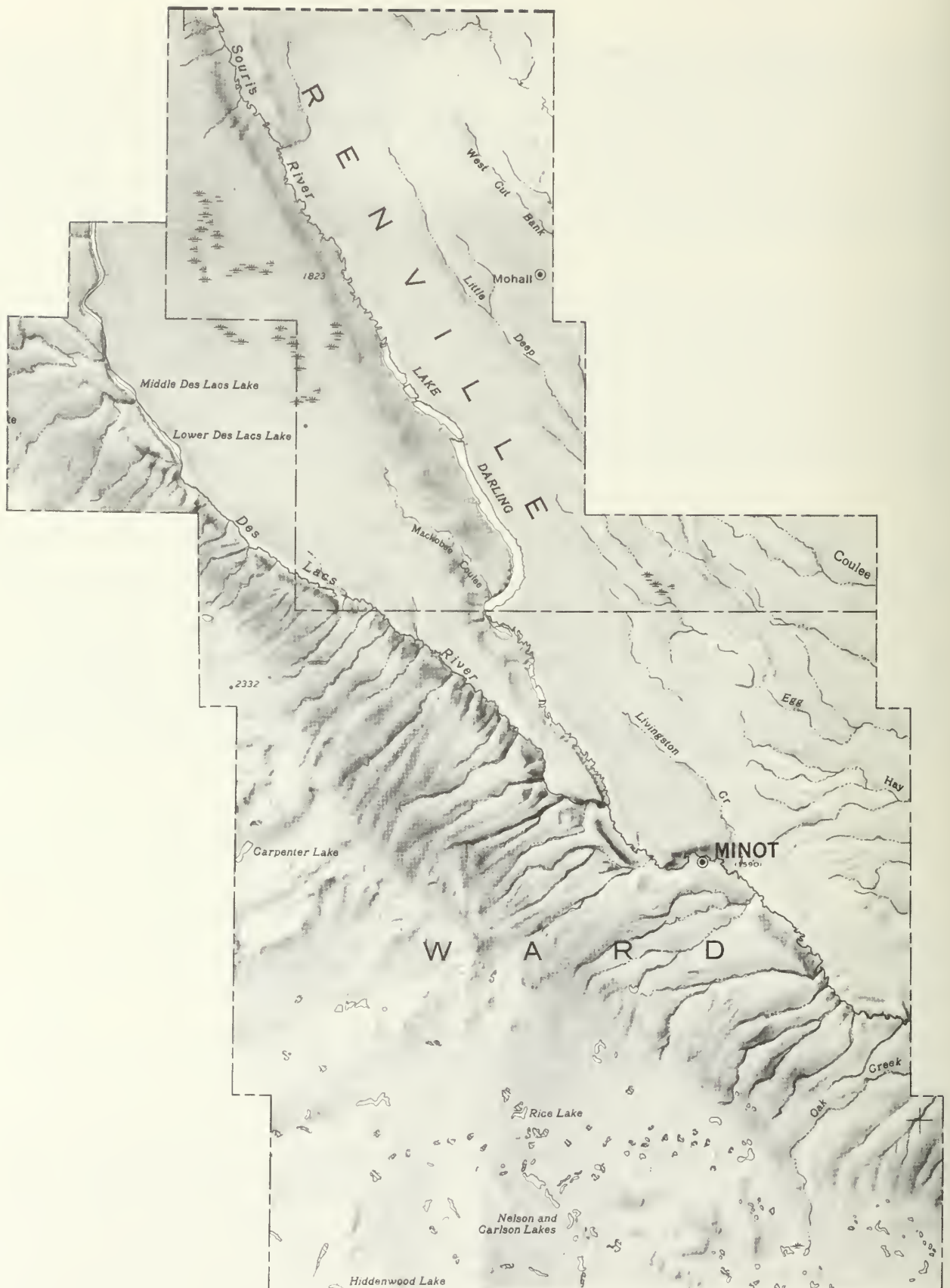


Figure 38. North-Central study area, Dickinson District Office—BLM study region (from the U.S.G.S. 1:500,000 North Dakota shaded relief map, 1965).

study area in the Central Lowlands province. A final topographic feature, the Missouri Escarpment, runs along the northeastern margin of the Missouri Coteau and presents a gentle slope of approximately 10 m/km (Pettyjohn and Hutchinson 1971:4).

DRAINAGE

Drainage in the North-Central study area is related to the location of the Missouri Coteau, a subcontinental divide. Streams to the southwest of the Missouri Escarpment flow into the Missouri River system, while those to the northeast (Drift Prairie area) flow into the Hudson Bay system. The Missouri Coteau district drainage system is mostly closed, with rainfall, snowmelt, and groundwater collecting in the numerous lakes and sloughs which vary in water content from perennial to intermittent. The water quality also varies, with many potholes containing heavy concentrations of salts and other dissolved minerals (Pettyjohn and Hutchinson 1971).

Drainage in the Central Lowlands is dominated by the Souris and Des Lacs rivers. Both of these rivers originate in Canada, and the Souris forms a loop (the Souris Loop) which eventually flows back north into Canada. The Souris headwaters are located near Weyburn, Saskatchewan. After flowing a length of approximately 338 km through North Dakota, the river re-enters Canada and empties into the Assiniboine River near Treesbank, Manitoba. The Des Lacs River originates near the North Dakota-Saskatchewan border and flows into the Souris River in northcentral Ward County. Both rivers are permanent and have well established, broad valleys. The Souris River Valley ranges in width from ca. 600-1500 m and is ca. 48 m deep north of the Des Lacs confluence (Lemke 1960:7). The Souris-Des Lacs drainage system is fed by numerous tributaries in the North-Central study area, including Seven Mile Coulee, Little Deep Creek, Cut-Bank Creek, and West Cut-Bank Creek.

GEOLOGY

Tertiary bedrock is exposed in several localities in the North-Central study area, such as along the dissected valley of the Souris River (Pettyjohn and Hutchinson 1971:21). These Tertiary sediments are composed of sandstone, clay, shale, and lignite, and represent the Cannonball, Bullion Creek and Sentinel Butte formations (Pettyjohn and Hutchinson 1971:20). Throughout the entire study area, glacial drift caps the Tertiary sediments and accounts for most of the present topography. Most of the glacial material is Pleistocene, and likely includes all four substages of the Wisconsin glaciation (Good and Fox 1978:14). The glacial features are numerous and include ground moraines, end moraines, dead ice moraines, kame terraces, and outwash deposits (Good and Fox 1978; Pettyjohn and Hutchinson 1971).

NATURAL RESOURCE POTENTIAL

Within the North-Central study area, unknown quantities of lithic raw material are available. Brown petrified wood, brown chert, moss agate, and jasper have been reported in the Souris River gravels (Watrall 1976:21-23). Other gravel deposits are present in glacial outwash on the Missouri Coteau and are likely to contain some knappable materials (Pettyjohn and Hutchinson 1971).

Water is a fairly abundant resource in the study area. Numerous potholes and lakes are present throughout the area, and are especially abundant in the Missouri Coteau district. While the quality of the pothole water varies considerably, potable water is present (Pettyjohn and Hutchinson 1971:95). The Souris and Des Lacs rivers both carry substantial amounts of potable water and represent the most significant natural resources in the North-Central study area. In addition to water, the river valleys contain stands of deciduous trees that provided fuel and shelter. Underbrush vegetation provides edible food resources such as chokecherry, junberry, and buffaloberry. Prehistorically, the river valleys supported a variety of game animals, including deer, antelope, elk, and grizzly bear. The valleys may have also supported moose, bighorn sheep, and caribou (Good and Fox 1978:25-26). Bison were common in all parts of the North-Central study area, and undoubtedly represented a critical resource.

Previous Research

There are fewer archeological sites recorded in this study area than in any of the other five study areas. This is a result of limited avocational and professional archeological work and probably does not reflect actual site densities.

SITE RECORD COMPILATION BY COUNTY

At the end of 1981, 91 prehistoric and historic sites were recorded in this study area with 47 in Ward and 44 in Renville. The 91 sites reflect 18 different site types. The most common site types are: unspecified historic (24%), stone rings (23%), CM (cultural material) scatters (21%), rock features (6.5%), and rock features and stone rings (3.3%). Other site types represented include stone rings with hearths (one); grave and mound (one); grave, mound, and rock feature (one); CM scatter and mound (one); and CM scatter and stone ring (one). The recorded sites offer little in the way of cultural/temporal information. Hecker's work in the Souris Basin in 1934-1935 resulted in the recovery of some Paleo-Indian material (Schneider, UND). A total of 63.7% are listed as unknown, 30% are listed as historic, and 6.3% are listed as Late Prehistoric.

PRINCIPAL PROJECTS AND WORKS

Structured archeological investigations in the North-Central study area were virtually nonexistent until the mid-1970s, and to date are only represented by a handful of projects. In 1974-1975, the State Historical Society of North Dakota surveyed the Burlington Dam area on the Souris River. The survey recorded eight prehistoric sites: three cairn sites, one burial mound (32WD103), three stone circle sites, and one petroform (Franke 1975).

In 1977, the University of North Dakota conducted archeological, historical, and paleontological reconnaissance survey in the Burlington Flood Control Project area. This reconnaissance also included an overview discussion of the historic and prehistoric background of the area, including a presentation of recorded sites and site leads (Schneider 1977).

Intensive archeological survey of the Burlington Dam-Lake Darling area was conducted in 1977 by the University of North Dakota. The inventory recorded 48 sites, 19 of which are in Ward County, and 29 in Renville County (Good and Fox 1978). A wide variety of site types were encountered; however, stone circle sites and CM scatters were the most common. A total of 68 sherds were recovered from seven of the recorded sites. The ceramic specimens were very fragmented, so ware and type classifications were not attempted. However, the sherds displayed both Woodland and Plains Village traits (Fox 1982; Good and Fox 1978). It was postulated that Swan River chert predominates on sites with Plains Village ceramics. On these sites the material was more common than Knife River flint. Swan River chert is believed to occur naturally in the glacial drift within the project area (Good and Fox 1978).

Three of the 48 sites recorded during the Burlington Dam survey were test excavated in 1978 by the University of North Dakota: general debris scatters 32WD401, 32WD407, and 32WD408. Only one of the three, 32WD407, contained sufficient cultural material to warrant additional excavation (Good and Hauff 1980). The site did not produce temporally diagnostic materials; however, site function was interpreted as bison processing and bone grease rendering (Good and Hauff 1980).

Finally, a synthesis of Souris Basin archeology was presented by Fox (1982) as part of a published Northeastern Plains symposium from the 39th Plains Conference. The synthesis emphasized the ambiguities which exist in the archeological record of the Souris Basin, but also stressed the potential significance of the basin in understanding prehistoric cultural interaction.

Syms (1980) presents data from archeological surveys in southwestern Manitoba as well as a discussion-overview of the archeological record of that area. The report contains substantial data from the Upper Souris region of Manitoba, and is therefore pertinent to the North-Central study area. The report contains information useful in interpreting cultural chronology, settlement, subsistence, ceramic variation, and lithic raw material distribution (Syms 1980).

Information Deficiencies

"Middle Missouri like" ceramics have been recovered from sites along the Souris River (Good and Fox 1978). However, the temporal extent(s) and function of the sites with these ceramics remain unknown. This was Hidatsa territory in the protohistoric period, but core-secondary-tertiary area considerations have not been developed. The problem of Plains Village period interaction between the Missouri River Trench and parklands to the north has barely been considered.

Woodland tradition pottery has also been recovered from along the Souris River (Fox 1982). In addition, Middle and Late Woodland materials representative of Besant, Sonota, Avonlea, Valley, Devils Lake-Sourisford, and Blackduck occupations have been recovered from the Souris Basin in Canada (cf. Fox 1982; Syms 1977, 1980; Wettlaufer and Mayer-Oakes 1960). However, the Woodland chronology and culture history of this study area are essentially unknown. Burial mounds may indicate at least some Woodland period use of portions of the study area as core areas.

The Long Creek and Oxbow Dam sites are located in the Canadian portion of the Souris Basin a short distance above the North Dakota-Saskatchewan border. These sites contained cultural components from the late Early Plains Archaic to the Late Prehistoric period (Nero and McCorquodale 1958; Wettlaufer and Mayer-Oakes 1960). Similar types of deeply stratified sites should also be present in the North Dakota portion of the Souris Basin, but survey work away from the Souris has been limited. Prehistoric cultural complexes identified at the Long Creek and Oxbow Dam sites should also be represented in the North Dakota portion of the basin, but a paucity of information from surveys and excavations again hampers prehistoric cultural reconstructions.

The nature of lithic raw material utilization in the Souris Basin remains unknown. There are indications certain time periods reflect heavy reliance on Swan River chert rather than Knife River flint, but data are deficient for all but the most elementary quantitative statements.

Finally, the occupational history along the shoreline of glacial Lake Souris is unknown. The glacial lake should have affected human use of the study area until ca. 6000 B.C. The early Holocene natural setting of the study area has not been described.

Limitations to Research

The North-Central study area contains certain inherent research limitations characteristic of other glaciated and heavily farmed study areas. These types of limitations include detrimental effects of plowing, large private land holdings, filling of sloughs, and identification of rock features in areas of heavy glacial till. Perhaps the most severe limitation which is unique to the North-Central study area is the destruction of archeological sites due to flooding by the waters of Lake Darling and the Des Lacs lakes. Lake Darling was formed by the construction of the Burlington Dam on the Souris River, and is ca. 32 km long. The Des Lacs lakes are three separate lakes, formed by three dams on the Des Lacs River in Ward County, and are ca. 22 km long.

The deficient cultural/temporal background limits formulation of research questions for both this and surrounding study areas. For example, it is impossible to study cultural change through the Woodland period without knowledge of the Woodland archeological units represented in the area. Similarly, it is difficult to approach questions of Missouri Trench-parkland interaction in the Plains Village period without knowledge of approximate times within the period represented by sites in the study area.

The deficient background concerning the early Holocene natural setting will limit building the culture history of the study area. For example, some areas may have been uninhabitable until the effects of the glacial Lake Souris were removed; other areas may have been boggy boreal forest with limited human carrying capacity until the Atlantic climatic episode.

Recommendations and Future Directions

Within the North-Central study area, virtually no archeological information is available from areas outside the Souris and Des Lacs river valleys. Existing information from adjacent areas indicates the Missouri Coteau and Drift Prairie portions of Ward and Renville counties are likely to contain numerous stone rings and other stone feature sites. Temporally diagnostic artifacts are likely to be rare on the surfaces of these sites; however, affiliation with Late Prehistoric and Historic period groups can be expected. As evident in the Missouri Coteau portion of the Northwest study area, there may be a strong association between sloughs, potholes, and stone ring sites. Major creek valleys may contain earlier materials; however, no evidence exists at present. A program of intensive survey, either large block or small sample, is highly recommended for areas outside the Souris-Des Lacs river valleys. These surveys

should be structured to investigate the entire range of physiographic and natural resource variability. A program of test excavation to procure radiocarbon samples, feature and artifact assemblage data, and other basic information should be conducted at key sites identified during the surveys.

The Souris River Basin has the potential to be a significant cultural resource area in terms of Northern Plains archeology. Available information suggests Paleo-Indian occupation (from projectile points observed in private collections), Woodland occupation, and Late Prehistoric (including Plains Village) occupation. Early and Middle Archaic utilization of the Souris Basin is suggested on the basis of proximity to sites excavated along the Souris in Canada (i.e., Long Creek and Oxbow Dam). The Souris Basin appears to be an area of culture contact and cultural interaction between various Woodland groups (primarily Middle and Late Woodland), and between Woodland and Plains Village groups. The Souris appears to have been an important transportation route from the Canadian parklands-Hudson Bay areas to the Missouri River. This idea is substantiated by early historic accounts (e.g., of explorers such as La Verendrye).

Since large portions of the Souris and Des Lacs river valleys are inundated, it is strongly recommended that the remaining undisturbed portions be surveyed. These surveys should include the flood plains and terrace networks, as well as at least a sample of the adjacent uplands.

Test excavations are desperately needed at key sites along the Souris and Des Lacs rivers. As previously stated, only three sites, all general debris scatters, have been tested along the Souris. No ceramic bearing sites have been tested. The need for such excavations are obvious, and include the procurement of radiocarbon dates, pollen samples, artifact assemblages, and feature descriptions.

The East-Central Study Area

The East-Central study area is composed of Burleigh, McLean, and Sheridan counties. It is located on the east side of the Missouri River in the approximate center of North Dakota (Figure 39), and undoubtedly provided avenues for interaction between groups in the study region and groups in eastern North Dakota.

Physical Setting

The study area contains several major physiographic areas, and includes portions of three drainage systems. It was all glaciated during the Pleistocene.

PHYSIOGRAPHY

The East-Central study area contains portions of the Central Lowlands and Great Plains physiographic provinces (Fenneman 1931). The Drift Prairie district of the Central Lowlands province is present in the approximate northern third of Sheridan County. The Drift Prairie is a gently rolling, low relief plain. The Great Plains province is represented by the Missouri Coteau district in the southern two-thirds of Sheridan, and northeastern corner of Burleigh, and the northeastern quarter of McLean County. The Missouri Coteau is primarily a dead-ice moraine with associated ice-disintegration features (potholes and sloughs) (Kume and Hansen 1965:1). The Coteau Slope district is present in the southwestern four-fifths of Burleigh and the western and southwestern three-quarters of McLean County. The Coteau Slope is a glaciated bedrock slope situated between the Missouri Coteau and the Missouri River Trench. The slope has been modified by erosion from integrated streams draining south and southwest into the Missouri River (Kume and Hansen 1965:1). Finally, the Missouri River Trench district is located along the western border of Burleigh County, and the west and southwestern border of McLean County. The Missouri River Trench is a broad Pleistocene valley containing four alluvial and outwash terraces (Kume and Hansen 1965:1).

DRAINAGE

The Missouri Coteau cuts across the northeastern portion of the study area and represents a zone of closed drainage and a subcontinental divide. Within the Coteau, rainfall and spring discharge feed the numerous potholes and sloughs, but generally do not flow into integrated streams. Runoff from the northeastern side of the Coteau feeds the Red River-Hudson Bay drainage system. In the study area, one permanent stream, the Sheyenne River, begins in north-central Sheridan County and flows east, eventually emptying into the Red River in Cass County. Runoff from the south and southwestern side of the Coteau (i.e., the Coteau Slope) is the dominant drainage pattern in the study area. Major, permanent streams which flow off the Coteau Slope and feed the Missouri River include Apple Creek, Burnt Creek, Painted Woods Creek, Turtle Creek, Buffalo Creek, Yanktoni Creek, and Douglas Creek.

In addition to permanent streams, the study area contains numerous potholes, sloughs, and lakes, many of which hold water year-round. Prominent lakes in the study area include Rice Lake, Clear Lake, Strawberry Lake, Long Lake, Crooked Lake, Turtle Lake, Krueger Lake, and John's Lake. Several of the lakes are arranged in a close, linear pattern, and were apparently parts of larger lakes during the late Pleistocene and early Holocene. An example of this pattern is the Strawberry, Long, and Crooked lake complex in eastern McLean County.

GEOLOGY

Exposed bedrock in the study area, which is situated near the eastern edge of the Williston Basin, consists of the Cretaceous Pierre, Fox Hills, and Hell Creek formations, and the Tertiary Fort Union group, composed of the Ludlow, Cannonball, and Bullion Creek formations (Clayton 1980; Kume and Hansen 1965:1-2).

The entire study area was glaciated during the Pleistocene, and glacial features dominate the topography. The more common glacial landforms in the study area are dead-ice moraines, sheet moraines, disintegration ridges, kames, kettle chains, end moraines, and outwash channels (Kume and Hansen 1965).

NATURAL RESOURCE POTENTIAL

The topography and natural setting of the East-Central study area is similar to parts of the Northwest and North-Central areas, resulting in similar natural resources. Throughout the Missouri Coteau District, the numerous potholes and lakes can be interpreted as a major prehistoric natural resource. While the quality and quantity of water in the lakes and potholes varies tremendously, some contain permanent and potable water. Water conditions during prehistoric periods are unknown; however, the high density of archeological sites associated with potholes in adjacent areas may indicate an attraction for human use of these features in the East-Central study area as well (cf. Fox 1980).

In the Drift Prairie district of northern Sheridan County, the Sheyenne River represents a major natural resource. The large number of archeological sites recorded along the Lone Tree Reservoir-Sheyenne River portion of the Garrison Diversion Project attests to the importance of the river to prehistoric groups (Schneider 1976; Schneider and Treat 1974).

The several permanent streams which drain off of the Coteau Slope into the Missouri River, such as Apple Creek, Painted Woods Creek, and Turtle Creek, undoubtedly represent a significant type of natural resource in the study area. Apple Creek in Burleigh County, for instance, contains two prominent branches, both with well formed valleys and terrace networks.

The topography may be considered a natural resource, especially from a perspective of bison procurement. Site 32SH7, a bison kill site in Sheridan County, for example, is located in a gully on the east side of the Missouri Coteau along the face of the Missouri Escarpment (Larson 1976) at the border with the Drift Prairie. The local relief offered by the Missouri Escarpment may have been utilized for similar procurement activities throughout the study area.

The East-Central study area contains abundant glacially deposited rock which may have been utilized for flintknapping raw materials, stone boiling, and temper for ceramics. In Burleigh County, terraces south of Bismarck have been found to contain sand and gravel deposits over 100 feet thick (Kume and Hansen 1965:76). In addition to gravels, quantities of porcellanite may be present in the Fort Union

exposures throughout the study area; scoria and clinker pits have been reported for Burleigh County (Kume and Hanson 1965:76).

As in other study areas, the Missouri River can be considered the single most significant natural resource within the East-Central area. The Missouri contains an excellent source of clean water, numerous species of fish, extensively timbered bottoms, and abundant wild game (especially prehistorically). In the study area, both unaltered and flooded portions of the Missouri are present. The Garrison Dam is located on the Missouri in central McLean County.

Previous Research

Sites in the East-Central study area are largely of unknown cultural/temporal affiliation, or have been assigned to the Late Prehistoric or Historic periods. Almost all of the previous archeological work conducted has been in association with the Garrison Diversion Project or coal mine planning.

SITE RECORD COMPILATION BY COUNTY

At the end of 1981, 261 sites were recorded in the study area, with Burleigh County containing 28, McLean County 133, and Sheridan County 100. These represent a variety of site types, but a very limited number of named archeological units. A capsulization of the site inventory by county follows.

Only 28 sites are listed for Burleigh County, representing 10 different site types. The recorded sites include 10 earthlodge villages, eight CM (cultural material) scatters, six earthworks, and two graves, hearths, and stone ring sites. Bison jumps, rock features, and trails are each represented by one site. A total of 14 sites have been identified as historic, 13 have unknown affiliation, and one is Late Prehistoric. The earthlodge villages represent Plains Village occupations.

McLean County contains the largest number of recorded sites in the study area with 133. These represent 20 site types and three cultural/temporal groups. Stone ring sites are the most common site type in the county with 24.6% of the total. CM scatters are second with 22.6%, followed by earthlodge villages (9%), graves (5%), hearths (5%), and rock features (8.2%). Other recorded site types include possible earthlodge villages (four), possible earthworks (one), bison jumps (three), mounds (five), rock art (one), and miscellaneous (one). Assignable temporal and cultural affiliations are limited to 41 historic, two Euro-American, and one Late Prehistoric. A total of 89 sites have unknown affiliation. The earthlodge villages and mounds probably represent Plains Village and Woodland occupations, respectively.

Sheridan County contained 100 recorded sites at the end of 1981. Rock feature and stone ring sites dominate with 37% of the total each. CM scatters account for 12% of the total, followed by possible graves (6%) and mounds (3%). The remaining site types are possible rock features (three), rock art (two), and trails (one). The overwhelming majority of sites in Sheridan County have unknown cultural/temporal affiliation (88 of the 100). Historic affiliation has been assigned to 11 sites, and Late Prehistoric to one. Again, the mounds indicate Woodland period occupation.

PRINCIPAL PROJECTS AND WORKS

The earliest formal archeological work in the East-Central study area was test excavation at the Double Ditch earthlodge village north of Bismarck by Will and Spinden (1906). The work resulted in a detailed site map and the identification of the site as a Mandan village.

The State Historical Society of North Dakota conducted numerous reconnaissance surveys along the Missouri River between 1906 and 1913. These surveys were primarily limited to large village sites, and included portions of Burleigh and McLean counties (Wood 1978:75-90).

Personnel from the Smithsonian Institution, River Basin Surveys conducted reconnaissance surveys for the Missouri-Souris and Garrison Diversion projects in McLean and Sheridan counties between 1946 and 1965. These investigations included a 1946 survey by Bauxer and Cooper (Wedel 1948); a 1963 survey by Johnson, and a 1965 survey by Mallory. At least 46 sites were identified as a result of these projects (Schneider and Treat 1974:1).

Two prominent sites along the Missouri River in McLean County were excavated by River Basin Surveys personnel. These are Nightwalker's Butte (32ML39) and Like-a-Fishhook-Fort Berthold (Lehmer

et al. 1978; Smith 1972). Nightwalker's Butte is a Disorganized variant, Coalescent tradition village, with an earlier Woodland component; Like-a-Fishhook is the last inhabited earthlodge village occupied by the Mandan, Hidatsa, and Arikara after 1862 (Lovick and Ahler 1982; Smith 1972).

Archeological work associated with the Garrison Diversion project for the U.S. Bureau of Reclamation was conducted in the study area between 1973 and 1980. Additional funding for the project has been received and work is expected to continue in 1983. In 1973, a survey was conducted for the Garrison Diversion project in Sheridan and Wells counties by UNDAR, resulting in the recording of 27 sites (Schneider 1974). In 1974, an UNDAR survey of the Lone Tree Reservoir resulted in 72 recorded sites in Sheridan and Wells counties (Schneider 1976). Also during the 1974 season, three rock cairns, one historic site, and 69 stone ring sites were test excavated (Schneider 1976; Schneider and Treat 1974).

A bison kill site, 32SH7, was excavated as part of the Lone Tree Reservoir project by UNDAR under the direction of Thomas Larson. Data recovered from the excavations indicate the site functioned as a bison trap during Late Prehistoric and postcontact times (Larson 1976). Recently, a reexamination of the data from the site has been presented (Larson 1981).

In 1973, excavations were conducted at the Sprenger site (32SH205) by UNDAR archeologists for the McKlusky Canal. The site, which contains 81 stone rings, produced ceramics, stone tools, and faunal materials (Schneider and Treat 1974). The excavations encountered an interesting rock lined depression and projectile points resembling Besant, which, together with the ceramics, indicate a Besant complex, Woodland tradition affiliation (Schneider and Treat 1974).

In 1978, UNDAR conducted test excavations at the Anderson site (32MLIII) for Falkirk Mining Company. The site consists of 95 stone rings and rock cairns. The excavations were concentrated in three stone rings, one rock cairn, and several areas outside of features (Good and Hauff 1978). Recovered cultural materials include ceramics, bone, flaking debris, and stone tools. In addition, the excavations revealed a buried stone ring (Good and Hauff 1978).

In 1977, an intensive surface collection was conducted at the Stanton Ferry site (32ML6) by UNDAR, under the direction of Stanley A. Ahler. The site appears to have been an earthlodge village as evidenced by early aerial photographs; however, it was totally destroyed by gravel mining operations (Ahler and Swenson 1980). The ceramics indicate an Extended variant, Middle Missouri tradition cultural affiliation (Ahler and Swenson 1980).

Testing and evaluation were conducted at two Plains Village sites (32ML404 and 32ML406) in McLean County by UNDAR archeologists in 1978. The sites are both located on the east side of the Missouri River and appear to represent flood plain horticulture or winter village activity (Griffin and Ahler 1978).

Two additional projects of sufficient scope to warrant mention here include the 1978 UNDAR survey of the Otter Tail Transmission Line, in McLean, Sheridan, and Wells counties (O'Brien et al. 1978), and the 1979 UNDAR survey of the Falkirk Mine area in McLean County (Good and Dahlberg 1979).

Finally, the most recent, and ongoing work in the study area consists of (1) survey, testing, and evaluation of sites in the Falkirk Mine area, and (2) Flaming Arrow site investigations. An inventory conducted in 1981 over 3840 Falkirk Mine acres resulted in the recording of nine prehistoric archeological sites and nine historic sites (Good and Schreiner 1981). The Flaming Arrow site (32ML4) potentially holds important information from the Paleo-Indian, Plains Archaic, Woodland, and Plains Village periods (Toom and Root 1983a).

Information Deficiencies

The East-Central study area suffers from the same basic information deficiencies as most of the other understudied areas. Extant data are largely from village sites along the Missouri River and from several large projects of limited spatial scope. A perusal of existing information does indicate the study area offers several unanswered research questions that are unique to this portion of North Dakota.

The basic deficiencies include a complete lack of radiocarbon dates; a cultural chronology that lacks information from several major time periods; a small sample of excavated sites representing only a few named archeological units known from the area; a paucity of surface inventories from most areas; a lack

of subsistence and paleoenvironmental data; and a lack of information concerning cultural interaction, trade, and movement between the area and surrounding regions.

An examination of artifact collections indicates a paucity of Paleo-Indian materials from territory east of the Missouri Coteau (Schneider, UND). However, this information is biased by the nature of surface collections, and even the potential for Paleo-Indian occupations is essentially unknown.

Previous archeological investigations in the study area have produced little information from the Middle Plains Archaic period, in contrast to numerous artifacts from this time period from projects west of the Missouri River. This may be a result of unreliable samples or may indicate the area is in a cultural transition zone between eastern Archaic and Plains Archaic complexes.

Apparent Besant complex, Woodland tradition occupations were encountered along the Missouri (Lehmer et al. 1978; Wedel 1948:23-24), and at the Sprenger site (Schneider and Treat 1974). In addition, extensive Woodland occupation has been documented from areas north and east of the study area. However, the nature and cultural/temporal affiliations of Woodland tradition sites in the study area remains essentially unknown and cannot be compared and contrasted in any detail with Woodland sites from adjacent areas.

Numerous Plains Village sites are present in the study area along the Missouri River. In addition, Plains Village affiliation has been assigned to at least one site some distance east of the Missouri (Larson 1976). Plains Village utilization of the areas east of the Missouri River is understudied.

Evidence of an Extended variant, Middle Missouri tradition occupation at the Stanton Ferry site was obtained from ceramic specimens (Ahler and Swenson 1980). The Missouri River Trench in McLean and Burleigh counties appears to have witnessed Extended Middle Missouri settlement, but little more can be said with available data.

The Menoken earthlodge village west of Bismarck has long been a source of controversy concerning the La Verendrye expedition to the Missouri River in 1738 (cf. Smith 1980). That expedition probably visited the Larson and Double Ditch sites nearby in the study area (Thompson 1983), but this remains a prominent research problem in North Dakota archeology.

Finally, major cultural resources in the East-Central study area are stone ring sites. Excavations at some of these sites have produced ceramics, stone tools, faunal remains, and stone lined features (Good and Hauff 1978; Schneider and Treat 1974). Major problem areas remain in our understanding of stone ring sites, including temporal distribution, occupation seasonality, association with bison procurement, length of occupation, population size, and social organization.

Limitations to Research

Specific limitations in the East-Central study area include the inundation of Missouri River bottom land in McLean County, destruction of cultural resources by early coal mining activities, and site vandalism such as that recently reported from the Larson site north of Bismarck. Information deficiencies limit investigations of the eastward distribution of KRF, Plains Archaic complexes, Middle Missouri tradition influences, and most questions of regional interaction and geographic extent of archeological units involving the study area.

Recommendation and Future Directions

The East Central study area of Burleigh, McLean, and Sheridan counties is relatively unexplored in terms of archeological investigations away from a few limited project areas such as that associated with Garrison Diversion. The area is bordered by the Missouri River Trench on the west, and lies to the south of the Souris River drainage system. It was heavily glaciated during the Pleistocene, and contains numerous potholes and lakes which may have attracted prehistoric human use. Potential impacts to cultural resources are presented by planned coal and water diversion developments. Additional archeological work is scheduled for 1983 in the Falkirk Mining area and for the Garrison Diversion Project. If conducted properly, these projects should mitigate adverse impact to significant sites and should provide much needed archeological base line information.

Archeological surveys are highly recommended for all three physiographic districts in the study area. A program of stratified random sample surveys of pothole and lake regions would greatly increase knowledge of settlement patterns, site locations, resource utilization, etc. Cost efficient data procurement could be obtained by a program of surveys along the major streams in the area, such as Apple Creek, Painted Woods Creek, and Turtle Creek.

Being one of the largest remaining stretches of unflooded Missouri River, the western border of the study area should be surveyed as soon as possible. The survey should include the entire eastern side of the Missouri River Trench from the Garrison Dam to the Burleigh-Emmons county border.

As in virtually every study area, excavations are highly recommended for key sites. The highest priority should be given to Paleo-Indian, Early and Middle Plains Archaic, and pre-Coalescent Plains Village sites. These excavation programs should be designed to obtain basic information such as radiocarbon dates, tool assemblage descriptions, cultural and natural stratigraphic descriptions, and descriptions of lithic resource utilization.

Programs which encourage interaction between Federal, State, and corporate agencies are highly recommended, especially for those areas scheduled for intensive development. In addition, programs should be developed which provide for public education and information dissemination, especially in the large metropolitan areas such as Bismarck where large groups of people reside in close proximity to numerous, highly visible archeological sites. An obvious goal of such programs should be to discourage vandalism, and promote preservation and lay interest in the area's heritage resources.

The Central Study Area

The Central study area consists of Dunn, Mercer, Morton, Oliver, and Stark counties, located south and west of the Missouri River in west-central North Dakota (Figure 40).

Physical Setting

The Central study area is characterized by topographic diversity which ranges from the Little Missouri Badlands to the Killdeer Mountains and the Missouri River. Erosion, rather than glaciation, has been the chief architect of the present landscape.

PHYSIOGRAPHY

The Central study area is located in the Missouri Plateau section of the Great Plains province (Fenneman 1931). The Little Missouri Badlands are present in extreme northern Dunn County. The Missouri River Trench district forms the eastern and northern border of the study area.

The study area is characterized by rolling to fairly rugged, hilly plains. An occasional butte can be found throughout most of the area. The most prominent butte is the Killdeer Mountains in northwestern Dunn County. The Killdeer Mountains are approximately 14.5 km long and 9.7 km wide, and rise nearly 200 m above the surrounding plain (Delimata 1975).

The Little Missouri Badlands are located along the valley of the Little Missouri where the river has entrenched approximately 150 m below the surrounding uplands (Bluemle 1977). The Missouri River Trench is a recently (Pleistocene) formed river valley, which generally marks the southern and western extent of the Wisconsin glaciation (Bluemle 1977). The sides of the Missouri Trench are steep and fairly dissected, resembling the Little Missouri Badlands in places. Part of the Missouri River Trench in the study area is inundated by Lake Sakakawea.

While the Wisconsin glaciation was largely north and east of the study area, isolated lobes or fingers did penetrate Dunn and Mercer counties. In addition, glacial outwash channels can be found throughout the area. More common glacial features are tills, boulder beds, and outwash from earlier, pre-Wisconsin glaciers. The exact ages of these earlier glacial episodes are unknown, but may be Kansan (Laird and Mitchell 1942:24).

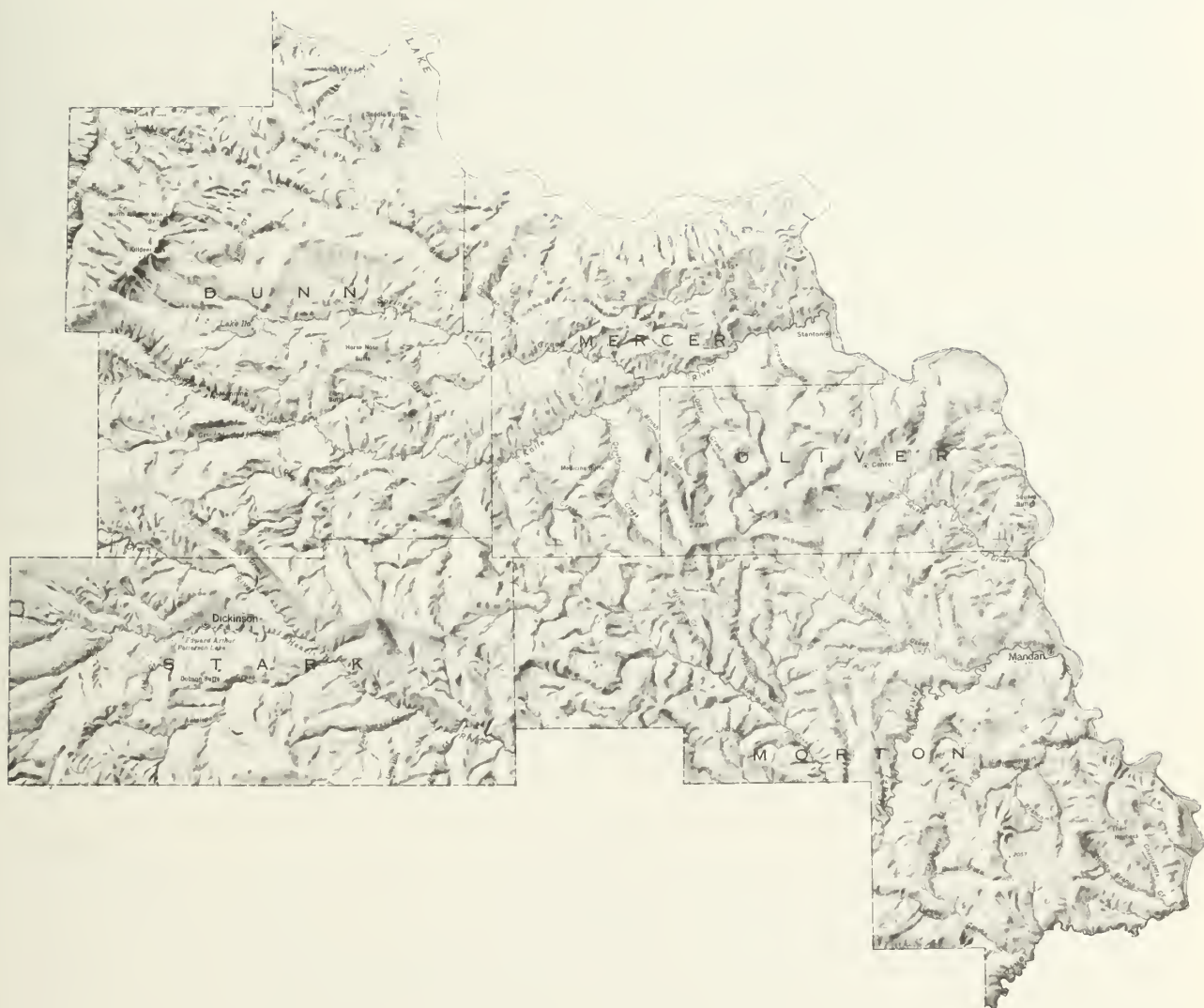


Figure 40. Central study area, Dickinson District Office—BLM study region (from the U.S.G.S. 1:500,000 North Dakota shaded relief map, 1965).

DRAINAGE

All surface runoff and spring discharge in the study area feeds the Missouri River drainage system in a dendritic pattern. As such, most of the drainage is to the east and southeast. Besides the Missouri River, several other prominent rivers and creeks are also located in the study area; however, some counties have fewer streams than others.

In Dunn County, the Killdeer Mountains act as a drainage divide between the Little Missouri and Knife river systems. In northern and northwestern Dunn County, the Little Missouri River flows east into the Missouri River. Permanent streams which feed the Little Missouri include Charley Bob Creek, Squaw Creek, Moccasin Creek, Crosby Creek, Jims Creek, and Hans Creek. Drainage off the south and east side of the Killdeers feeds the Knife River, which flows east, emptying into the Missouri River in Mercer County. Permanent streams which feed the Knife River include Spring Creek and Crooked Creek. A major stream which feeds the Heart River system is the Green River, which crosses the extreme southwest corner of Dunn County.

The Knife River flows through south-central Mercer County, emptying into the Missouri north of Stanton. Spring Creek, a major tributary, joins the Knife River near Beulah. In addition, two major creeks, Coyote and Otter, flow into the Knife in south-central Mercer County.

The Heart River flows through central Morton County and joins the Missouri River south of Mandan. The Heart in Morton County is fed by Sweet Briar Creek, Big Muddy Creek, and Hailstone Creek. The Cannonball River joins the Missouri at the Morton and Sioux county border. The only permanent stream which feeds the Cannonball River in Morton County is Chanta Peta Creek, which flows in near Breien. In addition, two permanent streams flow directly into the Missouri River in the county: Square Butte Creek and the Little Heart River.

Besides the Missouri River, the only other permanent streams in Oliver County are Otter Creek and Square Butte Creek. Otter Creek flows north through the western part of the county, emptying into the Knife River just across the border in Mercer County. Square Butte Creek originates in central Oliver County and flows southeast, joining the Missouri in northeast Morton County.

The Heart River flows east through the center of Stark County. The Green River enters the Heart near Gladstone. The Heart River in Stark County is fed by Antelope Creek, and the South Branch of the Heart.

GEOLOGY

Geological diversity is substantial in the Central study area, with exposed bedrock representing the Cretaceous and Tertiary periods. The oldest exposed rocks in the study area are the sandstones and shales of the Fox Hills formation, which are located only along the Missouri River Trench in southern Morton County. The next oldest formation, the Hell Creek, is also only exposed in the study area in southern Morton County (Laird and Mitchell 1942). Also exposed along the Missouri River Trench are the Tertiary Ludlow, Cannonball, and Slope formations (Clayton 1980). The Bullion Creek formation of the Fort Union group is exposed only in southeastern Oliver County and northwestern Morton County (Clayton 1980). The most common geological formation in the study area is the Sentinel Butte formation of the Tertiary period. The Sentinel Butte, composed of dull gray and yellow sandstones, clays, and shales, is present in every county except Morton (Clayton 1980). The Eocene Golden Valley formation overlies the Sentinel Butte, and is present in higher elevations in Dunn, Mercer and Stark counties (Clayton 1980). Sandstones and limestones of the Miocene and Pliocene epochs are found exposed only on top of the Killdeer Mountains in Dunn County and in the Dobson Butte area of Stark County (Clayton 1980). All of the counties except Stark contain some Pleistocene glacial sediment. These deposits are spotty and are most likely of early pre-Wisconsin age (Clayton 1980; Laird and Mitchell 1942). Evidence of the Verone and/or Napoleon advance are noted for parts of the study area (Ahler and Christensen 1983:51). The youngest geologic formation in the study area is the Holocene Oahe formation. The Oahe consists of clay, silt, sand, and gravel deposited by a variety of processes during the Holocene. Oahe sediments have been mapped along the Missouri River in northern Mercer County (Clayton 1980).

NATURAL RESOURCE POTENTIAL

With natural topographic diversity ranging from the Little Missouri Badlands to the Killdeer Mountains to the Missouri River Trench, natural resources in the Central study area are relatively diverse. Dunn

County contains all of the major physiographic regions present in the Central study area. A significant natural resource located in western and northern Dunn County is the Little Missouri Badlands. The Badlands here are extremely dissected and follow the Little Missouri River and its major tributaries, such as Crosby Creek. Numerous ecosystems and ecotones are present in the Badlands, resulting in excellent resource variability within a localized setting. An additional, major natural resource is the Killdeer Mountains of northwestern Dunn County. The Killdeers represent the highest point of land in the region, and therefore offer a commanding view of the surrounding countryside. The Killdeer Mountains also contain stands of hardwoods, including quaking aspen and oak. The heavy timber and underbrush offer good cover for game animals, which are abundant around the mountains at the present time. The Killdeers also contain numerous springs and seeps around their flanks. These springs produce discharges, feeding the numerous drainages which run off the west and north sides. The Missouri River Valley, and all of its inherent natural resources, is situated along the northeastern edge of the county. The Missouri and Little Missouri river valleys in most of Dunn County are now flooded by the waters of Lake Sakakawea.

One cannot talk of the natural resources of Dunn County in a prehistoric perspective without addressing Knife River flint. Dunn County contains the largest source of KRF in North Dakota and the remains of some of the most extensive prehistoric quarrying activity in North America. Knife River flint is thought to have originated in the "HS" bed of the Golden Valley formation, found only in the Williston Basin of North Dakota (Clayton et al. 1970). Within Dunn County, KRF is present in two different settings, both secondary deposits. The largest amount of the material is in gravel deposits of alluvial, slopewash, and lag origin. These deposits are believed to be early Wisconsin in age and associated with the Verone advance (Ahler and Christensen 1983:51; Clayton et al. 1980). The extensive prehistoric quarries, such as the Lynch Quarry along Spring Creek in Dunn County, demonstrate utilization of this natural resource for over 10,000 years.

The second source of KRF in Dunn County is fluvial gravels deposited on flat, upland ridges west of the Killdeer Mountains (Ahler and Christensen 1983; Kuehn 1982a). The age of these deposits is uncertain; however, Clayton (1970) has identified Quaternary age gravels on pediment surfaces flanking the Killdeers, indicating they originated from the mountains and were deposited on the pediments by slopewash and stream action (Ahler and Christensen 1983:46, 51; Clayton 1970).

Mercer County also contains extensive natural KRF deposits in the early Wisconsin glaciated areas, similar to those in Dunn County. Many prehistoric quarries are present in Mercer County, attesting to the prehistoric utilization of this resource. In addition, surface deposits of KRF are present south of Zap in Mercer County.

A second major resource is the Knife River, which passes through Mercer County from the southwest to the northeast. The Knife River is a well established, Pleistocene river with well developed terraces.

The Missouri River Valley borders Mercer County on the north and east, representing a third major natural resource. The portion of the Missouri along the north edge of Mercer County is now part of Lake Sakakawea. The portion along the east side of the county, however, is not flooded and represents a portion of the river largely unchanged since prehistoric time. Timber cutting, agriculture, and coal mining have altered the sides of the river valley in recent years.

Natural resources in Morton County, from a perspective of prehistoric utilization, center around the Missouri, Heart, and Cannonball rivers. The Missouri River borders Morton County on the east, where the northern half remains in a natural state and the southern half is inundated by the waters of the Oahe Reservoir. The Heart River flows through the south-central portion of the county, and the Cannonball forms the extreme southeastern border. Both rivers are well established and have patches of wooded bottoms.

Exposures of Fort Union group formations are present in Morton County, especially south of Mandan, where badlands topography is present. Outcrops of porcellanite are possible in these exposures; however, they have not been reported. In addition, Morton County contains several prominent buttes: Signal Butte, Ambulance Butte, and Crown Butte.

A major natural resource in Oliver County is the Missouri River, which borders along the east side. This portion of the Missouri contains extensive natural bottoms with heavy timber and underbrush. Perhaps

the largest stand of native Missouri River timber is located on the Cross Ranch in Oliver County (Ahler, Lee, and Falk 1981). In addition to the Missouri River, two other permanent streams are located in Oliver County: Otter Creek and Square Butte Creek. Both are permanent water sources and contain stands of timber and underbrush. Another potential resource in Oliver County is Square Butte, a prominent, flat topped butte in the southeastern portion of the county. Square Butte offers a commanding view of the Missouri River and the surrounding countryside. Porcellanite may be present along the eroded Missouri Valley wall in Oliver County, as exposures of the Fort Union group have been observed by D. Kuehn.

The three major permanent streams in Stark County (the Heart River, the Green River, and the South Branch of the Heart) represent significant natural resources which were undoubtedly utilized prehistorically. A fourth permanent creek, Antelope Creek, also constitutes an important resource. Stark County contains several prominent buttes, including White Butte, Dobson Butte, and Davis Butte. The area around Dobson Butte represents a remnant upland which contains exposures of Miocene/Pliocene and White River formations. These exposures may contain knappable lithic raw materials and large pieces of limestone. In addition, exposures of the Fort Union group are present in Stark County and may contain porcellanite.

Previous Research

The Central study area contains more recorded sites and has been the subject of more archeological investigations than any other study area in the district. Archeological research has been conducted in the region since the turn of the century.

SITE RECORD COMPILATION BY COUNTY

A total of 1318 sites were recorded for the Central study area at the end of 1981. These sites represent a variety of site types, and all temporal periods. The distribution of the sites by county is extremely uneven, reflecting disparities in previous work and in natural resources. In portions of the study area where numerous archeological projects have been undertaken since 1982, the new information was not incorporated into the site files used for this project. For more up-to-date information the reader is encouraged to consult any of the recent cultural resource reports referenced later in this section or in the prehistory section.

A total of 400 sites are listed for Dunn County. These reflect 20 different site/feature types; however, some sites have combinations of one or more different types. The most common sites recorded for Dunn County are CM (cultural material) scatters, representing 62% of the total number listed. The second most common site type is quarry/mine with 10% of the total. Possible quarry/mines are third with 6%, followed by stone rings (5.2%), and rock features (5%). Other listed site types include earthlodge villages (five), possible earthlodge villages (six), hearths (six), pits (five), trails (six), and miscellaneous (eight).

Temporally, sites in Dunn County range from Paleo-Indian through the Historic period. As with every county in the study area, the majority in Dunn County have unknown temporal/cultural affiliation. Paleo-Indian projectile points have been recovered from 10 sites in Dunn County recorded by UNDAR in 1975. These points have recently been illustrated in Ahler and Christensen (1983). The sites containing these Paleo-Indian materials are 32DU452, 438, 497, 562, 438, 433, 519, 487, 547, 429 (Ahler and Christensen 1983; Loendorf et al. 1976). Archaic/Plains Woodland designation has been given to 17 sites in Dunn County. In addition, one site has been identified with a Logan Creek/Mummy Cave complex component (32DU278). A second Logan Creek/Mummy Cave site, 32DU605, has been recently excavated in western Dunn County (Kuehn 1982c). The remaining temporal/cultural designations from Dunn County are as follows: McKean/Duncan/Hanna (one), Besant (one), Late Prehistoric (21), Avonlea (two), Plains Village (two), Historic (50), and unknown (306).

Mercer County has 468 reported sites. Site density is very high in places. Kjos, Schreiner et al. (1983) documented a density of one site per ca. 18 ha in part of the Glenharold Mine area.

A total of 24 different site types are represented. The most common type is CM scatters with 32% of the total. Stone ring sites are second with 26%, followed by rock features (10.4%), quarry/mines (3.7%), earthlodge villages (3.5%), hearths (3.5%), graves (3%), and mounds (2%). Other site types include possible earthlodge villages (11), earthworks (six), possible graves (15), possible jumps (two), possible

rock features (13), pits (eight), rock art sites (two), and trails (six). The recorded cultural/temporal affiliations of the sites in Mercer County are much more limited than those in Dunn County. One Paleo-Indian site (32ME304) has been designated; however, the site was never excavated and the designation is tenuous. Archaic/Plains Woodland affiliation is designated for 19 sites in Mercer County, Late Prehistoric (24), Historic (101); and unknown affiliation (334).

Morton County has 140 recorded sites. Again, CM scatters are the most common with 33% of the total. Earthlodge villages are more commonly represented in Morton County than in any other county on the computer list. Forty-two earthlodge villages, or 30% of the county total, are listed. Sites with possible earthlodge villages and sites with earthworks each account for 4.7% of the total. Rock features represent 5% of the total, pits 6.8%, and stone ring sites 6.3%. Other site types include graves (eight), hearths (one), possible bison jump (one), mounds (five), quarry/mines (two), possible rock art (one), and trails (four). Cultural/temporal designations consist of Archaic/Plains Woodland (five), Middle Woodland (one), Late Woodland (one), Late Prehistoric (four), Plains Village (three), Historic (18), Mandan (one), and unknown (107).

A total of 290 sites, representing 23 site types, are listed for Oliver County. CM scatters represent 42% of the total, followed by rock features (20%), stone circle sites (8.6%), and earthlodge villages (7%). Other site types are possible earthlodge villages (five), earthworks (five), graves (eight), hearths (nine), bison jump (one) (320L107), mounds (five), pits (five), rock art (effigies) (nine), possible rock shelters (two), rock shelter (one) and trails (two). Cultural/temporal affiliations are Archaic/Plains Woodland (one), Avonlea (one), Late Prehistoric (13), Historic (30), Arapaho (one) (320L251), and unknown (244).

Only 20 sites are listed for Stark County, reflecting the paucity of organized archeological work there. These 20 sites reflect nine different site types. The most common sites are CM scatters with 55% of the total. CM scatter with quarry/mine are second with 10%. The remaining site types are each represented by one site: CM scatter with bison jump; grave; CM scatter with possible quarry/mine; bison jump (32SK107); unspecified; and unspecified historic. The cultural/temporal affiliations are post-Plano (one) (32SK37), Archaic/Plains Woodland (one), Late Prehistoric (one), Historic (one), and unknown (17).

PRINCIPAL PROJECTS AND WORKS

More structured, large-scale archeological investigation has been conducted in the Central study area than in any other portion of North Dakota. Most of this work has been at the large Plains Village sites in the Middle Missouri subarea; however, more recent activity has been focused in the coal fields of Dunn and Mercer counties. The list of previous work in the study area is quite lengthy, and for the purposes of this report, will be limited to those projects which have contributed significantly to the archeology of North Dakota.

As early as 1883, archeological reconnaissance and mapping were conducted at prominent earthlodge villages in Mercer County by Theodore Lewis (Lovick and Ahler 1982:85-86). The work resulted in maps of Big Hidatsa, Sakakawea, Amahami, and Fort Clark (Lovick and Ahler 1982:85-86).

The State Historical Society of North Dakota conducted intensive reconnaissance and mapping of prominent earthlodge sites along the Missouri River between 1906 and 1913 (Lovick and Ahler 1982; Wood 1978:75-90). As part of this program, O. G. Libby investigated sites between Elbowoods and the Cannonball River, which included much of the Central study area (Libby 1910).

An early pioneer in North Dakota archeology, George F. Will, published articles on Mandan villages and other sites along the Missouri River (Will 1910, 1924, 1933; Will and Spinden 1906). Will's *Archaeology of the Missouri Valley* (1924) provides the first inventory of prominent sites, and the first meaningful ceramic discussion from the Middle Missouri subarea of North Dakota.

During the 1930s and early 1940s, Will and Thad Hecker conducted numerous small-scale excavations of village sites along the Missouri River. Of interest to the Central study area, excavations included the Huff Site in Morton County (Lovick and Ahler 1982; Will and Hecker 1944). Will and Hecker (1944), provide a lengthy inventory of Missouri River sites, as well as brief statements concerning numerous excavations. The paper provides a framework for the study of Plains Village sites, and divides the Middle Missouri occupation sequence into four temporal periods (Lovick and Ahler 1982; Will and Hecker 1944).

In 1938, excavations were conducted by Columbia University under the direction of W. Duncan Strong at prominent village sites along the Missouri. Included in the excavations were Big Hidatsa, Sakakawea, Lower Hidatsa, and Slant villages (Lovick and Ahler 1982; Strong 1940).

Early ethnographic work with the Mandan and Hidatsa was conducted in and near the study area by Alfred Bowers and Gilbert Wilson. These studies are significant contributions to American ethnography, and have also proven valuable to archeological investigations (Bowers 1950, 1965; Wilson 1928, 1934).

The River Basin Surveys and the Inter-Agency Archeological Salvage Program conducted numerous archeological investigations at sites in the Central study area from ca. 1945 to 1965. Key sites excavated in the study area include Bendish (32M02) (Thiessen 1976); Huff (32MO11) (Wood 1967); Grandmother's Lodge (32ME59) (Woolworth 1956); Star Village (32ME16) (Metcalf 1963); and Rock Village (32ME15) (Lehmer et al. 1978). A short overview of the River Basin Surveys work in the Garrison Region is presented in Metcalf (1963).

Limited testing was conducted at Lower Hidatsa and Sakakawea villages in Mercer County in 1965 by Donald J. Lehmer. The excavations resulted in the procurement of ceramic and stratigraphic data (Lehmer 1967; Lovick and Ahler 1982). In 1968, Donald J. Lehmer and W. Raymond Wood conducted a program of limited testing at 16 earthlodge village sites in the upper Knife-Heart region (Lovick and Ahler 1982:92-93). A comparative analysis of flaking debris from seven of the sites is presented in Schneider (1972).

The Hidatsa village of Amahami (32ME8) was excavated in 1971 and 1972 by Dana College. The results of the excavation are presented in Lehmer et al. (1978), and Dill (1975). Research at the historic, earthlodge village and trading post at Fort Clark is summarized by Dill and Holland (1983).

The High Butte site (32ME13) was excavated in 1973 by W. Raymond Wood and Ann Johnson. The site, located on a prominent butte in Mercer County, is one of the few documented Besant/Sonota complex, Woodland tradition sites excavated in North Dakota (Wood and Johnson 1973).

Archeological testing was conducted at Sakakawea Village in the newly created Knife River Indian Villages National Historic Site in 1976 and 1977 under the direction of Stanley A. Ahler (Ahler et al. 1980). In 1977, a program of surface collection was undertaken at Sakakawea and Lower Hidatsa villages (Ahler and Benz 1980). Also within the KNRI, test excavations were conducted at Lower Hidatsa Village in 1978 and Big Hidatsa Village in 1980 (Ahler and Weston 1981; Lovick and Ahler 1982).

Salvage excavations were conducted at the White Buffalo Robe site (32ME7) in 1978. The excavations revealed two major components, and enabled refining the temporal placement of the Heart River phase (Lee 1980; Lovick and Ahler 1982).

Investigations were conducted at the Cross Ranch in Oliver County between 1979 and 1982. The investigations involved survey and test excavations at a large number of sites, representing occupation from the Plains Archaic to the Plains Village period. The most intensive utilization of the Cross Ranch area appears to have been during the Late Woodland period (Ahler et al. 1982; Ahler, Lee, and Falk 1981; Weston et al. 1980).

Numerous archeological projects have been conducted in the study area in response to recent, intensive coal mining activity. Important among these are the 1976 UNDAR survey of a coal gasification project in Dunn County (Loendorf et al. 1976); the 1979 UNDAR survey in the Glenharold Mine area (Wilt and Swegle 1980); the 1979 UNDAR survey of the South Beulah Mine Extension in Mercer County (Roberson 1980); the random, block area survey in the Dunn Center Coal area by Historic Research Associates (Greiser and Greiser 1981); the reconnaissance and test excavations for the Consol projects by UNDAR (Ahler et al. 1979; Ahler, Mehrer, and Picha 1981); the Historic Research Associates' testing for the Nakota Methanol Project (Stanfil et al. 1982); and test excavations at several sites in the Glenharold Mine area (Kjos, Dahlberg et al. 1983).

Other important projects conducted in the Central study area include test excavations at Slant Village, Morton County, in 1980 (Ahler et al. 1981); test excavations at the Midipadi Butte site (32DU2) in 1977 and 1982 (Good and Hauff 1977; Kuehn et al. 1982); the 1976 shoreline survey of Lake Sakakawea and the Little Missouri River (Leaf 1976); and the test excavations at the Tysver-Olson site, 32DU605 (Kuehn 1982c).

From 1980-1982, archeological survey and excavations were conducted across the study area for the Northern Border Pipeline Project. The Northern Border Project resulted in excavations at three sites in Dunn County (32DU37, 273, and 285), one in Mercer and one in Stark (32ME385 and 32SK6), and approximately 20 sites in Morton County (Root 1981).

The most recently completed project in the study area was the test excavation and mapping program conducted at 32DU508 near Lake Ilo in Dunn County. The site consists of a Knife River flint quarry and associated workshop. The project represents the first well documented excavations within the KRF quarry areas (Ahler and Christensen 1983).

Information Deficiencies

Even though a great deal of archeological work has been conducted in the Central study area, most has been concentrated in village sites along the Missouri. As a result, information deficiencies of a basic nature exist outside of the Missouri Trench, and from cultural and temporal periods other than Plains Village in the Trench. Because of the extensive amount of work that has been conducted in the Plains Village sites, information deficiencies, especially from the Coalescent tradition, take the form of more specific, problem oriented research questions.

Basic types of data from the Paleo-Indian period are lacking from all parts of the study area. While Paleo-Indian period projectile points have been recovered from Dunn County, adequate documentation and subsurface data remain to be procured. Needed from the Paleo-Indian period are radiocarbon dates, a comparative collection of projectile points, feature data, subsistence information, and paleoenvironmental information.

The same basic deficiencies exist for the Early Plains Archaic period. To date, only one site has been documented from this time period (Kuehn 1982c). Several possible early side notched points have been recovered from the study area, but better documentation and more excavated data is desperately needed. Intact early Holocene sediments are well represented in the Knife River-Missouri River confluence area (Ahler, UND), but there has been little effort to identify Early Plains Archaic components in them.

Is there a McKean complex pattern of warm weather, open air camps and KRF workshops on ridge tops, with winter retreats into the Little Missouri and Missouri river valleys? (Root, UND) Are there site types representing a seasonal round west of the Missouri River? (Root, UND) The McKean components investigated by the Northern Border Project yielded no evidence for structures, no large hearths with substantial oxidation rings, or other kinds of remains that should result from winter occupations (Root, UND). Understanding of McKean settlement systems seems to be hampered by a sample of investigated sites that is biased toward warm season occupations.

Information from the Plains Woodland period indicates intense utilization of the Middle Missouri subarea (cf. Ahler et al. 1982). However, only a few sites have been excavated. Recent archeological work at the Cross Ranch indicates a pattern of Woodland camps along the Missouri River breaks, with heavy reliance on bison procurement. This pattern may be different during the Plains Village period (Ahler, UND), although 320L226 is a multicomponent bison kill and processing site used during both the Plains Woodland and Plains Village periods (Kjos, Dahlberg et al. 1983). Additional survey and excavation data are needed to identify and evaluate the differences between Plains Woodland and Plains Village settlement systems.

At the present time, problems also exist differentiating Plains Village and Late Woodland ceramics. The differences are more clear-cut in the lower portions of the Missouri Trench but become blurred further upstream (Toom and Ahler, UND). Many more ceramic specimens from excavated contexts are needed to clarify this problem. Similarly, difficulty exists in differentiating Woodland from Plains Village side notched projectile points (Ahler et al. 1982), indicating a need for a much larger collection of specimens from both periods coupled with refined analyses of point morphological data.

Several prominent mound sites, of apparent Woodland age, are present on the uplands along the Missouri River, in the study area. Information is needed on mound content, time of construction, ceramic assemblages (if present), and association with occupation sites. Some mound sites, like 320L242, have

associated artifacts that are probably more than 1500 years old (Kjos, Dahlberg et al. 1983), and the possibility of pre-Woodland mound burial must remain open. Ethnographic data indicates that linear mounds in the study area may be associated with the Hidatsa and the Plains Village period, rather than the Woodland period (Ahler, UND). This possibility should be explored. Finally, a major, unanswered research question that should be addressed is the nature of Late Woodland and early Plains Village association. Was Late Woodland influenced by Plains Village? What are the differences in material culture? (Toom, UND).

The crux of the current information on the Plains Village tradition comes from the Post-Contact and Disorganized Coalescent variants. Scattered excavations of earlier Plains Village sites have been reported from the study area, but certainly more information is needed. The discovery of an Extended Middle Missouri variant component at Grandmother's Lodge in Mercer County indicates occupation of the northern part of the study area by earlier Plains Village groups.

Information concerning prehistoric Plains Village use of areas west of the Missouri River Trench is sketchy at best. Within the Central study area, what types of Plains Village tradition sites are located along the Cannonball, Heart, and Knife rivers? What archeological evidence is there to indicate Plains Village association with sites around the Killdeer Mountains? Similarly, what was the extent of Plains Village use of the Knife River flint quarries?

Within Post-Contact Coalescent and Disorganized Coalescent sites, specific research problems include the nature of artifact distributions and activity patterns within houses and outside houses; changes in architectural patterns through time; and the nature of fortification systems through time (Ahler et al. 1980:200). In addition, a great deal of archeological information is needed to improve understanding of Mandan and Hidatsa culture change in response to increasing EuroAmerican contact, epidemics of introduced European diseases, and warfare with the Dakota (cf. Hanson 1983a).

Finally, the Central study area contains one of the most significant archeological districts in the Northern Plains, the Knife River flint quarries. To date, only one major test excavation project has been conducted in the KRF primary source area. This excavation has indicated that quarry sites contain extremely complex stratigraphy and cultural histories (Ahler and Christensen 1983). One quarry site alone can represent 10,000 years of quarry and workshop activity, and a wide range of stone tool technologies. Certainly, an archeological district of this significance requires additional, well controlled, and internally consistent research.

Limitations to Research

Containing a cross section of topographic and physiographic settings, the Central study area is subjected to many of the natural research limitations that are present in the other study areas. These natural limitations include loss and/or alteration of sites by erosional processes, especially in the Little Missouri Badlands portion of the study area; contamination of pollen samples by redeposited Tertiary pollen (32DU285, 32DU605); potential for burial of early sites under thick accumulations of aeolian sediment on upland settings; and differentiating natural from cultural stone features in areas of dense glacial till.

Research limitations imposed by human activities are both (1) similar to those in other study areas, and (2) unique to the Central study area. Like most of the study areas, large areas have been converted to farm land. In these areas, destruction and disturbance of archeological sites by plowing is a common occurrence. Another agricultural-related problem is the removal of ancient stone features and creation of recent cairns as a result of field rock clearing.

The destruction and looting of archeological sites by "pot-hunters" is not an uncommon occurrence throughout North Dakota. This problem may be most severe in the Central study area where the numerous and large village sites along the Missouri River are highly visible. An example of this activity which has been recently discovered is extensive looting and subterranean tunneling at the Larson Village site on the east side of the Missouri River.

A major research limitation in the Central study area is the loss of lowland sites along the Missouri River as a result of inundation by Oahe and Garrison reservoirs. A large stretch of the Missouri in northeastern

Dunn and northern Mercer counties is flooded by the waters of Lake Sakakawea, while a large stretch of the Missouri flood plain in Morton County is inundated by the Oahe Reservoir.

Finally, large portions of Dunn and Mercer counties have been stripped for coal. While archeological programs have been actively identifying, testing, and mitigating sites in coal mine areas in recent years, many sites were undoubtedly destroyed before cultural resource protection measures were implemented.

Recommendations and Future Directions

Future archeological research and cultural resource management in the study area should consider approaches to alleviate deficiencies and enhance preservation. Existing data indicate the Central study area is significant from a perspective of North Dakota prehistory and environment. Physiographic diversity ranges from the Killdeer Mountains to the Little Missouri Badlands to the Missouri River Trench. The natural setting and associated resources are responsible, in part, for one of the largest lithic resource procurement areas in North America, and for an archeological record which spans the entire temporal range of human activity in the Northern Plains. To date, over 10 sites in the study area have been recorded which contain Paleo-Indian points from surface contexts. The study area also contains one of the few documented Early Plains Archaic sites in the state, several very significant Woodland period sites, and most of the Disorganized Coalescent variant sites in existence. With this archeological diversity in mind, the following general recommendations are offered for future research in the Central study area.

The Middle Missouri subarea has been critically altered by dam construction and subsequent inundation by flood waters. The Central study area contains one of the largest natural, unaltered stretches of Missouri River Valley remaining. It is therefore recommended that an intensive survey be conducted along the entire west side of the river, from the Oahe Reservoir in Morton County to the Garrison Dam in Mercer County. Such a survey should cover the flood plain, terrace networks, and breaks.

An irreplaceable complex of cultural resources, the Knife River flint quarries, is in increasing danger from coal development and related activities. A program of intensive archeological survey should be conducted on the entire quarry district. Such a survey should include the quarry pits, workshops, and other site types.

A program of both large block, and small sample surveys is recommended for those areas in the study area away from the Missouri River and the Knife River flint quarries. For instance, a stratified random sample survey along the Heart, Cannonball, and Knife rivers would be extremely productive in terms of useful data. A similar, highly desirable project would be an intensive, perhaps random, survey of prominent buttes in the study area. A survey project in the Killdeer Mountains would surely encounter high site densities. There appears to have been a large Pleistocene lake in the St. Anthony area (Schneider, UND); that area should be surveyed.

Test excavations should be conducted at key sites from virtually all temporal periods, especially Paleo-Indian, Early Plains Archaic, Plains Woodland, and pre-Coalescent Plains Village. Such excavations should be structured to collect basic information on artifact and feature density and diversity. Information from excavations of this nature could be used to structure large-scale mitigation programs where particular sites are threatened.

Additional research should be conducted in the Knife River flint quarries for the purposes of obtaining a better understanding of intersite variability and relationships between quarries, workshops, and campsites. A comprehensive and useful series of recommendations for future research in the Knife River flint quarries is presented in Ahler and Christensen (1983).

Finally, there is a need for a comprehensive program of preservation and public interpretation of the more significant cultural resources in the Central study area. Sites such as the Lynch Quarry and the prominent earthlodge villages represent the irreplaceable legacy of previous human achievement, and should be preserved for appreciation by future generations.

The Southwest Study Area

The Southwest study area consists of Adams, Bowman, Grant, and Hettinger counties (Figure 41). It is the highest and driest part of North Dakota. It should have been the first part of North Dakota to make the transition from boreal forest to grassland in the early Holocene, and thus should eventually provide evidence for the earliest human occupation of the study region.

Physical Setting

Several of the larger Missouri River tributaries in the study region are present in this area. The numerous buttes, good bison range, and diverse lithic resources are highlights of the physical setting.

PHYSIOGRAPHY

The study area is situated almost entirely in the unglaciated Missouri Plateau subsection, Great Plains physiographic province (Fenneman 1931). Eastern Hettinger County is in an unnamed district of the glaciated Missouri Plateau. Being in the extreme southwestern corner of North Dakota, the study area remained virtually unglaciated during the Wisconsin glaciation. Wisconsin age outwash materials are present in some parts of the study area, as are scattered tills from earlier in the Pleistocene (Bluemle 1977).

The Southwest study area is largely a rolling to hilly plain which generally slopes southwest to the northeast. Much of the topography of the area is dominated by prominent buttes which remain today as erosional remnants from the Tertiary period. In addition to rolling hills and buttes, the western part of the study area contains a portion of the Little Missouri Badlands. This southern section of the Badlands is not as dramatically eroded as sections farther north.

DRAINAGE

All of the creeks and rivers in the Southwest study area are part of the Missouri River drainage system. In western Bowman County, several small streams feed the Little Missouri River which flows north through the county, eventually emptying into the Missouri River in eastern Dunn County. In the approximate center of Bowman County, the Medicine Pole Hills are a drainage divide between the Little Missouri and Grand rivers. Along the east side of the Medicine Pole Hills, several streams, including Spring Creek, flow southeast into the North Fork of the Grand River. The North Fork of the Grand River flows southeast, eventually emptying into the Missouri River in South Dakota. The Bowman-Haley Reservoir is located in the valley of the North Fork of the Grand in southeastern Bowman County.

Drainage in the remaining portion of the Southwest study area is dominated by the Heart River, the Cannonball River, and Cedar Creek, all permanent streams which flow east into the Missouri River in Sioux and Morton counties. These streams are in turn fed by numerous smaller intermittent and permanent drainages including Thirty Mile Creek, Timber Creek, Chanta Peta Creek, Antelope Creek, and Indian Creek. Many of the major streams in the study area have well established, dissected valleys with extensive terrace networks. Natural lakes or playas are extremely rare in the study area, perhaps the most arid portion of North Dakota. Several small marshy areas are present in Adams, Grant, and Hettinger counties, and may have contained standing water during mesic periods in prehistory.

GEOLOGY

The Southwest study area is located in the Cretaceous Williston Basin. The oldest exposed sediments in the study area are shales of the Pierre formation which outcrop along the Little Missouri River in western Bowman County. The Cretaceous Fox Hills formation overlies the Pierre and is exposed only in western Bowman County. The Hell Creek formation is exposed along dissected drainages in Bowman and southern Grant counties. The most common bedrock in the study area belongs to the Tertiary Fort Union group. The Fort Union group consists of the Ludlow (oldest), Cannonball, Slope, Bullion Creek, and Sentinel Butte formations. The Ludlow, Cannonball, and Slope formations are largely limited to the southern portions of Bowman, Adams, and Grant counties. The Bullion Creek formation is exposed in the northeastern portion of Bowman County, the north half of Adams County, the southern edge of Hettinger



Figure 41. Southwest study area, Dickinson District Office—BLM study region (from the U.S.G.S. 1:500,000 North Dakota shaded relief map, 1965).

County, and the west-central edge of Grant County. The Sentinel Butte formation is found only in the north half of Hettinger County and a small area in western Grant County (Bluemle 1977; Clayton 1980). The Eocene Golden Valley formation is extremely rare and remains only on top of several prominent buttes in Hettinger and Grant counties (Clayton 1980). The different Tertiary formations present in the study area are similar in that they are sedimentary in nature and are composed largely of sandstone, clays, and shales. Lignite coal deposits are limited to the formations of the Fort Union group, as are related deposits of scoria, clinker, and porcellanite.

NATURAL RESOURCE POTENTIAL

The Southwest study area does contain a variety of natural resources, in spite of the fact that good sources of water are limited. Most of the resources which would have attracted prehistoric people relate to the geological and topographic setting of the area. While some resources are common to all of the counties in the study area (i.e., good grazing land for bison), individual variability between counties is sufficient to warrant an individual discussion of each.

Adams County contains several prominent buttes, including Wolf Butte, Cow Butte, Pearl Butte, Square Butte, Whetsone Buttes, and Rocky Ridge. These buttes are good observation points, are sometimes capped with lithic raw materials (lag gravels), and are locations of ground water discharge (springs). The location of these buttes is a direct result of geologic processes such as erosion and cap rock resistance.

Other resources in Adams County include deposits of smooth gray Tongue River silicified sediment (TRSS). This material is believed to originate at the contact between the Slope and Bullion Creek formations (Ahler 1977b:137; Clayton et al. 1977). In Adams County, the Slope-Bullion Creek contact runs through the entire north-central portion of the county. An additional potential lithic resource in Adams County is porcellanite. Porcellanite is formed by the heating of Fort Union group sediments by burning lignite coal. In Adams County, at least one burning coal vein is active at this time, indicating at least the potential for porcellanite deposits.

Bowman County contains perhaps the most diverse natural resources of the entire Southwest study area. The county has three permanent streams, the Little Missouri River, the North Fork of the Grand River, and Box Elder Creek. These drainages contain deciduous trees and thick underbrush, providing fuel, shelter, and support for varied wildlife. In addition, Bowman County contains several prominent buttes, including the Cedar Hills and Snake Buttes. The county has excellent lithic resource potential, with at least three different possible sources of raw material. Unknown amounts of lag gravels containing petrified wood, Knife River flint, agate, and chalcedonies have been observed in the vicinity of the Little Missouri River by Dale Davidson. Deposits of smooth gray TRSS are likely to exist within the county, as the contact between the Slope and Bullion Creek formations runs through a large area of the northeast portion. Porcellanite deposits are also expected to occur, as the Fort Union lignite bearing formations are exposed in parts of the county. An additional resource in the county is the Little Missouri Badlands. The Badlands represent a unique ecosystem, with greater floral, faunal, and topographic diversity than the surrounding prairie. Finally, Bowman County may have been attractive to prehistoric groups due to its proximity to the Cave Hills of South Dakota (less than 30 km). The Cave Hills are an area of abundant natural resources within an ecotone setting, and are known to contain numerous prehistoric sites (cf. Keyser 1982).

Grant County contains at least three major permanent water sources: the Cannonball River, the Heart River, and Antelope Creek. The Cannonball and Heart rivers are very significant from an archeological perspective. Both have well formed, broad valleys and extensive terrace networks with concentrations of trees and underbrush. Archeological survey along portions of the Heart River revealed a high site density (Plochman et al. 1982). In addition to permanent streams, Grant County is well drained by an extensive network of dendritic, intermittent creeks. Several marshy areas are also present in low lying areas during high water table periods. Grant County contains several prominent buttes, including Pretty Rock, Dog Tooth, and Heart Butte. Fluvial gravels containing usable quantities of Knife River flint and quartzite have been reported from the Heart River drainage. A substantial number of prehistoric procurement areas have been recorded in association with the gravels (Plochman et al. 1982).

Hettinger County contains resources similar to Adams and Grant counties. Prominent buttes include Tepee Buttes, White Butte, and Black Butte. Permanent streams are limited to the Cannonball River and Thirtymile Creek. Several large marshy areas are present in low lying areas near Timber Creek, but are likely to contain water only seasonally. Hettinger County is located north of the Slope-Bullion Creek contact, therefore large deposits of smooth gray TRSS are not expected. However, several large areas of Quarternary river gravels and sediment are shown to be in the southeastern part of the county, and may contain knappable materials (Clayton 1980). In addition, porcellanite and other lithic raw materials may be located on or around some prominent buttes.

Previous Research

The 218 recorded sites, a few survey projects, and excavations at a few sites in the Bowman-Haley Reservoir locality provide the basis for this summary of previous research.

SITE RECORD COMPILATION BY COUNTY

Some 218 sites have been recorded to date in the Southwest study area. These sites are distributed as follows: Adams (six), Bowman (48), Grant (146), and Hettinger (18). The disparity in site distribution by county is largely a reflection of the intensity of previous archeological investigations, and not necessarily related to actual site density. In Adams County, a total of four site types are represented. Stone ring sites make up 50%, followed by historic quarry/mines (33%), and stone rings with CM (cultural material) scatter and quarry/mine (17%). The cultural/temporal affiliations in Adams County are divided between Late Prehistoric (two), Historic (two), and unknown (two).

In Bowman County, 24 different site types are represented. These are dominated by CM scatters (37%), CM scatters with hearth (8%), and stone ring sites (4%). Other site types represented include CM scatter with quarry/mine; CM scatter, rock feature, stone circle; CM scatter with possible bison jump; rock art (historic); and miscellaneous. Out of the 48 sites in Bowman County, six are Archaic-Plains Woodland, two are Late Prehistoric, two are historic, and 40 have unknown temporal affiliations.

In Grant County, 146 recorded sites represent 21 different site types. CM scatters are by far the most common site with 47% of the total. Stone ring sites are the second most common with 14%. Other more common site types include CM scatter with quarry/mine (9%); CM scatter with stone rings (7%); CM scatter and miscellaneous (3%); and unspecified sites (3%). Cultural and temporal affiliations include Archaic/Plains Woodland (one), Late Prehistoric (three), historic (seven), and unknown (137). Grant County also contains one recorded earthlodge village (32GT8) and one small rockshelter (32GT417).

In Hettinger County, nine different site types have been reported. The most common sites are CM scatters (39%), followed by unspecified historic (17%), and stone rings (11%). Other site types in Hettinger County include CM scatter with possible grave and mound; CM scatter with possible earthlodge village (32HT302); rock feature with stone circle; and unspecified historic. Out of the 18 sites, one has been assigned to the Archaic/Plains Woodland, three to the Late Prehistoric, four to the Historic; periods of occupation are unrecorded for seven. Despite the lack of recorded information, there appears to be a concentration of Cody complex components in Hettinger and Slope counties (Schneider, UND).

PRINCIPAL PROJECTS AND WORKS

The earliest formal archeological investigations in the Southwest study area were conducted at the Bowman-Haley Reservoir in 1964 by the River Basin Surveys. The project consisted of a survey of the proposed reservoir area, resulting in the recording of 36 sites, and limited test excavations at 32B0213, 32B0207, and 32B0217 (Hume and Malmsten Hume 1964). Two of the excavated sites, 32B0213 (the Red Fox site), and 32B0207 (the Fisher site), contained stratified components of the Middle Plains Archaic McKean complex (Syms 1969:132-140). The third site, 32B0217, contained a single McKean complex component (Syms 1969:136). A recent synthesis of the Red Fox site data, and a comparison of the Red Fox material to artifacts from the Lightning Springs site in the Cave Hills of South Dakota, is presented in Keyser (1982). The two sites, located less than 30 km apart, demonstrate temporal contemporaneity, and may have been occupied by the same groups of people (Keyser 1982:31).

In 1978, a large survey was conducted in the New Leipzig area of Grant County by UNDAR for the Knife River Coal Company (Fox 1979). The survey resulted in the recording of approximately 30 prehistoric sites. Duncan and corner notched dart points indicate Middle and Late Plains Archaic occupations. Site types included CM scatters, stone rings, and rock features. TRSS and KRF were the most common lithic raw materials observed. 32GT437 is reported to contain four, vertically stratified levels of artifact deposits (Fox 1979).

In 1980 and 1981, an extensive archeological and historical survey was conducted along Lake Tschida-Heart Butte Reservoir by Historical Research Associates for the U.S. Bureau of Reclamation. The survey recorded 80 prehistoric sites, nine historic sites, and 10 prehistoric isolates (Plochman et al. 1982). The prehistoric sites included lithic procurement/workshops, lithic workshops, open campsites, and stone ring sites (Plochman et al. 1982:244). Diagnostic artifacts recovered span the time period from the Middle Plains Archaic through the Late Prehistoric period (Plochman et al. 1982).

In 1982, mapping and testing was conducted at seven prehistoric sites along the Bowman-Haley Reservoir by Larson-Tibesar Associates. Sites tested included CM scatters and a stone ring site. Diagnostic artifacts were Late Plains Archaic and Late Prehistoric in age (Tibesar 1982).

In 1982, a reconnaissance survey was conducted along a transect from the South Dakota border to just west of Rhame in Bowman County by personnel from the U.S. Bureau of Land Management. The survey recorded 18 sites (Dale Davidson, personal communication, 1983).

Information Deficiencies

The majority of archeological investigations conducted in the Southwest study area have been along the Bowman-Haley and Heart Butte reservoirs. As a result, serious information deficiencies exist in most other portions of the study area. This paucity of research is particularly acute in Adams and Hettinger counties where only a handful of very small projects have been conducted. A solid archeological foundation for the area is lacking, including such basic data as site temporal placement, settlement patterns, subsistence strategies, a working cultural chronology, and lithic resource utilization patterns. As with the other study areas discussed, several research questions can be formulated, which if answered would alleviate some of the deficiencies. These questions represent some of the research potential which is unique to the Southwest study area.

Dominant topographic features of the study area are the numerous buttes which rise above the surrounding plains. What role did these buttes play in the prehistoric utilization of the area? A predictability statement concerning butte and site type relationships is presented in Loendorf et al. (1982). Does this statement have practical applicability to the Southwest study area?

The Cave Hills of South Dakota are an area of diverse natural resources and high prehistoric site density in close proximity to the Southwest study area (Keyser 1982). Do sites in the Southwest study area compare favorably to those in the Cave Hills in terms of cultural/temporal affiliation, site function, lithic technology, etc.? In a related question, was the Southwest study area utilized during seasonal group movements from the Cave Hills-Black Hills region to the upper Middle Missouri subarea?

The Heart and Cannonball rivers are major streams which empty into the Heart and Cannonball regions of the Middle Missouri subarea (Lehmer 1971). What was the nature of Plains Village utilization of these two rivers west of the Missouri River Trench? What are the cultural/temporal affiliations of Plains Village sites in the Southwest study area?

Major source areas for smooth gray TRSS should be located in the Southwest study area (Ahler 1977b). What is the nature and extent of prehistoric utilization of the TRSS source area? Are there any actual quarries attributable to TRSS procurement? Fox's (1979) survey results indicate source areas and workshops in the New Leipzig area.

The Southwest study area has a geomorphological history which has resulted in the preservation of the early Holocene landscape in many areas. What is the potential for discovering Paleo-Indian and Early Plains Archaic sites in these areas?

Limitations to Research

Limitations related to site destruction are not as numerous or severe in the Southwest study area as in others. Much of the Southwest area is range land, therefore site disturbance due to plowing is not as common as in heavily farmed areas. However, some areas of high site probability have been plowed. In addition, the natural aridity in the Southwest area may mean there is better preservation of archeological materials than in the other study areas.

Restricted sources may have limited prehistoric utilization of much of the study area. In a similar light, limited water availability may have resulted in a concentration of sites within restricted physiographic areas. While such a site density/distribution pattern would provide important research directions, low site density would have limiting effects on research.

Unknown numbers of sites have been destroyed by inundation of the Heart Butte and Bowman-Haley reservoirs. Archeological investigations in these areas have indicated a high density of prehistoric sites (Plochman et al. 1982). Time periods and settlement types may be represented in these inundated areas that are not present elsewhere in the study area.

Erosion along dissected river valleys may have destroyed or disturbed prehistoric sites in the study area. This may be particularly true in the Little Missouri River Badlands in Bowman County, resulting in limitations similar to those created by inundation.

Research into prehistoric lithic resource utilization patterns and group movements throughout most of the study region will be limited by lack of knowledge concerning the procurement and reduction of smooth gray TRSS.

Surely thousands of Plains Village occupations are represented in the study area, but the paucity of descriptive analyses from such sites limits settlement system research. Ethnographic and ethnohistoric accounts indicate heavy use of the study area by the villagers for technological and subsistence resources essential to the horticultural-hunter-gatherer lifeway.

Lack of in-depth understanding of Holocene geomorphology in this study area limits potentially important research into Paleo-Indian period occupations. Here the BLM range and soils specialists could work with cultural resources personnel to begin identifying sections of intact, early Holocene landscape.

Recommendations and Future Directions

The Southwest study area is composed of Adams, Bowman, Grant, and Hettinger counties. At the present time, most of the archeological information comes from sites along the major streams and on prominent buttes. This may reflect a general pattern of prehistoric settlement during all time periods, or may simply reflect bias in the location of previous survey. A certain amount of bias undoubtedly exists, as the major research effort in the area to date has come from reservoir salvage projects of limited spatial scope.

A program of large block and/or sample survey is recommended for those areas away from the principal streams. Away from the streams, survey may be structured randomly to facilitate formulating predictive models, or may focus on areas of highest site probability in order to maximize data recovery. In any case, a comprehensive data base from all physiographic/resource areas is desperately needed. While site densities are expected to be highest along major streams and buttes, this idea cannot be substantiated until areas away from these geographic features are surveyed.

As in virtually all of the study areas, excavated data is needed to procure radiocarbon dates, to analyze features and tool assemblages, to study paleoenvironmental conditions, and to fill in gaps in the cultural chronology. Such excavation should be concentrated at key sites from all time periods identified during the recommended surveys or from existing site records. Hearth features are actively eroding from deposits in the Fisher-Red Fox locality (Loendorf, UND); this area should receive attention.

The Little Missouri Study Area

This study area consists of Billings, Golden Valley, McKenzie, and Slope counties (Figure 42). Montana borders it to the west. The prehistoric archeology of this area has developed very rapidly in the last few years as a result of oil and gas development and sound cultural resource management by the Forest Service and BLM.

Physical Setting

The physical setting is dominated by the Little Missouri River and the Badlands. Man-land relationships have been a more persistent theme in the prehistoric archeology of this area than any of the other study areas.

PHYSIOGRAPHY

The Little Missouri study area is situated in the Great Plains physiographic province (Fenneman 1931) where glaciated and unglaciated Missouri Plateau, the Little Missouri Badlands, and the Missouri River Trench can be differentiated. The Missouri Plateau contains rolling to hilly grasslands with prominent buttes in areas. The Plateau is represented in the eastern two-thirds of Slope County, the eastern third of Billings County, the western third of Golden Valley County, and the northern quarter of McKenzie County. Prominent buttes are located in the eastern half of Slope County, the southern half of Golden Valley County, and the northeastern quarter of McKenzie County.

Most of the remaining portions of the study area are composed of the Little Missouri Badlands, one of the most unique, and certainly the most rugged area in North Dakota. The Badlands are located along the valley of the Little Missouri River where they range from 3.2-24.0 km wide (Petter 1956:18). They were formed as a result of downcutting, headward erosion, and mass-wasting of the soft sediments of the Fort Union group. The Badlands began to form during the Pleistocene when stream piracy and a glacial advance altered the course of the Little Missouri, causing it to flow over a shorter and steeper gradient, which in turn initiated rapid downcutting and erosion (Kuehn 1982a; Schmitz 1955). At the present time, the Badlands have dissected as much as 150 m below the surrounding plateau (Bluemle 1977:11).

The Missouri River Trench district is represented in the extreme northern portion of the study area where it forms the border with the Northwest study area. The Missouri River Valley is a broad and fairly deep trench which formed since the Pleistocene as a result of a glacial diversion of the original Missouri River (Bluemle 1977). Today, most of the Missouri River Valley in the study area is inundated by Lake Sakakawea.

DRAINAGE

The Little Missouri study area contains dozens of permanent streams, as well as several major rivers. The entire drainage network in the study area feeds the Missouri River system. Perhaps the most significant drainage in the study area is the Little Missouri River which flows north through Slope, Billings, and McKenzie counties. The river turns east in southern McKenzie County and empties into the Missouri River in eastern Dunn County. Numerous permanent but low yielding streams feed the Little Missouri within the study area. These streams include Deep Creek and Sand Creek (Slope County); Bullion Creek and Beaver Creek (Golden Valley County); Whitetail Creek, Blacktail Creek, and Maggie Creek (Billings County); Cherry Creek, Beicegel Creek, Bennett Creek, Red Wing Creek, Bennie Peer Creek, Bowline Creek, Charlie Bob Creek, and Spring Creek (McKenzie County).

In Slope County, three permanent streams feed the Cannonball River, which eventually empties into the Missouri River in Sioux County. These streams are the North Fork of Cedar Creek, the South Fork of the Cannonball River, and the North Fork of the Cannonball River.

Two major permanent streams head in Billings County: the Knife River and the Green River. The Knife River flows east, emptying into the Missouri in Mercer County. The Green River flows southeast and empties into the Heart River in Stark County.

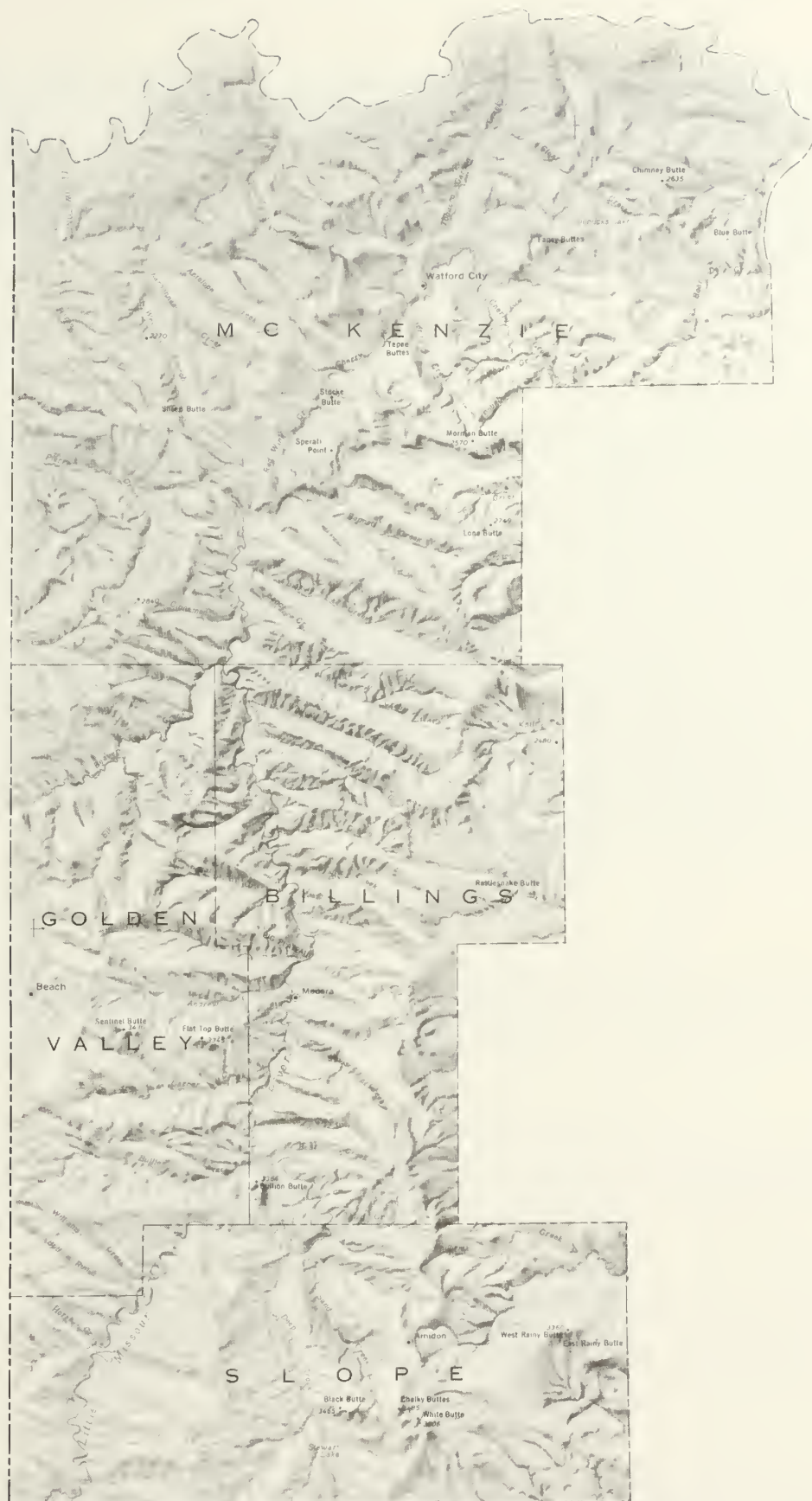


Figure 42. Little Missouri study area, Dickinson District Office—BLM study region (from the U.S.G.S. 1:500,000 North Dakota shaded relief map, 1965).

The Yellowstone River flows into the Missouri in the extreme northwestern corner of McKenzie County. In McKenzie County, the Yellowstone is fed by three permanent creeks: Horse Creek, Charbonneau Creek, and Antelope Creek. In northern and northeastern McKenzie County, three permanent streams flow directly into the Missouri River: Timber Creek, Tobacco Garden Creek, and Bear Den Creek.

In addition to the integrated drainage system, the Little Missouri study area also contains at least one nonintegrated playa. Demicks Lake, a glacial lake remnant, is located in northeastern McKenzie County. The lake covers over 280 ha and has standing water year-round.

GEOLOGY

As with all of the study areas, the Little Missouri study area is situated within the Williston Basin. The Basin, which contains the deepest post-Cambrian rocks in North Dakota, is centered in McKenzie County, southeast of Watford City (Bluemle 1977).

The oldest sediments exposed in the Little Missouri study area are the Hell Creek, Ludlow, and Slope formations, and are exposed only in dissected areas in Slope County (Clayton 1980). Much more commonly exposed (in every county in the study area) are the Bullion Creek and Sentinel Butte formations (Clayton 1980). Most of the Badlands are composed of the dull gray and yellow layers of these formations, primarily sands, clays, and shales. The higher elevations and buttes in the study area contain younger Tertiary sediments of the Golden Valley and White River formations (Clayton 1980). In Golden Valley County, on top of Sentinel Butte, the youngest formation in North Dakota is exposed. This formation is unnamed, but formed during the Oligocene and Miocene (Clayton 1980).

Most of the Little Missouri study area appears not to have been glaciated during the Pleistocene. Scattered, well weathered tills of the early Pleistocene are present throughout the study area in trace amounts. These tills indicate a very old glacial advance into the area. The more recent Wisconsin glaciation is represented by drift deposits in northern McKenzie County only. The Wisconsin glaciation penetrated the present day location of the Missouri River in this portion of the study area, diverting the Little Missouri River and leaving extensive till deposits and glacial outwash deposits upon the final retreat ca. 14,000 years ago (Moran et al. 1976).

NATURAL RESOURCE POTENTIAL

With Missouri Plateau, Little Missouri Badlands, and Missouri River Trench physiography, the study area has diverse topographic settings and natural resources. As an example, the U.S. Forest Service has identified 10 separate ecosystems within the Badlands Planning Unit of the Little Missouri National Grasslands. An ecosystem has been defined as a "complex of living and non-living components, each interacting with the other to function as an integrated system or unit" (U.S. Forest Service 1974:12). The 10 ecosystems identified in the Badlands are river bottom, hardwood draw, ponderosa pine, upland grassland, rolling grassland, terraces, upland breaks, river breaks, toe slopes, and hilly scoria (U.S. Forest Service 1974:13). Each of these ecosystems contains a unique combination of topographic, pedologic, floral, and faunal characteristics. Numerous ecotones result from contact between adjacent ecosystems. An ecotone is defined as "a transition between two or more diverse communities" (Odum 1971:157). Within an ecotone setting, the number and types of plant and animal species may be higher than in the surrounding individual ecosystems (Odum 1971:157). Ecotones then, potentially offer maximum natural resource diversity within a limited geographical area. As such they should have been a focus of prehistoric land use and should have significant archeological research potential.

For these reasons, and for reasons described in previous sections, the Badlands may be thought of as representing the most important natural resource area within the Little Missouri study area. Numerous other resources exist, and are worthy of mention on a county by county basis.

Slope County is likely to contain numerous sources of lithic raw materials. Porcellanite is likely to occur throughout the Fort Union group exposures. One burning coal vein near the Little Missouri in northern Slope County is a local tourist attraction. The upland ridges and butte tops in the county should have a patchy veneer of lag gravels, including agate and Knife River flint. Smooth gray TRSS should also occur as the Slope-Bullion Creek formation contact runs through the west-central portion of the county. Numerous buttes are present in the county, including the prominent Rainy Buttes, White Butte, Black Butte, Chalky Buttes, and Pretty Butte. A natural resource unique to Slope County is an isolated stand of

limber pine (*Pinus flexilis*). The limber pines produce seeds, rich in oils and protein, which have been found in archeological contexts in Wyoming (Beckes et al. 1982:11-12; Frison and Huseas 1968). Another unique resource is a large stand of Ponderosa pine in the north-central part of the county.

A number of different lithic raw materials occur naturally in Golden Valley County. Porcellanite procurement areas have been recorded north of Beach (Fox and Schweigert 1982). Dave Kuehn has observed large quantities of gray pseudoquartzite (perhaps a variant of TRSS?) on upland settings north of Camel Hump Butte. Unknown quantities of "Miocene (?) flint" have been reported from the top of Sentinel Butte in central Golden Valley County (Clayton et al. 1970:288). Several very large buttes undoubtedly played a role in prehistoric land use patterns: Sentinel Butte, Flat Top Butte, and Twin Buttes.

Billings County is likely to contain quantities of knappable lithic raw materials, including porcellanite in the Fort Union group exposures, and Knife River flint and agate in lag gravel deposits on the upland ridges (Kuehn 1982a). Billings County also contains an extensive series of ridge systems along the east side of the Little Missouri River. These ridges remain as upland remnants and generally trend from northwest to southeast. The utilization of these ridge systems as transportation routes through the Badlands has been suggested by Simon (1982). Finally, several prominent buttes are located in Billings County. Key among these are Bullion Butte, Tracy Mountain, and Chimney Butte.

McKenzie County contains extensive badlands, several major river valleys, including the confluence of the Yellowstone and Missouri rivers, and numerous sources of lithic raw materials, including glacial drift rock. Including the three major rivers, McKenzie County contains at least 12 permanent streams, and at least one permanent playa lake. Porcellanite deposits occur throughout the county, but are concentrated in the scoria hills area west of the Little Missouri. One porcellanite procurement/quarry area has been identified by Dave Kuehn in the west-central portion of the county. In addition, a quarry of what has been identified as silicified peat has also been recorded in the west-central portion of the county (Beckes et al. 1983). Quantities of Knife River flint have been observed in lag gravels on several prominent ridge systems, including Flat Top Butte and Ice Box Canyon Ridge. Extensive glacial gravel deposits containing quartzites and granite are present in the northern and northeastern parts of the county. Recently, a mammoth tooth was found in one such gravel deposit north of Watford City.

Previous Research

Relatively little archeological work was conducted in this study area until the late 1970s. Information has built rapidly since that time. Work has focused on gas and oil development tracts, perhaps introducing some bias into the information base, but concentrated work has produced volumes of data which, in some cases, have offset potential biases.

SITE RECORD COMPILATION BY COUNTY

A total of 869 sites were recorded for the Little Missouri study area at the end of 1981. The current total is larger, as newly discovered sites have not yet been incorporated. In addition, information on some sites is incomplete; updated excavation data has not always been incorporated into the site files. A summarization of the site inventory information by county follows.

A total of 249 sites, representing 18 different site types, are listed for Billings County. The most common sites are cultural material (CM) scatters, which represent 71.5% of the total. The second most common sites are quarry/mines, with 6% of the total. Other site/feature types listed include earthworks (two), hearths (five), mounds (two), rock features (seven), rock shelter (one), stone rings (three), trails (eight), and miscellaneous (10). The inventory contains sites with six different cultural/temporal affiliations: Archaic/Plains Woodland (three), Logan Creek/Mummy Cave (one), McKean/Duncan/Hanna (one), Besant (one), Late Prehistoric (four), Historic (65), and unknown (169).

A total of 59 sites are recorded in Golden Valley County. These represent 14 different site types. Again, the most common sites are CM scatters, with 65% of the total. Other site/feature types include earthworks (one), hearth (one), rock feature (one), quarry/mines (four), rock art (one), stone rings (four), and possible rock shelter (one). Archaic/Plains Woodland affiliation has been assigned to four sites in Golden Valley County, Late Prehistoric to seven, Historic to 10, and 40 sites are listed as unknown.

McKenzie County has the largest number of sites recorded through 1981 in the Little Missouri study area. This appears to be the result of the county's large size (largest in North Dakota) and the extensive amount of recent, oil related archeological work. A total of 530 sites are listed. CM scatters make up 59% of the total, followed by stone rings (10%), rock features (9.7%), quarry/mines (5%), and hearths (2%). Other recorded sites include conical timber lodges (two), possible earthlodge villages (five), earthworks (five), bison jump (one), rock art (one), and rock shelters (two) (both historic). Having the largest number of sites, McKenzie County also has the most recorded temporal and cultural diversity. The affiliations represented are Paleo-Indian (two), Archaic/Plains Woodland (24), McKean/Duncan/Hanna (one), Pelican Lake (one), Besant (one), Pre-ceramic (one), Late Prehistoric (26), Late Woodland (one), Plains Village (one), Historic (84), Arapaho (one), Euro-American (two), and unknown (396).

A total of 31 sites are listed for Slope County. The majority of these (60%) are CM scatters. Other site/feature types represented are grave (one), bison jump (one), mound (one), rock features (four), pit (?) (one), quarry/mines (four), rock shelter (one), and stone rings (three). Cultural and temporal affiliations are very limited, with five Late Prehistoric, five Historic, and 25 having unknown affiliation.

PRINCIPAL PROJECTS AND WORKS

During the past five years, oil exploration has resulted in a flood of archeological projects in the Little Missouri study area. Literally hundreds of surveys and testing projects have been conducted, but most have been limited in scope. In addition to the numerous small projects, several large excavations and surveys have also been conducted. These have provided a great deal of information about the prehistory of western North Dakota when there was little before. For the purposes of this report, only these large and most productive projects will be discussed. The projects are summarized in terms of the institution which conducted the work.

UNDAR. The Flat Top Butte site (32MZ422) was test excavated in 1979. The site consists of several artifact concentrations representing temporary hunting camps. A radiocarbon date of 1470 ± 40 B.P. was obtained from a hearth at concentration three, indicating a Late Prehistoric period occupation (Simon and Borchert 1981a).

Testing was conducted at the Ice Box Canyon Ridge site (32MZ38) in 1980. The site contains six artifact concentrations on a prominent ridge top in central McKenzie County. Three radiocarbon dates were obtained as a result of the excavations, indicating Middle and Late Plains Archaic period components (Simon and Borchert 1981c).

The Sunday Sage site (32BI22) is located on a terrace above Ash Coulee in Billings County, and was test excavated in 1980. Two cultural components, Pelican Lake and Besant, were identified. In addition, a radiocarbon date of A.D. 270-320 was obtained from an earth filled hearth feature (Simon and Borchert 1981b).

Testing was conducted at seven sites located along Anderson Divide in Billings County in 1982. The sites are base camps and hunting camps occupied during the Middle Plains Archaic through the Late Prehistoric period. In addition to providing valuable archeological data, the Anderson Divide sites also produced important late Holocene paleoenvironmental and geomorphological data (Simon et al. 1982).

Impact mitigating excavations were conducted at the Marsh Hawk site (32BI317) in 1982. The site is located near the west end of Anderson Divide. Middle and Late Plains Archaic as well as Late Prehistoric period components were excavated (Simon et al. 1983).

The Northern Border Pipeline Project transected the northern and eastern portions of McKenzie County. Survey and testing were conducted along the pipeline route in 1980. Three sites in McKenzie County (32MZ369, 32MZ487, and 32MZ559) were test excavated, representing occupations from the Middle Plains Archaic through the Late Prehistoric period (Root 1981).

Extensive archeological excavations were conducted at the Mondrian Tree site (32MZ58) in north-western McKenzie County as part of the Northern Border Pipeline Project. The site contains seven cultural zones. A total of 22 radiocarbon dates were obtained, supporting interpretations of occupation from the Middle Plains Archaic through the Late Prehistoric period, including Plains Village (Toom 1981a). Historic Plains Village occupations are an important aspect of this area's archeology (cf. Malouf 1963).

Recently, research has been published concerning prehistoric utilization of ridge top networks (Simon 1982), and Badlands geomorphology and lithic resource availability (Kuehn 1982a).

University of Pittsburg. Extensive archeological testing was conducted at six prehistoric sites on Cinnamon Creek Ridge in 1980 and 1981. All of the sites appear to be temporary camps, occupied intermittently from the Middle Plains Archaic to the Late Prehistoric period (East et al. 1981). A radiocarbon date of 1280 ± 90 B.P. was obtained from site 32MZ257B (East et al. 1981:36).

In 1981, archeological testing and evaluation was conducted at three sites near Lone Butte in McKenzie County. No radiocarbon dates were obtained, but one Late Plains Archaic component is indicated (East et al. 1982).

Powers Elevation Co. In 1981, archeological mitigation was conducted at the Cribbage site (32BI272) in Billings County. The Cribbage site is situated on a high ridge top not far from the Marsh Hawk site. Excavations revealed several noncontemporaneous work areas of short-term duration. Radiocarbon and obsidian hydration dates obtained from the site are ca. 1090 B.P., 3250 B.P., and ca. 2990 B.P., indicating Middle and Late Plains Archaic and Late Prehistoric occupation (Aivazian 1981).

During the summer of 1982, excavations were conducted at sites 32MZ333 and 32MZ334 in west-central McKenzie County. The sites are located on an upland ridge top and high terrace in an area of upland grasslands and scoria hills. Three cultural horizons were encountered at each site; however, only 32MZ333 could be absolutely dated. At 32MZ333, nine radiocarbon and obsidian hydration dates were obtained, ranging from ca. 2270 B.P. to ca. 215 B.P. (Floodman et al. 1982).

Mesa Corporation. In 1981, a Class II sampling survey was conducted on three tracts of land in southwestern North Dakota and eastern Montana. One of these tracts, the Wibaux-Beach tract, is located within the Little Missouri study area. In this tract, a total of 6160 acres were investigated, with 52 sites being recorded (Fox and Schweigert 1982). Of these 52 sites, 19 were prehistoric and 33 were historic. At least one site in the Wibaux-Beach tract has been designated as Late Plains Archaic. In addition, several porcellanite procurement/quarry sites were recorded (Fox and Schweigert 1982).

Overland Archeology, Inc. In 1982, archeological mitigation was conducted at the Magpie Road Site, 32BI286. The site contained Late Plains Archaic and Late Prehistoric period components (Campbell et al. 1983). The identification of Late Woodland Blackduck ceramics makes the site unusual for the Little Missouri Badlands (Campbell et al. 1983).

U.S. Forest Service. Forest Service personnel have conducted numerous small-scale surveys and have field checked many contract surveys and excavations. A synthesis of Hidatsa eagle trapping in the Little Missouri Badlands is presented in Allen (1982). The article outlines traditional ethnographic data such as that gathered by Wilson (1928), and also incorporates more recent information (Allen 1982).

An unusual stand of limber pine in Stark County has been evaluated from archeological and biological perspectives by Beckes et al. (1981). Evidence suggests a prehistoric, cultural origin for the stand. The prehistory of the Little Missouri National Grasslands has been ably summarized by Beckes and Keyser (1983).

Bureau of Land Management. Personnel from the BLM have reviewed contract reports and conducted field visits to sites throughout the study area. Recently, an article was published outlining historic period homesteading activity within the study area (Davidson 1982). An overview of homesteading history and the Land Utilization Program is presented, along with a model for understanding cultural development in the area during the homesteading period (Davidson 1982).

Information Deficiencies

In recent years, more archeological work has been done in the Little Missouri study area than in any other part of North Dakota. As a result, a great deal of information has been generated concerning the prehistory of western North Dakota. Nevertheless, serious information deficiencies remain, primarily due to the hopscotch and highly descriptive nature of the work conducted. In addition, while thousands of acres have been surveyed, no large-scale stratified random sampling surveys have been conducted to

sample all of the topographic and environmental settings which exist. As a result, statistically valid conclusions or predictions concerning site locations and densities cannot be formulated. Information is lacking on Paleo-Indian and Early Plains Archaic period occupations. As with the Southwest study area, the southern portion of the Little Missouri study area should have been available for some of the earliest human occupation in the study region. It is likely that much of the early Holocene landscape has been removed by Badlands erosion, but the horizontal and vertical extents of this erosion have been only grossly estimated.

The lack of a refined projectile point typology for most time periods in most of the study region is especially apparent in this study area. Problems in differentiating small side notched points of the Early Plains Archaic, Late Plains Archaic, and Late Prehistoric periods may be a significant factor in the nonrecognition of Early Plains Archaic sites (Reeves 1973). Inability to distinguish Plains Village points from those of contemporary hunter-gatherers hinders separation of components from these two, very different cultural traditions. Late Plains Archaic corner notched points, once lumped together as "Pelican Lake," are now known to present a great range of morphological variation, and also overlap with Early Archaic styles from elsewhere in the Northern Plains. Problems with the Pelican Lake point type concept are especially evident at the Mondrian Tree site.

There is a lack of excavated data from lowland settings in the Badlands; this has resulted in an incomplete picture of prehistoric utilization patterns. At present, most of the data available suggest warm season occupation of the Badlands (cf. East et al. 1981). On the other hand, ethnographic evidence indicates Plains Village groups wintered in the Badlands (Bowers 1948). Data on season of occupation are lacking in reports of investigations at most sites in this area.

Virtually all of the sites excavated to date reflect short-term occupation. Are there any long-term or permanent occupation sites in the Badlands? The ceramic bearing sites on terraces along the Little Missouri should be investigated (Loendorf, UND).

Some excavated sites contain a predominance of bison remains (e.g., Anderson Divide), while others lack bison and contain other large mammal remains such as elk (East et al. 1981). What was the nature of faunal resource utilization in the Badlands? In a similar vein, to what extent did bison utilize the Badlands?

The majority of sites excavated show a heavy use of KRF, disproportionate to its local availability (cf. Kuehn 1982a). What were the lithic resource utilization patterns in the Badlands?

The Little Missouri study area contains badlands and rolling grasslands in close proximity. What are the differences between sites in the two physiographic areas?

At present, most excavated sites appear to be concentrated in the Middle and Late Plains Archaic time periods. Are other time periods not as well represented due to environmental conditions unfavorable to settlement, or are they obscured by erosional/depositional landscape modification?

Limitations to Research

The major inherent limitations to research in the Little Missouri study area are the result of the instability of the landscape. Man-made limitations also impose constraints on archeological research.

Erosion, primarily in the form of slopewash and mass-wasting, but also from channel cutting and headward erosion of streams, appears to have a profound adverse impact on cultural resources. Erosion can alter prehistoric sites in three ways: (1) it can completely remove sites from their primary context on uplands and redeposit them downslope; (2) it can bury and obscure sites in the lowlands; and (3) deflation can remove site matrix, resulting in mixing of different components. A recent and useful study on slopewash in the Badlands can be found in Tinker (1970).

A research limitation that has only been recently discovered is the ongoing process of Tertiary pollen redeposition (Scott and Lewis 1983). This type of contamination should have been expected considering the erosion which has taken place, and the massive amount of windblown sediment that has been deposited on the uplands.

The rugged Badlands terrain makes access to remote areas very difficult. This can be thought of as a research limitation, especially in terms of transporting crews and equipment to site locations.

Recent excavations have discovered thick accumulations of aeolian sediment in upland settings. At the Anderson Coulee site for instance, the aeolian sediment (Oahe formation) was over 4 m thick, and the bottom could not be reached even with a backhoe (Kuehn 1982b). A potential research limitation of such extensive buildup of aeolian sediment is the burial of Paleo-Indian and Early Archaic sites. If early sites are present under many meters of sediment, detecting them could be very difficult.

A potential research limitation which may hamper future research is the private ownership of most of the land along the Little Missouri River. Receiving funding or permission to conduct research along the Little Missouri may be impeded by these private landholdings.

Like most work, archeological research requires funding. One potential limitation to research in the Little Missouri study area is the heavy reliance on energy developers for funding. As evidenced by the current slowdown in oil activity in the Williston Basin, sources of funding are dependent on unstable forces such as the world price of crude oil and the inclination of energy resource developers to fund heritage preservation work.

Recommendations and Future Directions

Archeological research in the Little Missouri National Grasslands has increased tremendously in the past five years, resulting in the recovery of valuable information related to periods of prehistoric occupation, site location, natural resource exploitation, and stone tool technology. At the present time, over 45 absolute dates have been received from sites in the Little Missouri study area. Five years ago there were no absolute dates available. Certainly, our understanding of the prehistory of western North Dakota has improved a great deal. Archeology is, however, a dynamic and changing science. As more information becomes available, the need for more and specific types of data to answer newly defined questions becomes evident. This is the case with the Little Missouri study area. The procurement of absolute dates from certain time periods stimulates the question of why other time periods are not represented. The discovery and excavation of sites on ridge top networks results in the need for more research in the lowlands. The discovery of prehistoric components in association with paleosols clarifies the need for more paleoenvironmental data. These are only a few of a potentially lengthy list of research directions which have developed in response to the influx of recent information.

A comprehensive survey encompassing all ecosystems is seriously needed and highly recommended. No specific sample or sampling unit sizes are recommended here, but the work should be oriented around a stratified random sample. A survey which investigates all different ecosystems equally is needed to understand the nature of prehistoric adaptation to an area such as the Badlands with its significant natural diversity. Adequate sampling survey is needed to enable statistically valid conclusions and predictions.

Other than an occasional isolated projectile point, data from the Paleo-Indian and the Early Plains Archaic periods is virtually lacking. At present, there is no comprehensive explanation for why these time periods are not represented in the study area. Perhaps the most plausible is that site remains have been seriously altered, or obscured by erosional activity since the time of occupation. It is recommended that a program of survey and testing be conducted for the purpose of identifying and investigating Paleo-Indian and Early Archaic sites. A survey of the cutbanks exposed along recent and deeply dissected gullies/arroyos might be productive in locating deeply buried cultural materials. Such investigations have been successful in locating Paleo-Indian sites in the southwestern United States. Other approaches to this problem might involve (1) a program of paleotopographic reconstruction by qualified geomorphologists for the purposes of recreating ancient landscapes and locating potential site areas (e.g., Floodman et al. 1982); (2) interviews with local artifact collectors for the purpose of getting leads to the locations of early sites; (3) deep test probes in sites which have good potential for early materials (e.g., thick deposits of aeolian sediment); and (4) survey of locations which appear to have good potential for early sites, such as natural Lake Demick in McKenzie County.

As previously mentioned, much of the previous archeological work in the Badlands has been conducted at ridge top sites. While providing very significant information, data are lacking from other Badlands settings. Therefore it is recommended that effort be directed at identifying sites in lowland and terrace settings. Test excavations should then be conducted at key lowland sites to obtain information on season of occupation, site activities, and occupational intensity. Comparisons of lowland and ridge top sites should be a key research orientation.

District Wide Deficiencies, Limitations, and Recommendations

The Dickinson District has witnessed archeological research since the turn of the century. However, until the cultural resource legislation and energy development of recent years, most of this research was concentrated in the Middle Missouri subarea. This spatially restricted concentration of effort generated a great deal of information about the Plains Village tradition in North Dakota. The major objectives of contemporary archeology (chronology building, lifeways reconstruction, and understanding human behavior) are closer to being met in the study of the Plains Village tradition than in the study of any other named archeological unit in the state.

Energy development in areas away from the Middle Missouri subarea has stimulated a great deal of archeological research during the past decade. This research has contributed to archeological objectives in the study of several named cultural units, notably McKean, Pelican Lake, Besant, Woodland, and Plains Archaic. As discussed in the individual study area sections, numerous information deficiencies remain in all named units.

The miniconference on information deficiencies held at the University of North Dakota in October, 1982, was productive in identifying problem areas and summarizing some aspects of the current state of North Dakota archeology. Basic research limitations and deficiencies, as well as recommendations, were outlined during the conference. Limitations and deficiencies for specific study areas have been presented above in the individual study area sections and will not be restated here. The more general, district-wide problems discussed at the conference are summarized as follows.

There are widespread deficiencies in descriptive artifact analyses and data quantification (Root, UND).

Contemporary archeology requires control of background information, ability to conduct adequate field work, and a capability to collect and use data (Gregg, UND). The value of much of the past work is limited by inadequacies in one or more of these areas.

There is a general need to collect and report more metric data for projectile points and other artifacts recovered by surface collection and excavation. The lack of consistent metric data presentation is a stumbling block to the development of projectile point stylistic analyses (Gregg, UND).

Most of the District has not been surveyed, and much of the survey information is suspect (Davidson, UND).

There is a basic need to develop a better understanding of soils and geomorphology in order to develop predictive models for locating intact, early Holocene landscapes (Root, UND).

Most of the District suffers from a lack of paleoenvironmental information (Root, UND).

Areas which have received extensive archeological attention in recent years still have information deficiencies due to the lack of sampling surveys to identify prehistoric adaptations to the entire range of environmental variability (Kuehn, UND).

We are currently impeded by a bare-bones cultural chronology that does not always work very well (Toom, UND).

There is a need to explore the range of variability within the McKean and Pelican Lake complexes; these are geographically extensive, long lasting, and poorly defined named archeological units (Gregg, UND).

There are presently unclassified components dating to the Late Plains Archaic period (Gregg, UND). This problem could be approached through a synthesis of projectile point stylistic data from well dated contexts (Schneider, UND).

There is a need to examine the origin of cultigens during the Woodland period (Gregg, UND). Similarly, the possibility of regional sunflower domestication should be explored (Loendorf, UND).

The above list of deficiencies represents the crux of those outlined during the miniconference. There are certainly more problems that inhibit archeological research and cultural resource management within the District. For instance, unknown numbers of sites have been destroyed and/or disturbed by agricultural activities, dam construction, and vandalism. Erosion continues to remove and/or obscure sites in the Little Missouri Badlands and other river breaks areas. Some sites in upland settings are buried under thick accumulations of windblown sediments, making them hard to locate and difficult to excavate.

Recommendations to alleviate problems go hand in hand with identifying them. The following recommendations are offered. Cultural resources which should be considered significant in the District include those that can be dated, have artifact diversity, and have stratigraphic integrity (Gregg, UND). Other kinds of significant sites are rare sites; sites with multiple/separable components; ceramic bearing sites; sites with standing wooden structures; all earthen mound sites; and, stone ring sites with buried rings, charcoal for radiocarbon dating, high density artifact deposits, or ceramics (Davidson, Dill, and Loendorf, UND).

A survey of Pleistocene megafauna finds in the state should be conducted. Such a project could start with an examination of the files at the UND Department of Geology (Ahler, UND). In a similar light, all known concentrations of paleofaunal remains should be examined by archeologists (Schneider, UND).

Artifact collections from future projects should remain in the state of North Dakota, with the Heritage Center in Bismarck as the main repository (Gregg, UND).

Obsidian hydration dating and sourcing should be conducted whenever possible, with particular emphasis on identifying source areas (Ahler, UND).

The North Dakota site files are in need of updating and correction. Presently, most information from excavations has not been incorporated into the site files. For example, the Moe site is now listed as Historic. In addition, several prominent sites, such as the Writing Rock in Divide County, do not have assigned site numbers. These problems are not the responsibility of any one institution, but are shared by all archeologists and cultural resource managers in the state. It is highly recommended that a program be instituted to update the state site files (Gregg, UND).

The District contains a wide variety of naturally occurring and exotic lithic raw materials. At present, archeological descriptions of lithic raw materials are usually vague and inconsistent. Future archeological investigations should be encouraged to include a comprehensive descriptive analysis of lithic raw material characteristics, distributions, and densities. A single project synthesizing lithic raw material characteristics and distributions could make a significant contribution (Gregg, UND).

One of the major stumbling blocks to understanding western North Dakota prehistory is the lack of consistent and adequate data collection and presentation. Future projects should be encouraged to explicitly state or cite descriptions and/or definitions for (1) the procedures used for all data collection, (2) the artifact classes and data fields dealt with in the report analyses, and (3) analytical procedures employed by the project. In addition, the dissemination of future information should be encouraged at the state and regional levels.

Finally, the UND miniconference provided a forum for evaluating current conditions in North Dakota prehistoric archeology. The participation of professionals from several different institutions strengthened the conference by broadening the range of participants' backgrounds and interests. Future conferences of this nature are recommended, perhaps on a yearly and expanded basis.

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