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Missouri National Recreational River: Native American Cultural Resources

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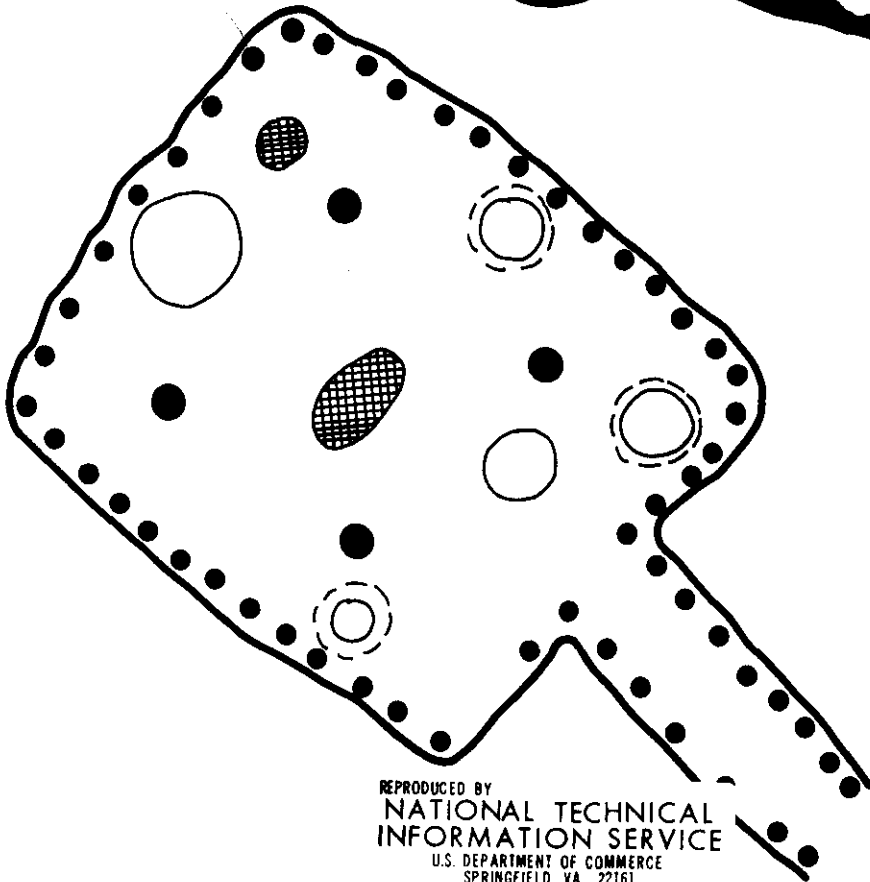
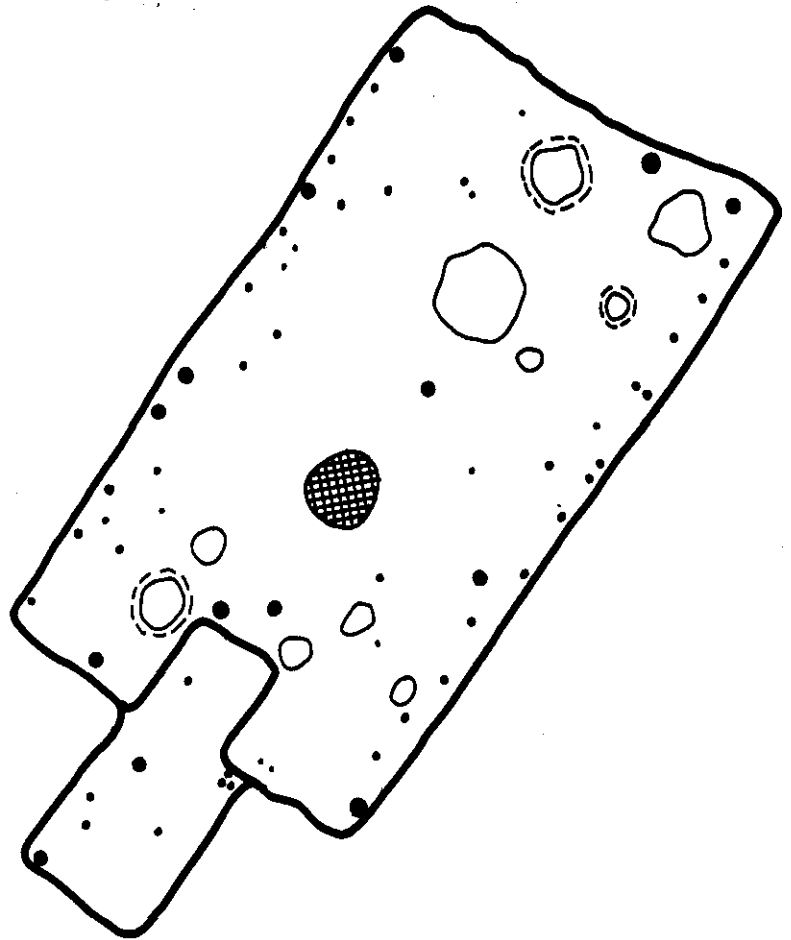
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Recreational River:

Native American
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John Ludwickson
Donald Blakeslee
John O'Shea
1981

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MISSOURI NATIONAL RECREATIONAL RIVER:
NATIVE AMERICAN CULTURAL RESOURCES

PROPERTY OF INTERAGENCY ARCHAEOLOGICAL SERVICES - DENVER

BY

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1981

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16. Abstract (Limit: 200 words) An inventory of known and identifiable cultural resources referable to Native American populations was undertaken for a corridor along the new Missouri National Recreational River, roughly from Gavin's Point Dam to Ponca, Nebraska. These resources included archaeological sites and collections, ethnographic and ethnohistorical data and relevant environmental background information. Using these data the Native American occupation of the Missouri National Recreational River area was synthesized into a regional overview which stresses culture-historical developments and changing adaptations to the natural environment. Problems for continuing research utilizing existing archaeological collections were developed, and recommendations for continued field work to fill in gaps in existing knowledge were made. Finally, a number of management suggestions were formulated with regard to the ongoing operation of the Missouri National Recreational River area, most important of which is the recommendation that a site of some significance be acquired and developed as a focal point for interpretive and educational efforts anticipated in the future.			
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It is perhaps worth pointing out that the northeast Nebraska - southeast South Dakota area in late prehistoric times seems to have been one of intense human activity and an avenue through which both populational and cultural movements passed up the Missouri and between the prairies and plains. Its complexity may well resist convincing interpretation for some time to come.

Waldo R. Wedel 1961
PREHISTORIC MAN ON
THE GREAT PLAINS: 183-184

ABSTRACT

THIS REPORT provides an overview of the prehistoric and early historic cultural resources of the Missouri National Recreational River. A preliminary description of the natural environment is provided along with ethnographic descriptions of the tribes which inhabited the region. An ethnohistoric overview reviews the documentary evidence, and archaeological summaries are provided for each of the cultural episodes. Recorded archaeological sites are supplemented with evidence provided by landowners and amateur archaeologists, and by aerial photo interpretation.

THE DATA gathered provide the basis for formulating research questions and guidelines for management and interpretation. These are critically important because our research has demonstrated that the Missouri National Recreational River is even more important for the cultural resources it contains than for the scenic and natural features which led to its creation.

IMPORTANT KNOWN SITES are the original St. Helena sites, 25CD1, 25CD2, and 25CD3, which are on the National Register, and 25CD11 and 25DX6 which are not. Many other sites are poorly documented now but probably will achieve National Register status.

MANAGEMENT RECOMMENDATIONS include emergency archaeological survey of areas threatened by development; a well-designed survey of the whole area, including subsurface testing in order to generate a predictive model for management purposes; gathering the data necessary to make National Register nominations, and acquisition of appropriate properties, such as the Fort Site, 25CD11, for use as interpretive centers.

RESEARCH QUESTIONS developed involve chronology, environmental reconstruction, culture history, physical anthropology, and human behavior. If these are pursued in a well-planned interdisciplinary program, the Missouri National Recreational River has the potential for contributing to significant advances in a number of disciplines.

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I.

INTRODUCTION

A fifty eight mile long stretch of the Missouri River and its immediate environs, from Ponca State Park, Nebraska, to Gavins Point Dam, was designated a National Recreational River, a classification within the Wild and Scenic Rivers program, in November, 1978 (P.L. 95-625, "The National Parks and Recreation Bill of 1978"). Designation of the Missouri National Recreational River (MNRR) acknowledges that this reach (in the words of the Wild and Scenic Rivers Act) was found to:

...possess outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural or other similar values...

This study is focused on the prehistoric and early historic aboriginal peoples in and near the Missouri National Recreational River. From this perspective, the character of the known or suspected cultural values may well exceed the explicit expectations in the wording of the original laws--this is a genuinely remarkable archaeological area.

In order to circumvent, from the beginning, any confusion regarding the precise area to which this study is addressed, we have coined the term "project domain". The project domain is that area roughly bounded by U. S. Highway 12 on the south, U. S. Highway 50 on the north, Gavins Point Dam on the west, the Big Sioux River on the east and a somewhat arbitrary line on the southeast from the Dixon - Dakota county (Nebraska) boundary across the Missouri to intersect with the Big Sioux (Figure 1.1). Through the center of the project domain flows the Missouri National Recreational River, and its corridor of adjacent lands. It will be useful to keep in mind the distinctions between the project domain, in contrast to the MNRR corridor, modern political boundaries, and divisions of archaeological space such as locality, region, subarea and area, as defined by Willey and Phillips (1958).

The MISSOURI NATIONAL RECREATIONAL RIVER MANAGEMENT PLAN (pages 23-24), a document intended as a general guide for administering the MNRR, identifies as objectives compliance with the National Historic Preservation Act of 1966, establishment and maintenance of an inventory to identify, evaluate, and protect historic and prehistoric cultural resources; the preservation, protection, and enhancement of historic and archaeological sites; and the interpretation of historic and archaeological sites for visitor enjoyment. As a step in implementing these objectives, the U. S. Army Corps of Engineers, through

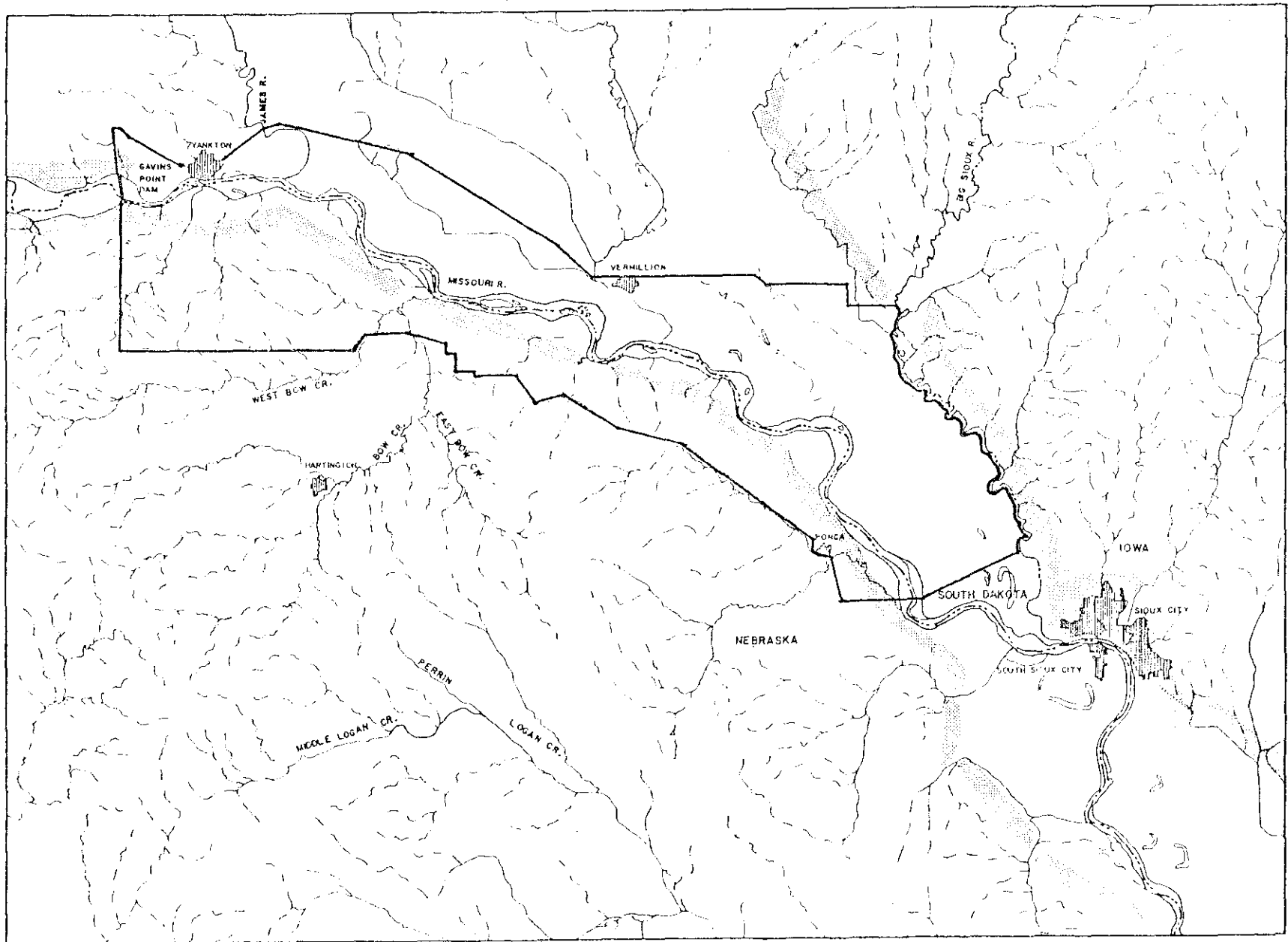
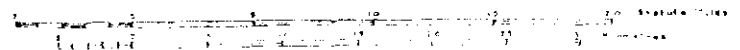


FIGURE I.1

2

bluff lines



THE PROJECT DOMAIN

the Interagency Archeological Services - Denver, solicited proposals to research and write an inventory and overview of the aboriginal cultural resources of the project domain (RFP W530053). A proposal for such a study was submitted by the authors. This was accepted and this report is a result.

The results of our investigations are organized into five broad topical categories, under each of which an inventory of known resources was conducted, an overview constructed using available resources, and research questions utilizing the existing data generated. These five topics are 1) a regional overview of the culture history, 2) environmental considerations, 3) human behavior, 4) human biology, and 5) management and interpretation.

We have utilized a broad range of pertinent information to construct these overviews, and have recommendations to make on every count. However, we felt that we would not be properly executing our obligation if we restricted ourselves to recommendations concerning existing resources only. We will show that these are valuable but flawed, and we recommend some specific remedies which would entail new field work. In each case, this category of research questions and recommendations is kept separate from those explicitly called for in the scope of work.

This report is divided into ten parts. These introductory remarks are followed by a brief narrative of activities during our work on this project (Part II). Part III reviews aspects of previous anthropological research, especially archaeology, in and near the project domain. Part IV provides some information necessary to characterize the natural environment of the project domain and its broader environmental context. Part V is a series of ethnographic sketches of the Native American peoples known or suspected to have been resident in or to have passed through the project domain, while Part VI focuses upon an ethnohistoric narrative of events which involve these people in the project domain from about A.D. 1700 or a little earlier. Part VII is an overview of regional archaeology, with an emphasis on the project domain; it summarizes what we know about the project domain from the earliest human occupation to the protohistoric period. Part VIII is an overview of the inventory of existing archaeological data from the project domain. In Part IX research questions which we have developed will be explored, and in Part X some recommendations regarding research, management, and interpreting the record will be offered.

II.

NARRATIVE OF ACTIVITIES

The compilation of the present overview of prehistoric cultural and archaeological resources along the Missouri National Recreational River, involved three primary activities: 1) the review of archaeological, ethnographic, and ethnohistoric literature; 2) the inventory and assessment of existing archaeological collections from the project domain; and 3) the formulation of research problems and management recommendations for the region.

On October 1, 1980, work began on the literature review, with the responsibilities for specific archaeological and ethnographic reviews allocated between the three co-principal investigators. Library research at Wichita State University was performed by Ms. Lorna Batterson (Mandan, Arikara, Central Plains Tradition, Coalescent Tradition, and Oneota Tradition). Library research at the University of Iowa was performed by Royce Krantz (Ioway, Pawnee, Omaha) and William Edwards (Archaic, Great Oasis, and Middle Missouri Tradition particularly Mill Creek). This background research was conducted as the first phase of the project and resulted in the ethnographic overviews of Part V in this report and the archaeological overviews of Part VII. The environmental overview (Part IV) and the historical narrative (Part VI) were compiled at the Nebraska State Historical Society.

The occasion of the 38th Plains Conference on November 5, 1980, in Iowa City, provided the opportunity both for the principal investigators to meet and evaluate their progress to date, and to compare notes with other professionals with an interest in the project region. On November 6, a discussion session of the Plains Conference was held to elicit suggestions concerning the project and to define specific research problems which might profitably be undertaken in the project area. As a result of this session, and other informal contacts made during the conference, a broad range of ideas and research suggestions were collected for consideration. On November 8, the investigators met to organize the second project phase, that of an archaeological collections inventory. Also during this meeting, rough drafts of the literature overviews were compared, and a standard format, based on the Kansas State Plan for archaeology, was adopted.

On November 28, the investigators met at the Nebraska State Historical Society to test the collection inventory procedure to be used during the project. The inventory forms and procedures were tested by applying them to a series of varied collections stored at the University of Nebraska and the Historical Society (all of which

derived from the project area). Based on these tests, the inventory forms and procedures were revised. These experiments were also important as a means of ensuring consistency in reporting on the part of the observers.

Following the Lincoln meeting, the investigators began the process of collections inventory. All collections deriving from sites within the project area were inventoried. Institutions and repositories in the areas neighboring the project domain were contacted to ensure complete coverage. During this second phase of research, each investigator was responsible for the collections residing in his area. In addition, Blakeslee and O'Shea examined collections at the Iowa State Historical Society and the Iowa Office of the State Archaeologist in Iowa City, and collections at Luther College in Decorah, Iowa. Duane Anderson, Joseph Tiffany, Dale Henning, and Elizabeth Henning were consulted during this period. Blakeslee continued on to inventory the Gavins Point Site collections at the University of Illinois, Chicago Circle, and to consult with Dr. Robert Hall. During January, 1981, Ludwickson made a similar data gathering trip to South Dakota. During this trip he examined collections and historical records at the South Dakota Archaeological Research Center in Sturgis, the State of South Dakota Department of School and Public Lands in Pierre, and to consult with Drs. Larry Zimmerman and Larry Bradley at the University of South Dakota in Vermillion.

A second important aspect of the inventory phase of research was a trip to the project area by the investigators. This trip had two objectives: 1) to meet with Native American groups in the region to discuss sites of possible cultural or religious significance which might fall into the project domain, and 2) to make contact with local amateurs in an effort to assess the existence of archaeological resources beyond those presently documented. It should be noted that fieldwork was expressly outside the scope of work specified for the current project. All site locations attributable to local amateurs (or remote sensing) are unconfirmed and are offered as a suggestion of resource potential only. Research in the project area took place during the period January 5-9, 1981.

Following previous contact by mail and telephone, individuals of the Omaha, Winnebago, Santee Sioux, and Yankton Sioux tribes were interviewed. The results of these interviews are summarized in Part X. Contact with local amateurs was obtained through a series of public lectures in Ponca and Wynot, Nebraska, Yankton and Vermillion, South Dakota, on the evenings of January 5, 6, 7, and 8, 1981. Participants were urged to bring their personal collections to the lecture. Following the talk and slide presentation, the investigators examined and discussed with the collectors their artifacts and knowledge of sites within the locality. Considerable information was

gathered during these evening sessions relating to unknown sites within the project region.

One further aspect of the inventory process was the analysis of remote sensing data from the project domain, as a means of identifying potential site locations. This aspect of the project was undertaken by Ms. Sandra Laney of the Remote Sensing Applications Laboratory at the University of Nebraska-Omaha. The photo-interpretive work has resulted in the identification of a large number of areas as potential site locations. These findings are discussed in Part VIII.

On January 10, the investigators returned to their respective institutions to complete the writing of various report sections, and to begin the task of formulating appropriate research problems and management recommendations. A final meeting of the investigators occurred on February 22 in Wichita, Kansas. At this meeting drafts of the report sections were evaluated, and final decisions on format and organization were made. Considerable time at this meeting was also devoted to the consideration of research problems and management recommendations, and to the suitability of the existing archaeological collections for further research. These considerations are reflected in Parts VIII, IX, and X of this report.

Final preparation of the preliminary report was undertaken at the Nebraska State Historical Society. Graphics and maps were prepared by Mr. William Potenski of Wichita. John Ludwickson, who acted as project coordinator throughout the research, had the responsibility for the final assembly and production of the report. After receipt of reviews of the draft report, revisions were made by all three investigators. The final version was assembled at Wichita State University. Ms. Lorna Batterson compiled the bibliography, and Wanda Sanborn typed the manuscript and contributed to the editing.

III.

PREVIOUS ANTHROPOLOGICAL INVESTIGATION

The project domain has been the subject of archaeological research for a respectable period of time. Interest in the area has not been continuous, but it has periodically drawn archaeologists and ethnologists into several portions of the locality. It is valuable to consider that the first Plains Conference, or as it was originally styled, the "Western Plains Conference of Explorers," was held at Vermillion, South Dakota, within the project domain, in September of 1931 (Sheldon 1932: 161). Lewis and Clark, as early as 1804, remarked on the "Ancient Village of the Mahars" and studied the fabled "Spirit Mound" just north of the project domain (Lewis and Clark 1904-1905 I: 121-123).

Serious archaeological activity within the project domain appears to have begun in 1890 with the investigations of Professor Theodore H. Lewis under the sponsorship and with the aid of Alfred J. Hill (Keyes 1928; Lewis 1891, 1898). These men created the "Northwestern Archaeological Survey" in 1880 which persisted until Hill's death in 1895. During these years over 13,000 mounds and earthworks were mapped with precision by Lewis, not to mention rubbings of petroglyphs and other records made of now largely destroyed archaeological phenomena. Although Lewis and Hill were firm believers in the "mound-builder" theories of their day, Lewis was a careful and skeptical scientist. His self-proclaimed research goal was:

...to make a complete and systematic survey of all the pre-historic earthworks in Minnesota, to include also such portions of the adjoining states, territories, and provinces as might be deemed desirable to show the direct and relative connections of the various systems.

Lewis 1898: 1

In September of 1890 this ambition brought Lewis into the project domain. He mapped an earthwork at the mouth of Bow Creek within which were two conical mounds, and described a village site in Dixon County which contained house depressions protected by a fortification ditch (Wood 1978). The former site can with confidence be identified with Site 25CD11, appropriately named the Fort Site, and the latter is probably 25DX20. It is not possible to overestimate T. H. Lewis' contribution and we can but wish he had spent more time here. Lewis' notes and drawings are now housed at the Minnesota Historical Society and are a valuable resource.

William Huse's 1896 HISTORY OF DIXON COUNTY relates a number of "Indian legends" of no particular value, but does mention some sites which must fall within the project domain:

There was also an Indian village occupying the ground where Ponca is. Another was about three miles east and down the valley; and along the bluffs on the north were several more. One of these, quite a large town, was on the farm of Joseph Brewer. Near where Ionia was, were two villages, one of them as large as the town in the Daily valley.

Huse 1896: 62

Huse also records some instances of early amateur archaeology:

This [legend] was in a measure corroborated a few years ago by exploring a mound on the farm then owned by Mr. F. Conrad. There, on one of the high bluffs which overlook the Missouri, is a mound of circular form about twenty feet in diameter and ten feet in height. Its appearance indicate that it was constructed by human hands, a few years ago N.S. Porter and others investigated it to see what it contained. The ground was packed down very hard, so hard that it was almost as impenetrable as rock. With great difficulty and labor, the explorers with pickaxes and spades were enabled to excavate a hole from the top of the mound downward about eight feet and some four feet across. They were rewarded by finding the bones of numerous human skeletons.

These skeletons showed that those buried there were of great size, the skulls were large but thin and the jaw bones were powerful and armed with tremendously strong double teeth. With these bones they found a quantity of charcoal. The skeletons had been placed side by side in a sitting position and fronting the north. With them no beads, pipes or weapons were found, thus showing that the occupants of the mounds had been deprived of their weapons and ornaments before burial.

Huse 1896: 62-63

Huse records the explorations of "Old Joe Brewer" during the 1870's about two miles northwest of Ponca. On the prominent bluffs overlooking the Missouri River at that point, Brewer excavated in a

"city of mound builders" (Huse 1896: 94-95). It is apparent that the cultural remains of the project domain have been a cause for curiosity for over a century.

There is a hiatus in archaeological activity on the Nebraska side of the Missouri for many years. Archaeological research in the South Dakota portion of the project domain, however, began with the explorations of William H. Over in the Arbor Hill Mounds, near Richland in Union County in 1918 (Over 1973: 290-291). Here Over exposed a number of human skeletons but failed to recover artifacts in association. He also described a village site which was discovered on the terraces of Brule Creek about one-half mile south of Arbor Hill during gravel pit excavations which probably destroyed the site.

Over excavated in the Ufford Mound group, 39CL2, near Vermillion in 1929 and 1930, and again in 1947 (Over 1973: 26). Also, he gathered a sample of Oneota pottery from sewer trenches on the bluff within the town of Vermillion, but carried on no excavations here (Over 1973: 28-29). At another place within Vermillion, a late prehistoric burial was discovered, as well as prehistoric interments, the locations of which have been lost (Over 1973: 29-30).

The search for the "Bad Village" of the Omaha, guided by cryptic descriptions in Fletcher and LaFlesche's monograph on that tribe, was a major impetus for renewed archaeological activity on the Nebraska side of the Missouri in December of 1932. Doctor George Gilmore and Lee Daniels, under the direction of Dr. Earl Bell, director of the University of Nebraska Archaeological Survey, made a trip to Dakota and Cedar counties looking for evidence of historic Omaha sites (G. H. Gilmore 1933; Cooper and Bell 1936). They failed in this objective but discovered the numerous remains of what was to be called the St. Helena Focus. During 1933 and 1934 civilian work relief crews directed by student archaeologists under the overall supervision of Dr. Bell excavated in three villages and two ossuaries of the manifestation. The resulting master's thesis by Paul L. Cooper was subsequently published and remains the only substantive published record of the various excavations carried out within the project domain (Cooper and Bell 1936).

Bell returned to the project domain again in the summer of 1938, choosing the Dixon County vicinity near Ponca as the locus of his excavations (Ponca JOURNAL LEADER, May 12, June 2, June 26, September 22, November 3, and December 8, 1938; Field Notes, Sites 25DX1-25DX10). Assisted by Steven Wimberly and Stanley Bartos, Bell excavated four lodges at Peterson Site (25DX1), salvaged part of another, possibly a charnel house, at the Brewer Site (25DX3), and conducted excavations at a Woodland or Central Plains Tradition ossuary (25DX4), and two Woodland sites immediately outside of the project domain. The Woodland sites, among other "Early Ceramic Period" sites from northeastern

Nebraska, provided the raw material for a master's thesis by Raymond Price (1956). Five additional sites were located during surveys conducted by Wimberly and Bartos under unknown conditions.

Parts of the University of Nebraska Archaeological Survey field seasons of 1939 and 1940 were spent in Dakota County, Nebraska, excavating Woodland (Price 1956: 90-107), Central Plains Tradition (Frantz 1963; Blakeslee 1978) and historic Omaha sites (Ludwickson 1979a; O'Shea and Ludwickson, in press). During 1940, a small party from the Nebraska State Historical Society spent a weekend in Cedar County near the mouth of Bow Creek. This time, A. T. Hill was trying to identify the Omaha "Bad Village". He may have succeeded in part, for he tested a depression in the site to become known as the Jones Site (25CD7) and discovered a human burial of the historic period.

In 1940, John L. Champe had succeeded Earl Bell as Professor at the University of Nebraska and leader of the Archaeological Survey. Based on the leads A. T. Hill and he had developed, the Archaeological Survey of the University returned to the Bow Creek valley in 1941. Field crews, again W.P.A. sponsored, were supervised by Albert Spaulding, Paul Cooper, and Robert Cuming. The result of this season's work was the excavation of a Central Plain Tradition ossuary, historic period storage pits and burials at the Jones Site, extensive trenching and the discovery of several storage pits of Great Oasis affinity at the Ferber Site (25CD10), and the testing of historic components at the Pick Hill Site, 25CD8, and the Fort Site, 25CD11 (Champe 1949; Ludwickson and Snyder n.d.; Ludwickson et. al. n.d.).

World War II, Korea to an extent, and the priority of salvaging archaeological data from oblivion along the Missouri mainstem reservoirs then under construction combined to create another gap in investigations within the project domain until 1958. During that year University of Nebraska Department of Anthropology returned to the Bow Creek valley. Only one site within the boundaries of the project domain was excavated; the Wissler Site (25CD12) was determined to be another Great Oasis site (Frantz 1958a, 1958b). Southwest of Hartington, a Woodland ossuary was excavated and a number of other sites examined (Frantz 1958a, 1958c).

A small crew from the University of Nebraska returned to Cedar County again on a weekend in 1969 in order to excavate burials of apparent Archaic affinity. Although this work was outside of the project domain, it is mentioned because it provides the best evidence for Archaic sites near the bounded area (Carlson and Steinacher 1978).

The highway survey program of the Nebraska State Historical Society has resulted in the identification of a number of sites in the project domain from 1972 to 1979, but this effort has been limited and

sporadic (Ludwickson and Holen 1979). There has also been an attempt to identify the location of a military post, "Fort Jackson" (1864-1865), which has resulted in the accidental discovery of another Great Oasis site and a possible burial mound in the Bow Creek valley (Ludwickson 1981).

The Missouri National Recreational River corridor has been subjected to archaeological survey since 1976. In that year the University of South Dakota Archaeological Laboratory conducted a survey of the Vermillion River Chute area, South Dakota, and the Brooky Bottom Road area, Nebraska (Zimmerman and Buechler 1976). No prehistoric cultural resources were identified. Five additional areas within the corridor, two in Nebraska and three in South Dakota, were surveyed with similar results by the University of South Dakota in 1977 (Zimmerman and Burns 1977).

Two additional areas, one in South Dakota and one in Nebraska, were surveyed in 1978 by a crew from the Division of Archaeological Research of the University of Nebraska (Angus and Falk 1978). Again, no cultural resources were identified. Finally, during 1980, a survey was conducted by the U. S. Army Corps of Engineers South Dakota Area Archaeologist in four more areas on the South Dakota side of the Missouri and three on the Nebraska side (Nowak 1980). A buried Woodland site (25DX26, the Lembke Landing Site) was discovered on the Nebraska side.

Ethnography and Ethnohistory

The tribes known to have lived in the project domain during historic times include the Omaha, Ponca, Yankton, Teton (Brule), and Santee. Others are believed to have occupied it in the prehistoric or protohistoric periods; these are the Ioway, Arikara and Mandan. The Pawnee, although perhaps never residents, are closely allied with the Arikara culturally and were politically allied to the Omaha during the historic period. The Winnebago were late arrivals (1865-1866) in the region. These are the groups studied during this project. They have been the subject of ethnographic and ethnohistoric study for over a century.

Truteau, in 1794, recorded aspects of both Omaha and Teton life-ways and documents their presence in and near the project domain (Nasatir 1952). James MacKay (1799) wrote a description of the Indians of the region which passed into the possession of William Clark. Lewis and Clark themselves left a wealth of documentary records of the ethnography of the region. These are being reassembled in a definitive new edition of the Journals by the Institute for Great Plains Studies of the University of Nebraska. Edwin James (1823) provided extensive ethnographic data on the Omaha. J. N.

Nicollet made numerous valuable observations on the Dakota in 1839 (Nicollet 1976). These efforts, valuable though they are, were sporadic.

Formal ethnographic studies began in the late 19th century. Study of the Omaha and Ponca was initiated by the Rev. J. Owen Dorsey in 1879 (Dorsey 1884, 1886, 1889, 1890) and was continued by Alice Fletcher and Francis La Flesche (1911). The Rev. Steven R. Riggs (1890, 1893) began a study of the Dakota groups about 1840.

Litigation undertaken by the Omaha in the early 20th century recorded important oral testimony regarding Omaha and Ponca traditions (U. S. Court of Claims 1916). This evidence was used by Howard (1970) to help identify Ponca village sites.

Of the early 20th century investigators of the region, none is more important than Dr. Melvin R. Gilmore whose publications regarding the Indians of the region (e.g. Gilmore 1919) only hint at the broad knowledge recorded in his notes, many of which are in archival repositories including the Nebraska State Historical Society. Sporadic ethnographic research in the region (Mead 1932; Fortune 1932) was replaced by more intensive efforts following World War II. James Howard conducted research among the Ponca (1965) and among the Dakota groups (1960a, 1966, 1972). Among other accomplishments, he demonstrated the importance of the winter counts as a source of ethnohistoric data (Howard 1960b; 1976). Ella Deloria (1967a, 1967b) has also provided a number of studies of the Dakota. Indian Claims Commission cases yielded a wealth of ethnohistoric information. Reports on the Omaha (Smith 1973, 1974), Ponca (Jablow 1974) and Yankton (Champe 1974; Woolworth 1974) have been published, and other expert testimony is available on microfiche.

Finally, some efforts to provide ethnohistoric perspectives for historical sites excavated during the 1930's and 1940's are beginning to find their way into print (Wood 1959, 1960; O'Shea and Ludwickson in press). Ethnohistoric work continues with the efforts of Paul Olson who is taping and transcribing oral histories and those of W. R. Wood (e.g. 1981) who has been analyzing and publishing ethnohistoric documents and maps.

IV

ENVIRONMENTAL OVERVIEW

Introduction

The purpose of this chapter is threefold. First, a brief attempt will be made to characterize the environment of the project domain; second, we want to look at some of the recent literature regarding aspects of utilization of changing environments by human populations and how these apply to the project domain. Finally, we want to examine the impact of natural processes upon site formation, masking, and destruction.

Environment of the Project Domain

Topography:

The physiography of the project domain is dominated by the Missouri River, which has cut through unconsolidated Pleistocene sediments and Cretaceous bedrock. Local topographic relief varies from about 1440 feet on the west to 1090 feet in the southeast. The character of the Missouri valley changes dramatically six miles above Yankton, at Gavins Point. Prior to the flooding of Lewis and Clark Lake, the river ran in a 300 to 200 foot deep by one-and-a-half mile wide trench, known as the "gorge of the Missouri". Downstream from Gavins Point, the valley widens dramatically, so that at Vermillion it is four miles wide and at Elk Point, eight (Rothrock 1943). Above Gavins Point, Missouri "breaks"--steeply eroded gulleys and valleys (often cutting through Pierre shale)--dominate both banks; below this point the South Dakota side is a broad, alluvial plain.

The topography seen today is largely the product of historical geologic processes (see below) which occurred during the Pleistocene, and were quite different north and south of the river. The product of this is the geomorphic contrast between the opposite sides of the Missouri. On the Nebraska side, an old high loess plain (modified in the west by paleo stream channels) was created from aeolian sediments generated by glacial action; the subsequent incision of the Missouri River to bedrock has caused this plain to erode into numerous rugged valleys and smaller ravines fronting the river. A few large tributary streams, such as Aowa Creek and Bow Creek have developed; these tend to flow in broad valleys. In part this reflects the control upon local drainage (especially Bow Creek) by medial Pleistocene (Hartington Till) moraine deposits (Reed et al 1965: 194). Some playa lakes are found in the bluffs where remnants of the old loess plain have not yet been fully dissected.

The South Dakota side presents a far different picture. Here, old high terraces with much less relief than the Nebraska side have been eroded by three dominant tributary rivers: the James, Vermillion,

and Big Sioux. These streams, in contrast to the dendritic pattern seen on Aowa and Bow Creeks in Nebraska, are larger rivers joined by few and insignificant tributaries. Within the project domain, Brule Creek is the only major tributary of the Big Sioux, and Clay Creek the only one on the Vermillion; the James has none to speak of.

Near Elk Point, between the Missouri and the Big Sioux, an area of stabilized sand dunes exist. There are also three large morainal ridges, Turkey Ridge, James Ridge and Yankton Ridge, which attain a relief of 300 to 400 feet higher than the adjacent terrain.

Geologic History:

The region is underlain by Cambrian rock, which is separated by an unconformity (representing 400 million years) from Late Cretaceous sediments. These Late Cretaceous sediments are the oldest beds exposed in the project domain. The Dakota Group sandstones and shales represent shifting "beach" environments. Subsidence occurred and allowed the deposition of marine sediments: the Graneros shale, Greenhorn limestone, Carlisle shale, and Niobrara chalk. After this episode of deposition the sea retreated, and severe weathering removed the terminal Cretaceous and virtually all Tertiary sediments.

At the beginning of the Pleistocene, the ancient White River flowed through Clay County, South Dakota in a deep valley. A tributary which was a continuation of the ancient Niobrara River joined it just east of present Vermillion. Cretaceous marls, shales, limestones, and sandstones formed high, steep-walled bluffs along these ancient rivers.

The Nebraskan and Kansan ice sheets modified the then-existing topography to a considerable degree; meltwaters from the retreating ice sheets poured down these ancient rivers, destroying much of the till left by the glaciers. As the meltwaters subsided, outwash was deposited in the White and Niobrara River valleys; this was partially removed by subsequent meltwaters and covered by younger tills.

Later Kansan and Yarmouthian times were characterized by weathering and erosion; the Sappa silts and clays, and the Grand Island sands and gravels were laid down at this time. Illinoian ice covered most of the South Dakota portion of the project domain and till was deposited widely which exists today both at the surface and subsurface. Meltwaters then scoured out much of the existing deposits in the White and Niobrara valleys, deepening and widening the channels. These were later partly refilled with Illinoian outwash.

The warm Sangamon Interglacial was characterized by erosion and weathering. Buried Sangamon soils occur in Union County, however (Steece and Tipton 1965). Elsewhere these were either removed or were deeply buried by Wisconsin drift.

Early Wisconsin ice stopped some 80 miles north of the project domain; any east-flowing streams in eastern South Dakota not disrupted previously were now dammed and diverted southward. These streams again removed much of the fill of the White and Niobrara rivers.

Early Wisconsin outwash was deposited in previously formed troughs as volume and velocity of meltwaters decreased. A vast amount of loess was blown from this outwash plain and deposited on surrounding highlands. A medial Wisconsin ice sheet crossed the Missouri in northern Cedar County, diverting the river south and depositing the Hartington till.

An ice tongue advanced down the ancient White River during the late Wisconsin; marginal ice partly or completely overrode the surrounding highlands, and during the maximum of the late Wisconsin advance, ice pushed at least as far south as the present Missouri River floodplain. No late Wisconsin till is found any farther south than this (Reed et al 1965). Although no late Wisconsin till remains in the Missouri Valley, the north bluff of the trench is composed almost entirely of late Wisconsin till. An end moraine may have existed beyond the north Missouri River bluff, and an end moraine in the floodplain caused a constriction in the Missouri River trench near Vermillion.

As much as 136 feet of late Wisconsin till in the north central part of Clay County (in contrast to 50-60 feet on highlands on either side) suggests that ice remained in the ancient White River longer than elsewhere. Fluctuations in the ice contributed to formation of the end moraine complex in northwestern and northeastern Yankton counties, and ground moraine in northeastern Clay and northwest Union counties. Meltwaters from the retreating late Wisconsin ice carved a deep trench through this late Wisconsin ground moraine and early Wisconsin outwash, beginning the formation of the present Vermillion River trench. This trench was partly refilled by late Wisconsin outwash. This outwash has been dated by a radiocarbon assay on wood recovered from a well at a depth of 32 feet from the Vermillion valley outwash near Hurley, Turner County, S. D., (14 miles north of the Clay County boundary) dated $12,760 \pm 120$ B.P. (7-595).

After the retreat of the late Wisconsin ice, westerly winds carried vast amounts of silt and fine sand from the Missouri and Vermillion River outwash and deposited it as loess and dune sand on the adjacent uplands and dune sand near Elk Point.

It is clear that the landscape of the project domain is not the same today as in the distant past. Detailed study of the geomorphology should reveal some stable land surfaces, some surfaces removed entirely, and some masked from view by the present landscape, all of which may have been the scenes of human activity. We may reasonably assume that the Missouri River floodplain has been an important locus of human

activity since late in the Pleistocene, but active meandering has probably destroyed all but the most recent evidence. In contrast, the tops of the bluffs on the Nebraska side of the river often seem to bear visible late prehistoric lodge depressions. Lower topographic situations are often mantled by colluvial deposits to the extent that only chance exposure will reveal a deeply buried archaeological site.

Characterizations of landscape within the project domain, with the goal of establishing (for example) locations of potential floral resources and exploitation sites, must establish the topographic situations as they existed during the time period of interest. Detailed studies of landscape formation are beginning in Iowa (Thompson and Bettis 1980) and can eventually be done for the project domain to provide explanations of these processes.

Paleo-economic Geology:

Geologists who have studied the project domain have paid almost no attention to the lithic and other mineral resources which were of interest to the prehistoric inhabitants of the region. The data for a detailed study of artifact provenance does not exist, but a few outlines can be sketched.

Bedrock exposures are generally limited to the heavily dissected areas near the Missouri River in Dixon, Cedar, and Yankton Counties. The Omadi Sandstone formation of the Dakota Group "can be traced in an almost continuous strip along the Missouri River bluffs to a point a few miles north of Ponca" (Lorenz 1956: 13). This ferruginous sandstone was used for abrading tools and is common in archaeological sites.

The Smoky Hill chalk member of the Niobrara Formation is exposed from western Dixon County west, and becomes the most important outcropping lithic unit in central and western Cedar County (Lampshire 1956: 32) and along the bluffs in central Yankton County (Simpson 1960). The presence of so-called "Republican River Jasper," a variable siliceous facies of the Smoky Hill member, is not suggested by reading geologic reports. It occurs in sites, however, and may be a locally available resource. Outcrops of putative Ogallala Formation (Tertiary) rocks in western (R.1W) and eastern (R3E) Cedar County are reported (Lampshire 1956: 40-41), but the reports do not mention anything which could be construed as "Bijou Hills quartzite," a chippable material found in Ogallala deposits in South Dakota. Simpson (1960: 43) describes what may be the quartzite west of Gavins Point Dam in Knox County. This stone was also used by the aboriginal inhabitants of the region.

The Carlisle Shale formation contains a pebble conglomerate (probably stream beds) composed of water-worn, tabular cherty fragments

usually with ash gray to tan centers the edges becoming dark gray to black and possessing a concentric banded structure (Lorenz 1956: 28; Simpson 1960). These pebbles are fractured and pitted and were probably not a desirable resource for flintknapping.

Studies of Pleistocene deposits are scarce, but Simpson provides a description for the western portion of the project domain. Unconsolidated till with usefully large cobbles of Sioux Quartzite occur in the Cary till (Simpson 1960: 47-48). This material may be found in several moraine deposits in South Dakota and to a more limited extent, in Nebraska. Chert is a minor constituent in glacial deposits (Simpson 1960: 57).

The Grand Island Formation consists of fluvial sands and gravel transported eastward (in our case) by the ancient Niobrara. A good deal of petrified wood, some as logs 8-10 inches in diameter and several feet long, are reported (Simpson 1960: 70). It outcrops abundantly west of the project domain.

Archaeological studies of lithic raw material procurement are limited, so far, to one site: 25CD10. The frequency of lithic types from one major excavation unit is summarized in Table IV.1. It suggests that the Great Oasis people who created the site were utilizing stone sources predominantly west of the project domain. The high frequency of Republican River (Smoky Hill) jasper suggests that a local source may have been used.

Soils:

There are published soil surveys for four of the five counties of the project domain and survey of the fifth (Cedar County, Nebraska) is in process (Buntley et al 1953; Driesen 1968; Ensz 1979; Slama and Kerl 1978). A good characterization of broad soil characteristics is thus possible. South of the Missouri, Peorian loess blankets the uplands and supports deep, silt-loam soils of the Monona and Crofton series. Bottomlands on tributaries, such as Aowa Creek, have deep silt loams of Kennebec and McPaul series on nearly level slopes, and Napier soils on gently sloping areas. Uplands consist of Monona, Crofton, Knox, and Moody soil series, usually deep silt loams formed on loess.

North of the Missouri deep, nearly level floodplain soils of the Forney-Haynie-Sarpy Series occupy the bottomlands. To the west in Yankton County, the uplands are mantled in deep, nearly level and gently sloping silty soils of the Egan-Wentworth types. Clay County has sandy loams of the Fordville-Flandreau series formed on coarse sand and gravel, with alluvial silty clay loams of the Onawa, Luton, Lamoure, and Sarpy series. The "panhandle" in Union County is composed almost entirely of bottomland soils formed on alluvium.

TABLE IV.1

LITHIC RAW MATERIAL TYPES, EXCAVATION UNIT FIVE 25CD10

Lithic Category	Sample Size	Percent
Chipped Stone		
Bijou Hills Quartzite	95	32.7
Republican River Jasper	48	16.5
Chert	40	13.8
Chalcedony	9	3.1
Petrified Wood	12	4.1
Chert Pebbles	3	1.0
Other Stone Material		
Clinker	5	1.7
Red Pigment	4	1.4
Yellow Pigment	1	.3
Sioux Quartzite	20	6.9
Granite	18	6.2
Other Glacial Till	16	5.5
Limestone	10	3.4
Non-chert Stream Pebbles	9	3.1
Fossil Clam Shell	1	.3
TOTAL	291	100.0

Modern soil surveys are mapped in gross mapping units of similar, and sometimes dissimilar, soil types; this is for the convenience of the soil scientist. Gross-level soil mapping of this type has been shown to be of use to archaeologists, especially for studying large historic and late prehistoric sites (e.g. O'Shea 1979). However, fine-grained mapping may be necessary for earlier, smaller sites (see research questions, Part IX).

Flora:

Basic ecological studies of floodplain and upland vegetation in the project domain exist (Lawrey et al 1973a, 1973b). These can be supplemented with some historical data to begin to characterize the flora of the project domain.

Floodplain flora during the early nineteenth century was described casually by a number of observers. A somewhat more systematic data set is available in the original General Land Office survey notes. William Clark, in August 1805, commented on points of willows fringing the Missouri discontinuously at a number of spots as they passed up the Missouri (Clark 1964: 112-112). He mentions no other tree species. More pervasive are indirect and direct comments on the great expansive floodplain prairie composed of grasses (Clark 1964: 118). All the timber of the Vermillion, for example, ". . . would not thickly timber 100 acres of land" (Clark 1964: 118). The expanse on the South Dakota side was the "Hupan Kutey" or Buffalo Prairie of Nicollet and others, a natural expanse worth of comment to some early journalists. On returning from Spirit Mound to the Missouri, Clark remarked on ". . . a small grove here we got Great quantities of the best largest grapes I ever tasted, some Blue Currents still on the bushes, and two kinds of Plums, one the common wild plum, the other a large Yellow plum". (Clark 1964: 119), and found similar "plums" and grapes at the mouth of Bow Creek (Clark 1964: 120).

Sergeant Ordway was more observant of the trees, specifying cottonwood, elm, and oak. He mentions passing a "Red ceeder Bluff" a little above Aoway Creek, and again east of the Ionia volcano, both on the Nebraska side (Ordway 1916: 115). He also mentions "Rabbit berries" (buffalo berry?) at the same spot. He describes the party's camp of August 28 as being in a "handsome Bottom & Groves of oak Timber & C.[ottonwood]" (Ordway 1916: 118).

H. Marie Brackenridge passed through the project domain in 1811. Below volcano hill, he remarks:

I observe a much greater variety of trees and shrubs, than below, and some altogether new to me. . . .In the hollows, clumps of trees are usually found, but what surprizes me, they are very low, though some of the oaks and ash are eighteen or twenty inches in diameter, they look like orchard trees, and have much greater resemblance to regular plantations than wild woods.

Brackenridge 1814:232

He also remarks on ". . . the beautiful upland N.E. side, but without wood, an immense level plain stretches out . . . for about an hundred miles" (Brackenridge 1814: 233). Above the James River Brackenridge notes: "We are now in the open country--no woods are to be seen, except some slender cotton wood trees in the points, and some clumps in the hollows of the uplands" (Brackenridge 1814: 234).

The contrast with the lower Missouri was remarked on by Maximilian in 1833:

The character of the country was much changed; it is, for the most part, naked, and without woods. The trees which are found here are no longer lofty and vigorous, as on the lower Missouri; yet the wild vines are still seen climbing on the bushes, though this too entirely ceases further up the river.

Weid-Neuwied 1906 XXII: 281

There are many more anecdotal descriptions of the flora of the project domain which could be given. However, if we skip to 1855-1860 it is possible to characterize the flora in the entire area, and to arrive at a more comprehensive list of arboreal species. Lt. G. K. Warren, in 1855, constructed a map of the Missouri River upon which, among other features of interest, he has notes on the flora. In 1858 (Nebraska) and 1860 (South Dakota) the township and section line subdivisions were mapped by surveyors of the General Land Office. Flat maps of the townships were later compiled, and these three sources allow a characterization of flora in the mid-nineteenth century. By this time, however, European-American interference may have modified the arboreal flora to an unknown extent, chiefly through timbering to provide fuel for steamboats (from 1832).

These maps and documents show a fairly continuous band of cottonwood and willow along the banks of the Missouri, sometimes a mile wide, and sometimes pinching to nothing. At that time, the Missouri generally flowed on the south side of the floodplain, and the southern floodplain forest belt is correspondingly narrow. On the Nebraska side the general picture is a rapid rise to a rugged, grassy prairie, with some mention of burr oak and cedar in favorable spots. Marshy oxbow lakes are relatively scarce on the south side.

On the South Dakota side, most of the eastern portion of the project domain was "Rich Level Prairie" with quite a few oxbows. In the western portion, the arboreal fringe narrowed with a proportionate increase in prairie. Oxbow lakes are about the same.

Composition of the arboreal flora was overwhelmingly cottonwood and willow. Often mentioned is the existence of a cottonwood overstory and willow undergrowth. Line summaries and witness trees

(when used) also mention red elm, white elm, ironwood, burr oak, white oak, ash, "coffee bean" (Kentucky coffeetree, 1 mention), hackberry, box elder, dogwood, walnut (1 mention), and lynn.

Although a species list can be compiled, inference regarding community associations and succession are risky with the data at hand. Robert B. Kaul, a skillful botanist, using field data and selected other resources, has made an attempt at this for the period around 1850. Kaul (n.d.) characterizes his "Floodplain Prairie and Forest" as a Phalaris-Spartina, Populus-Salix (canary grass-cord grass, cottonwood-willow) association (named for the most frequently occurring species). He characterizes this zone as one of wet prairies and marshes (not entirely applicable to the entire South Dakota side). A narrow band of "Eastern Deciduous Forest," dominated by oak, is suggested on the dryer terraces, and in protected ravines. The uplands, and the dryer terraces on the South Dakota side, are "Tall-grass Bluestem Prairie," an Andropogon-Panicum-Sorghastrum (bluestem grasses--switchgrass-Indian grass) association. A number of G.L.O. surveyor records, however, mention "Scattering oak" on the uplands. The wetland flora, not specified by Kaul, would include bulrushes, cattails, reed, arrowhead and water plantain (Weaver 1965: 42); many of these had economic importance for the Native American inhabitants of the region.

The study of Lawrey et al (1973a) is important since it describes floodplain arboreal community succession. They propose a five-stage succession of (in order) Typha (cattail), Typha-Salix-Populus (cattail-willow-cottonwood), Populus-Salix, Populus-Cornus (cottonwood-dogwood) and Ulmus-Fraxinus-Celtis (elm-ash-hackberry), which represents progression from pioneers to climax vegetation on the usually unstable floodplain. The fact that G.L.O. surveyors observed a dominance of subclimax willow and cottonwood would argue for an unstable environment with flooding and channel changes being the controlling variables and burn-offs encouraging prairie colonization.

Upland deciduous forests on the bluffs overlooking the Missouri may represent stands hundreds of years old (Lawrey et al 1973b). The project domain is so close to the arid western edge of deciduous forest distribution, that stands of climax flora are displaced onto a lower topographic position to use the most favorable topographic and soils situations. In the project domain, existing hardwood stands in Cedar and Dixon Counties have climax arboreal vegetation dominated by basswood, American and slippery elms, green ash and burr oak.

In terms of the diversity and abundance of flora in the project domain, consultation of the ATLAS OF THE FLORA OF THE GREAT PLAINS (Great Plains Flora Association 1977) revealed that some 700 species occurred in at least one of the counties involved. Detailed studies by Dr. Melvin R. Gilmore of plant utilization by Indians on the Upper

Missouri (1913a, 1913b, 1919) show the economic importance of many of the species available in the project domain.

Fauna:

An excellent species list of vertebrates, especially mammals, can be constructed for the project domain using standard works (Jones 1964; Hall and Kelson 1959).

The various journalists of the Lewis and Clark expedition mention buffalo, elk, deer, beaver, prairie wolves, mink, badgers, a goose, "Prairie Larks," and catfish. Clark remarks especially on ". . .several large gangues of Buffalow & Elk feeding upwards of 800 in number" (Clark 1964: 119). Ordway noted that "The Missouri river affords us plenty of fish & the country plenty of all kinds of game" (Ordway 1916: 119).

We needn't speculate on the abundance of the country in prehistoric times. A faunal analysis is available for the Broken Kettle West Site (13PM25) immediately across the Big Sioux from the project domain, and an analysis of fauna from the Ferber Site (25CD10) has been done (Ludwickson et al n.d.). Both, unfortunately, are Great Oasis sites and thus do not show the temporal variation in species availability which might be evidenced with a more diverse sample. Certain conclusions are possible, however. The following table (IV.2) is a summary of the faunal analysis from 25CD10; the analysis from 13PM25 has been published (Bryson et al 1970).

The fauna from 13PM25 is diverse; nine small mammal species and bison, elk, and deer are represented, with almost 30 species of birds (ca. 72% waterfowl), fish, amphibians and reptiles. Nine mammalian species, one bird and one reptile are represented at 25CD10, reflecting the more primitive recovery techniques used there. Regardless of recovery differences, it is clear that there is major inter-site variation in the procurement of fauna. One bison bone was found at 13PM25 (House 3), while 107 bones representing at least seven animals were found at 25CD10. Although these are interesting comparisons, the real purpose here is to demonstrate the degree to which the abundant local fauna was used prehistorically.

Past Climates and Human Populations

Climate and climatic change rate special consideration since archaeologists and climatologists have spent so much time, and created such a large literature, on the subject. New conventions for discussing climate change have evolved since the early 1960's, based primarily on the work of Drs. Reid Bryson and David Baerreis, both of the University of Wisconsin, and their students. However, climatic explanations for cultural events in the Plains can be traced in a

TABLE IV.2

FAUNAL REMAINS FROM 25CD10

Species	Number	Percentage	MNI*	Percentage of Meat**
<u>Bison bison</u>	107	62.21	7	84.00
<u>Cervus canadensis</u>	6	3.49	2	9.80
<u>Odocoileus sp.</u>	11	6.40	2	2.80
<u>Antilocapra americana</u>	3	1.74	1	0.77
<u>Canis sp.</u>	29	16.86	3	1.26
<u>Taxidea taxus</u>	1	0.58	1	0.17
<u>Sylvilagus sp.</u>	1	0.58	1	0.03
<u>Castor canadensis</u>	3	1.74	2	1.08
<u>Geomys sp.</u>	8	4.65	3	0.02
<u>Chen sp.</u>	2	1.16	1	0.05
<u>Terepene ornata</u>	<u>1</u>	<u>0.58</u>	<u>1</u>	<u>0.02</u>
TOTAL	172	100.00%	24	100.00%

* Minimum Number of Individuals (MNI) computation based on Chaplin (1971)

** Meat utilization computation based on White (1953)

clear line to Dr. Waldo Wedel (during the 1930's and 1940's) and beyond to Dr. Fred Sterns. These studies invoke an environmental "possibilism" which has characterized Plains archaeology almost from its beginnings.

Analysis of radiocarbon dates by Bryson et al (1970) has been used to construct a postulated "step-like" succession of post-glacial climatic episodes; this complex model replacing the simpler one of Ernst Antevs which postulated a gradual rise in post-glacial temperatures (Altithermal) followed by a gradual fall (Antevs 1955). Subdivisions after ca. 1200 A.D. are based on a number of data sets, including the "beginnings" and "endings" of archaeological "cultures" (Wendland and Bryson 1974). The use of such data, often mere abstractions "guess-dated," would seem to introduce a measure of unreliability into the situation and compromise the procedure. The complete post-glacial climatic sequence, from Baerreis and Bryson (1965), Bryson, Baerreis and Wendland (1970), and Wendland and Bryson (1974) is given in Table IV.3.

The study of more recent Holocene climatic change has come to the very edge of the project domain. The Mill Creek "culture" of northwest Iowa was utilized to test models of late prehistoric climate change through collection of data sensitive to climatic factors (e.g. pollen and snails) (Henning 1968, 1969). This study has been criticized for a number of technical and methodological reasons (Butzer 1973). Recently, it has been suggested that the gradual build-up of midden sediments, an assumption upon which much of the study was predicated, may in fact be fewer discrete episodes involving house construction (Baerreis and Alex 1973).

Another set of evidence used to support the idea of a dramatic climate change on the Plains at this time is the fate of Upper Republican peoples further west who should have been more vulnerable to climatic stress. It is asserted that these people migrated to the Panhandle region of Texas and Oklahoma due to the thirteenth century drought which may also have affected Mill Creek peoples (Baerreis and Bryson 1965; Bryson, Baerreis, and Wendland 1970). This position is no longer tenable when viewed from central Nebraska (Ludwickson 1978) or the Panhandle (Lintz 1978), but continues to be cited as evidence (Bryson 1980, 1981). We feel that data from the contemporary Central Plains Tradition sites in the project domain can be brought to bear on the hypothesis of a thirteenth century drought and its putative effects on prehistoric Native American populations. This is discussed in Part IX, Research Questions.

TABLE IV.3

BEGINNING DATES FOR POST-GLACIAL CLIMATIC EPISODES

	Baerreis & Bryson 1965	SOURCE Bryson, Baerreis & Wendland 1970	Wendland & Bryson 1974
Recent	A.D. 1880		
Neo-Boreal	A.D. 1550		
Pacific	A.D. 1250		A.D. 1120
Neo-Atlantic	A.D. 800-900		
Scandic	A.D. 300-400		A.D. 270
Sub-Atlantic	500-600 B.C.		810 B.C.
Sub-Boreal III			1620 B.C.
Sub-Boreal II			2290 B.C.
Sub-Boreal I		2730 B.C.	3110 B.C.
Atlantic IV		4030 B.C.	4100 B.C.
Atlantic III		5100 B.C.	4690 B.C.
Atlantic II		5780 B.C.	5790 B.C.
Atlantic I		6500 B.C.	6540 B.C.
Boreal		7700 B.C.	7350 B.C.
Pre-Boreal		8550 B.C.	8080 B.C.

V.

ETHNOGRAPHIC OVERVIEW

Introduction

The project domain and the region surrounding it can be shown to have been the arena of activities for a variety of Native American peoples. The Mandan and Arikara may be documented only through archaeological evidence, a somewhat risky inferential exercise, but one with value. We are aware, and will discuss, some non-concordance between ethnic groups and archaeological evidence in Part VI; here we argue the potential value of linking archaeological remains to antecedents of historically identifiable groups. St. Helena sites, for example, may reveal more to one aware that they may have been occupied by people whose biological and cultural descendants were Arikara.

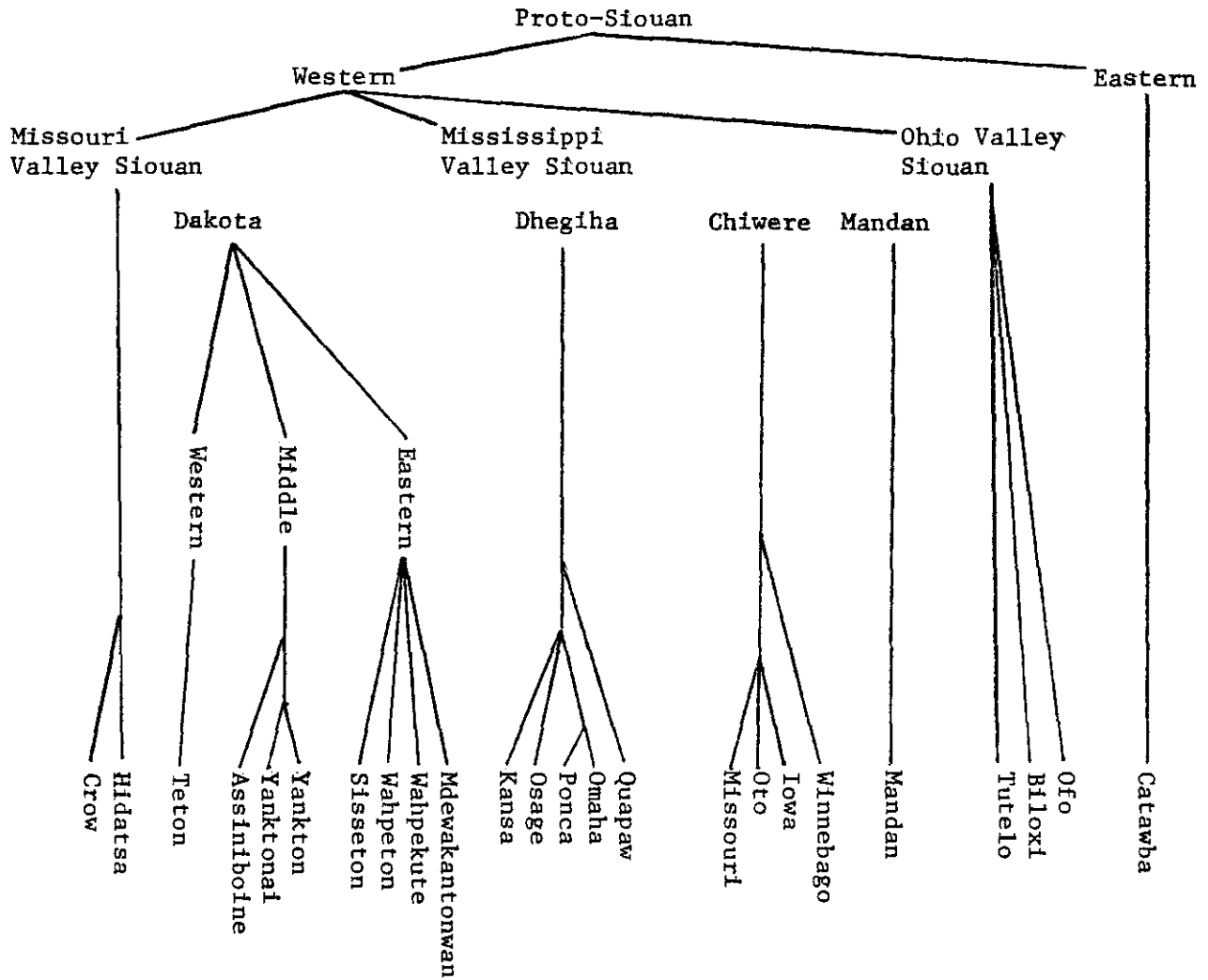
Language:

Speakers of a number of languages from two large language families have occupied the project domain at different times. Speakers of Northern Caddoan languages (Pawnee, Arikara) may be represented archaeologically by sites of the St. Helena Phase and Central Plains Tradition. Linguistic studies have indicated that Arikara is very closely related to Pawnee and less closely related to the other Northern Caddoan languages (Kitsai, Wichita, and Tawakoni-Waco). Presently there are only four Caddoan languages extant: Caddo, Wichita, Arikara, and Pawnee. According to Parks (1979a: 199), Arikara is not a branch of Skidi Pawnee (as was formerly thought). He believes it split from Pawnee before the division between Skidi and South Band Pawnee occurred. Parks suggests that the split between Pawnee and Arikara occurred about 500 years ago, even though glotto-chronological techniques suggest an age of only 300 years for the split (Parks 1979a: 205-207). Park's estimate of 500 years is close to assessments made by various archaeologists who trace the Arikara back in time to at least the Initial Coalescent Variant.

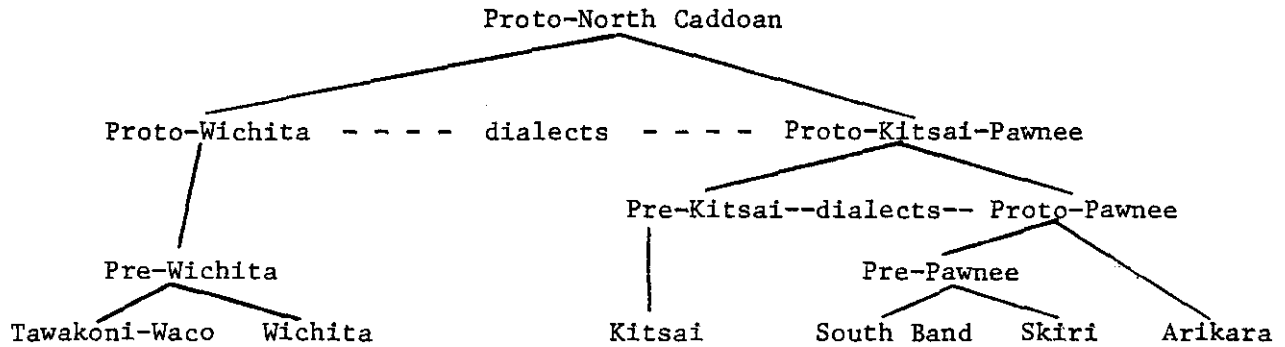
Speakers of the Proto-Mandan Siouan language may be represented by the Big Sioux Mill Creek Phase and/or the Over and James River Phases which are about coeval with St. Helena just outside the project domain to the northwest and southeast. Other Siouans, the Omaha and Ponca Dhegiha-speakers, and the Ioway and Oto Chiwere-speakers moved into and through the project domain during the late seventeenth and eighteenth centuries. Finally, speakers of all three Dakota language dialects (D, N, and L) resided in or passed through the project domain in the late eighteenth and nineteenth centuries. The best way to illustrate the inferred internal historical relationships

FIGURE V.1

RELATIONSHIPS OF SIOUAN LANGUAGES



RELATIONSHIPS OF THE NORTHERN CADDOAN LANGUAGES



between these languages is to present a dendrogram (after Parks 1979a) for the Caddoan-speakers and one (after Wozniak 1978) for the Siouans.

Bias of the Sketches:

There is no way to succinctly characterize the broad range of activities, beliefs, customs, usages, and behaviors manifested by a given ethnic entity. Neither can the "ethnographic present" be calibrated for each group to coincide with their time of occupancy of the project domain; in fact most ethnographies which deal with the peoples of immediate interest are products of the late nineteenth or early twentieth century. Finally, the literature on most groups is large, and data selection had to be made to limit our descriptions to reasonable lengths. Our approach is to briefly characterize each group, then to focus on aspects of behavior likely to have archaeological manifestations. The sketches on the Pawnee and Arikara will be given first, followed by the Siouans, the Mandan, Ioway-Oto, Omaha-Ponca, and Dakota.

PAWNEE

Introduction

The Pawnee had no permanent villages in the project area. Their villages in the proto-historic and historic periods were in a well defined area in Central Nebraska. They did claim territory north and east to the Missouri River, although they exercised no effective control over this claim. They hunted cooperatively with the Omaha in the nineteenth century both north and south of the Platte River and so must have occasionally visited the project area.

Traditional and Documentary History

Oral traditions about the movement of the Pawnee also suggest a southern origin for the group. Dunbar declares that "the Pawnee migrated to the Platte River region from the south and secured possession of it by conquest. The period of this migration is so remote that they failed to retain any of its details, except in a confused form (Dunbar 1880: 251). Hyde (1951: 9) notes traditional tales which point to a homeland beyond the Rio Grande (i.e., somewhere in the American Southwest), and believes that there is historical evidence for a movement of the Pawnee from the Red River area north (Hyde 1951: 12).

There is little support for these migration tales in current archaeological evidence, and more conservative ethnohistorical analyses do not support Hyde's reconstruction (Champe and Fenenga 1974). Indeed archaeologists have pointed out that the closest archaeological associations to the historic and protohistoric Pawnee exist in South Dakota, not to the south (e.g. Grange 1968).

The historic record for the Pawnee begins, questionably, with the entrada of Coronado in 1541. There is endless speculation that the "Harahey" were the Pawnee (Champe and Fenenga 1974: 10; Hyde 1951: 33). The case will probably never be proven (Champe and Fenenga 1974: 11).

The French provide the earliest and most accurate information on the location of the Pawnee. The "Pana" of the 1673 Marquette map were undoubtedly northern Caddoans (Wedel 1936; Champe and Fenenga 1974). Knowledge of the Pawnee grew rapidly after 1700 with the French establishment in Louisiana, and the 1718 Delisle map demonstrates that the locations for the "Les Panis, 10 villages" and "les Panimaha, 12 villages" are shown at the traditional as well as the historical placement of the Pawnee South Band and the Skidi Pawnee. Thus the two major divisions of the Pawnee were already recognized.

The period from 1726 to 1803 is one of generally spotty information and infrequent reference to the Pawnee. However, the individual bands of the South band become recognized as separate entities. The Kitkahahki, or Republican Pawnee, are identified as a separate grouping in 1777, and after 1785 there is mention of the Pitahauerat or Tapage as a separate band. Village movements were also being recorded, all within a limited area (Grange 1968; Champe and Fenenga 1974: 50). These movements no doubt reflect the beginning of a pattern during the nineteenth century of band combination into larger villages oscillating with their periodic breakdown into smaller villages. Villages combined in part because of the increasing sociopolitical friction in the Plains engendered by the Euro-american invasion. The larger units were, however, unstable because of the unreliability of the food resource base and so would fragment again (O'Shea 1979).

Lesser (1933) divides nineteenth century Pawnee history into four periods, only the first three of which need concern us. The first period extends from the Louisiana Purchase in 1803 to the Treaty of 1833. The population at the beginning of the period was probably around 10,000 for the four bands. Smallpox, however, hit the Pawnee in 1803, 1825, and then in a series of epidemics from 1829 to 1833. With the U. S. government's removal policy, tribes from the east were forced into the Pawnee's territory, and the Sioux began serious raiding expeditions against the Pawnee villages.

The second period is bounded by the treaty of 1833 in which land south of the Platte was ceded and by the Treaty of 1857 in which a Pawnee reservation was created and rights to other land were relinquished and the Pawnee became wards of the government. A mounting series of pressures--disease, Sioux raids, and Euro-american intrusion--brought the Pawnee to the Treaty of 1857 which marked their recognition of "cultural and economic defeat" (Lesser 1933: 16).

In 1857 the Pawnee were again moved north of the Platte and placed on a reservation. The lot of the Pawnee, however, did not markedly improve. Sioux raids continued, aimed not only at the Pawnee villages but also at the Pawnee on their traditional hunting grounds on the Republican River (Wishart 1979). During this time there are a number of accounts of the Pawnee hunting with other groups including the Omaha for mutual protection (Hyde 1951: 246, 289, 309). Fletcher and La Flesche (1911: 88-89) describe this relationship:

...when the two tribes hunted together north of the Platte, as they frequently did in the first half of the last century, the Omaha led, ...When however, the two tribes hunted together south of the Platte, the Pawnee led..."

With the advent of the reform-minded Quakers as Indian agents, the Pawnee were put under increasing pressure to stop the seasonal hunting cycle and take up the cultivation of wheat. Finally, a combination of government policy, Quaker urging, and Pawnee dissatisfaction led to the removal of the Pawnee from the traditional lands that they had inhabited for hundreds of years (Wishart 1979).

Ethnography

Economy:

The Pawnee claimed and undoubtedly were familiar with more land than actually was used by them or was under their effective control. Wedel summarizes these two contrasting domains:

The territory claimed by the Pawnee was bound on the north by the Niobrara River, on the south by the Arkansas or possibly the Canadian, on the east by the Missouri, and on the west extended rather indefinitely toward the Rockies...The actual area over which the Pawnee hunted and exercised chief control was thus a strip, as follows: Commencing with the Niobrara (between its mouth and Plum Creek) and extending southward to include the Platte between Shell Creek and the present city of North Platte, thence into Kansas to include the Smoky Hill drainage between the Republican River and the Ninety-ninth meridian...

Wedel 1936: 3-4

The land itself was used in two contrasting ways as the Pawnee practiced a dual economy of hunting and agriculture. Approximately two-thirds of the year was spent on the biannual hunts and one-third in the permanent villages in horticultural pursuits. Champe and Fenenga outline the seasonal cycle:

The tribe usually returned from the winter hunt to the permanent villages the first week in April and went to work immediately in preparation for spring planting. Planting, and the first hoeing of the crop, was usually completed by the 20th of June and the tribe then departed on the summer hunt, returning about the first of August to harvest their crops. The harvest was completed and crops were stored by the last week in October whereupon they set out upon the long winter hunt.

Champe and Fenenga 1974: 91-92

The traditional hunting grounds for buffalo, the major source of meat, were to the southwest on the Republican River, roughly ten days' march from the permanent villages (Weltfish 1965: 171-177). The hunts were generally highly organized, the pattern of movement and the location of the villages in the temporary camping areas dictated by tradition (Weltfish 1965: 163-170). Braves were also appointed as policemen to keep order on the march and during the hunts.

The cultivated crops most important to the Pawnee were corn, beans, and squash. Weltfish (1965: 119-123) noted that the Pawnee named ten different varieties of corn, seven different varieties of squash and pumpkin and eight varieties of beans. The women were largely responsible for the agricultural work. The cornfields were small, seldom larger than an acre, often located at the mouth of a ravine or similar spot where the soil was loose and fertile. Fields could be from five to eight miles from the village (Wedel 1936: 57).

Social Organization:

The Pawnee were divided into four bands: Chaui, Kitkahahki, Pitahauerat, and Skidi. The bands originally consisted of groups of villages which were largely independent and endogamous units (Weltfish 1965: 20; Parks 1979b). With the progressive collapse of the population, small villages united as bands, and finally the bands into larger villages. The first chief of the Chaui band was titular head of the Pawnee nation and formed a council made up of the four chiefs of each of the bands. The council only dealt with matters concerning the whole tribe and had no coercive power. The ranked chiefs of each band inherited their position generally through the maternal lineage, although desire and ability were important in affirming the position. The chief had a herald to call meetings and proclaim the results of the chief's council. The band also had 24 young braves as police. Their tenure was limited to a year and their authority generally limited to the buffalo hunts. A priesthood to supervise the rich and complex religious and ritual life of the Pawnee formed, on occasion, a counterbalance to the authority of

the chiefs. This is noted in the famous Morning Star ceremony in which a human sacrifice took place. In later years, this ceremony was opposed by the chiefs. Hyde (1951) vividly records a number of the schisms among the Pawnee over the Morning Star ceremony.

Villages:

The historic villages were located in the large river valleys of the Lower Loup, Platte, and Republican Rivers (Wedel 1936: 4,6) and consisted of earthlodges. As already noted, band combinations into villages fluctuated during the nineteenth century. Parks (1979b) estimates, however, that there may have been in the early historic period between 8 and 19 Skidi villages; the Pitahauerat probably had two and the two other South Bands had one apiece.

Burials:

The dead were, according to Bushnell (1927: 79-80), buried in excavated graves in a sitting position. Small, low mounds were erected over the graves. The cemeteries, belonging to several villages, were situated on high ground some distance away.

Archaeology

Archaeologists have located many of the historic village sites of the Pawnee mentioned in the historical record (Wedel 1936; Grange 1968; Roberts 1978). The Lower Loup Focus has been shown to be ancestral to the historic Pawnee, thus placing Pawnee occupation of central Nebraska back to at least A.D. 1500 (Wedel 1938; Grange 1968). Both Lower Loup and historic Pawnee are classified within the Coalescent Tradition.

Summary

The Pawnee never had permanent villages within the project domain. Their only ventures into the area would have been on joint hunting expeditions with the Omaha which took place in the middle of the nineteenth century and on trade visits to the Omaha villages. Their hunting camps were composed of the typical skin tipis of the Plains; thus only the remains of these transient camps with hunting paraphernalia, much of it (kettles, knives, gunparts) of American or European manufacture, would mark a Pawnee camp in the area.

ARIKARA

Introduction

The Arikara are a Caddoan-speaking people who emerge in the earliest historic period a short distance upriver from the project domain. Their traditions and what is known of the archaeological record, physical anthropology and linguistics all indicate a previous

residence in the Central Plains and to a lesser extent in the project domain.

Some traditional accounts derive the Arikara, in a very general way, from the south or east (Dorsey 1904: 12-40), but are not specific. One version brings the Arikara and Pawnee from big mountains in the south and into the Missouri River country via the Black Hills (Anonymous 1909). Gilmore's (1929: 95) assertion that the Caddoans migrated from northern Mexico is undocumented speculation. Dorsey (1904: xiii, 1906: 8-9) found some evidence in Pawnee traditions that the Arikara split from the Skidi (Awaho or "left behind") in the Loup River area of Nebraska. Finally, Fletcher and La Flesche (1911) record that the Omaha remembered finding the Arikara in north-east Nebraska, and credit the Arikara with teaching them to build earth-lodges and cultivate maize.

When the Arikara first emerge into history in the late 1600's on the Marquette Map of 1673 (Delanglez 1945; Tucker 1942). they are living near the South Dakota-Nebraska border on the Missouri and are shown on succeedingly farther north on later maps (cf. Delisle 1718). The Arikara were struck by smallpox three times prior to 1780 and by 1796 were living near present Hensler, North Dakota (Wedel 1955); by 1799 some were near the Grand River where they lived until 1833, with the exception of 1823 when they sought refuge after the attack on their village by Col. Leavenworth and the 6th Infantry (Wedel 1955; Krause 1972). From 1832 to 1837 they roved on the Platte River in Nebraska, finally returning to the old Mandan village at Fort Clark, North Dakota, and moving to Like-A-Fishhook village in 1862 (Smith 1972).

Ethnography

Economy:

The Arikara of the historic period lived in earthlodge villages along the Missouri River in South and North Dakota. Subsistence was obtained through horticulture, hunting, and trade. Gathering of wild vegetable products was of lesser importance (Denig 1961).

Social Organization:

The Arikara of the earliest historic records appear to have been coalescing into a tribal unit from previously independent village units. Arikara villages of the late 18th century appear to have contained speakers of several dialects and competing "chiefs" (Tabeau 1939: 124-136). This situation may have developed as introduced European diseases and warfare depopulated previously independent villages and forced them to coalesce for mutual defense (Hoffman 1977: 24-25).

Previously, the Arikara appear to have had a social structure very much like that of the early historic Skidi Pawnee. They lived in twelve or more independent named villages, each of which had its own sacred bundle (Gilmore 1927). Hoffman (1977) has suggested that a matrilineal descent system with village endogamy and lineage exogamy persisted among the Arikara into the 19th century. Since the Skidi Pawnee shared this pattern, it might have a time depth at least as great as the Arikara-Pawnee linguistic split, i.e. 500 years.

Villages:

Arikara villages consisted of a number of earthlodges, and many contained some sort of central plaza where public ceremonies sometimes occurred and a large ceremonial lodge which faced onto it (Gilmore 1930: 48). The earthlodges of the Arikara were large circular structures usually supported by drift cottonwood posts. They contained a central fireplace and large sub-floor cache pits. Many villages were fortified with a palisade and dry moat.

Burials:

There appears to have been some change in Arikara burial practices during the prehistoric and historic periods, and there may well have been several variations of mortuary practice at all times. In the historic period, the Arikara created primary burials in individual pits covered with poles. Earlier, exposure of the body on a scaffold was practiced prior to interment (Ubelaker and Willey 1978). Earlier still, the Arikara of the St. Helena phase included ossuary interment after a period of primary pit burial as part of their mortuary cycle (cf. discussion below).

Archaeology

The direct historical approach (Strong 1940), as it has been applied to the Arikara, has been immensely successful. Lewis and Clark, among many other travellers to the Middle Missouri, recorded the locations of many former Arikara villages. Excavations in these and other earlier villages have provided a direct line of continuous development from before A.D. 1300 to the historic period. This line of development is known to archaeologists as the Coalescent Tradition. The remains of the Protohistoric Pawnee, the Lower Loup Focus, are very similar to the Initial and Extended Coalescent materials from South Dakota. Thus it is possible that the Pawnee, or some portion of the Pawnee, once were part of the Coalescent Tradition of the Dakotas (Smith 1977: 156).

Another tribe, for example, which may have left remains identified as belonging to the Coalescent Tradition is the Cheyenne. This tribe has traditions of having once lived in Minnesota, but

the earliest excavated village attributed to them is the Biesterfeldt Site on the Sheyenne River in North Dakota. This site is a fortified earthlodge village which yielded pottery very similar to that found in contemporary Coalescent Tradition villages on the Missouri River (Wood 1971). According to Cheyenne, Sioux, and Arikara traditions, the Cheyenne later occupied a number of villages along the Missouri River (Grinnell 1962 I: 8-9, 22-30). Since no excavated villages in this heavily studied region has been attributed to this tribe, it may be that the later remains of the Cheyenne are indistinguishable from those of the Arikara. Another tradition which places the Cheyenne in the general region at this time belongs to the Kansa, who claim to have been defeated in battle by the Cheyenne when they tried to move north from Kansas along the Missouri River (Wedel 1946).

Finally, among the various groups which may have participated in the Coalescent Tradition are the Mandan, some of whom may have lived in villages along with the Arikara (Blakeslee in press). The evidence for this consists of oral traditions, burial practices, and skeletal remains.

Of all of the peoples who might have participated in the Coalescent Tradition, the case for the Arikara is the strongest. This is so in great part because of the efforts of William Bass and his associates in gathering and analyzing skeletal data. Their studies have identified a biological continuum from at least Basal Coalescent times (see Part VII) to the historic Leavenworth site as Arikara (Bass 1964; Bass et al 1971; Jantz 1972, 1973, 1977; Jantz et al in press; Lin 1973; Owsley et al in press). St. Helena phase sites including the Wiseman Mounds (25CD4), Hancock (25DK13), and Murphy (25DK9) have been identified as Arikara on the basis of 17 measured crania (Jantz 1977: Table 3). Thus the identity of much of the Coalescent Tradition as Arikara is secure.

One of the classic studies of the New Archaeology deals with the remains of the Arikara. Deetz (1965) attributed changes in the coherence of Arikara ceramic types to alterations in post-marital residence attendant upon changing economic circumstances in the historic period. Studies of this sort have been criticized from a number of points of view, although Deetz's work has been given more credit than most of the others (Allen and Richardson 1971; Bartovics 1974). Nonetheless, it has been criticized for placing the changes in Arikara kinship practices at the wrong time (Hoffman 1977: 23) and for wrongly assuming that female potters regularly taught ceramics to their daughters or granddaughters (Blakeslee in press). Deetz's general premise--that ceramic patterning reflects social organization at some level--is likely to be true, however. For this reason, we suggest some new approaches to this subject in our list of research problems.

Summary

Late prehistoric villages of Arikara have been identified as the St. Helena phase. Later villages of the Coalescent Tradition

are found further north along the Missouri River in South and North Dakota. St. Helena phase sites are found in the project domain, and it is possible that Initial Coalescent remains may be present as well.

MANDAN

Introduction

The Mandan are a Siouan-speaking tribe who occupied a territory centered on the mouth of the Heart River in North Dakota (Bowers 1950: 8). Investigations into their prehistory have suggested that the Mandan were responsible, at least in part, for the archaeological entity known as the Middle Missouri Tradition (Will and Spinden 1906; Wood 1967; Bowers 1948; Lehmer 1971; Strong 1940). The Middle Missouri Tradition encompasses variants which extend south and east to the project domain where the Mill Creek culture is considered to be part of the Initial Middle Missouri Variant. The apparent cultural continuity between Mill Creek and the historic Mandan is the reason we have included a consideration of this tribe here.

Traditional and Documentary History

It has long been recognized that the Mandan maintained two conflicting sets of origin traditions (Wied-Neuwied 1906). One tradition centers on the Heart River region, where the world was created and where major Mandan rituals originated. The other is more complex and can be seen to include movements of three different Mandan bands, the Nuptadi, Nuitadi, and Awigaxa (Bowers 1950: 156-163). In the historic period, these bands spoke different dialects of the Mandan language.

The origin traditions in question have these bands moving together up the Mississippi River to the vicinity of Minnesota. Somewhere in this region east of the Missouri River, one group, identifiable much later as Nuitadi, separated and moved north of the Turtle Mountains. The others proceeded south and west, eventually arriving at the Missouri River in the region of the mouth of the White River (Bowers 1950: 160). Here the Awigaxa separated from the Nuitadi and moved westward for a period. These three bands were associated with three sets of ritual: the Awigaxa with the skull bundle corn rites, the Nuptadi with buffalo rites, and the Nuitadi with the first Okipa. Furthermore, the Nuptadi and Nuitadi had different culture heroes, Good Furred Robe and Four Bears respectively.

It is thus reasonable to assume that the historic Mandan derived from a coalescence of three fairly independent groups, each with its own tribal ceremony and dialect. There may have been more than three, but the evidence for this is not clear. Of the three for which we have evidence, either the Awigaxa or the Nuptadi (or both) could have participated in the Mill creek development if, indeed, the oral traditions apply accurately to band locations at

such a remote period.

Ethnography

Economy:

Subsistence was provided by a combination of hunting and maize horticulture. Bison were the major game animal; these were sought away from the villages on an annual summer hunt and near the winter villages in the Missouri River trench in the dead of winter. Maize, beans, squash, and sunflowers were raised by the women while men planted tobacco. These crops not only fed the Mandan, they also drew tribes from all over the Plains to trade at the Mandan villages.

Social Organization:

The Mandan tribe was composed of three bands, each of which spoke a different dialect of the Mandan language. One of the bands lived in a single village; the other two were divided into several villages early in the historic period. Seven non-localized clans crosscut village boundaries; these were divided into moieties. Clan chiefs were hereditary owners of sacred bundles.

The men (and to a lesser extent, the women) were organized into age graded societies, membership in which was purchased at the appropriate time from members of the next higher age group (Stewart 1977). One age grade, the Blackmouths, served as village police.

Villages:

The Mandan resided in fortified earthlodge villages located on terraces of the Missouri River. Unfortified winter villages were located in floodplain forests. While the Mandan of the Historic period constructed circular earthlodges essentially similar to those of the Arikara, their prehistoric ancestors lived in long rectangular lodges, a type typical of the Middle Missouri Tradition. Many late Mandan villages contained a central plaza which in at least some cases contained a sacred cedar post surrounded by a circular wall of cottonwood planks (Bowers 1950: 111, 113).

Burials:

Traditional Mandan burials are not clearly described in the literature. Mortuary behavior usually involved exposure on scaffolds, but this was not universal (Bowers 1950: 60, 98, 99). Skulls from at least the scaffold burials were gathered together into circles on the prairie. Apparently each clan had its own circle, which constituted a shrine to the Woman Above (Bowers 1950: 100). The postcranial remains were interred after having been exposed until the scaffold collapsed (Bowers 1950: 101), and the skulls may also eventually have been interred (the sources are silent on this point).

Archaeology

Two critical sets of problems remain before the prehistoric Mandan can be equated directly with the Middle Missouri Tradition. One of these concerns the possibility that the Middle Missouri Tradition involves the remains of more "tribes" than just the Mandan. The second involves the possibility that some Mandan groups left remains which are not regarded by archaeologists as part of the Middle Missouri Tradition. There is some evidence to suggest that both possibilities have some validity.

That the Middle Missouri Tradition may have involved people other than the biological ancestors of the Mandan is suggested by several lines of evidence. One of these is the failure on the part of several generations of archaeologists to readily separate the remains of the Hidatsa from those of the Mandan. The Hidatsa tribe of the historic period was culturally similar but linguistically distinct from the Mandan. Historic sites of both tribes are known, but in spite of an early attempt by Bowers (1948) and considerable work since (cf. Calabrese 1972; Lehmer, Wood and Dill 1979), the remains of the two tribes are not yet clearly distinguished. Thus, it is quite possible that some prehistoric ancestors of the Hidatsa may have participated in the Middle Missouri Tradition.

The other line of evidence which suggests that some group other than the prehistoric Mandan may have participated in the Middle Missouri Tradition is in the form of human crania. The few intact human crania recovered from Mill Creek sites have been analyzed by physical anthropologists and compared both to historic Mandan and Arikara populations and to prehistoric Middle Missouri and Coalescent Tradition skulls (Owsley et al 1980). The results of a craniometric analysis using discriminant functions indicated that the Mill Creek crania were unlike those of the historic Mandan. Most of the crania from Initial and Extended Middle Missouri variant sites in South Dakota, however, did classify as Mandan. Definitive assignment of the biological identity of the Mill Creek people must await a better sample of crania.

The second problem in the equation of Mandan with the Middle Missouri Tradition--the possibility that some prehistoric Mandan communities left remains that are not recognized as part of the Middle Missouri Tradition--has been suggested recently. Using archaeological, ethnohistoric, and craniometric evidence, Blakeslee (in press) has suggested that Mandan populations lived with Arikara populations in at least some Le Beau Phase villages. The Le Beau phase is a part of the Coalescent Tradition, not the Middle Missouri Tradition. The idea that the Le Beau Phase should be identified with Mandan was originally proposed by Hurt (1957), but on grounds that are no longer considered valid.

Therefore, at this stage, no clear conclusions can be drawn regarding the relationship of the historic Mandan to the prehistoric archaeological assemblages in the project domain. The biological identity of both the Mill Creek villages and some units of the Coalescent Tradition are very much open to question.

IOWAY

Introduction

The Ioway are a people of the Chiwere Siouan language group, closely related to the Oto, less intimately with the Missouri and Winnebago. The vague, often unreliable, records relating to the early history of the Ioway make precise historical reconstruction difficult. While it is hoped that a feeling for the corpus of Ioway-related materials is gained, the emphasis is on extracting those elements which may illuminate the location and style of life which the Ioway led in the project domain.

Traditional and Documentary History

Few Ioway traditions of tribal movements have been recorded; for that reason, they are supplemented here by pertinent portions of Oto and Omaha traditions.

Schoolcraft (1851-57, III: 256-276) presents a map showing sixteen Ioway camps or villages based on his interpretation of native tradition. One of the locations puts the Ioway in the region of interest: it has the Ioway ascending

...the Missouri to a point of land formed by a small stream, on its east shore, called by the Indians Fish Creek, which flows in from the direction of, and not far from, the celebrated Red Pipe Stone quarry, on the heights of the Couteau Des Prairies.

Schoolcraft 1851-57, III: 257

Other recorded Ioway traditions refer to times when they were "one tribe" with the Winnebago, Omaha, and Missouri (McKinney and Hall 1933-34, II: 168) or with the Otos, Missouris, Omahas, and Poncas (Dorsey 1886: 12; Gallatin 1836: 127).

Oto migration traditions begin with a similar grouping and make mention of specific locations of Ioway villages (James 1905, XV: 130-136; Wied-Neuwied 1906, XXV: 313-314). They record a migration from the north, possibly north of the Great Lakes. The group split at Lake Winnebago, where the Winnebago remained. The Ioway separated at the Upper Iowa River. The Oto and Missouri proceeded to the Missouri River where they separated, with the Oto going upstream:

They [the Otos] moved still further up the Missouri, and established a village on its bank, about fourteen miles below Council Bluff. In this position they remained several years, during which time a band of the Ioways took up their residence about one year, on the bank of the river nearly opposite to them, and within about thirty miles of the present site of the Omawhaw village...The Ioways, after having resided in a village on the lower part of the Missouri a considerable space of time, were rejoined by the band above mentioned; when they abandoned their position, and returned to the waters of the Mississippi and erected a village on the Moyene, where it still remains.

James 1905, 15: 132-133

The historical record conflicts with this story on a number of points. The Oto were probably moving down the Missouri, not up it (Anonymous 1974: 19-20) and the suggested Ioway village was surely inhabited longer than one year (see historical section below). The village locations are approximately correct and the story has the interesting highlight of mentioning two Iowa villages for this period, although it does not locate the second one.

The oral traditions of the Omaha are the most explicit in the placing of Ioway villages on the Missouri (Dorsey 1884, 1886); Fletcher and La Flesche 1911; Fontenelle 1885). Dorsey starts the Omaha saga on the Ohio River. The Ioway accompanied the Omaha and Ponca in their northwestward trek up either the Missouri or the Des Moines River into the area of the Red Pipestone quarries in Minnesota. Fletcher and La Flesche (1911: 74) suggest two separate Omaha occupations of the Big Sioux area. Dorsey mentions only one and Fontenelle says that the Winnebago and other groups separated at this time. According to Dorsey, while the Omaha were on the White River the "Iowas [went] beyond [the Omahas] till they reached Ionia Creek, where they made a village on the east bank of the stream, near its mouth, and not far from the site of the present town of Ponca" (Dorsey 1884: 213). The location is described in 1886 as "the stream on which is situated the town of Ionia, Dixon County, Neb., hence its name 'where the Iowas farmed'" (Dorsey 1886: 219), and by Dorsey and Thomas (1907: 278) as the "site of Ionia, Dixon Co., Nebr." Fletcher and La Flesche mention this site, or similar one occupied by the Ioway, not far from the site of the present town of Ponca City (1911: 86). They also identify Aowa Creek as the one called by the Omaha "Ma'xude waa i te, where the Iowa farmed" (Fletcher and La Flesche 1911: 91). Fontenelle declares that the "Iowas located at the mouth of Iowa creek, near the present site of Ponca, Nebraska" (1885: 78). Dorsey may have simply confused Ionia Creek with Aowa Creek. although he should have been aware of the name confusion (cf. Riggs 1893: 190). Two pieces of external evidence, the 1718 Delisle map which shows a village in the area of Vermillion River opposite "Ionia", and Oneota

pottery found in Vermillion, South Dakota, may be of significance. Dorsey's informant may have named an Ioway site near Ionia and an Ioway village on Aowa Creek and Dorsey combined the two locations. As it stands the evidence favors a single Aowa creek location, with Dorsey confusing Aowa and Ionia Creeks. Dorsey (1886: 213) notes the final Ioway moves: "In the course of time the Iowas passed the Omahas again, and made a new village near the place where Florence now stands. After that they continued their course southward to their present reservation." The Florence Site is probably the one opposite the Oto village mentioned by James (1905, XV: 132-133). Most of the moves of the Ioway on the Missouri recorded by Omaha tradition apparently occurred in a time frame of roughly 1690 to 1750.

The oral traditions of the Omaha are not completely consistent with those of the Oto and Ioway. The northern movement of the Ponca and Omaha contradicts the southern drift recorded by the Ioway and the Oto. Dorsey claims the Oto left the Omaha and Ponca on the Missouri; Fontenelle says the split took place on the Big Sioux. The position of the Oto is particularly uncertain in these tales and is not clarified in the historical record.

Dakota traditions also mention the Ioway. Black Tomahawk, a Mdewakantonwan, declared that the Ioways:

...lived in a village at the place which is now called Oak Grove, seven or eight miles from Fort Snelling on the north side of the Minnesota river.

Pond 1908: 144

"The Iowas then built another village on the south side of the river, near the present planting grounds of Grey Iron, where they remained till the Dakotas obtained firearms..." The Ioways then fled to the mouth of the Iowa River and finally were driven by the Dakota to the Missouri (Pond 1908: 145). Other Dakotas disagree that it was the Ioway, stating that they were never as far north as the Minnesota River.

Much of the documentary ethnohistorical work on the Ioway, particularly for the French period has been done by Mildred Wedel (1938, 1974, 1976, 1978), and our discussion is based primarily on her work. For overviews of the history of the Ioway during later periods see Anderson (1973) and Blaine (1979).

During the 1650's, Nicolas Perrot commented that the Outaouas "ascended that river [Mississippi] to a place about twelve leagues from the Ouisconching, where they came to another river, which is named for the Ayo" (Blair 1911, I: 159). Wedel (1938: 237) has suggested the Upper Iowa as a likely candidate for this river. A

map sketched by Marquette ca. 1673 has survived: between 40° and 41° latitude are written the names Pahstet Maha, Pana, and Otontanta (Ioway, Omaha, Pawnee or Arikara, and Oto). While it is not possible to determine which river system these tribes are to be placed on, these Indian tribes may have been at the headwaters of either the Des Moines or the Iowa River. The Jolliet-Marquette information is obviously second-hand, but it gives the Oto and Ioway distinct names at an early date, and it locates both groups in the west associated with the Omaha. The second reference to the Ioway comes from Father Louis Andre writing in 1676 from Green Bay:

They are called aiaoua, or nadoessi mascouteins. Their village, which lies 200 leagues from here toward the west is very large, but poor; for their greatest wealth consists of ox-hides and Red Calumets...they lives at a distance of twelve days' journey beyond the great River called Mississippi.

Thwaites 1890, 60: 203, 205

The mention of the red calumet and the distances mentioned suggest that the Ioway were living in the west toward the Missouri river.

La Membre and Hennepin both make reference to the Ioway and the Oto, placing them in northeastern Iowa and southeastern Minnesota; Wedel (1976: 15) believes, however, that both sources are unreliable. Nicholas Perrot, on a trading mission in Sioux country in 1686, gives an account of his visit to an Ioway village. The village was "nine leagues distant, on the bank of the river" (Blair 1911, I: 368) from Perrot's trading post. Wedel (1938: 240) suggests an Upper Iowa River location for this village.

Father Marest, relying on information from Indians coming down the Missouri, refers to the "Paoute," which is name for the Ioway used by the Ioway themselves and generally by Dhegihan speakers; the term "Aiouex" is used by the Dakota and northern Algonquian tribes (M. Wedel 1978). Marest probably suffered from terminological confusion, but he may also record the difference between a western group of Ioway known only as "Paoute" and an eastern group known to the French as "Aiouez," who had to move near to their western kinsman.

In 1700, Le Sueur was told by the Sioux that the Blue Earth River was the country of the "Scioux of the West" (Teton?), the Ayavois and Otoctatas residing a little further south or west on the shore of a lake 20 leagues distant. Two Canadians, sent out to find the Ioways and the Otos, returned two days later without having found them. Less than a month later it was learned "...that the Ayavois and the Otoctatas had gone to establish themselves on the banks of the Missouri river, in the neighborhood of the Maha, a nation in those quarters" (Margry 1876, VI: 82).

The Delisles made notes on a 1697 Franquelin map which may already have contained information from Le Sueur's previous voyages. A translation of one of the notes on the map reads "Aiaouiex Nation that was formerly on the Mississippi at the place where the river enters which carries its name...and which withdrew here 10 or 12 years ago having made peace with the Sioux" (Blaine 1979: 26). By this information the abandonment of the Upper Ioway must have taken place shortly after Perrot's visit. Using Delisle's notes, Mildred Wedel locates the "Lake" village on Spirit Lake (Wedel 1976: 30) and suggests that the Gillet Grove Site may be this historic Ioway site.

Wedel (1938: 242-243) points out that the abandonment of the Spirit Lake Ioway village must have occurred recently because the Sioux informing Le Sueur were not aware of it. They may have gone to the Big Sioux location, the "Vermillion River" location suggested by the 1718 DeLisle map or the Aowa Creek location of Omaha oral tradition. The 1718 Delisle map places the Ioway in three locations. The first is the "Village des Aiaouex ou Paoutez" on a chain of lakes, the second on the "R. du Rocher" (clearly the Big Sioux, Wedel 1976: 30), and finally a village of Ioway is located on the north side of the Missouri on the eastern side of the mouth of a river tentatively identified by Wedel (1938: 302) as the Vermillion River, in large measure because of Oneota pottery finds in the vicinity (cf, Over 1973: 28-30). The Oto were then located on the Platte and in one or two villages on the prairie between the Missouri and the Des Moines. Wedel (1976: 30) believes that the Big Sioux site was inhabited for only a short time "possibly not more than a few months or a year," which would leave the site tentatively located on the Missouri at Vermillion River as the only known Ioway village between 1700 and 1712.

In 1714, Bourgmund made a trip up the Missouri River, noting groups on the Riviere Large or Nibraskier (the Platte) including the Oto, Panis and Panimahas (Folmer 1942; Giraud 1958). Bourgmund continues his narrative noting the Ayowest or Rakode 100 leagues above the Platte, on the left bank. Calculating the league at 2.7 miles and using Lewis and Clark's mileage chart (1904-05, 6: 3-5) for the Missouri places the Ioway village between the Big Sioux and Vermillion Rivers. One possible location is the Vermillion River; if it is correct, the supposed Aowa Creek village is not mentioned.

Another interpretation of Bourgmund's reference to the Ioway village is possible. In the immediately preceding passage, he describes the Skidi Pawnee village location with respect to the Platte River as "on the left as you ascend" (Giraud 1958: 16). If he intended the same orientation for the Ioway, the village would have been on the south shore of the Missouri River. The reference may be to the village which tradition places on Aowa Creek.

A reference by Charlevoix, who was visiting Kaskaskia, Illinois, in 1721, writes:

A little higher [up the Missouri] we find the Cansez, then the Octotatas, ...afterwards the Aiouez... All these nations...dwell upon the western banks of the Missouri, excepting the Aiouez who live on the eastern and are neighbours to the Sioux and their allies.

Charlevoix 1761, II: 224

Wedel (1938: 246) suggests that this may be either the old Ioway village south of Council Bluffs or a reference to a rehabilitation of the lakes region, but this might also be the Vermillion River village.

The next evidence locating the Ioway with any surety is the Bougainville Memoir of 1757 (1908: 178) in which the Ayoues and the Otoks are said to be fifty leagues above the Kansas. In the following year, 1758, Chevalier de Kerlerec places the Oto 80 leagues above the Kansas and the Ioway 10 leagues beyond that (Nasatir 1952, I: 52). Both references are probably to the Ioway village north of Council Bluffs. The Ioway then may have, all or in part, abandoned their more northerly village, or villages, as early as the 1720's or as late as the 1750's. The gap is disconcerting, but more information does not seem to be available.

Shortly after the confirmation of the Ioway presence near Council Bluffs, August Chouteau notes that in 1765 the Ioway "determined on a removal to the country of the river des Moins...about one half of the Tribe moved in the same year...the balance of the Tribe all removed to the same place in the course of two or three years" (Chouteau 1940: 139-140). The Ioway were not to return to the Missouri in numbers for many decades.

In reviewing the archaeological and ethnohistorical materials it appears that the data will fit with few conflicts into at least three acceptable settlement pattern models. The first is that the Ioway through most of their existence lived in a single village. There is no hard evidence contradicting this assumption until the voyage of Pike up the Mississippi when he noted two villages. If the Ioway occupy one village then any "good" siting locates the entire tribe in time and space; the Ioway then would have inhabited the Upper Iowa River from at least the 1650's to the 1680's. They move to Spirit Lake in the 1690's, to the Big Sioux in 1700, and then to the Aowa Creek village until after 1714 and south of Council Bluffs from the 1720's (maybe 1740's) until the 1750's when they move to the east bank of the Mississippi.

The second scenario postulates two and only two villages of the Ioway. One might have been located in the western part of Iowa

and one on the eastern part. The western one is that recorded in the Omaha legends and noted on the Marquette map. The confusion in the early literature between "Paoute" and "Aiouez" may be in part the result of two villages, one known to the traders as "Paoute" and the other as "Aiouez." James, in 1820 (1905, 15: 132), mentions two villages; as does Morse (1822). Wedel (1976: 21) notes that the Ioway were living in two settlements on the reservation. She (1976: 21) also notes that two villages with populations of 400 to 500 each would account for the large village sites on the Upper Iowa. Much of the dating accuracy of the one-village model is lost, but a number of second-hand accounts may be incorporated by the present model and later accounts fit this one better.

The third model is one of several small villages living in close proximity. This interpretation has the advantage of explaining the number of occupations in the Upper Iowa River which appear to be coeval or very closely spaced in time. The 1718 Delisle map showing three Ioway villages would be simply a reflection of this tendency to fragment. The villages may unite, so there is an occasional single village, and on rare occasions villages may branch off. Possibly the Oto did this in the protohistoric period; this would explain why there are no known prehistoric sites for them. This model will act in many respects like the first because the hamlets would tend to stay close together, but any particular siting does not now mean that the whole group has moved, and one Ioway village would indicate that there should be others in the area. This model has the least predictive ability for archaeological or ethnohistorical reconstruction.

Ethnography

Economy:

The Ioway were a semi-nomadic people who depended for part of their sustenance on the chase, part on horticulture, and part on wild plant products, although the contribution of each is not known. Gussow outlines the Ioway seasonal round:

The Iowa spent the greater part of each year away from their villages in hunting. Once a year, from May until the beginning of August, a village buffalo hunt was organized. Summers were the time when the Iowa hunted principally in order to secure food for the winter ahead. Buffalo, elk, and deer were hunted in the fall and winter, for their skins, by small parties and individuals, from September until the end of December. A short spring hunt lasting about a month or longer, from February or March until April, for bear and beaver, was also made by small parties and individuals. The time between April and May, August to September, and from Christmas through February or March, was spent in the village, though small parties and individuals issued

forth from the village constantly to hunt for daily food within their immediate vicinity. Crops, which were planted in April, were harvested between August and the fall hunt.

Gussow 1974: 13-14

The fur trade quickly subverted the hunting segment of the subsistence economy into a hunt for furs and peltries. As the animals whose furs and pelts were taken were often edible and the extent of time devoted to hunting for the trade is not known, the initial effect on the diet and the scheduling of traditional activities is not known. The ultimate effect of the trade was depletion of game supplies and exhaustion of a major part of the subsistence base.

Reference to the areas traditionally hunted by the Ioway are also limited. Gussow (1974: 18-20) surmises that the hunting grounds for the Ioway during the 18th century lay east of the Missouri and extended to the Des Moines River. A fur trader who wintered in 1805 at the Des Moines River village declared that the Ioway "hunted near the Missouri, about ninety miles from where we were located" (Anderson 1888: 151). Later references suggest that the hunting territory moved south and west of the Missouri River (Gussow 1974: 21).

Social Organization:

The social structure of the Ioway was a complex of hereditary and earned ranks, patrilineal clans, and societies. According to Skinner, ranks in Ioway society included chiefs, braves, and commoners. The five ranked chiefs' positions were hereditary within family lines. "Brave was an earned position with a series of grades depending on war honors" (Skinner 1926: 204-207).

The Ioway appear to have had ten clans: Bear, Wolf, Eagle and Thunder, Elk, Beaver, Pigeon, Buffalo, Snake, and Owl. These were arranged in two moieties. The clans were ranked, and each was responsible for different duties and rituals. Each clan had its own war bundles and peace pipes. The two leading clans, the Bear and Buffalo, supplied leadership and organization for half of the year. The Buffalo clan organized the summer activities, including the summer hunt and the bear clan handled the winter hunt and activities associated with that part of the year. Crosscutting the clan structure were the societies organized around different villages concerns. There were military societies, doctor societies, and dance societies. As with the clan war bundles and peace pipes, these different societies also owned bundles and other religious paraphernalia.

Villages:

Skinner (1926: 271-272) states "...The Ioway have retained an unusual number of house types, including the earth lodge, wattle and daub house, the square bark and oval mat houses, and the buffalo hide tipi." Irvin declares that their shelters were:

...in the form of huts or houses made of the bark of trees stretched over slender poles and tied together with bark strings, or they were tents or lodges made of the skins of the buffalo or elk...These bark houses were mainly for summer shelter, and would in a few years yield to the wear of time, when they would be abandoned and a new location sought...

Plank 1907-08: 312

Kurz (1937: 43) describes Ioway houses in 1848 as consisting of summer dwellings of skin tents, and winter lodges covered with rush mats or bark. The Ioway at any one point in their history used or made any and all the house types attributed to them by Skinner, although the bark and mat covered structures were the predominant forms with the earthlodge being rare.

Burials:

Blaine (1979: 186, 295) and Skinner(1926: 256) recorded the existence of scaffold burials. Lewis Henry Morgan in 1862 visited an Ioway cemetery and noted that they buried their dead in a sitting position with hollow graves with a roof of timber, covered with earth (Morgan 1959: 137). This is similar to Oto and Missouri burials from the 1830's (Bushnell 1927: 61-65) and different from the protohistoric extended burials of the Upper Ioway River.

Archaeology

The early historic and late prehistoric Ioway are represented by sites of the Oneota tradition, specifically the Orr focus. Other Chiewere and Dhegiha speaking tribes are also represented in the Oneota tradition, and some Algonquian speaking groups may also have participated in the tradition.

The Orr focus includes a series of sites on the Upper Iowa River in northeastern Iowa, two on the Root River in southern Minnesota, and the Harriman, Gillette grove, and Blood Run Sites in northwestern Iowa. Three of the sites on the Upper Iowa River contained trade goods; the others appear to have been prehistoric.

The Dixon, Gothier, and Correctionville village sites on the Little Sioux River are considered to be Correctionville-Blue Earth

phase. The early suggestion that this phase was associated with the Oto tribe has fallen into disfavor as no historic materials are present at any of the sites, and an alternative suggestion is that Correctionville-Blue Earth was a predecessor of the Orr Phase.

The Orr Focus sites in northeast Iowa are "characteristically found on the high flat terraces adjacent to the flood plain of the Upper Iowa River" (Henning 1970: 148). The three sites in northwest Iowa associated with the Orr Focus, Gillet Grove, Harriman, and Blood Run, are all located on high terraces, in contrast with the pattern of the Correctionville Focus where sites are located on the lower terraces (Henning 1970: 148, 153). Besides their location on high bluffs, the three northwestern Orr Focus sites are identified by the presence of Allamakee Trilled pottery and European trade goods.

If we postulate that the people inhabiting the Upper Ioway River valley moved west settling in scattered villages on the Missouri, their remains should be found on high bluffs, average size roughly ten acres. There should be no remains of houses and a village cemetery should be close by, containing extended burials with Allamakee Trilled pottery, some copper and catlinite objects, and glass beads and pieces of iron.

Summary

The Ioway when in the project area were practicing a dual economy of hunting and agriculture. Hunting grounds were probably in western Iowa and southern Minnesota. Agriculture took place in the river bottoms adjacent to the village. Houses were probably of mat and bark construction (although earth lodges may have been present) with the village graveyard not too distant. The critical issue of the number of villages the Ioway occupied simultaneously cannot be determined from the ethnohistorical or ethnographic record.

Omaha tradition and its recorders differ on the location of the Ioway village in the project domain: Dorsey proposed an Ionia Creek or an Aowa Creek (or both) location and Fletcher and La Flesche an Aowa Creek location. Bourgmond in 1714 located an Ioway village in the project area on the "left" bank of the Missouri. The Delisle (1718) map suggests a village near the mouth of Vermillion River on the north bank of the Missouri.

The ethnohistorical record suggests that the Ioway entered the project area circa 1700 and left circa 1720 to 1750. The Ioway village (or villages) should be found on a bluff or high terrace and have a size of about 10 acres. House remains will probably not be typical earthlodges, but a village cemetery should be nearby. Allamakee Trilled pottery, some brass or copper, catlinite, glass beads and iron fragments should be among the remains.

OMAHA AND PONCA

Introduction

The Omaha lived in and around the project domain for all of their recorded history and much of their traditional history. Ethno-historical sources and traditional accounts place at least one, and probably two, villages in the project domain. The Ponca are thought to have once been a clan of the Omaha, which separated from the Omaha sometime early in the eighteenth century. The Omaha and Ponca speak a Dhegiha Siouan language. There does not seem to be much evidence to support a division into more than one language, and what differences exist between the two are merely dialectical.

Traditional and Documentary History

Omaha tradition points to an ancestral homeland for the Dhegiha tribes in the vicinity of the Ohio River valley. From the original group, the Quapaw split off at the mouth of the Ohio River and went south, the Osage and Kansa splitting away on the lower Missouri, and the Omaha and Ponca continuing northwest. Some traditions assert that the Ioway, Oto, Missouri, and Winnebago accompanied the migrating Dhegihan tribes. There is disagreement whether the northward movement followed the tributaries of the Missouri or the De Moines River.

All narratives place the Omaha, Ponca, and Ioway on the Big Sioux River in northwestern Iowa. Fontenelle (1885) places the Omaha village near the Red Pipestone quarries in southwestern Minnesota. While Dorsey (1886) and Fontenelle record only one village on the Big Sioux, Fletcher and La Flesche (1911) describe two. The first was on the banks of a small stream that flowed from the northeast and probably refers to the village mentioned by Dorsey and Fontenelle. This may have been the Blood Run Site (Harvey 1979). A battle drove the Omaha and allied tribes away but they remained east of the Missouri, returning to the Big Sioux to build a village "...where the river makes a loop at a point where a small stream enters from a canyon, two cliffs standing at its entrance"--almost certainly the vicinity of Sioux Falls, South Dakota (Fletcher and La Flesche 1911: 74).

Dorsey notes a stop at Chouteau Creek near Lake Andes; then a village was next erected near the mouth of the White River. According to Fletcher and La Flesche, this village was inhabited a considerable time, but Fontenelle suggests a short stay. Bourgmund, in 1714, locates an Omaha village 200 leagues above the Platte (Giraud 1958), which would fit a White River village well. The Ponca are said to have wandered to the Black Hills while the Omaha remained on the White River. They returned and accompanied the Omaha (and Ioway) southward to the Niobrara River, where they remained.

From the White River, the Omaha descended the Missouri River to Bow Creek in present Cedar County, Nebraska. Fletcher and La Flesche give the location of the Bow Creek village, called "Bad Village" by the Omaha, and relate an incident which here divided the Omaha into two factions. One group went east beyond the Missouri and the other went south. Some, notably John L. Champe, have felt that the "Bad Village" story relates the Ponca - Omaha split. Jablow (1974: 9-10) notes, however, that 1) there is specific information in the traditions regarding the Ponca split, and it occurred at the Niobrara, not "Bad Village", and 2) Fletcher and La Flesche note that the Omaha factions reunited, while the Ponca are still a separate but closely linked tribe.

Dorsey's informants next bring the Omaha to the vicinity of Covington (present South Sioux City), Nebraska, and Fletcher and La Flesche state that the village at which the two Omaha factions from the "Bad Village" feud were reunited was near the Ioway village near Ponca. It seems reasonable to presume, tentatively, that the same village is being referred to in both accounts; Fontenelle does not mention this village.

Dorsey next locates the Omaha in two consecutive villages near Homer in Dakota County, Nebraska. The first, at Zande'buṭa on a stream and prominent bluff by this name, and then at "Big Village" south of Homer. Fletcher and La Flesche do not mention Zande'buṭa but locate the tribe at "Big Village," about one-half mile north of Homer (which would fit Dorsey's Zande'buṭa, not his "Big Village"). Whichever location is correct (and both may be if this truly was a "Big Village"), all sources agree that this was the village occupied, abandoned periodically and reoccupied for many years, probably from the 1760's until 1845 when it was finally abandoned for a village near Papillion, Nebraska (cf. Smith 1973, 1974).

The earliest documentary source on the Omaha is the notation on the Marquette map of 1673-74, where they are shown close to the Otontanta and Pah8tet (the Oto and Ioway). There is a brief reference in Le Sueur's journal to the effect that the "Ayavois and the Otactas had gone to establish themselves on the banks of the Missouri River, in the neighborhood of the Maha, a nation which lived in those quarters." LeSueur supplied additional information to the mapmaker Delisle when he returned to France (M. Wedel 1974). Delisle's 1702 map shows a "Village des Mahas" on a tributary of the Missouri, the "R des Maha."

In 1714 Bourgmund claimed to have ascended the Missouri River to the White River, perhaps higher (Giraud 1958). He found the Omaha at the White River and described them as "rovers." The 1718 Delisle map depicts the "Maha, a wandering Nation," in about this position, and an Omaha village is also depicted on the west bank of a tributary of the "Big Sioux," called the "R. du Rocher" or Rock River.

Renaudiere summarizing in 1723 information gained from voyageurs, states that the Maha were 90 leagues above the mouth of the Platte on the north bank of the Missouri. This is the only source which credits the Omaha with a village on the north bank of the Missouri. His 90 leagues above the Platte would place the tribe in the vicinity of Sioux City, Iowa. He goes on to relate a story of nuggets of silver lying about the houses of the Omaha--a statement which tends to discredit this source entirely.

A hiatus in information regarding the Upper Missouri ends in 1758 with Governor deKerlerec's report, which places the Maha 80 leagues above the Ioway, who in turn are 10 leagues above the Platte. The implication is that the Covington/Omaha Creek vicinity is being described. deKerlerec reports that the Omaha are still little known to the French. This brackets the "Bad Village" between 1714 and 1758, but it was probably occupied earlier in this period rather than later, perhaps the 1720's and 1730's.

Cruzat's 1777 reports to the Spanish crown show that the Omaha were enmeshed in the expanding trade network of the Europeans. Cruzat lists two traders who had been granted licenses to trade among the Omaha, and their chief is said to be El Pajaro Negro, Blackbird. The village is on a small tributary of the Missouri 60 leagues from the mouth of the Platte. This is the "Big Village" on Omaha Creek.

Sometime during the 1780's or early 1790's, and after the rise of Blackbird as chief of the Omaha, an Omaha leader named Little Bow seceded with 200 followers and reoccupied the vicinity of the mouth of Bow Creek (incidentally providing its modern name). This village is not mentioned by any of the narrators of traditional history, but is prominent among early explorers. This village was abandoned before 1794 or 1795, probably when Little Bow died and the village could not hold out against raiding Dakota groups. This village is explored in detail in the next chapter.

The Ponca emerge from anonymity in 1785 when they were described as a small tribe living on a creek just below the mouth of the Niobrara (Miro in Nasatir 1952 I: 126). This is certainly Bazille Creek in Knox County, Nebraska. The Ponca are described as being here, or on the Niobrara or on Ponca Creek just north of the Niobrara from this time on with but few exceptions. They may have separated from the Omaha immediately after 1714, if the migration tradition is accurate. Although if there is in fact some connection between the Redbird Phase and the Ponca and this archaeological complex is dated properly, a date of separation at the almost incredible date of 1600 A.D. could be argued. It is far more likely that the small number of trade goods has led to the assignment of a date that is too early for the phase. During treaty negotiations in 1858, it became clear that the Ponca claimed the entire south bank of the project domain

to the mouth of Aowa Creek, an area previously ceded by the Omaha (Jablow 1974). The Ponca and Omaha, barely separate tribes, must both have considered this area to be part of their territory although apparently no group occupied it on more than a seasonal basis since Little Bow's band gave up their village.

The expedition of Lewis and Clark found the Omaha village on Omaha Creek abandoned because the Omaha were on their annual summer buffalo hunt. The smallpox epidemic of 1800-1801 and the devastation it had caused among the tribe were noted. Fletcher and La Flesche suggest that "Big Village" was abandoned at about this time because of the epidemic and Dorsey places them for about five years on the Elkhorn River and Shell Creek. They were back by 1809, however, if not before.

In 1819 the Omaha moved to the Elkhorn River due to pressure from the Sauk Indians who were concerned with Omaha hunting east of the Missouri. This village is where they were visited by Duke Paul Wilhelm in 1823, and without much doubt it can be identified with the Stanton Site, 25ST1 (Gunnerson n.d.). The pressure from surrounding tribes, and especially the Sioux, made the position of the Omaha very precarious. The history of the Omaha and their different moves reflect the divergent forces of Sioux raids, the need to participate in the fur trade, pressure from land-hungry Americans and the need for U. S. Government protection.

The Omaha spent from 1819 to 1833 on the Elkhorn, with a faction of the tribe reoccupying the Omaha Creek village for one year. From 1834 to 1845 the Omaha were usually found on Omaha Creek or near Bellevue, and they appear to have become mobile in an attempt to avoid battle with the Dakota. The Omaha may have become increasingly factionalized during this period; references to more than one Omaha village are found, although it is unclear how independent these may have been. The early nineteenth century traditions of the Omaha-Ponca split, the "Bad Village" story, and Little Bow's secession, and the multiple villages on the reservation such as the "Village of the Make Believe White-Men" (Fletcher and La Flesche 1911: 633-634), all suggest centripetal forces at work within the Omaha tribe.

The treaty of 1854 ceded all Omaha lands not previously signed away, and the Omaha reservation just south of the old Omaha Creek village was established. The Omaha again retired northward under the increasing pressure to become "civilized" farmers, which ultimately led to the division of remaining lands in severality after 1882, supervised by Alice Fletcher. These remaining lands did not include about one-half of the reservation on the north which had been given to refugee Winnebagos in 1865.

Ethnography

Territory and Economy:

The Omaha area of occupancy was bounded by the western bank of the Missouri from the mouth of the Niobrara to the mouth of the Platte, following the Platte to the headwaters of Shell Creek and thence north to the Missouri. This region was not the exclusive domain of the Omaha, however; they shared it with the Oto on the south, the Pawnee on the southwest, the Ponca and the Dakota to the north. Raiding from the Sioux in the 19th century generally kept the Omaha south of the Omaha Creek village. The periodic village moves after Large Village was established were all to the south and southwest. The Ponca ranged west from semi-permanent villages on the Niobrara, Bazille Creek, or Ponca Creek.

The Omaha and Ponca practiced a dual economy relying on hunting and horticulture to meet their subsistence needs. With the coming of Europeans, the fur trade became interwoven with the hunting of the Ponca and Omaha. The Omaha hunted east of the Missouri to the Raccoon and Des Moines rivers, and west the Ponca and Omaha hunted in the Sand Hills of Nebraska and in the buffalo ranges further west and south. Earlier in their history hunting territories were further north in the Blue Earth River area of Minnesota. While Fletcher and La Flesche (1911: 89) claim that hunting east of the Missouri was abandoned in the 18th century, Smith (1974: 85-86) records that in 1828 the Sauk protested Oto and Omaha hunting along the Des Moines River.

The major buffalo hunt took place in the summer after the corn was planted and weeded (Dorsey 1884: 282-285). The entire tribe went to the buffalo grounds in the west camping in the traditional camp circle on the open prairies (Dorsey 1889). The hunt was supervised by special directors and specially appointed police.

The Omaha and Ponca would return to their permanent villages about the first of September to harvest their garden crops. The winter hunt began in the later part of October and ended about the month of April; now deer and elk were sought as well as buffalo. It was generally carried on by individuals and small parties.

Gardens of the Omaha and Ponca were located along the borders of streams and ranged in size from half an acre to two or three acres. Fletcher and La Flesche (1911: 269) declare that men and women worked together in the gardens although this would be unusual (Will and Hyde 1917). Corn and squash were planted in alternate hills, beans were either planted with the corn or in separate hills depending on the amount of space available. Dorsey (1884: 304) notes that the Omaha named some fifteen varieties of corn and Will

and Hyde (1917: 303-305) record thirteen; three native varieties of pumpkin and two modern are named as well as fifteen varieties of beans (Dorsey 1884: 306-08). While maize was less important than buffalo, it was still surrounded by an elaborate ceremonialism (Fletcher and La Flesche 1911: 261).

Social Organization:

Both Omaha and Ponca social organizations are webs of kinship groups, societies and ranked positions of civil and religious authority. The basic structure is the clan:

A group of exogamous kindred who practiced a particular rite, the child's birthright to which descended solely through the father...There was no political or governing chief of the Omaha gens or subgens, but there were persons to whom belonged the hereditary right to be keepers, or "priests," in the ceremonies that were in charge of the gens.

Fletcher and La Flesche 1911: 195-196

Ten named Omaha clans were grouped into two major divisions of five each, representing the earth and the sky. The Omaha lack a Ponca clan, a grouping found in most Dhegiha tribes (Fletcher and La Flesche 1911: 41). This suggests that the Ponca tribe was once a clan of the Omaha. There is a good deal of confusion regarding Ponca clans; there are lists of seven and eight. No moiety divisions are admitted by recent Ponca informants (Howard 1965: 86-91), a fact which is in keeping with the idea that they were once a single clan.

There were three major ranks or grades among the Omaha: commoner, brave, and chief. Braves earned their position through honors gained in war. Two major grades of chiefs existed: the first grade was unlimited in membership, while the second grade elected the first group to their position. From this elevated grade came the Council of Seven, the governing body of the tribe, and from the Council of Seven, the two principal chiefs of the Omaha. The Council of Seven was a governing body representing the whole tribe with the power to subordinate all factions to a central authority and settle all contentions (Fletcher and La Flesche 1911: 202-208).

Societies cross-cut kinship for tribal unity and organization. There were two types of societies, secret and social. Membership in the social societies was acquired through performing the acts required for eligibility, and included the warrior societies and those for purely social purposes. The secret societies:

...dealt with mysteries and membership was generally attained by virtue of a dream or vision. Some of these secret societies had knowledge of medicine, roots and plants used in healing; others were noted for their occult and shamanistic proceedings...

Fletcher and La Flesche 1911: 459

Villages:

There are a few indications that the Omaha and Ponca may have inhabited more than one village simultaneously on a number of occasions, but one village was usual. This must have been a large village for the Omaha, as an aboriginal population of around 3000 individuals is estimated, with early 19th century estimates varying between 1200 and 1800 individuals (Smith 1974: 198-201). The Ponca may have had about 800 in 1780 and later (Jablow 1974: 335-338).

Fletcher and La Flesche (1911: 95) describe the typical village location:

The site for the village was always chosen near a running stream convenient to timber and generally not far from hills...The earth lodge and the tipi were typical dwellings used by the Omaha in their permanent villages. Occasionally bark lodges were used for summer occupancy (Dorsey 1896: 269)

There were two Omaha villages located in the project domain: Bad Village, occupied (perhaps) in the 1730's (Fletcher and La Flesche 1911) and the late eighteenth century village of Little Bow (Ludwickson 1979a). This village was also claimed by the Ponca (Howard 1970).

Burials:

Both underground and scaffold burials have been observed among the Ponca and Omaha (Bushnell 1927: 50-53). Fletcher and La Flesche note some of the burial customs of the Omaha:

The body was...placed in a grave in a sitting posture, facing the east; graves were usually made on a hilltop. The shallow hole was dug and the body placed in it, and poles were arranged over the opening upon which earth was heaped into a mound. Mound burial was the common practice of the Omaha.

Fletcher and La Flesche 1911: 392

Archaeology

A few historic Omaha sites have been located and dug. Some of the earliest work on the Omaha was done by E. E. Blackman and Dr. Robert Gilder on the Papillion Creek Site according to Strong (1935). Gilder reported the site (1909: 75) noting the litter of fractured iron pots, Delft, and figured China. A number of historic Ponca sites including the "Ponca Fort," 25KX1 (Wood 1960) and a number of burials have been excavated (Howard and Gant 1966).

John Champe in 1940-41 excavated an Omaha cemetery and nearby "Large Village" of the Omaha near Homer, just south of the project domain. Most of the material was of European derivation, but Champe suggested that the few fragments of Great Oasis pottery found in the cemetery linked the historic Omaha with this prehistoric group. This association is now generally rejected.

The failure to associate a distinctive pottery type with the Omaha has led to the speculation that the Omaha may have been part of the Oneota Tradition. The association of Oneota-like pottery with the Osage and Kansa is used as supporting evidence (Henning 1970: 146-148). Harvey (1979: 227) suggests that the Omaha occupied the Blood Run Site with the protohistoric Ioway, and that the Omaha may have been responsible for the grit-tempered ceramics found there.

The suggestion by Wood (1965) that the Redbird Focus is the archaeological product of the Ponca could lend support to an ultimate "Oneota" affiliation for these groups. Harvey (1979: 228) suggests that the distinction between the pottery at Redbird Focus and Oneota pottery may not be as great as first suggested. The ceramic identity of the Dhegihan tribes in their traditional homeland near the Ohio River is still unresolved; it is possible that they will eventually be identified as Late Mississippian.

The Omaha site at Bow Creek, possibly occupied during the 1730's, may be early enough to still contain remains of pottery, and further excavation there may solve some of the problems pertaining to the relationship between Omaha-Ponca, Oneota, and Redbird.

Summary

The Omaha occupied a number of sites in the vicinity of the project area in the protohistoric and historic times. One site, "Bad Village," located on Bow Creek is in the project domain and was probably occupied sometime after 1714, probably in the 1730's, although the Omaha may have abandoned the village as early as 1723. Bow Creek was again occupied by the Omaha in the late 18th century under "Little Bow." The Bad Village was occupied during a period in which the manufacture of pottery may still have been practiced. Historic (Ponca Fort) and protohistoric (Redbird Phase) Ponca or putative Ponca sites have also been excavated.

DAKOTA OR SIOUX

Introduction

Dakota may be translated, roughly, as "friends who are allied," and although they called themselves by some form of this name, they have been referred to usually as "Sioux," a corruption by the French of the last part of the Chippewa word Na' ta wesiwck, "Snakes" (Nicollet 1976: 253; Howard 1966: 2). The divisions of the Dakota are complex, but the basic seven "Council Fires" or "Fire Places" seem to go back into the seventeenth century if not before (Wedel 1974). Larger groupings into Eastern (Santee), Middle (Wiciyela), and Western (Teton) divisions have been recognized for over a century based on dialectical and cultural distinctions. The Teton, originally just one of the seven council fires, moved west onto the prairies and plains and soon grew so much in population that the Teton bands were as populous as the other council fires. The general relationships, circa 1838-39, are depicted in Table V.1. Howard (1966: 10, 17-18, 20) gives other names, especially for the Wiciyela bands.

All three of the major divisions had at one time or another villages within the project domain, although the Brule (Teton) occupancy is little more than an hypothesis and the Santee village consisted of a small group of renegades. The Yankton, however, were the principal occupants of the the north bank of the project domain from at least the 1790's to the extinction of Indian title.

Traditional and Documentary History

A fairly ancient origin for the eastern and western divisions is suggested by LeSueur (Wedel 1974). Dorsey (in Riggs 1893) and Robinson (1904) sketch Dakota origins and migrations. It seems likely that the Dakota occupied the area of mixed deciduous-coniferous forests around Mille Lacs and to the east into western Wisconsin from at least the early seventeenth century. During the early eighteenth century the Chippewa, enemies of the Dakota, drove them south using newly acquired firearms (Hickerson 1970). Warfare and the lure of buffalo hunting to the west apparently drew by increments the Teton and then the Wiciyela westward. They were led by the Brule who probably occupied the project domain in the early to mid-eighteenth century. The Omaha and Ioway were forced south, and the Yankton gradually moved in to fill the vacuum as the Brule continued west.

Ethnography

Economy:

The three major divisions of the Dakota occupied contiguous territories from south central Minnesota to Wyoming during the

Table V.1. Divisions of the Sioux or Dakota Nation during the 1830's.
 (data from Nicollet 1976: 252-262, except where attributed
 to Denig 1961: 14-15).

Major Linguistic and Cultural Divisions	Seven Major Bands	Band or Village Subdivisions
Eastern or Santee (Dakota)	Mdewakantonwan	7 or 8 villages
	Wahpekute	2 villages (30 lodges on the Missouri, Denig)
	Wahpeton	3 villages
	Sisseton	3 villages
Middle or Wiciyela (Nakota)	Yanktonai	Cutheads (Pamaksa ewichakiapi) (250 lodges, Denig). Wazikute (100 lodges, Denig). Watapaatidan (?? lodges) San cihapi (?? lodges) San yoda (33 lodges)
	Yankton	Oyurhpe wanitcha (?? lodges) Taku ibotto (?? lodges) Amdowapuskia (?? lodges) (300 Yankton lodges total, Denig)
Western or Teton (Lakota)	Teton	Sicharu or Brule (500 lodges, Denig) Chokatowanyan, 90 lodges Wazazi, 70 lodges Minishanan, 60 lodges Kiuksa, 80+ lodges Oglala (300 lodges, Denig) Onkp'hatinas, 100 lodges Ku-Inyan, 100 lodges Oyurpe, 100 lodges Saone bands Minneconjou, 180 lodges (260 according to Denig) Oohenonpa or Two Kettle (100 lodges, Denig) Itazipco or Sans Arc, 110 lodges (100 lodges, Denig) Sihasapa or Blackfeet, 100 lodges (220 lodges, Denig) Hunkpapa, 100 lodges (150 lodges, Denig)

historic period. Economic activities varied with the geographical situation, the Eastern groups resembling neighboring Algonquian groups in culture and economic pursuits, the Middle Dakota groups seeming to adopt much of the sedentary riverine Plains villagers' lifeways, and the Teton adopting the full equestrian nomadism of the western Plains buffalo hunters (Howard 1960a). These distinctions are too strongly drawn, however, since on occasion some of the Brule band gardened in the White River valley (Warren 1856: 74) where they built cabins and earthlodges. The Yankton and Yanktonai, on the other hand, seem to have been forced into horticultural pursuits late in the mid-nineteenth century by the unavailability of the bison. Furthermore, although the earthlodge and/or log cabins may have been a preferred winter dwelling, the hide tipi was used both on the bison hunt and in winter villages (cf. Wied-Neuwied 1906 XXII: 342).

Santee economy may be characterized as being based on hunting (moose and deer), fishing, gathering wild plant foods and horticulture. The bison was not as important as among the other two divisions. Important wild foods included tipsina, wild rice, maple (and box elder) sugar. Corn was cultivated extensively. A gable-roofed bark structure (possibly originally a clan house) was the principal summer dwelling, and mat or bark wigwams were used in the winter (Howard 1966: 4-5).

Middle Dakota economy was probably based on a mix of bison hunting, food gathering and horticulture. Bison hunts occurred in midsummer and in late fall. The Yanktonnai may have depended heavily on fishing in the James River. Tipsina, chokecherry and other wild plants were extensively gathered (Gilmore 1913, 1919) and corn, beans, and squash were cultivated. The skin tipi was the principal dwelling in summer and winter, although semi-permanent villages of earthlodges and cabins were also constructed (cf. Howard 1966: 11-13).

The Teton were among the great bison hunters of the Plains. However, gathering wild plant food, and on occasion gardening corn (cf. Warren 1856: 74) were also important. Denig also credits the Brule with pronghorn antelope drives or pounds (1961: 18) and this may have been widespread among the Sioux.

Social Organization:

All the Dakota may at one time have had patrilineal exogamous clans, although these had disappeared by the early nineteenth century, even among the Santee (Stipe 1971). Government among the Santee and Middle Dakota was based on kinship, with each kindred selecting representatives to sit on a band council. A band chief was selected, usually on a hereditary basis, and this man had a

number of "policemen" or "soldiers" (akichita) to enforce his orders and those of the council. The Teton, however, had a bilateral-bilocal kinship group, residence within which was rather fluid. Teton chiefs appear to have won their status through war or other exploits rather than gaining this role through kinship. Orders of the chiefs and councilors were carried out by two head akichita and a larger police or soldiery (cf. Tabeau 1939).

Villages:

Dakota villages are rather poorly documented. Santee summer and winter villages were of bark houses and wigwams. Mayer, in 1851, described the Santee village at Kaposia on the Mississippi as:

...situated on a small piece of bottom land which intervenes between the bluffs & the Mississippi river. ...The village is composed of two sorts of habitations winter houses & summer houses or Tipis...

Mayer 1932: 104

A village may have contained a dozen or more of these structures. Middle Dakota villages consisted of fairly large tipi villages on terraces and winter villages in floodplain forests along the Missouri. During the 1850's several Yankton villages of cabins and earthlodges appear to have been built along the Missouri. Smutty Bear's Lower Yankton village was described in June of 1857 as consisting "...mostly of earthlodges, though I also observed some quite good log-houses..." (Redfield 1857). This is probably the historic component at the Gavins Point Site (Hall n.d.). Palliser described the Santee and Yankton village at Fort Vermillion in 1847:

As we descended the hills, we crossed a large extent of plain approaching Fort Vermillion, which we found surrounded by the Indian camp. ...The surrounding Indian camp consisted of a band of 600 Sioux, including men, women and children. ...

Below and behind the fort were ranged the Indian lodges or tents, made of dressed skins of the buffalo ... to form, when raised on the poles, a sort of cone, but open at the top to allow the smoke to escape.

Palliser 1856: 69

Ella Deloria notes that the Yankton dug bell-shaped underground cache pits up to several feet deep and several feet in diameter, which were used to store parfleches of dried meat and bags of corn (Deloria 1967: 23-25).

Burials:

Santee Dakota either interred the dead in the ground with a small house erected over the grave, or burial was on a scaffold or in a tree. The Middle Dakota and Teton are said to have practiced only scaffold burial, but what must have been a Middle Dakota burial was excavated near Centerville, Clay County, South Dakota, just north of the project domain (Kelly 1967).

Archaeology

There is little in the field of Dakota archaeology. Excavations and surface materials from the Gavins Point Site (Hall n.d.), the Ice Glider Site (Wood, ed. 1981) in North Dakota and the Dirt Lodges Village in Spink County, South Dakota (Haberman 1980) are the significant exceptions. Prehistoric and/or protohistoric sites have not been excavated or have not been recognized.

VI.

ETHNOHISTORIC OVERVIEW

Introduction

The purpose of this section is to narrate a history of Native American groups in and near the project domain through the use of documents. Part VII will attempt to carry this narrative back into unrecorded time through the use of archaeological data. Although these two categories of information are not directly comparable, they often can be used to complement one another.

"Documents" can be understood to embrace a wide range of material. First, written accounts contemporary with the observations recorded are best, if they supply relevant information, which they often do not. Second, written contemporary accounts at second or third hand may record information well, or may be severely distorted. Third, early maps are assumed to record accurately the current state of knowledge about the Indians of the Upper Missouri; this assumption, however, can often be shown to be wrong, and maps must be properly attributed and used with care.

A fourth category of documentation involves oral tradition. This type of data is extremely useful when properly gathered and analyzed (cf. Van Sina 1965, 1978). The present case cannot be so construed. The principal oral traditions used in this chapter are those that relate to the Omaha (Dorsey 1884, 1886; Fontenelle 1885; Fletcher and La Flesche 1911; Blackbird in U. S. Court of Claims 1916). Dorsey and Fletcher and La Flesche represent well-filtered oral tradition, mixed with the anthropologist's opinions as to what might have been historically or geographically possible. That a good deal of accuracy is inherent in these documents is attested to by Fontenelle's account of the Omaha which corroborates the general story, apparently independently. It is unclear how independent the Blackbird account is, however, since Fletcher and La Flesche (1911) was published prior to when he gave testimony (1916), and he may have been coached. Although these sources must be used with caution, they form what is thought to be a reliable framework upon which to hang corroborative Euro-american documents to produce a reasonably accurate construction.

A fifth category of documents is relatively unique. This category consists of Dakota "winter-counts." Winter counts appear to be mnemonic devices to stimulate the telling of an annual chronicle (cf. Howard 1960). The subject of the account for a particular "winter" may be of almost no ethnohistorical consequence, or it may record an important event which can be corroborated in other documents. Winter counts seem to have been a phenomenon of the Teton,

but the Eastern Dakota (Sisseton), Middle Dakota (Yanktonai) and non-Dakota (Blackfoot, Blood, Kiowa, Mandan, Piegan) winter counts are also known (Howard 1976). Unfortunately, the Yankton do not seem to have kept winter counts; at any rate, none has survived.

1650 - 1710

The peoples who would occupy the project domain during the period of documentation (about 1650 onward) were outside it at the beginning of the period. Some of the Arikara, among others, may have occupied it previously (see Parts V and VII).

The Ioways and Otos inhabited the southeastern Minnesota region from the 1650's (at least) to the 1680's. The Oto ranged somewhat to the west, and the Ioway bison-hunting country was between the headwaters of the Upper Iowa and Lower Minnesota rivers (Wedel 1976: 23-24). The Omaha were west of the Oto, perhaps at the Pipe-stone quarries, and the Dakota were on the St. Peters River.

From the southwest, possible Spanish contacts into the central Plains may have occurred. Father Escalante, writing in 1778, reported that an expedition led by D. Juan de Archuleta went northeast from New Mexico to "El Cuartelejo" (in western Kansas) sometime between 1664 and 1680. Archuleta apparently heard of the Pawnee and "With them the French at that time were trading" (Thomas 1935: 53). Champe felt that Escalante may have been confusing this with the 1706 Ulibarri expedition (Champe and Fenenga 1974: 11). Beginning in 1695 reports that French traders were visiting the Pawnee were brought to the Spanish at Santa Fe by Navajo and Apache groups.

Michel Accault, sent by LaSalle from Fort Frontenac at the head of the St. Lawrence River, spent from 1677 to 1679 with the Ioway, probably at one of the Orr Focus villages on the Upper Iowa River (Wedel 1976: 27). Nicholas Perrot met the Ioway on the Mississippi in 1685 and traded with them for beaver pelts, involving the Ioway in the fur trade and causing forfeiture of their previously neutral status with Algonquian peoples east of the Mississippi and with the Dakota (Wedel 1976: 28). The Algonquians, resentful of their loss of influence due to direct trade and fearful that the Dakota and Ioway would receive firearms, began raiding the Ioway "cutting them to pieces" (La Potherie cited in Wedel 1976: 28). The Ioway were forced to flee in the late 1680's, according to LeSueur, and in the 1690's were residing in northwestern Iowa while the Oto may have been in northeastern Nebraska (Marest cited in deVilliers 1925: 34).

Pierre-Charles LeSueur first came to the country of the Dakota in 1683, and prior to 1700 lived among the Sioux for seven years off and on (Wedel 1974: 157). In the 1690's he discovered what he believed to be copper ore somewhere on the Blue Earth River in Minnesota. He returned in October 1700 to found "Fort l'Huillier" also

called Fort Vert (Fort Green). The fort was in operation for less than a year, but in the various documents relating to it is some of the earliest specific information regarding the tribes of interest to us.

The Ioway were said to be living on the shore of a lake 30 leagues west of Fort Vert. Wishing the Ioway to visit, perhaps settle, at Fort Vert "because these savages are industrious and used to cultivating the soil." LeSueur sent two Dakotas to invite the Ioway to make their village there. When they returned "...it was ascertained that the Ayovois and Octotatas had gone to establish themselves on the banks of the Missouri River, in the neighborhood of the Mahas, a nation which lived in those quarters" (Margry 1879-86 VI: 82). An undated memoire by LeSueur states that his post "...attracted several Sioux villages, as well as those of the Mahas, Hoctatas, and Poantes very populous nations that live on the banks of the Missouri, some 60 leagues distant from the fort" (Margry VI: 91 in Smith 1974: 20). Although no claim was made that there was face-to-face contact with the Omaha, Oto or Ioway, Smith concludes that these groups were in trade contact with the Europeans, the Omaha possibly for the first time (Smith 1974: 21).

After reviewing Delisle's notes from LeSueur's now lost Journal, Mildred Wedel concludes that the Ioway were living on Spirit Lake near the upper Little Sioux River in Dickens and Clay counties (Wedel 1976: 29). They are depicted in that position on Delisle's 1702 map (M. Wedel 1974: 168 Fig. 2).

On the 1702 Delisle map, the Omaha ("Maha") are shown on the east bank of a stream, generally conceded to be the Big Sioux (M. Mott 1938: 244-245, 262; Harvey 1979). Omaha tradition makes explicit reference to this village on the Big Sioux. Alice Fletcher and Francis La Flesche note that the village was built "...on the banks of a small stream that flows in from the northeast" (1911: 73). Unfortunately, Fletcher and La Flesche were aware of the 1718 Delisle map which depicts the Omaha on such a stream (see below), thereby suggesting that this is not an independent observation on the part of their informants but a reconstruction based on a number of lines of evidence available in early 1900's. Dorsey remarks that they built a fort, lived in earthlodges and cultivated fields (Dorsey 1886: 212). At this time or slightly prior, the Omaha had met the Cheyenne: "We made peace with the Cheyenne. At that time the Ponca were with us, and the Iowa and Oto joined in the Peace" (Fletcher and La Flesche 1911: 73). This peace may have been precipitated by the migrating Siouans' occupancy of former Cheyenne territory; the Dakota traditions credit the Cheyenne with prior possession of southern Minnesota. Possibly here too, the Omaha formed a tribal government, in the form of the "Council of Seven." Henry Fontenelle's account states: "In their migrations up the [Missouri] river nothing of importance is mentioned until they reached a point on the Big

Sioux River, where they located their villages, and lived many years in confederation with the Iowas, Otoes, and Winnebagos (sic)" (Fontenelle 1885: 77).

Pierre LeMoynes, Sieur de Iberville's Memoire Sur le Pays du Mississippi, dated June 20, 1702, credits the Sioux with 4000 families, the Maha with 1200, and Toctata and Aymons (Oto and Ioway combined) with 300 (Nasatir 1952 I: 8n).

In 1706 or 1707, one Derbanne claimed to have been the first to have gone 400 leagues up the Missouri (Nasatir 1952 I:9). Such a distance may well have put M. Derbanne within the project domain, but unfortunately, nothing regarding the Indians he encountered is recorded.

The 1706 Ulibarri expedition from Santa Fe to El Cuartelejo reported Frenchmen among the Pawnee, and Derbanne and many of his contemporaries may actually have ascended one of the western tributaries, not the Missouri itself. A Frenchman, identified by his red cap, was killed by the El Cuartelejo Apaches in western Kansas, when he accompanied some Pawnees who had intended to attack the settlement (Thomas 1935: 16-22). Other anonymous voyageurs are hinted at in the documents prior to 1714 (Nasatir 1952 I: 9-12). It is only from the activities of Etienne Veniard de Bourgmond, however, that the first really good information regarding the Upper Missouri River region is forthcoming.

1710 - 1760

Bourgmond arrived at Fort Detroit in January 1706, but in 1707 or 1708 ran off with the wife of one Tichenet; a detachment of 50 men retrieved the fugitives from the shore of Lake Erie. Bourgmond was acquitted at his trial, but soon took up with an Indian girl, LaChenette. In 1712, a deputation of Missouris came to Fort Detroit, and Bourgmond deserted with them, following a young Missouri girl back to her village. Bourgmond lived with that tribe until about 1719 when he abandoned the wilderness and returned to Paris, with a son (Bray 1978: 7-8; Folmer 1942: 281-282; Giraud 1958).

Bourgmond claimed to have made a number of expeditions up the Missouri River. Two documents attributed to him regarding these survive: Routte qu'il faut tenir pour monter le rivièrè du Missouri (Route one must keep in ascending the Missouri River) and Exacte description de la Louisiane, de les ports terres et rivières, et noms des nations sauvages qui l'occupant et des commerces et avantages que l'on pent tirer dans l'establissement d'une colonie (Exact description of Louisiana, its ports, lands and rivers, names of the Indian nations that occupy it and the commerces and advantages that might result in the establishment of a colony). The first document is an extract from Bourgmond's now-lost journal of a 1714 expedition,

made by Guillaume Delisle. A note on the manuscript, by Claude Delisle, credits Bourgmond with the knowledge that the Missouri was 800 leagues long, and le Page du Pratz confirms this (Nasatir 1952 I: 13). The Route, however, ends at the mouth of the "River of the Panis" on June 16th (Folmer 1942: 283).

The second document is usually ascribed a date of 1717 (Villiers du Terrage 1925: 64) and therefore is generally believed to report on a later ascent of the Missouri by Bourgmond (Bray 1978: 8). Marcel Giraud, however, on the basis of internal evidence suggests that this document also was prepared in 1714 (1958: 5-6):

...in the spring of 1714, he undertook this survey of the Missouri, the purely topographical findings of which figure in the "Route to be followed for ascending the Missouri River," and of which the "Exacte Description" summarizes the observations of an ethnic and geographic order...the two texts, dating from the same year, apparently apply to the same journey.

Giraud 1958: 6

The Route... ends on June 16th at the "River of the Panis" (Platte), but the Exacte description includes information on Arikara villages which may have been located as far upstream as the Cheyenne River. An extract of the relevant portions of Bourgmond's Exacte Description...follows:

Higher up [the Missouri] is found the wide river called by the French and by the Indians Nibraskier, which branch runs to the northwest and to the west-northwest. 10 leagues further along it are the Maquetantanka, a tribe allied with and friendly to the French. They are on the bank of a small river whose water is salty and from which they make salt. ...There follow, as you go up the salt river [sic], 25 leagues farther up the Panis, well populated, alert, and good horsemen. The French know them and see them sometimes. ...20 leagues higher are the Panimahas, whom the French also see sometimes. They comprise 9 villages, and are numerous, handsome and well-built. They are on the left as you ascend, and worship the sun. ...

Let us continue to ascend the Missouri. 100 leagues higher up, on the left, is a tribe called Ayowest or Rakode by their neighbors and the French. ...100 leagues further up the Missouri divides into two forks, that on the right as well as that on the left is called by the Indians Nidejaudege, which the French translate as Smoky River, because the sand

blows like smoke and makes the water of the river all white and muddy. It is very rapid and dreadful at the time of the flood waters...At the separation of this river is a village called the Mahas, [who are] white and blonde, like Europeans. It is the most beautiful tribe of all these continents. They live without warring on their neighbors. They are rovers, sometimes on one side of the river, and sometimes on the other. 80 leagues along the said river are the Padoccas, a tribe with whom the French have as yet no acquaintance. Higher up [the Missouri?] on the left are found 2 villages called Aricaras. ...They have seen the French and know them. Higher up on said river are 40 Caricara villages, which are ranged on both sides of the river. They are very numerous and are in the most beautiful countries to be seen for their fertility. This is all I can say about this river.

Giraud (1958: 16-17)

Footnotes by Giraud correctly identify the Maquetantata as the Oto and the Ayowest as the Ioway, but incorrectly identifies "Nidejaudege" as the Niobrara River. The latter is the White River in South Dakota. Clearly Bourgmond obtained the name from a speaker of a southern Siouan language, possibly an Omaha. In the Omaha language, the Niobrara is Ni' ubtha tha ke and is said to mean "wide river;" the White River is Ni'ugashude te "turbid river" (Fletcher and La Flesche 1911: 92, 93). Dorsey's orthography for White River is Ni-ugacude (1884: 212) or Ni-u-ga-cu -de (1886: 219). In terms of both rendition of sound and of meaning, Bourgmond's reference is clearly to the White River.

Sometime between about 1700 and 1714 the Omaha had moved to the mouth of the White River. Dorsey (1884: 212) relates Omaha traditions which state that the Yankton moved into proximity with the Omaha, Ponca, and Ioway on the Big Sioux and made war on them, killing many and forcing the Omaha to flee to a lake near the head of Chouteau Creek, possibly Lake Andes: "Here they cut the sacred pole, and assigned to each gens and subgens its peculiar customs..." They then travelled up the Missouri to the White River, where they crossed to the west side above the White:

There the Iowas and Omahas remained, but the Ponkas crossed the Missouri near the mouth of the White river, and went on to the Little Missouri river and the country near the Black Hills.

Dorsey 1886: 219

Fletcher and La Flesche, however, state that the sacred pole was cut prior to the Omaha even coming to the village on the Big

Sioux. Further, they state that while in that village a disastrous battle took place which forced the Omaha to abandon the country, but the Sioux are not explicitly named as the foe (Fletcher and La Flesche 1911: 73).

After the Omaha moved from the Big Sioux, they carried on an intermittent but intense warfare with the Arikara on the Missouri River:

When the Missouri was reached by the Omaha, they found the Arikara there, cultivating the maize and living in villages of earth lodges--evidently a peaceful, sedentary folk. Omaha war parties from the east side of the river harassed the Arikara, who were living on the west side. ...Omaha war parties seem finally to have driven them from their homes and to have forced them northward up the Missouri river. ...Both Omaha and Ponca traditions say that the tribes were together when they met and drove the Arikara northward. It was from the Arikara that the Omaha and Ponca learned to make and use earth lodges. ...(although they) were probably ignorant of the symbolic character of the structure.

Fletcher and La Flesche 1911: 75

It is possible that the battle referred to by Dorsey and Fletcher and La Flesche may have been with the Arikara, not the Yankton as Dorsey believed.

Although many Omaha traditions mention conflict with Dakota bands, little of this warfare is reflected in Dakota winter counts. The Yankton are a frequently mentioned foe in Omaha tales, but there are no known Yankton winter counts. Battiste Good, a Brule, recorded some Dakota-Omaha hostilities in his winter count (Mallery 1893). These are excerpted in Table VI.1. In addition to the references to the Omaha listed there, he records many 18th century encounters with foes who go unnamed. Some of these may have been with the Omaha. Curiously, no fights with Iowa, Oto, or Ponca adversaries are listed, although the Pawnee and other tribes are mentioned.

A second Omaha village on the Big Sioux is recorded by Fletcher and La Flesche, occupied sometime after the great battle. This village was built "...where the river makes a loop, at a point where a small stream enters from a canyon which...has 'two cliffs, like pinnacles, standing at its entrance, through which the wind rushes with such violence as to disturb the water'" (Fletcher and La Flesche 1911: 74). Here the Omaha lived in bark houses, for they hadn't yet adopted the earthlodge. Here also peace between the Arikara and the Omaha, Ponca, Cheyenne, Ioway and Oto allies was concluded via the calumet ceremony (Fletcher and La Flesche 1911: 74).

TABLE VI.1

BRULE/OMAHA HOSTILITIES IN THE BAPTISTE GOOD WINTER COUNT

Winter	Description	Page in Mallery 1893
1708-09	Brought home Omaha horses	295
1725-26	Brought home ten Omaha horses	298
1731-32	Came from killing one Omaha and danced	299
1743-44	The Omahas came and killed them in the night	301
1744-45	Brought home Omaha horses	302
1751-52	Omahas came and killed two in the lodge	303
1752-53	Destroyed three lodges of Omahas	303
1758-59	Killed two Omahas who came to the camp on the warpath	304
1821-22	Used up the Omahas	317

Fletcher and La Flesche mention nothing of Lake Andes, or even how the Omaha got to the Missouri River. They do relate a story regarding the Omaha village on the White River:

Near the mouth of the White River, South Dakota, the tribe once found a flock of snowbirds, which brought so much relief to the hungry people that the village erected at that place was known as "Where the snowbirds came." They seem to have stayed in this village for a considerable time, but were finally driven away by wars.

Fletcher and La Flesche 1911: 85

Henry Fontenelle also relates a story about this village, attributing its abandonment to the lack of fertile soil:

After many years residence on the Sioux River, at or near the red pipe stone quarry, they went on up the Missouri with the other tribes mentioned (Ioway, Oto and Winnebagos [sic], until they reached a point opposite the mouth of White Earth River where they crossed the Missouri to the west side and explored the country west of that point. The country being barren and soil poor they could not successfully raise corn. They lived here but a short time and moved down the west side of the Missouri River (still with the other tribes that started with them from the Sioux River)...

Fontenelle 1885: 77-78

Finally, Ellis Blackbird's account of the White River village states:

...the Iowas and Omahas went on together; and when they came to the mouth of the White River they went along the banks of the White River, and the Iowas went south, while the Omahas stopped and founded a village and made gardens of squaw corn, but the corn didn't come up. After staying there 2 years they came down to where the Pipestone quarries are, and again tried to have fields of corn.

U. S. Court of Claims 1916: 27

Thus the Omaha, probably with the Ponca (who may have separated from the Omaha for a time here), possibly the Ioway and perhaps the Oto, built a village on the White River which most traditional authorities say was occupied briefly. They were "known to the French" by 1714, when the Omaha were described by Bourgmond.

Guillaume Delisle's map of 1718 (Tucker 1942: Plate XV) clearly reflects new knowledge pertaining to the Missouri River, knowledge attributable to Bourgmond (Folmer 1942: 283-284). The 1718 Delisle map may therefore be taken as a Bourgmond companion document analogous to the relationship of the 1702 Delisle map to LeSueur's explorations. We suggest, however, that the 1718 map is not an entirely accurate reflection of Bourgmond's information.

Bourgmond's description has the Ioway 100 leagues from the mouth of the Platte, or one-half the distance to the Omaha on the White River. Such a position (in river miles) puts the Ioway just downstream from the mouth of the Vermillion River. The Ioway are depicted on the 1718 Delisle map in a village at the mouth of a northern tributary of the Missouri, west of the Big Sioux. This is about where Bourgmond's text places them, but on the wrong side of the river. The context of Bourgmond's narrative makes it clear that he was referring to the left bank of the Missouri when one is ascending the river. Apparently Delisle confused this with the convention in which right bank and left bank are understood to relate to a downstream orientation.

The Omaha are shown on this map on the upper Missouri and are labelled as "a wandering nation." This appears to be an interpretation of Bourgmond's comment that "they are rovers." We feel that the Omaha were probably in the vicinity of the White River. The Ioway may have been divided between villages on the Big Sioux and Aowa Creek.

It is clear that French voyageurs continued to contact the Indians of the Upper Missouri following Bourgmond's expedition of 1714. These contacts, however, are very poorly documented (Nasatir 1952 I: 13-15). In this context, the "Chemin du Voyageurs" depicted

on the 1718 Delisle map is of interest. This route connects the area opposite the mouth of the Wisconsin River with the Ioway village on the east side of the Big Sioux River. An important direct trade route is implied; it is unfortunate that we do not know Delisle's source for this datum.

Charles Claude du Tisné went in 1719 from the Osage villages on the Osage River to the "Pani" (Wichita) on the Neosho River in Kansas (Nasatir 1952 I: 18; Wedel 1981), and Governor Valverde's 1719 expedition from Santa Fe learned of the alliance he had forged there. During the summer of 1720, a Spanish expedition under Pedro Villasur reached the vicinity of the Pawnee and Oto villages on the Platte river in eastern Nebraska, or alternatively the forks of the Platte in western Nebraska (Thomas 1935), or even somewhere on the Republican River (Champe 1974: 24). Here the allied Indian force destroyed Villasur's column on August 13th.

Because of the Spanish activity on the western border of Louisiana, Bourgmōnd was called on in 1722 to occupy the lower Missouri, construct a fort and bring peace between the Padoucas (Comanches) and their enemies. He established Fort Orleans near the Missouri village in the winter of 1723 (Bray 1978) and reported that the Otos and Ioways had made an alliance with the Sioux and Fox against the French (Nasatir 1952 I: 21). Such an alliance would have been a disaster for the French. In October, 1724, Bourgmōnd first succeeded in breaking the alliance mentioned, and allying the Kansa, Oto, Ioway and Skidi Pawnee to the French; he then presided over a peace between the Padoucas and their enemies (Nasatir 1952 I: 21).

The "Memoire of Sieur de la Renaudiere" August 23, 1723, reports on the mines of the region to be entered by Bourgmōnd and cites voyageurs as authorities. The Maha village was reported to be 90 leagues above the mouth of the Platte River, on the north bank of the Missouri. The Maha were said to have raided Spanish silver mines located near them, but that they knew nothing of the value of the metal; a voyageur named Francois LaFleur, who was trading with the Omaha, claimed to have purchased some. Ten leagues above the Omaha were said to be the Arikara nation, allied with the Omaha. If Renaudiere's estimate of the Omaha villages' location is even close at 90 leagues, it suggests that the Omaha had moved from the White river to, perhaps, Bow Creek during the years 1714 and 1723. The statement that the tribe was on the north bank would argue against a Bow Creek location.

Regarding Siouan migrations referable to this period, Dorsey continues:

They [Ponca] rejoined their allies and all descended the Missouri on its right /west/ bank. When they reached the mouth of the Niobrara river the first

separation was made. The Ponkas remained there. The Omahas settled on Bow Creek, Neb., which they called "Village Stream." The Iowas advanced to the stream on which is situated the town of Ionia, Dixon county, Neb., hence its name, "where the Iowas farmed."

Dorsey 1886: 219

Dorsey's 1884 account is similar, but states: "...the Iowas going beyond till they reached Ionia creek, where they made a village on the east bank of the stream, near its mouth, and not far from the site of the present town of Ponca" (Dorsey 1884: 213). Dorsey is clearly referring to Aoway (Aowa) creek, not Ionia, which is consistent with Fletcher and La Flesche "Ma xude waa i te ...Where the Iowa farmed ...Ayoway creek" (Fletcher and La Flesche 1911: 91).

Fletcher and La Flesche give an extended story of the Omaha village on Bow Creek, which is given in its entirety:

There is no mention of any village being built on their southward movements until after they had passed the Niobrara river. On Bow creek, Nebraska, near where the present town of St. James stands, a village of earth lodges was erected, and here the people remained until a tragedy occurred which caused a separation in the tribe and an abandonment of this village by all the people. The site was known and pointed out in the last century as the place where stood the Ton'wonpezhi, "Bad Village."

Fletcher and La Flesche 1911: 85

The details of the tragedy which split the tribe are also recounted:

In the Teci^{n'} de gens lived a man and his wife with their three sons and one daughter. Although the man was not a chief, he was respected and honored by the people because of his bravery and hospitality. His daughter was sought in marriage by many men in the tribe. There was one whom she preferred, and to whom she gave her word to be his wife. This fact was not known to her parents, who promised her to a warrior long past his youth. Against her will she was taken to the warrior's dwelling with the usual ceremonies in such marriages. The girl determined in her own mind never to be his wife. She did not cry or struggle when they took her, but acted well her part at the wedding feast, and none knew her purpose. When the feast was over and the sun had set, she slipped away in the dark and was gone. At once a search was started, which was kept up by the disappointed old warrior and his relatives for several days, but without success. The girl's mother grieved over the

loss of her daughter, but the father was silent. It was noticed that a certain young man was also missing, and it was thought that the two were probably together. After the girl had been gone some time, a boy rushed to the father's house one morning, as the family were eating their meal, and said: "Your daughter is found! The old man has stripped her of her clothing and is flogging her to death. Hurry, if you would see her alive!" The father turned to his sons and said: "Go, see if there is truth in this." The eldest refused, the second son bowed his head and sat still. The youngest arose, seized his bow, put on his quiver, and went out. The village had gathered to the scene. As the brother approached, he heard his sister's cries of anguish. Pushing his way through the crowd he shouted words of indignation to those who had not tried to rescue the girl, and drawing his bow, shot the angry old man. The relatives of the dead man and those who sympathized with his exercise of marital rights ran for their bows and fought those who sided with the young rescuer. A battle ensued; fathers fought sons and brothers contended with brothers. All day the two sides contested and many were slain before night put an end to the conflict. The next day those who had fought with the brother left the village with him and traveled eastward, while their opponents picked up their belongings, turned their back on their homes and moved toward the south. There was no wailing nor any outward sign of mourning. Silently the living separated, and the village was left with the unburied dead.

"A new generation had grown up," this strange story continues, "when a war party traveling east beyond the Missouri river encountered a village where the people spoke the Omaha language. Abandoning their warlike intents, the Omaha warriors entered the village peaceably, persuaded their new-found relatives to return with them, and so the Omaha people were once more united." The village where the reunion took place was near one then occupied by the Iowa, not far from the site of the present town of Ponca City.

Fletcher and La Flesche 1911: 85-86

Specific information regarding the location of Toⁿwoⁿpezhi, Bad Village is contained in the same work:

This village was located on East Bow creek, in the north-east part of township 32, range 2 east of the sixth principal meridian, Cedar county, Nebraska.

Fletcher and LaFlesche 1911: 99

The account of Henry Fontenelle also speaks of this village:

They lived there [on the White river] but a short time and moved down the west side of the Missouri river (still with the other tribes that started with them from the Sioux river), until they arrived at a place opposite the mouth of the James river of Dakota, and lived there many years. The Iowas located at the mouth of Iowa creek, near the present site of Ponca, Nebraska. The Otoes went on south until they came to the mouth of the Elkhorn river where they settled on the east side. ...No account is given of the Winnebagos after they left the Sioux river. How long the Omahas remained at their village opposite the James river we know not. The tradition tells us they moved on down the river to a place where the Omaha creek disembogues out the bluffs at the present site of Homer, Nebraska, and established a village there many years before a white man was known to them.

Fontenelle 1885: 77-78

Ellis Blackbird's account differs from the others since he brings the Omaha from the village on White River to the Pipestone quarries, and then to a village north of Sioux City and then to one opposite Yankton:

Leaving the Pipestone Quarries, they came down to Sioux City, and a little north of there they started a very large village and stayed there quite a while; and I have seen the site of an old village, and at the time I saw it, where they led the horses down to water you could see the paths going down and other evidence that there had been a very large village there. After living there for some time the enemies came and killed many of the Omahas and broke up the village.

After leaving the village they crossed the Missouri River and came on this side and started a village opposite where Yankton city now is, in near a large stream, where the land was fertile. They formed a camp on what is now known as the Omaha Creek. After living there awhile they quarreled among themselves. The cause of the quarrel was a woman who was married ran away with another man. Her husband's people would quarrel with the woman's people, and there were a great many of the Omahas killed, and the different bands taking part in the quarrel scattered, some in one direction, some in another. Wherever the bands went they formed a little village of mud lodges.

U.S. Court of Claims 1916: 27

"Omaha Creek," in Blackbird's account, refers to what is called Bow Creek today, as he later explained under cross-examination. It does not refer to modern Omaha Creek in Dakota County.

The next record of the region is a problematical one which derives from the Mallet expedition to Santa Fe in 1739 (Folmer 1939; Nasatir 1952 I: 28-29). Unlike previous explorers who ascended the Missouri to the Arikara villages, the Mallets ascended only to the "Panimaha River," and leaving from there they proceeded southeast paralleling the Missouri River until they struck the Platte and proceeded up that stream before veering southwest. Folmer maintained that the "Panimaha River" was the Niobrara (1939: 164n), which would have brought the Mallet expedition into the northeastern Nebraska region. He must be approximately correct, on the basis of what is reported in the abstract of the now-lost Mallet journal, but if so, this creates many problems. Most serious is the fact that the Panimaha (Skidi) are believed to have been in central Nebraska in 1739 (Grange 1968: 132-145). However, the possibility of the misidentification of the "Panimaha River" with the Niobrara (or the White) seems slight in view of the statements in the Mallet journal abstract that it is three days' march northwest of the Platte and that it flows directly into the Missouri River. Champe rationalized this inconsistency by correlating the Mallets' "Platte" river with the Missouri (Champe and Fenenga 1974: 36-37) but this simply cannot be justified with other portions of the journal abstract. Further, Jean Baptiste Lemoyne Sieur de Bienville, in a letter of April 22, 1734, states:

I learn by the same occasion that a Frenchman who has lived for several years with the Pani-mahas, who are established on the Missouri, having gone to the Ricaras who inhabit the upper part of this same river and who had not yet seen any Frenchmen, found in that district many silver mines which appear to him very rich.

Nasatir 1952 I: 25

(emphasis added)

This passage suggests that at least some Skidi had gone to live in an Arikara village on the Missouri River in northern Nebraska or South Dakota. This would be in keeping with 1) the close relationship known to have existed between the Skidi and the Arikara, and 2) known movements of both the Arikara (Wood 1955) and the Skidi (Troike 1964).

The problem of a Skidi presence in the Niobrara region is complicated by a reference made by Lewis and Clark to a purported Pawnee village there. On September 4, 1804, William Clark "went up the river three miles to a butifull Plain on the upper Side where the Panias once had a Village" (Lewis and Clark 1904: 139). Luckily, this bit of erroneous information has been resolved by Diller (1946). Lewis and Clark had with them a map prepared by John Evans (Wood 1981),

on which was scrawled the word, "Ponca"; Lewis and Clark misread it as "Pania," or Pawnee. The misreading was made practically inevitable by the difference between Evans' term, Ponca, and their own, Poncarar.

Finally, one must also consider the possibility of confusion on the part of the French between Maha and Panimaha. Such an error would by no means have been unique. In 1785, the governor of Spanish Louisiana, Estevan Miró, made this very error (Nasatir 1952 I: 126). A similar confusion may have led to deKerlerec's 1758 count of 40 Omaha villages. This number of villages is often attributed to the Arikara in this general time period, and the attribution of them to the Omaha suggests a whole chain of misidentifications: Omaha=Panimaha=Pani=Arikara.

At some point during the Omaha residence on the Missouri, probably in South Dakota, they came into intense contact with the Arikara from whom they adopted the earthlodge and perhaps other material culture traits. It is not impossible that the Omaha stories of contact with the Arikara, and possibly with Upper Missouri Skidi Pawnee as suggested by Bienville's letter, are reflected archaeologically by the Redbird Phase. The Redbird pottery exhibits some Oneota traits, but they are clearly influenced by Talking Crow (Arikara) ceramics.

There are no first-hand data regarding the Indians of the Upper Missouri from 1739 to 1758. However, it should be noted that a second French fort, replacing Fort Orleans, was established in 1744 at the Kansa village on a creek in northeastern Kansas. This establishment, Fort Cavagnial, Fort Cavagnole, or Missouri Post, was in existence until the French relinquished control of Missouri (as their northwest Louisiana possessions were known) to the Spanish in 1764 (Hoffhaus 1964). From here French traders probed southwest toward Santa Fe and traded with the Indians of the Missouri. Despite the existence of this post, no documents pertaining to the project domain and its surroundings have been preserved.

On December 12, 1758, Governor deKerlerec produced a list of the Indian nations who had intercourse with the French in Louisiana and Illinois (Nasatir 1952 I: 51-55). He describes the Big Osages, the Little Osages and Missouris, the Kansa, the "Octata" and "Ayowais," the "Panis-Mahas," the "Mahas" and the "Kikara" of the Missouri. The Octata are described as being 80 leagues up the Missouri River from Fort Cavagnial, "situated on the bank of the Missouri a la bord," the Ayowais 10 leagues farther. These villages are datum points for other upriver references. The Mahas are said to be 80 leagues above the Ayowais: "They would be little known if it were not for some French coureurs, who report that they number forty villages, extremely populated..." deKerlerec's estimate of Omaha population, 800 men, argues against the fabulous "forty villages," which would have contained but 20 men per village (Nasatir 1952: 52). The forty

villages may represent a confusion with the Arikara (cf. discussion above).

The Oto were not in their village on the Platte River, but rather were situated on the Missouri, with the Ioway located just above, but on the opposite bank. These surely are the villages seen by Lewis and Clark on July 27th and 28th, 1804:

I took one man R. Fields and walked on Shore with a view of examing Som Mounds on the L.S. of the river ... The Otteaus formerly lived here ... passed at 1 ml. a Bluff on the S.S. ...below this High Land on the S.S. the Aiauway Indians formerly lived, below this old vil- lage about 5 miles passed Some Monds on the L.S. in a bend where the Otteauze Indians formerly lived...

Thwaites ed. 1904 I: 92-93

The Oto village was some 20 river miles above the Platte, the Ioway village 5-6 miles above this on the opposite side. MacKay's "Table of Distances..." gives the distance from the Platte to the "Old village of the Iowa and Oto" as 7 leagues (Nasatir 1952 II: 489), and Brackenridge gives the distance as 21 miles to the Oto village and 27 miles to the Ioway village (Brackenridge 1814: 265-268). Finally, the "Notes of Auguste Chouteau on Boundaries of various Indian Nations" states:

The Iowas formerly had their village on the right bank of the Missouri about eighteen miles above the river (Platt[e] on the lands of the Mahas...Afraid to hunt on their own lands lest they might be attacked by the Sioux, and Constantly threatened by the Mahas & Otos who wished to drive them from the small tract of country of the river des Moins...and for that purpose in 1765...about one half of the Tribe moved...the bal- ance of the Tribe all removed to the same place in the course of two or three years.

Chouteau 1940: 139-140

The mouth of the Big Sioux is just over 80 leagues above the mouth of the Platte; thus if the Omaha were 80 leagues above the Ioway as deKerlerrec stated, they would have still been within the project domain by 1758... deKerlerrec's estimate of the Omaha position 90 leagues above the Platte is the same as Renaudiere's in 1723. If the 1723 village can in any way be equated with the "Bad Village," it seems unlikely that the Omaha were still there 35 years later.

Omaha traditional accounts referrable to this period are hazy, but suggest that they and the Ioway had moved out of the project

domain by the time of Governor deKerlerec's reports, and some imply that the Dakota were moving in, in force. Dorsey's account states:

By and by the Omahas removed to a place near Covington [South Sioux City]. Nebraska, nearly opposite the present Sioux City. The remains of this village are now known as "Ti-tan'-ga'jin'ga," and the lake nearby is called "Çix-ucpa'-u'gæ," because of the willow trees found along its banks.

In the course of time the Iowas passed the Omahas again, and made a new village near the place where Florence now stands. ...

After leaving Ti-tangajinga where the lodges were made of wood, they dwelt at Zande'bu'ta.

Dorsey 1884: 213

Ti-tanga-jinga and Zande'bu'ta are not precisely located archaeological sites today, but the traditions clearly place the Omaha south and east of the project boundary. Since the Ioway had "leapfrogged" the Omaha nearby by 1758, we may conclude they had abandoned Bow Creek before that date.

Fletcher and La Flesche remark that the village where the Omaha reunited was near Ponca "City." "Near" Ponca may be good enough to identify this place with Dorsey's Ti-tanga-jinga. Their account also notes:

The attacks of the Dakota tribes forced the Iowa to leave that part of the country and they moved southward as far as the river Platte and never again built a town near the Omaha tribe. The Omaha were driven by the Dakota from their village at the same time as the Iowas and finally settled...[at] To wo to ga, "large village."

Fletcher and La Flesche 1911: 86

The latter place was established, according to the same source, in the fourth quarter of the 18th century.

The account of Henry Fontenelle is uninformative regarding the period immediately prior to the establishment of the Big Village, which may imply direct move from Bow Creek to Homer (Fontenelle 1885: 78). Ellis Blackbird, however, does mention an intermediate village:

Leaving that village this side of Yankton, they came on down and got along the banks of the Missouri River near Dakota city, down on the bottom there. They lived there two years, but the sand blowing was very annoying, because it was very thick, and they told the young men to go and look for a location. They did not go very far until they came to Homer.

U.S. Court of Claims 1916: 43

The Omaha had not abandoned the project domain, however. Seasonal and/or intermittent reoccupation occurred throughout the 19th century.

Little Bow and the Bad Village

The enigma of the village of Little Bow, however, demands attention. As documented above, traditional accounts of the Omaha make prominent reference to the "Bad Village." Early historical sources, however, appear to confuse this with a second, later Omaha village. These sources are often in disagreement with each other, however, and are difficult to interpret. Most refer to late 18th, early 19th century travels which will be dealt with in proper sequence later in this paper, but their content with regard to Little Bow is presented here. Since most accounts refer Little Bow's village to the period immediately prior to the death of Blackbird in 1800-1801, presentation here may seem out of order. However, since the earliest specific account of the village in 1797 refers to the "Old Village of Petit Arc," however, some of the "history" presented below was based on misinformation.

James MacKay's "Table of Distances Along the Missouri in Ascending from the Mouth up to the White River, Taken by James MacKay 1797" states:

Old Village of Petit Arc. Built by an Omaha chief, named Petit-arc.

Nasatir 1952: 490

A map discovered in the Office of Indian Affairs originally thought to be a tracing of an original by John Evans (Abel 1916: 341-343) is now felt to have been authored by James MacKay (Diller 1946: 513). This map shows the "Riv. & village des petits os" rendered by an early 19th translator as "River & village of the Little Osages" (Abel 1916: 343, Plate II). The erroneous translation is clearly based upon an original error of transcription when the tracing was made. "Petit os" must have been "petit arc" on the original.

The map which is today attributed to Evans, a partner of MacKay's, was originally published by R. G. Thwaites in 1905, mistakenly identified as the work of William Clark (Thwaites 1905: Vol. 8, Map 5). The map was correctly identified as Evans' by Aubrey Diller (1946: 516; Wood 1981). The map depicts Bow Creek which is labelled "R & village Pettite Arch" with two triangular symbols drawn on the west bank. No further information is recorded; the symbols may refer to the two "small ancient fortifications" mentioned at a later time by Merriwether Lewis, or the map may have been the source of his information and the reason for remarking on them.

The lost manuscript map resulting from the activities of Evans and MacKay, was found among the papers of J. N. Nicollet in the War Department in 1917 (Diller 1946: 513-514; 1955: 125). It has never been published, but a photostatic copy was obtained from the Library of Congress. A single triangular symbol on the east side of Bow Creek (not identified by name) and the inscription: "Ancien Village du Petit Arc" written on the west are the only notations. The authorship of the map must be attributed to James MacKay since his 1796 westward journey is shown; the map is probably a copy, however.

Francois Marie Perrin du Lac claimed to have ascended the Missouri River in 1802 to the vicinity of the mouth of the White River. Historians concur in the opinion that Perrin du Lac derived most of his information from J. B. Truteau or perhaps Jacque D'Eglise; his report thus refers to the period just prior to 1795 (Diller 1946: 513, 517; Nasatir 1952 II: 707). It states:

Twenty miles from the Mahas River, is the second river of the Sioux, and sixty miles farther, the remains of the village Petit-Arc. It was built by a Mahas chief of the same name, who in consequence of a dispute with some of his tribe, came with his family and friends, and formed an establishment. These, after his death, finding themselves too weak to resist the Sioux, who came to lay them under contribution, joined themselves to this nation, from which they are no longer separated.

Nasatir 1952 II: 710

The cartographic work of Evans and MacKay found expression in published form in Perrin du Lac's map printed in Paris in 1805. This map depicts the "ancien village des petit arcs" on the east bank of Bow Creek near its mouth.

Lewis and Clark appear to have interpreted traditions current in 1804 regarding the matter. The rough field notes of William Clark state:

on the S. S opposit arch Creek above the Mouth of this Creek a Chief of the Maha nataton displeased with the Conduct of Black bird the main Chief came to this place

and built a Town which was called by his name Petite Arch [Arc] (or Little Bow) this Town was at the foot of a Hill in a hansom Plain fronting the river and Contained about 100 huts & 200 men, the remains of this tribe Since the Death of Petete arch has joined the remaining part of the nation

Clark 1964: 120

The version in the Original Journals, edited by Thwaites, tells a similar story:

camped on a Sand bar opposed the old* village Called Pitite Arc. a Small Creek falls into the river 15 yds wide below the Village on the Same Side L. S. this Village was built by a Indian Chief of the Maha nation name of Petite Arc (or Little Bow) displeased with the Great Chief of that nation (Black Bird) Seperated with 200 men and built a village at this place after his death the two Villages joined

Lewis and Clark 1904: 124

Finally, the published version of the account (edited by Coues) reverses the statement concerning the death of Little Bow being the critical event permitting the reconciliation of the tribe:

Opposite to this, on the south, is a small creek called Petit Arc or Little Bow; and a short distance above it, an old village of the same name. This village, of which nothing remains but the mound of earth about four feet high surrounding it, was built by a Maha chief named Little Bow, who being displeased with Blackbird, the late king, seceded with 200 followers and settled at this spot; it is now abandoned, as the two villages have reunited since the death of Blackbird.

Lewis and Clark 1893: 88

The Original Journals make no mention of the "mound of earth about four feet high" surrounding the site. A further reference to the village on Bow Creek occurs later in the account:

...some of our party say they observed two of these fortresses on the upper side of Petit Arc Creek, not far from its mouth, and that the wall was about six feet high and the sides of the angles 100 yards in length.

Lewis and Clark 1893: 106

Finally, Meriwether Lewis' "Summary View of Rivers and Creeks, etc.," apparently written during the winter of 1804-05 at Fort Mandan states:

20 miles higher up (i.e. above the mouth of the Big Sioux River) little bow creek falls in on the S side, below an old Maha village. it is 20 yards wide and waters a beautifull, fertile plain, and open country. the remains of two small ancient fortifications, are found on this creek at a short distance from its entrance.

Lewis and Clark 1905 Vol. 6: 45

Lewis' "Summary View" seems to describe the "old Maha village" and the two "small ancient fortifications" as if they were different entities. It seems probable that the "fortifications" which Lewis and Clark observed were actually natural, not cultural phenomena--an opinion expressed by F. V. Hayden (cited in Lewis 1891: 291) and T. H. Lewis (1891: 290-292).

The ambivalent statements regarding the deaths of Little Bow and Blackbird suggest that Lewis and Clark were reporting hearsay, and adjusting it as required. If the villages reunited after the death of Blackbird, then the event must have occurred after the winter of 1800-01; yet MacKay's account, dating to 1796 or 1797 (i.e., four years before the death of Blackbird) implies the Bow Creek village had already been abandoned ("Old village of Pettit Arc"). Perrin du Lac and the early versions of Lewis and Clark's account attribute the reunification to the death of Little Bow, which if correct is consistent with MacKay's map and "Table of Distances..." and Evans' map. The maps prepared by Lewis and Clark are transitional between the Evans and MacKay products, which usually depict the village of Little Bow in some fashion, and later American explorers' works which usually do not.

An 1806 tracing by Nicholas King of a field map prepared by William Clark (Wheat 1958: Map 284) depicts an "Old Mahar V." on the west side of Bow Creek near its mouth. Clark's manuscript maps of c. 1809 and 1814 (Wheat 1958: Maps 291 and 316) and the printed versions found in the 1815 and later editions of the expedition account delete specific information regarding Bow Creek although the stream itself might be shown.

An important map, which appears to be a large-scale copy of William Clark's field map, was given to Prince Maximilian of Wied by Benjamin O'Fallon in 1833 but alludes to the 1804-1806 period with annotations by Maximilian (Thomas and Ronnefeldt 1976: 9; Wood, Personal Communication 1981). The map is now in the possession of the Northern Natural Gas Company and is housed at Joslyn Art Museum,

Omaha. Bow Creek is depicted with the caption "Little Bow Creek" on the west side of the stream. On the east side of the stream is the caption "Ancient village of Mahars called Petete Arch." This suggests that Lewis and Clark believed that Little Bow's village was on the east side of the creek.

Henry Marie Brackenridge did not mention the village in the "Journal" of his 1811 voyage up the Missouri, but his "Table of Distances from the Mouth of the Missouri to the Mandan Village-Rivers-Latitudes, &c." tabulates the following:

<u>Places</u>	<u>Width</u>	<u>Side.</u>	<u>Dist.</u>	<u>T D</u>
An old village at the mouth of Little Bow creek	30	S.W.	20	880

Brackenridge 1814: 267

Edwin James' account of Stephen Long's expedition of 1819-1821 contains an account of Little Bow and Blackbird (transcribed by James from notes taken by Thomas Say during extensive interviews with John Dougherty regarding the Omaha). Information regarding the village is minimal, but the social and political atmosphere described is important:

One inferior, but distinguished chief, called Little Bow, at length opposed his (Blackbird's) power. This man was a warrior of high renown, and so popular in the nation, that it was remarked of him, that he enjoyed the confidence and best wishes of the people, whilst his rival reigned in terror. Such an opponent could not be brooked, and the Black Bird endeavored to destroy him.

On one occasion the Little Bow returned to his lodge, after the absence of a few days on an excursion. His wife placed before him his accustomed food; but the wariness of the Indian character led him to observe some peculiarity in her behaviour, which assured him that all was not right; he questioned her concerning the food she had set before him, and the appearance of her countenance, and her replies, so much increased his suspicions, that he compelled her to eat the contents of the bowl. She then confessed that the Black Bird had induced her to mingle with the food a portion of his terrible medicine, in order to destroy him. She fell a victim to the machination of the Black Bird, who was thus disappointed of his object.

With a band of nearly two hundred followers, the Little Bow finally seceded from the nation, and established a separate village on the Missouri, where they remained until the death of the tyrant.

James 1823: 205-206

James mentions that Blackbird died in 1800 just after the events described above. It seems probable that James borrowed (or Dougherty was paraphrasing) some of his account from the recently published Biddle edition of the Lewis and Clark expedition, and this may have been the source for the assertion of reunification after Blackbird's death.

There appears to have been no further mention of the story of Little Bow from the publication of James' account until 1859. In that year Phillip St. George Cooke published his memoirs relating to his adventures as a dragoon officer at Fort Leavenworth in the early 1830's. Cooke was a reliable reporter of events of frontier life and made a special effort to gather information of ethnographic interest. The whole of Cooke's Chapter XVIII is a description of Blackbird's life, and of interest is his account of relations between that chief and Little Bow:

There was one warrior who quailed not before the terrible power of Blackbird. This was Maundahe Ghingha, --the Little Bow. He had become so distinguished that the chief was jealous, or held his character in some dread; accordingly, on an occasion of his absence on a hunt, Blackbird's influence prevailed over his wife, and she consented to poison him on his return.

Agreeably to her instructions, on Little Bow's arrival, she was particularly attentive and affectionate in her usual offices: and setting before him a tempting bowl of food, invited him to eat. I know not if in this case his death had been foretold,--but from some cause Little Bow was distrustful: he requested her to partake of the meal; and on her declining, positively commanded her to eat. His wife then threw herself at his feet, and with many tears confessed her crime and revealed the secret of Blackbird's power.

The Little Bow dashed his tomahawk into her brain. He then threw on his war dress,--seized his arms, and mounted his best horse. He galloped through all parts of the village, proclaimed the villany of the murderous chief, and endeavored to stir up the people by violent harangues; he paraded in front of Blackbird's lodge; accused him of his crimes, uttered every abuse, and defied him to manly combat.

But Blackbird's power, founded on the ignorance and superstitious fears of the people, was scarcely to be shaken; the result was that Little Bow raised a party of about three hundred--including families--with which he seceded, and built a village about thirty miles above. Here they lived many years, until they were nearly all exterminated by small-pox. Little Bow himself survived his great enemy.

Blackbird, or Ton-wan-ga-hi--Town-builder as he was called,--died in 1803, about a year after this event, of small-pox.

Cooke 1859: 133-134

The story presents a retelling of a familiar story in a plausible sequence of events. The date of Blackbird's death and therefore the general time period are wrong, but there is nothing else out of line; by 1859 all data regarding Little Bow was probably badly muddled by Biddle's edition of Lewis and Clark and by James. However, there is new information which occurs in no previous account: Little Bow's Omaha name, a version of Blackbird's Omaha name, and the fact that Little Bow was moved to murder his wife rather than allow her to die by poison. Therefore, Cook may have been reporting an independent account gathered from an informant familiar with the story. Antoine Barada, mentioned by Cooke as his guide, might be the best candidate.

1760 - 1800

From 1758 to 1774, there is only indirect and unsatisfactory information regarding the Indians of the Upper Missouri in general, and the project domain in particular. Smith (1974: 39) suggests that this hiatus may have been due to the disruption of international trade caused by colonial and continental European wars of the period. From 1774 to 1785 information remains scanty, again, due possibly to the disruption caused by the American Revolution.

France ceded to Spain her western territories under the terms of the Treaty of Paris of 1763. However, Spain did not take control of the area until 1768 (Nasatir 1952 I: 58). An event of significance was the establishment, in February 1764, of St. Louis--almost immediately the focus of the Missouri River Indian trade. A letter of 1769 from Francisco Rui states that the Panimaha was the most distant tribe with whom they traded (Houck 1909 I: 63). Nasatir (1952 I: 70) notes that trade with tribes above the Panimaha was frowned upon, but he suspects it was actually carried on.

In a 1774 letter the Lieutenant Governor of Illinois, Pedro Piernas, stated that the "most distant nations of the Missouri" (Nasatir 1952 I: 59) were the Mahi, Panis, Panimai, Otoes and "one recently discovered more in the interior than those mentioned" called Ricaras. A letter from Piernas dated 1775 listed the Maha as a nation of the Missouri River with which the Spanish traded, two traders being allowed to the tribe. Trade with the "Ricarra nation" was proposed and was encouraged, but had not begun (Kinnaird 1945 II: 223) thus defining the geographical extent of Spanish trade and information.

In November 1777, Francisco Cruzat was ordered to send a list of traders to whom passports had been issued, and a description of Indian tribes. His report shows the Mahas to be the most northwesterly, and that this tribe was given to Jean Baptista Martigni and M. Chauvin (Houck 1909 I: 139). The Omaha are described as a tribe of 400 to 450 warriors on a small tributary of the Missouri 60 leagues from the mouth of the Platte River. The "...principal chief" was "El Pajaro Negro" - Blackbird (Houck 1909 I: 144). Regarding the Dakota, little was known at the time, and they are said to have been "...located on the meadowlands of the Misisipy in the Spanish district" (Houck 1909 I: 145).

Governor Estevan Miró, in a December 12, 1785 account of the geography of Spanish Louisiana, is the next datum. This is "...a detailed report according to local knowledge and the information I have been able to acquire..." noting that "In all the time in which trading has been going on along the Missouri, no one had ever gone higher than the river of the Sius..." (Nasatir 1952 I: 12 and 121). With respect to the area between the Big Sioux and the Niobrara rivers, there is little specific information, although Miró states that the Ponca Indians occupy a village on a small stream one league from the Missouri and one league downstream from the mouth of the Niobrara River (Nasatir 1952 I: 123). Clearly substituting "Panimaha" for "Maha," Miró writes of the Omaha and Ponca:

The Panimaha's [sic] live about two hundred and eighty leagues from the mouth of the Missouri, and they hunt in the region that is between the Boyer River and their villages.

The Poncas have a village on the small river below the River-that-Runs. Nevertheless they are nomadic, naturally ferocious and cruel, kill without mercy those whom they meet on the road, although if they find themselves inferior in strength, they make friends of them and, in a word, although they are not more than eighty warriors, they only keep friendship with those whom necessity obliges them to treat as friends.

Nasatir 1952 I: 126

It is interesting that Miró remarks on "the river of the Sius," for this is the first time the Big Sioux is so designated in a document. The 1702 Delisle map refers to what may be the Big Sioux as the "R des Maha" (Wedel 1974: 168), and on his 1718 map the stream is the "R. due Rocher."

Precisely when the name change occurred is not clear, but between 1718 and 1785 the Sioux became associated with this stream. J. N. Nicollet's remarks on the Brule relate the name of the band to an event which appears to have occurred on this stream.

The Sichanrus, or the burned thighs, whom the whites simply call the Brules, after a prairie fire that one night surprized their village on the river Tawicharuwakpadan, [the river where the wife was burned], which falls into the Big Sioux River near Dixon's place. Their name before this accident was a family name taken by the band, Chokatonwanyan, the people of the middle village.

Nicollet 1976: 259-260

This event may well have occurred in 1762-63, as the pictograph in Battiste Good's winter count for that year depicts "The people-were-burnt winter" (Mallery 1893: 304). Supplemental information explains:

They [the "Brule"] were living somewhere east of their present country when a prairie fire destroyed their entire village. Many of their children and a man and his wife, who were on foot some distance away from the village, were burned to death, as also were many of their horses. All the people that could get to a long lake, which was near by, saved themselves by jumping into it. Many of these were badly burned about the thighs and legs, and this circumstance gave rise to the name Sican-zhu, burnt thigh.

Mallery 1893: 304-305

This places the Brule occupation of the Big Sioux valley at least as early as 1762.

A letter from Manuel Perez to Governor-General Estevan Miró of April 5, 1791 notes that a great portion of the Oto had gone to trade with the English on the Mississippi, and further notes that the English were coming overland to trade with the Mahas and Panis at their villages (Kinnaird 1945 III: 410-411; Nasatir 1952 I: 145).

When Governor-General Carondelet requested information regarding the Mandan from Santiago de la Iglesia (Jacque D'Eglise) who had traded among them in 1792, Lieutenant Governor Zenon Trudeau informed him [May 20, 1793] he could not give him the least news since D'Eglise:

...is so simple and from a province of France of such a peculiar language (dialect) that nobody can understand it...But I hope to see within a few days a well informed Canadian mozo who has been in the said nation on discovery...

Nasatir 1952 I: 181

The mozo, from whom Trudeau had hopes of getting intelligence, was James MacKay.

A deposition by D'Eglise of June 19, 1794, however, does provide some information regarding his activities of 1792:

...in the year one thousand seven hundred and ninety-two, the deponent having proper permission for the usual practice of hunting on the Missouri River, and going in this way as far as the nation of Mahan, met there a trader, Don Pedro Montardy... from whom the deponent bought some goods for trading with the Indians.

Nasatir 1952 I: 234

D'Eglise continued upriver to the Mandan and Tayenes nations, supposedly the first Spanish subject to do so (Nasatir 1927). There is, however, nothing directly relating to the project domain in his account except that he had to travel to the Mandans to find "nations with whom there was no trading or commerce at that time." D'Eglise returned upriver in the spring of 1793 to trade with the Mandan, but was stopped by the Arikara and Sioux and thus failed (Nasatir 1927: 50). D'Eglise petitioned for four years' exclusive trade with the Mandans, but this was not granted because it would have been in conflict with the grant just given to the newly formed Missouri Company.

The founding of the Spanish "Company of Explorers of the Upper Missouri," or the Missouri Company, on October 15, 1793, set the stage for the opening of trade to the Mandans from St. Louis and the ambition of discovering an overland route to the Pacific

(Nasatir 1952 I: 85-86). The explorations of Truteau, MacKay and Evans, and after reorganization, those of Loisel and Tabeau, were under the authority of the Missouri Company which was supposed to defend the Spanish territory of the Upper Missouri and to profit its members.

Jean Baptiste Truteau, a former school teacher, was chosen to lead the first Company expedition to the Mandans, and he departed St. Louis in June of 1794. Truteau has left a full and informative account of his expedition which is the earliest day-to-day narrative we have of the Upper Missouri and the project domain (Nasatir 1952 I: 259-311; McDermott 1970). Below the mouth of the Platte River Truteau was overtaken by D'Eglise on his third expedition up the Missouri; D'Eglise was pillaged at the Ponca village, losing 25 muskets with powder and ball there, but continued to the Arikara villages having there a good trade and leaving few furs for Truteau (Nasatir 1927: 54-55).

Having avoided the Omaha by sneaking by their village, Truteau, under cover of night, camped at the Big Sioux River, six leagues above the Omaha village. He camped the evening of the 26th "above the great bend...twelve leagues from the Mahas," apparently the series of giant meanders above Sioux City eliminated in the 1880 flood. By September 4, he had reached the James River, 45 leagues above the Mahas, and by the 6th was encamped on Bon Homme Island, above the project domain. Unfortunately, Truteau gives few details; the lack of mention of groups inhabiting or claiming the area may or may not be significant.

Truteau continued upriver until, having fallen in after a band of Dakota whom he wished to avoid, he encountered a mixed Teton and Yankton hunting party on September 30th. Truteau's outfit was pillaged, but without loss of life. After going overland to an Arikara village up the Missouri, which he found abandoned, Truteau dropped downriver to just above the Ponca village and on the east shore began building a wintering house (in present Charles Mix County, South Dakota) on November 11th (Nasatir 1952 I: 267-280). This must be the Ponca House shown on the Evans map of 1796-97 (Wood 1981: Fig. 2).

Truteau's troubles were not over, for on the 13th of November he was discovered by 22 lodges of Omaha under Big Rabbit, and on December 18th Blackbird arrived. Truteau was repeatedly plagued by the Omaha, the Ponca and Jean Munier, the trader at the Ponca

village until his departure on March 25, 1794 (Nasatir 1952 I: 280-293). It is clear that the Omaha under the leadership of Blackbird felt quite comfortable on the northeast side of the river in spite of nearby Teton and Yankton hunting parties.

Jean Baptiste Munier claimed to have "discovered" the Ponca in 1789, and on that account he petitioned for and was given exclusive rights to trade with them from 1794-1798 (Nasatir 1952 II: 194-196). Jacques Clamorgan disputed Munier's claim of "discovery" (Nasatir 1952 I: 206-207). Clamorgan noted that the Poncas usually traded for their furs with the trader at the Omaha village, the Ponca village being about thirty leagues higher up, and therefore had been considered but a single trading "share" up to that time. Munier, claimed Clamorgan, intended to injure the trade at the Omaha village by thus dividing the Omaha trade into two shares. Governor Carondelet eventually rescinded Munier's exclusive trade with the Poncas and reincorporated it with that of the Omahas (Nasatir 1952 I: 212-213). The implication for our study is that the Ponca were in the habit of travelling through the project domain on a regular basis to trade at the Omaha village.

James MacKay led the Missouri Company's second expedition in August, 1795, to the Omaha village where he was to establish a fort and pass the winter. MacKay had been to the Mandan villages at least once before, in 1787, via the Canadian northwest (Nasatir 1952 I: 96-97). MacKay arrived at the Omaha village on November 11th and soon began construction of Fort Charles. Blackbird, the Omaha chief, agreed to promote a general peace among the Missouri River tribes and offered to bring the Sioux, Ponca, and Arikara to Fort Charles to make peace and ensure free passage, "reduce the Poncas to their duty," and personally escort MacKay to the Arikara if need be (Nasatir 1952 I: 360-362).

On two occasions MacKay sent John T. Evans up the Missouri. On the first occasion Evans left in December 1795 and returned to Fort Charles on January 6, 1796, having gotten as far as the White River before being forced to turn back when he encountered the "Sioux of the Grand Detour" (Nasatir 1952 I: 494). Evans' second attempt, begun on June 8, 1796, succeeded in reaching the Mandans (Nasatir 1952 II: 495-496). Nothing, unfortunately, except the briefest of remarks in MacKay's "Table of Distances..." of 1797 resulted from the explorations of Evans and MacKay which has a direct bearing on the project domain.

Nasatir remarks that it is difficult to say how many Spanish subjects were trading on the Upper Missouri after 1797, but arguing from references in the Lewis and Clark journals, he concludes "... that trade was continually being carried on upon the Upper Missouri by men subject to, if not licenced by, the government of Spanish

Illinois" (Nasatir 1952 I: 111). In addition, English traders from Prairie du Chieu began competing for the trade of the Omahas and Poncas, and these tribes (apparently) at the instigation of the British destroyed an expedition led by Hugh Heney in 1800 (Nasatir 1952 I: 112). The details of the Spanish trade, none of which throw direct light on the project domain, are summarized in Nasatir (1952 I: 111-115 and documents).

1800 - 1830

One traveler claimed to have ascended the Missouri to the White River in 1802: Francois Marie Perrin du Lac. He was accompanied by an "ancien traiteur." thought to be J. B. Truteau (Tabeau 1939: 15). Stopping at the Omaha village, Perrin du Lac noted that that tribe had suffered greatly from smallpox in 1801 (Nasatir 1952 II: 710). The latter fact was confirmed and amplified by a letter from Carlos Delassus to the Marques de Casa Calvo on April 3, 1801, noting:

...that the Mahas, Ayoas, and other Indians of that [my] district suffered last winter from smallpox...

Nasatir 1952 II: 631

Although trading was proceeding on the Upper Missouri, documents valuable to this study do not again appear until 1804 and the Lewis and Clark expedition. William Clark, and John Ordway kept particularly useful chronicles (Clark 1964; Ordway 1916). The expedition passed the mouth of Aowa Creek called Roloje Creek by Clark, a "... name given me last night in my sleep" (Clark 1964: 112), on August 22, 1804. The party visited Spirit Mound and remarked on Little Bow's village but encountered no Indians until above the mouth of the James River on August 27th, when an Omaha and a Sioux hailed them (Ordway 1916: 118). Arrangements were made to hold a council with the Yanktons (Clark erroneously identifies them as Brule) which was held on August 30 and 31st at Calumet Bluff at the western edge of the project domain.

Passing through the project domain on the return trip in September 1806, Lewis and Clark noted the remains of what was surely the trading house occupied by Robert McClellan during the 1804-05 winter (Thwaites 1905 V: 371-72). Below the Vermillion they encountered James Aird, a partner of Robert Dickson at Lac qui Parle, who was going up to trade with the Sioux (Thwaites 1905 V: 378).

Among the information recorded by Lewis and Clark was a description of the annual James River trade fair. This was held well up the James, probably in present-day Spink County. Truteau notes this fair as early as 1794 and Tabeau describes it in his Narrative (Abel 1939: 121-123). Lewis and Clark remark:

The Sioux annually hold a fair on some part of this river in the latter end of May. Thither the Yanktons of the North, and the Sissitons, who trade with a Mr. Cammaron (Cameron) on the head of the St. Peters river, bring guns, powder and balls, kettles, axes, knives, and a variety of European manufactures, which they barter to the 4 bands of Tetons and the Yanktons Ahnah, who inhabit the borders of the Missouri and the upper part of the River DeMoin, and received in exchange horses, leather lodges and buffaloe robes, which they have either manufactured, or plundered from the other Indian nations on the Missouri and west of it. This traffic is sufficient to keep the Siouxs of the Missouri tolerably well supplied with arms and amunition, thus rendering them independant of the trade of the Missouri, and enabling them to continue their piratical agressions on all who attempt to ascend that river, as well as to disturb perpetually the tranquility of all their Indian neighbors.

Thwaites 1905 VI: 45

The first expedition up the Missouri after the return of Lewis and Clark was led by Manuel Lisa in the spring of 1807 (Oglesby 1963: 40-64). Unfortunately, no first-hand account of this expedition has been discovered. We have no information for the following year, 1808, but two detailed accounts survive from 1809.

During the spring of 1809 a large trading expedition of the new St. Louis Missouri Fur Company, a partnership between Manuel Lisa, August Chouteau and other St. Louis businessmen, departed for the Upper Missouri. Among the responsibilities of the expedition was the return of the Mandan chief Sheheke, who had descended the Missouri with Lewis and Clark in 1806 and whose return had been thwarted by the Arikara in 1807. Two accounts of the 1809 expedition survive: the less complete and less reliable is by General Thomas James, writing from memory many years after the event (James [1846] 1966). The other is by Dr. Thomas, and was printed in the Missouri Gazette and Pittsburg Gazette in 1809 and 1810 (Thomas 1964).

The party arrived at the Maha village on Omaha Creek on August 11. Dr. Thomas describes the village, Omaha earthlodges and subsistence, and notes that the Omaha had just had a skirmish with the Sioux in which several Omaha warriors were killed. The Omaha village contained 400 to 500 men bearing arms, but Thomas warned that they were in danger of extermination by the Sioux (Thomas 1964: 196).

The party arrived at the Yankton village on August 18th:

On the 18th, we arrived at the Yantans, a branch of the Souex, [whose village] contained 300 lodges. Their huts were placed on the north bank. ...These people subsist entirely on the Buffalo, except sometimes a dog. They resemble the Arabs, having no place of residence, following the buffalo as the seasons change, without any wish or desire to raise corn, or vegetables. They hunt on horseback, armed with bows and short guns. They have their nation parcelled out into tribes, viz. Yantans, Titons, Chians [sic], Punkas [sic], &c. ...They are the terror and in fact the lordly masters of all their neighbors, claiming tribute (presents) from all other tribes. - Their dress consists of the skins of the deer, elk, buffalo and beaver, handsomely decorated with procupine quills. As they remain but a short period in one place, they have very little baggage: a few kettles, their arms and clothing, are prepared in small bundles sufficiently large for a dog to drag along by a sled. These animals are of a wolf breed, and know by instinct when the band is in motion: on stripping the huts which are covered with skins, they set up a most piteous howl, and endeavor to escape their intended labour by hiding from their owners.

Thomas 1964: 187

The party was received at the Yankton village by 50 warriors who discharged their guns into the water in front of the barges. The company officers were carried to the council with the Yankton leaders, on litters of buffalo robes. The Yankton were told that no trader was to be left with them and that they would get no presents, which precipitated threats and counter threats of violence, and in the end: "The gentlemen conceiving it their interest, established a trading house here" (Thomas 1964: 187).

The exact location of this Yankton village is not clear. The expedition departed the village on August 20th, and "passed the Panka river on the north side," and the Niobrara river on the 21st. The reference to "Panka river" is unclear since Ponca Creek is on the right side of the river and upstream from the Niobrara. Thomas (or the typographer) may have made a mistake regarding the side of the river, in which case Bazille Creek is most probably Thomas' "Panka river"; if this stream truly entered from the north, Emanuel creek is most likely candidate. Below the Yankton village, the only landmark mentioned is Floyd river, passed on the 13th. The only other clue to the location of the Yankton village is Thomas' statement that a few miles above the Omaha village "...3 Souex...informed us that a party of their nation were waiting for us about 80 miles up the river" (Thomas 1964: 186). This would imply that it lay between Floyd River and Bazille or Emanuel creek, perhaps on the Vermillion River (see below).

"General" Thomas James has also left an account of this expedition (James [1846] 1966: 19-21), but it was written and published over 30 years after the events and time may have obscured some facts. James states of the Sioux village:

We found the village at the mouth of the Jacques River...They were of the Teton tribe, which is kindred with the Sioux. As we approached the bank, which was lined with hundreds, they fired into the water before the forward barge, and as we landed they retreated with great rapidity, making a startling noise with whistles and rattles.

After landing and making fast the boats, about fifty savages took charge of them, as a guard. They wore raven feathers on the head. Their bodies were naked, save about the middle, and painted entirely black.

They presented, on the whole, a most martial and warlike appearance in their savage mode, and performed their office of guarding the boats so well that not even a chief was allowed to go onto them. Other Indians came with buffalo skins to be used as palanquins or litters for carrying the partners to their council house: each was taken up and carried off in state. I was compelled by some Indians to go in the same style to place of council. Here was a large company of old men awaiting us, and for dinner we had served up a great feast of dog's meat, a great delicacy with the Indians. The rich repast was served in forty-one wooden bowls, as I counted them, and from each bowl a dog's foot was hanging out, evidently to prove that this rarity was not a sham but a reality. ...We stayed with these hospitable savages two days. On arriving, we found the British flag flying, but easily persuaded them to hand it down. The Hudson's Bay Company had had their emissaries among them and were...buying them up with presents and promises, and persuading them to act as allies of Britain in any future war with the United States.

On the third day we left the friendly Tetons and proceeded up the river as before. ...

James 1966: 19-21

We believe General James erred in stating that the Sioux at this camp were Teton; perhaps he also erred in stating it was on the James River. Dr. Thomas had placed the village slightly over 80 miles from the Omaha village; in fact the James is about 120 miles. The Vermillion is about 87 miles, or an almost perfect fit. In spite of

what James says, therefore, the village might have been at the Vermillion, a favorite resort of the Yankton (but see the comments by Brackenridge below). The "Hudson's Bay Company" influence among the Yankton must surely have been in the person of Robert Dickson, although in fact he was operating independently of that company in promoting British interest on American soil (see Tohill 1928-29).

We have no account of activities during 1810 in the project domain. From 1811 two accounts are available: that of Henry Marie Brackenridge who accompanied Manuel Lisa's trading expedition, and that of John Bradbury traveling with the overland Astorian party. Brackenridge does not mention seeing any Indian villages beyond that of the Omaha until reaching the Poncas. He does note, on passing the mouth of the à Jaque (James) that it was "...the principal rendezvous of the traders with the Yankton Sioux" (Brackenridge 1814: 234). Brackenridge described the Yankton as follows:

[They] Wander in an agreeable country, a considerable portion of which is woodland--trade on the St. Peters, and on the Missouri at the riviere à Jaque. Their trade is not valuable, chiefly buffaloe robes and deer skins: they are the most peaceable of the Sioux bands.

Brackenridge 1814: 77

Since he credits only the Santee Sioux with gardening, we may assume the Yankton did not farm at this time. Bradbury's remarks are shorter than Brackenridges' (Bradbury 1906: 92-94) and add nothing of significance.

Lisa's trade expedition of 1812 was accompanied by John Luttig, who functioned as clerk. He also kept a daily journal of events (Luttig 1920). Luttig's terse comments are uninformative regarding the project domain, through which the expedition passed from the 9th to the 13th of July (Luttig 1920: 48-49). The most interesting intelligence was Luttig's comment on the 9th: "...passed a small River named Iowa..."; this being the first reference to Aowa Creek by a name referring to its former transitory inhabitants. The same day the prairie was fired "...to give Notice to the Indians of our approach."

Lisa's party continued up the Missouri to near the present North Dakota-South Dakota border, founding Fort Manuel and trading west to the Rocky Mountains. This venture was closed in the spring of 1813 when the party descended the river, perhaps as the result of Dakota hostilities (Oglesby 1963: 126-140). The War of 1812 had begun and the Indians of Minnesota and the Upper Missouri generally took the part of the British, effectively closing trade above the Omaha (Oglesby 1963: 151-163).

Following the conclusion of war, in 1818 and still apprehensive of potential British influence on the Indians of the Upper Mississippi and Missouri, Secretary of War John C. Calhoun conceived an ambitious plan of placing 3 military posts on the Plains at Council Bluffs (near present Fort Calhoun, Nebraska), at the mouth of the Yellowstone and at the mouth of the St. Peters River, in present St. Paul, Minnesota. The "Yellowstone Expedition," led by General Henry Atkinson, ascended the Missouri in 1819, establishing the first of the proposed forts, Cantonment Missouri (later moved and renamed Fort Atkinson) at the Council Bluffs, in Omaha territory near Blair, Nebraska (Gale 1969).

In 1823, following a series of lesser incidents, the Arikara attacked and killed a number of fur traders at their village in northern South Dakota. In retaliation, Colonel Henry Leavenworth and the "Missouri Legion" (actually composed of about 200 U. S. Army troops and several hundred Dakota allies) marched through the project domain en route up river to chastise the Arikara. The ensuing battle was an embarrassment for the United States, but started the Arikara on an eleven year hegira through Nebraska and Colorado (Morgan 1964).

The treaty-making expedition of General Henry Atkinson and Benjamin O'Fallon (with a 476 man infantry escort) passed through the project domain from June 1 to June 4, 1825. The anonymous journalist of the expedition noted: "...an Indian grave of pretty large size..." (a mound?) above the mouth of "Ioway river" and: "...above the middle of the middle of the ridge that approaches the [Missouri] river the nearest..." but no signs of recent Indian occupants (Reid and Gannon 1929: 16). The description of the return passage, in mid-September, is briefer still (Reid and Gannon 1929: 49-50). The treaties made during this trip (with the Ponca at their village at White Paint [Bazile] Creek, June 9; with the Teton, Yankton and Yanktonai at Fort Lookout, June 22; and Omaha at Fort Atkinson, October 6) were intended to regularize trade and establish United States jurisdiction over Indian vs. American disputes.

1830 - 1865

From about 1830 to the early 1850's, the main Native American village in the project domain was at Post Vermillion. Post Vermillion, known by a number of other names, most frequently Dixon's Post, was established in 1830 for the American Fur Company by William Dixon. Its location was on the east side of "Kate Sweeny Bend," near Burbank, South Dakota, some miles east of the mouth of the Vermillion River. Dixon, or Dickson, had previously operated a trading house somewhere on the James River, probably near Redfield, South Dakota during the 1820's, a fact that has led to a great deal of confusion regarding the location of Post Vermillion, since some people have apparently believed that Dixon's first post had been at or near Audubon's Point

about opposite Bow Creek in Nebraska (cf. Mattison 1956: 36-37, 46). There are no mentions in contemporary documents which would suggest that a post existed at Audubon's Point, this assertion resting on later-day recollections of people who had supposedly been there (see Larpenteur 1898 II: 288).

William Dixon was the son of Robert Dickson, the famous trader and British agent during the War of 1812, and To-to-win, a sister of We-kin-yan-duta (Red Thunder) a chief of the Cut-Head band of Yankton (Tohill 1928: 15). He was born in 1796 (Robinson 1925: 165) and died in 1839 (Nicollet 1843). Dixon was thus established in Eastern and Middle Dakota society by ties of kinship, business, and friendship.

The Santee chief War Eagle removed his band to the vicinity of the post Dixon established in 1830 to found the Indian village that grew up around the post (Marks 1908: 264). John L. Bean, sub-agent of the Upper Missouri agency, in April through June 1830 was "...collecting a deputation from the Yankton Sioux, Santies, Mahas, and Ottoes" to attend the treaty council to be held at Prairie du Chien, Wisconsin (Wm. Clark to John L. Bean U. S. Serial Set No. 245, Doc. 512, V. 2: 66-67). On June 2, Bean "...arrived at the trading location of the Yanktons, where I was informed by the trader LaCompt, that the Yanktons were starving...On the 4th, a Sioux Indian arrived from the Yankton and Santie camps, who informed me that his people were ten days travel from that place on the river Jaque; that they were still starving and were then in pursuit of buffaloes" (Bean to Clark July 12, 1830; U. S. Serial Set No. 245, Doc. 512, V. 2: 97). These statements may be taken as suggesting that the Santee were near the vicinity of Fort Vermillion, if not yet actually established there; they may have settled near the post in the fall.

Bean was not successful in persuading the Yanktons and the Santees to attend the Prairie du Chien council (although the Omaha and Oto did). Bean therefore returned to the Upper Missouri, and on September 4, 1830, the Treaty of Prairie du Chien was signed at Fort Tecumseh by the Sioux and signed again by a delegation at St. Louis in October (Clark to John Eaton, Nov. 1, 1830, U. S. Serial Set 245, Doc. 512, V. 2: 183). The leader of the Santee delegation that signed was the Black War Eagle (Kappler 1904). These references are the first to the Santee residing on the Missouri.

We have little information on Fort Vermillion and this Santee village until 1835. Theophile Bruguier, then in his early twenties, began clerking for Dixon in that year. He soon married two daughters of War Eagle, and eventually moved to the Sioux City vicinity (Marks 1908: 263-264). War Eagle and part of his band, apparently mainly Yanktons, accompanied Bruguier, and Howard (1972: 297) notes that this village (the last before moving to the reservation) was located near Sioux City where a drive-in theater was later built and that War

Eagle's grave is located on the bluffs overlooking the site. When Prince Maximilian ascended the river to about this point in May of 1832, he mentions only "...a grave surrounded with poles, which was that of some Sioux Indians, who had been killed by lightning" (Wied-Neuwied 1905 V. 22: 281), but no village.

Returning downriver during May, 1833, Maximilian remarks:

Towards ten o'clock we reached the mouth of Vermillion River, where many Sioux Indians were at that time assembled: here commence the lofty forests, which are peculiar to the banks of the lower Missouri.

Wied-Neuwied 1905, XXIV: 101

The preceding and following pages of Maximilian's account refer to a "plantation" left in Nebraska the preceding year which was to support a post headed by Francois Roi. The text implies that this was the only American Fur Company post in the vicinity. The paradox of the documents cannot be fully resolved although a discontinuous occupation of the Vermillion Post village might be suggested. Roi's post may have been the Vermillion Post; Dixon was upstream among the Ponca in 1834 (Wied-Neuwied 1905 XXIV: 96-97).

During the spring of 1835 Rev. Samuel Parker interviewed Joshua Pilcher, the newly appointed agent to the Yanktons, and reported:

The Yanktons, among whom Maj. P. is an agent, are an interesting tribe, numbering about 2000--their village is located on the Vermillion river near its confluence with the Missouri on the north side.

Parker (in Hulbert and Hulbert [eds.] 1936: 93

Parker also associates the "Santas" with the Yanktons (1936: 94).

Pilcher, in a letter to William Clark, October 6, 1835, notes that a few families of Yanktons and Santees had tried to raise corn near the mouth of the Vermillion (cited in Woolworth 1974: 94). In his annual report for 1836 Pilcher reported:

...20 families of Yanktons and Santees have made for the first time an attempt at cultivating small spots at such places as caprice led them to select, and by the aid of the person employed for that purpose of assisting them have succeeded tolerably well.

(cited in) Woolworth 1974: 96

Count Francesco Arese, an Italian nobleman, visited the project domain for three days in August of 1837. En route he had stopped at the Omaha village on Omaha creek, and a day later crossed the Missouri in the vicinity of Dixon's Post (Arese 1934: 77-81). Here he found a Sioux village of 25 to 30 lodges half of which were empty due to

deaths by smallpox or flight to avoid infection. Dixon's house was a log structure and it is clear that the Indian village of tipis was immediately adjacent (Arese 1934: 84). Arese noted that a lodge twelve feet in diameter was the home of 20 persons (1934: 88). In the village estimated to have housed 500 to 600 people, perhaps 250 to 300 had died that summer. Although no specific identification of the bands of Sioux which made up the village, it must have been the mixed Santee - Yankton community. Later, en route to the St. Peters River, Arese saw three lodges filled with dead Indians, who had apparently fled the Vermillion Post village (Arese 1934).

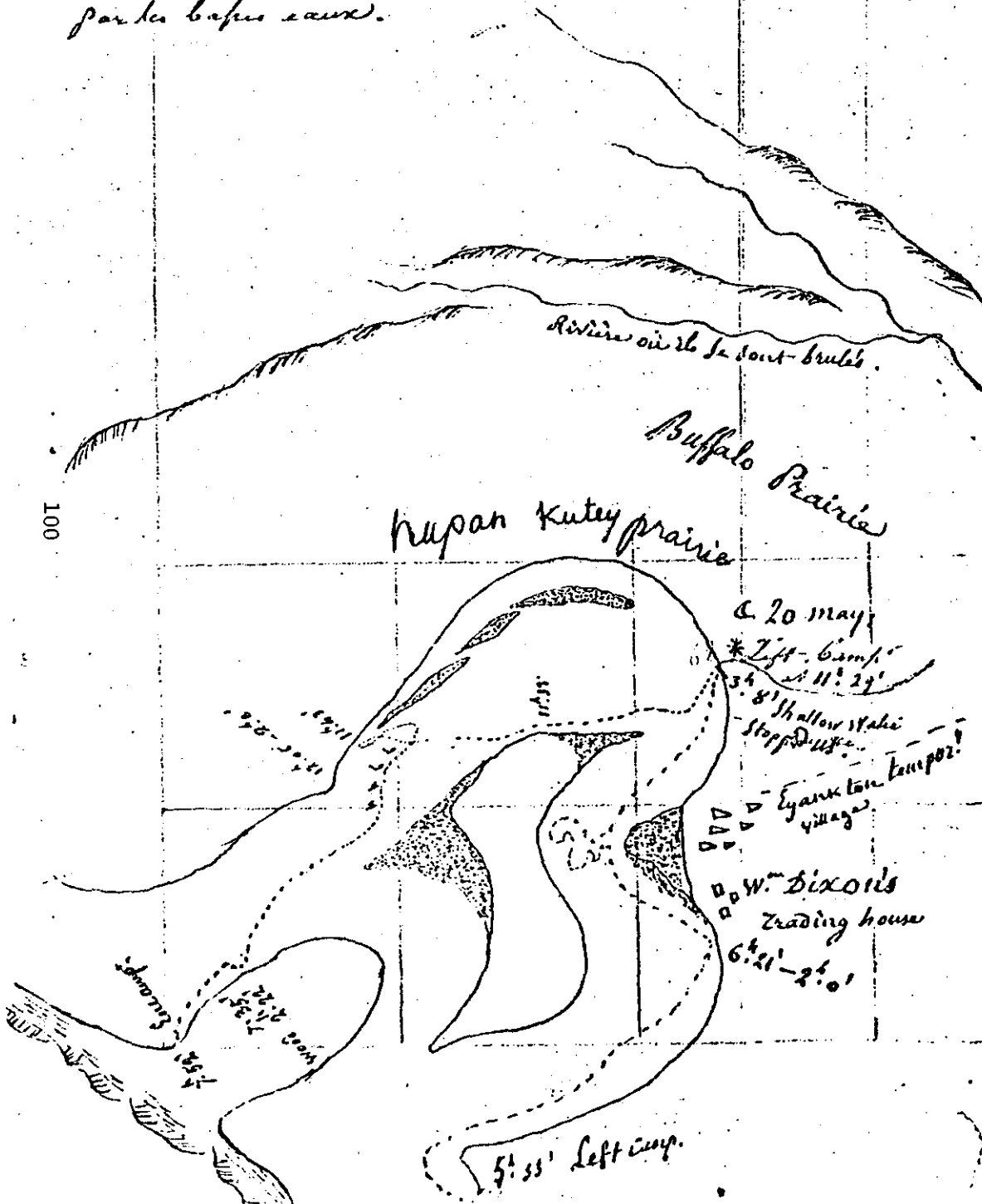
In May of 1839 the village and trading post were visited by J. N. Nicollet and John C. Frémont. Nicollet's journal for this period has not been found, but his sketch map (Nicollet 1976: 159) shows clearly the location of "Wm. Dixon's Trading House" and the "Eyankton tempor[ar]y village" (Figure VI.1). Nicollet employed Dixon for the rest of his journey into North Dakota, after which Dixon returned home, only to die later in the year. Should Nicollet's journal ever reappear, it might contain some of the best documentation regarding this village.

John James Audubon and Edward Harris stopped at the site of Post Vermillion in 1843 and have described the post and its locale, but both fail to mention the Indian village usually assembled around it (Audubon 1897 I: 493-494; Harris 1951: 65-66).

In May of 1845 some Mormons travelling west encountered some Sioux on the north bank of the Missouri after crossing the Big Sioux River, and on the following day were invited by some "Frenchmen" to come to Post Vermillion (Jones 1971; Morgan 1955). They found four to five log cabins and about 15 acres planted in corn. The Mormon men planted corn and vegetables for the traders, laid up hay and built graneries. No mention is made of an adjacent Indian village but one was clearly close by. One of the Mormon journalists mentions that a member of the party went about 15 miles to where the Sioux were drying buffalo meat (implying that they were on a hunt) and brought seven "chiefs" back. He gave one "Chief Henry" a copy of the Book of Mormon. This man was also called "Ongee" by another journalist, and we may conclude that this was in fact Henry Ange, a half-breed who settled in Sioux City in 1854 (Marks 1904: 766).

In the fall of 1845, the Indians "...came in from a hunting trip and decided to kill all the white people" (Jones 1971: 129). Another journalist records that this trouble had been precipitated by a horse-trading deal between one of the Mormons and "Brewyer" (Bruguier), who felt cheated and set the Indians on the party after giving them whisky and guns (Morgan [ed.] 1955: 31). "Chief Henry" (Ange) interceded on behalf of the Mormons apparently after a good deal of gunfire occurred. The implication is that Ange and Bruguier were at odds.

Séjour de 9 jours, occasionné
par les bûches saux.



10.43

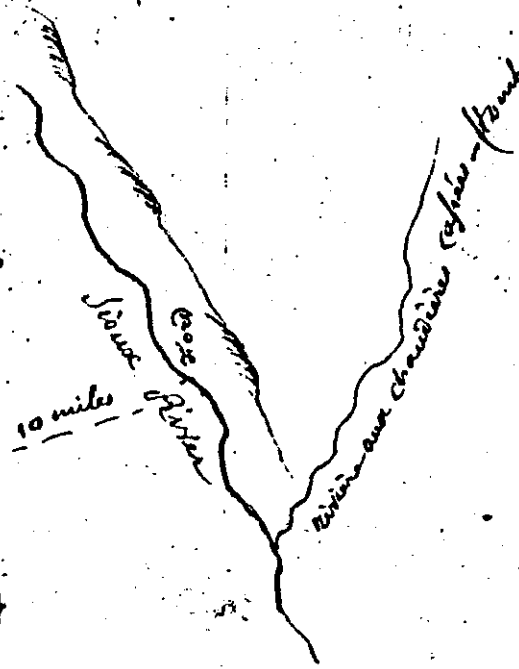


FIGURE VI. 1.
NICOLLET'S SKETCH MAP OF POST
VERMILLION OR DIXON'S POST, 1839

Rivière aux Chaudières (c'est-à-dire - grande chute - dans Sioux Riv. ou dans le Missouris?)

Perhaps because of this incident, a number of letters from Thomas H. Harvey, Superintendent of Indian Affairs at St. Louis, warned of trouble at Fort Vermillion because of the presence of these Mormons (Harvey to Commissioner of Indian Affairs, September 10, 1845, U. S. Serial Set 470, Senate Executive Document 1: 536), and the Mormons were in Indian territory without permission. They went back to Council Bluffs the following spring.

John Palliser, renowned sportsman, visited the Fort Vermillion village in September, 1847. He left this account:

...about noon we saw, to our surprize, from the hills commanding a view of the plain skirting the river by the fort, the lodges or tents of the Sioux Indians...

As we descended the hills, we crossed a large extent of plain approaching Fort Vermillion, which we found surrounded by the Indian camp. The fort itself was a very miserable little place, tenanted by a few sickly whites, servants of the American Fur Company. The surrounding Indian camp consisted of a band of 600 Sioux, including men, women and children...

Below and behind the fort were ranged the Indian lodges or tents, made of dressed skins of the buffalo, cut and sewn together in such a manner as to form, when raised on the poles, a sort of cone, but open at the top to allow the smoke to escape.

Palliser 1856: 64-65, 69

The Sioux had just returned from a successful raid on the Oto village in Nebraska, and Palliser witnessed a scalp dance (Palliser 1856: 69-70). He departed shortly, taking an overland route to Fort Pierre.

Thaddeus A. Culbertson, travelling the Upper Missouri for his health and to collect fossils for eastern scientists, was in the project domain from April 12th to (perhaps) April 16th, 1850. He stayed with Theophile Bruguer who had moved to the Big Sioux in 1849. He ascended the west side of the Vermillion before proceeding overland to Fort Pierre (Culbertson 1952: 35-43). Remarking on the Indian village at Vermillion Post, he writes:

A part of the Sontee Indians stay about here; the main body of the tribe live on the Mississippi and St. Peter's Rivers; about 60 lodges being here. About 25 lodges of the Yanktons stay about here. But there are none at the post just now as they are out after Buffalo.

Culbertson 1952: 36-37

Culbertson noted that Bruguier had recently had a mortal fight with some local Sioux, a fact confirmed in later years (Marks 1908: 267-268).

Charles Larpenteur, while at Fort Union in 1844, learned the American Fur Company wished to sell Vermillion Post and descended the Missouri to look the situation over. He was not impressed and made no effort to acquire it. On arriving there, he did learn that someone from St. Paul, Minnesota, had just arrived to take a census of the Santee half-breeds there (Larpenteur 1898 II: 277-279).

Larpenteur did take over Post Vermillion in late May/early June 1850:

The post, the country, all pleased me well enough, but I found there was nothing more to be made in the Indian trade, and the place was too much exposed to hostile Indians for me to remain as a farmer. The Indians robbed me of all my corn, as well as all the half-breeds who were settled near the post; they were obliged to abandon their places and most of them went to settle at Sergeant's Bluffs.

Larpenteur 1898 I: 289-290

He soon followed the half breeds to the Little Sioux, leaving Post Vermillion about May 15, 1851 (Ibid.: 292). Apparently, the post was run for another month, for on June 25, 1851, Rudolph Kurz wrote:

Fort Vermillion is abandoned. Schlegel, the bourgeois, came with bag and baggage aboard our steamer to proceed 60 miles further up the river and establish a new post...

Kurz 1937: 70

The abandonment of Fort Vermillion and the emigration of the half-breeds is tied up intimately with the earliest history of Sioux City. It is noted that: "About this time [1852] some difficulty occurred with the Indians at Fort Vermillion, and a small number of French descended the river and made a temporary settlement [at Sioux City]" (Western Publishing Company 1882: 178). Bruguier settled at the mouth of the Big Sioux in 1849. In 1850 Culbertson noted he had been in a fight with some local Sioux, and War Eagle died in 1851 at Bruguier's. A colony of French Canadians, half-breeds and Yanktons emerged in the extreme southeastern corner of Union County, South Dakota, and in the adjacent portion of Iowa. Another developed at Sergeant's Bluff south of Sioux City, and yet another on the Little Sioux. By the same token, permanent Indian settlement in the South Dakota portion of the project domain was over.

Denig, writing in the mid 1850's, characterized the worst lot of Santees who had resided on the Vermillion as:

...but a set of outlaws even among their own people, stealing horses from the other bands or from each other fully as often as from the traders...They were formerly scattered over their district in small camps of three to ten lodges, robbing whatever they could get their hands on or lounging along the borders of civilization drinking whisky or shooting wild turkeys...miserable in their homes and unwelcome visitors at other places.

Denig 1961: 39-40

It was this small band of Wahpekutes, reduced to ten or fifteen lodges, which committed the massacre at Spirit Lake in 1857, under the leader Inkpaduta. It was almost certainly these very renegades who committed depredations in 1863 and 1864 in the project domain.

From about 1830 to 1859 the Yankton were, for the most part, hunting and living west of Missouri River on the White and Niobrara rivers, and as far south as the North Platte. They traded and had their agency at Fort Lookout on the east side of the Missouri above the White. About 1846, Iowa, a chief of great ability, died. The Yankton fissioned into Upper and Lower bands when he was no longer there to keep them together. The Lower Yanktons, consisting of 4 bands, came to be led by "Struck-by-the-Ree," first chief, and "Smutty Bear," a rival. The Upper Yankton, composed of three sub-bands, never again re-entered the project domain in any numbers.

The Yanktons had virtually abandoned the north bank of the project domain by 1855, the "principal village" being at Handy's Point 30 miles north of the mouth of the Niobrara (Vaughn 1855: 71). This was probably just one small band, however. The same year, however, A. Cumming noted Smutty Bear was located at "Denaway Bluffs" (Dorion's Bluffs?); Struck-by-the-Ree had a village a few miles above, and Cumming mentions another 10 miles below the Vermillion (Cumming 1856: 3-7). These accounts cannot be easily correlated, but it appears that the Lower Yankton reoccupied the project domain late in 1855. G. K. Warren mentions no village in reports for October and November of 1855 (Warren 1856).

During June of 1857, Agent A. H. Redfield reported the Yankton in three villages: one apparently below the Vermillion River, one on Rhine Creek (present Yankton), and one at Gavins Point:

...we found on the right [sic] bank of the Missouri, on a beautiful green prairie sloping down to the river, about one hundred lodges of the Yanktons. They were engaged in cultivating corn...I gave them some provisions and groceries, and directed them to proceed up the river

to the principal village, which is directed by "The Man Struck by the Ree"...

On the next day, June 15, we arrived at the principal village, also on the right [sic] bank of the river...

A few miles above, and on the same side, we passed the village of "Smutty Bear"...They now raise considerable corn and vegetables, but not enough for their support...

They even now can be said to have nearly passed from the nomadic to the settled state, as they reside chiefly in fixed habitations, mostly earth lodges, though I also observed some quite good log-houses at the village of the "Smutty Bear."

Redfield: 1857

An independent account of Smutty Bear's village was given by a correspondent for FRANK LESLIES ILLUSTRATED NEWSPAPER, viewing the village from Wiegand Creek in present eastern Know County, Nebraska:

From here we have a fine view of Dakota Territory ...The cabins and tipis you see just across the river are at old Smutty Bear's camp, and those large, round-looking buildings made of poles and dirt are the places used for storing away their corn and provisions.

Perry Winkle 1858: 356

Woolworth (1974: 164) also notes the presence of Yankton villages, one on the east side of the mouth of the James River, under Feather in the Ear, and another under Mad Bull on the Vermillion. He also notes villages on the Big Sioux, on Brule Creek, on Emanuel Creek, and at and above Fort Pierre.

During 1858, the Yanktons ceded their interest in all their lands but for a reservation in present Charles Mix County, South Dakota. The move to the reservation must have been gradual, however, for Capt. W. F. Reynolds found Smutty Bear in his old village in June, 1859 (Reynolds 1868: 17). They must have moved soon after this, for in October, 1860, Agent Redfield reported the Yanktons had been settled there for 15 months and had 200 acres under cultivation (Redfield 1860: 310-315). Yankton title had thus been extinguished on the north bank of the Missouri and settlers moved in particularly at Yankton, soon the capital of Dakota Territory.

The Nebraska side was in question. The Omaha had ceded their rights in the project domain, from Aowa Creek to the Niobrara. The Poncas also claimed this area, however, and a treaty in which the Poncas ceded their interest in the project domain was not signed until March 12, 1858 (Jablow 1974: 286-315). That Indians were

continuing to trade at St. James in 1857 is corroborated by an anonymous traveler, who drew a sketch of the "St. James Hotel" (a one-room log house) and depicted an Indian in the doorway (Perry Winkle 1858).

The nature of the earliest white settlers and their impact upon the local Native American peoples can be judged by reference to a few selected examples. John H. Charles' reminiscent account of a surveying trip to plot a townsite during March, 1857, took him to Concord on Lime Creek and St. James where his party "...found trappers who had gone there to trade with the Indians" (Charles 1908: 410-411). Charles later found that a trapper named Allen had killed another, one Bill Cravens. He also records a second murder at St. James. Clearly the early territorial towns in the project domain were populated, in part, by rough sorts.

The Sioux Outbreak of 1862 resulted, ultimately, in Volunteer troops being stationed in the project domain. The Second Nebraska Cavalry had detachments in St. James and Niobrara during 1863, but were withdrawn. During July of that year the children of Henson Wiseman were killed, probably by a party from the bands of White Lodge and Inkpaduta. The people in Yankton, Vermillion, and at the settlement on Brule Creek were upset enough by all these events that stockades were erected at each place. There was no real threat, but the fortifications were reoccupied in the summer of 1864 during another equally unfounded scare. The Dakota side of the project domain was patrolled by Company A of the First Dakota Cavalry, but it was soon relieved by elements of the Seventh Iowa Cavalry.

The Nebraska side was reoccupied by Company B of the Seventh Iowa Cavalry during the autumn of 1864. A number of unsavory incidents occurred between these troops and local Ponca and Omaha peoples, but there was no contact with the Dakota against whom, presumably, the troops were there to protect the settlers. Soldiers were stationed at Dakota City, Ponca, St. James, St. Helena, and Niobrara. The Iowa troops were replaced, in about the same distribution, by Company B of the First Battalion, Nebraska Volunteer Cavalry, starting in June, 1864. From that date until July, 1865, this unit patrolled northeast Nebraska and constructed a number of small forts, including one in the project domain, Post Jackson. During April, 1865, detachments from Post Dakota (Dakota City, Nebraska) and Post Jackson surrounded parties of Omaha and Ponca and incarcerated them at Post Jackson. Although patrols were regularly made, no other significant contact with Indians, friendly or hostile, was reported in or near the project domain (Ludwickson 1981).

VII

ARCHAEOLOGICAL OVERVIEW

This section reviews on a regional and local scale prehistoric manifestations found in or expectable in the project domain. Paleo-Indian and Archaic sites have not been found in the project domain, but rare surface finds of points diagnostic of these periods have been reported. It may be predicted that sites of these categories exist in the project domain. Woodland sites have been found and excavated in and close to the project domain. Other Woodland sites are undoubtedly present in the project domain, and there is a need for deep-testing survey methods to fully realize the density of Woodland sites here. Great Oasis sites have also been found in and near the project domain.

The Plains Village Tradition is represented by the Central Plains Tradition (Nebraska Phase), and what we here term Basal Coalescent Variant (see below) is represented by sites of the St. Helena Phase. It is suggested too that a Great Oasis-Mill Creek site in the northeast corner of the project domain may have been destroyed. Mill Creek sites exist immediately east of the Big Sioux River, and James River Phase (Over Phase) villages exist north of the project domain on the James River. Oneota sites are known in and near the project domain, and the Redbird Phase (the possible archaeological expression of the Ponca) is just to the west. Historic sites of Native American origin are also present.

PALEO-INDIAN

Area:

The distribution of Paleo-Indian populations was probably continental in scope but constrained during its earliest expressions by retreating continental glaciers. The project domain was ice-free by the time of possible Clovis occupation, but was probably an open coniferous forest. Most intensively investigated Paleo-Indian sites lie in the western Plains (Agenbroad 1978; Dibble and Lorraine 1968; Frison 1974, 1978; Irwin-Williams et al 1973; Roberts 1935; Stanford 1974; Wheat 1972), but the Cherokee Sewer Site in eastern Iowa contains a terminal Paleo-Indian deposit (Shutler and Anderson 1974).

Age:

The most complete chronological sequence of Paleo-Indian occupations is at Hell Gap in Wyoming (Irwin-Williams, Irwin, Aggogino and Haynes 1973). Here stratigraphy and radiocarbon dating combine to give the following sequence:

<u>Years B.P.</u>	<u>Complex Name</u>	<u>Diagnostic Points</u>
7950-7450	Lusk	Lusk
8350-7950	Frederick	Frederick
8750-8350	Cody	Scottsbluff, Eden
9450-8950	Alberta	Alberta
9950-9450	Hell Gap	Hell Gap
10450-9950	Agate Basin	Agate Basin
10650-10350	Midland	Midland
10750-10550	Folsom	Folsom
10950-10750	Goshen	Clovis

Environment:

The post-Glacial period was characterized by retreating ice and a northeastward shift of vegetation zones (Wendland 1978). From 11,500 to 9,500 years B.P. the vicinity of the project domain probably changed from an open forest to a fairly moist grassland. The major Paleo-Indian sites to the west and southwest, to ca. 7,500 B.P., are all in a predominantly grassland or piedmont environment, modified by local factors.

Economy:

The Paleo-Indian peoples were extraordinary big game hunters. The Clovis peoples concentrated on mammoth and other late Pleistocene fauna (Haynes 1970); later peoples hunted extinct forms of Bison. Paleo Indians may have been involved in the extinction of some species (Martin and Wright 1967). Although other sources of food were undoubtedly utilized, aspects of preservation, recovery techniques, and a bias in favor of excavating kill sites have not produced the variety of data necessary to reconstruct all facets of subsistence behavior.

Architecture:

At the Hell Gap Site, oval or circular patterns of postmolds were found in Midland and Agate Basin levels, which have been interpreted as lightly constructed structures (Irwin-Williams et al 1973). A circle of stones, possibly a tipi ring, was found in a Frederick level at this site.

Burials:

Paleo-Indian burials are particularly scarce. The only well reported sites are the Clovis period burial of two sub adults at the Anzick Site in Montana (Lahren and Bonnicksen 1974) and the Gordon Creek Burial in northern Colorado (Breternitz et al 1971). The data are too sparse for lengthy comment, other than to note that ritual interment, with red ocher and grave goods included with the dead, was practiced from the earliest period.

Lithics:

The most impressive stone tools of the Paleo-Indians were the highly stylized lanceolate projectile points. The changing patterns in these points have served as temporal markers, and may have other meaning. A variety of bifacial knives, scrapers, drills, notched flakes, graters or burins and denticulates also occur (Irwin and Wormington 1970). Ground stone tools include abrading tools, grinding stones, ground hematite and hammerstones are rare (Wilmsen and Roberts 1978).

Bone, Antler, Shell:

The Lindenmeier Site alone has produced numbers of bone tools (besides expedient bone butchering tools). Bone needles, transversely cut rib sections, blunt-pointed rib-section tools, bone beads, peripherally incised bone discs, and other decorated bone have been found (Wilmsen and Roberts 1978). Bone or mammoth ivory points or foreshafts have also been found (cf. Lahren and Bonnicksen 1974).

Subdivisions:

Subunits have been suggested for Paleo-Indian manifestations (Llano, Plano, "Paleo-eastern" and "Paleo-western" Traditions) but these are gross subdivisions. The sequence of complexes discussed under Age, with the addition of several others, are the units being used by archaeologists. They differ from the phase into which later archaeological materials are divided in that they cover huge territories and in that some (especially Plainview and Folsom) appear to overlap considerably in time and space.

ARCHAIC

Area:

Archaic manifestations extend from the Rocky Mountains to the Mississippi River, and from the Plains of Saskatchewan and Manitoba to the Texas Gulf coast. A few of the better known sites within this region include the Mummy Cave Site (Wedel et al 1968) and the McKean Site (Mulloy 1954) in Wyoming, Signal Butte (Strong 1935) and Ash Hollow Cave (Champe 1946) in Nebraska, the Coffey Site (Schmits 1979) in Kansas, the Ray Long Site and Travis 2 Site (Ahler et al 1977) in South Dakota, Graham Cave and Rogers Rock Shelter (Wood and McMillan 1976) in Missouri, the Itasca Bison Kill Site (Shay 1971) in Minnesota, and the Modoc Rock Shelter (Fowler 1956) in Illinois. Several important Archaic sites occur in areas adjacent to the project domain, although none are recorded from it now. In eastern Nebraska, archaic remains are known at Logan Creek (Kivett 1962) in Burt County and at the Tramp Deep Site (Howard and Gant 1966) in Knox County. A series of important sites in western Iowa range from the Lewis Central

FIGURE VII.1

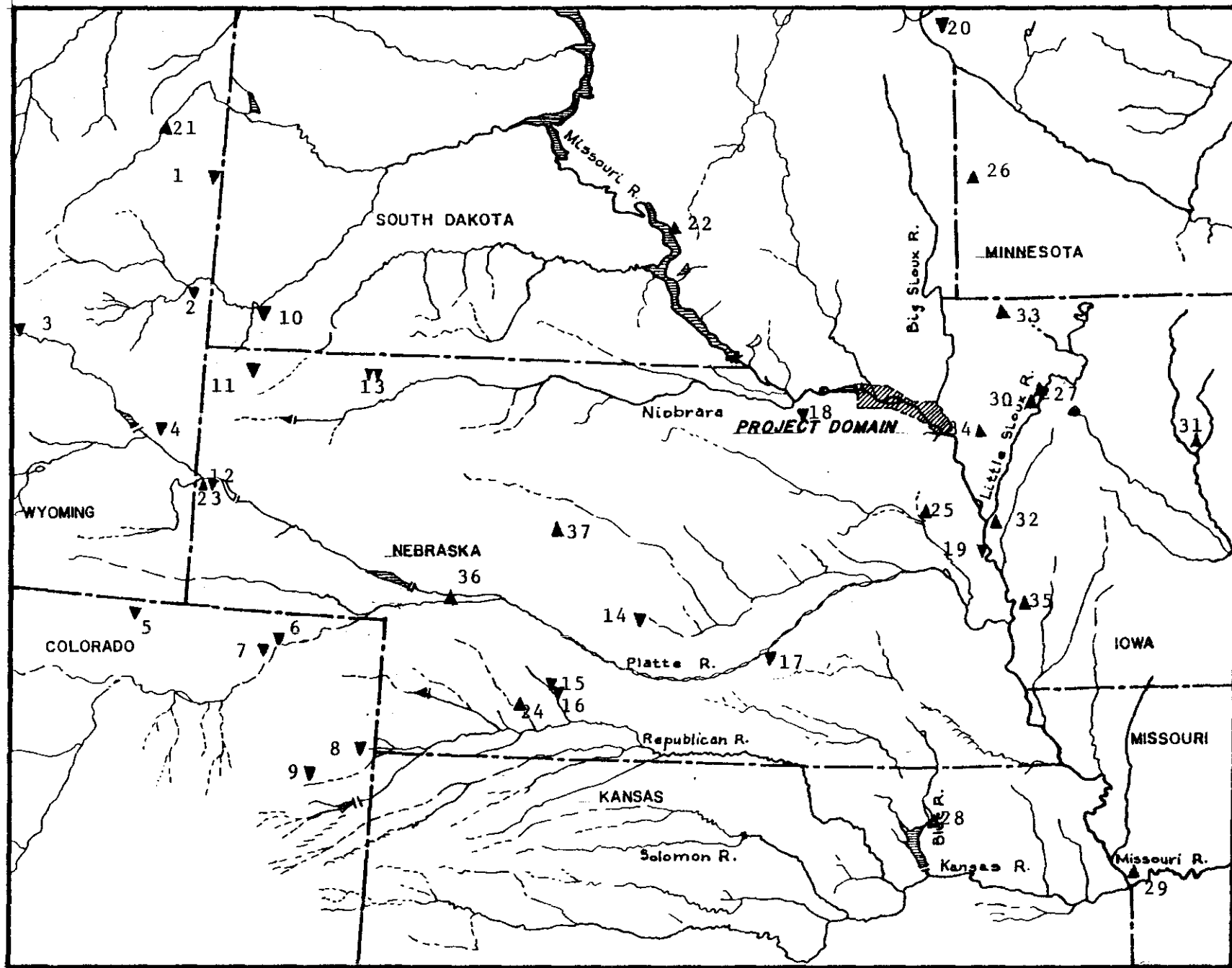
SELECTED PALEOINDIAN AND ARCHAIC SITES

▽ Paleoindian Sites

- | | |
|---------------------|---------------------------|
| 1. Hawken, WY | 11. Hudson-Meng, NB |
| 2. Agate Basin, WY | 12. Scottsbluff, NB |
| 3. Casper, WY | 13. Bear Creek, NB |
| 4. Hell Gap, WY | 14. Cumro, NB |
| 5. Lindenmeier, CO | 15. Red Smoke, NB |
| 6. Jurgens, CO | 16. Lime Creek, NB |
| 7. Dent, CO | 17. Meserve, NB |
| 8. Jones-Miller, CO | 18. Clovis point find, NB |
| 9. Claypool, CO | 19. Clovis point find, NB |
| 10. Ray Long, SD | 20. Browns Valley, MN |

△ Archaic Sites

- | | |
|------------------------|-----------------------|
| 21. McKean, WY | 30. Simonsen, IA |
| 22. Medicine Crow, SD | 31. Soldow, IA |
| 23. Signal Butte, NB | 32. Turin, IA |
| 24. 25FT31, NB | 33. Ocheyedan, IA |
| 25. Logan Creek, NB | 34. Lundgren, IA |
| 26. 25LN2, MN | 35. Lewis Central, IA |
| 27. Cherokee Sewer, IA | 36. 25KH20, NB |
| 28. Coffee, KS | 37. 25MP2, NB |
| 29. Nebo Hill, MO | |



School Site in the south to the Cherokee Sewer Site in Cherokee County (Anderson 1975; Anderson et al 1978; Brown 1967; Flanders 1977; Frankforter 1955, 1959; Ives 1955b; Shutler et al 1974, 1978). Although little is known of Archaic occupations in adjacent areas of South Dakota, Missouri River sites such as Travis 2 are coming to light, with potential Archaic occurrences known from Bon Homme County to Hughes County in South Dakota (Ahler et al 1974). Archaic sites abound in the Black Hills (cf. Tratebas 1981) (see Figure VII.1).

Age:

The Plains Archaic period has a temporal span from approximately 8500 B.P. to 2000 B.P. (W. Wedel 1978). This period has been divided into Early, Middle, and Late on the basis of projectile point morphology. The Early Archaic is marked by the common occurrence of lanceolate point forms and dates around 8000 B.P. at both sites. Side-notched forms appear most frequently around 6000-4500 B.P. at Modoc, and 7680-5300 B.P. at Mummy Cave (Middle Archaic). The Late Archaic is marked by the increasingly common occurrence of expanding stemmed projectile points at both sites. These dates correspond, generally, with the chronology seen at the Lewis Central School Site (Anderson et al 1978): Early Archaic (8500-6500 B.P.), Middle Archaic (6500-4500 B.P.) and Late Archaic (4500-2000 B.P.). Known Archaic sites in areas immediately adjacent to the project domain range in date from 8430 \pm 520 B.P. (Simonsen Site) to 2750 \pm 210 B.P. (Tramp Deep Site).

Although a general progression in projectile point morphology is observed during the Archaic period, numerous anomalous cases are also known in which the sequence is distorted or even reversed. Given the varied factors which must have influenced projectile point design, and the dispersed nature of human populations during Archaic times, this is not surprising. It does mean, however, that although projectile point morphology may serve as a useful chronological guide, its uses are limited.

Environment:

In terms of the utilization of the Plains environment, it seems clear that both valley and interfluvial were exploited during Archaic times. Known Archaic sites generally are located in one of two settings, either on bluff or ridgetops, and on (or in) lower alluvial terraces. Bluff and ridge top sites typically are not deeply buried and are reasonably visible to archaeological survey. Unfortunately, sites of this kind most often represent rather ephemeral hunting camps or stations, with a sparse and rather specialized artifact inventory. Terrace sites offer more in terms of recoverable social and economic data, but frequently are deeply buried. These sites are encountered more often by accident when exposed through construction or erosion, than by purposive search because of their poor surface visibility. It is a certainty that a substantial number of these

terrace sites exist in the extensive deep alluvial deposits of the Plains. Systematic coring, as pioneered in Iowa by Thompson and Bettis (1980) offers the possibility of identifying those deposits which are likely to contain sites of Archaic age.

One factor which may have altered existing Man/Land relationships during the Archaic is the Altithermal Climatic episode. The Altithermal was a period of time (approximately 6000-3000 B.C.) during which the climate on the Plains became significantly warmer and drier. It had among its effects the renewed down-cutting of streams and rivers and changes in the character of graze on the Plains which in turn affected the distribution and density of bison populations. Although shifts in the density of bison must have had an impact on the distribution of human groups on the Plains, it is no longer thought that the Plains were totally abandoned during this period (Reeves 1973). Increased erosion during this period of presumably reduced ground cover is one important factor influencing the archaeological discovery of Plains sites which were located near streams and rivers. Frison (1974) has offered this as a convincing explanation for the apparent hiatus in occupation at Medicine Lodge Creek in Wyoming, and it is a possibility which should be considered and assessed in other localities.

Economy:

Subsistence activities evidenced from Archaic sites in the vicinity of the project area include: hunting, fishing, and the gathering of shellfish and wild plant foods. Bison typically appears to be the principal prey species, although deer, elk, caribou, beaver and other small mammals were also taken. Assuming the Archaic populations behaved similarly to modern foraging and collecting groups, gathered nuts, berries, tubers, and seeds would also have formed a significant portion of the diet. Although modern excavations are recovering vegetal remains from Archaic occupations, often grinding stones are the only evidence for plant utilization.

Fauna recovered from the Cherokee Sewer Site (Shutler et al 1974) include: bison, elk, coyote, wolf, rabbit, chub, bullhead, clam and varieties of snails. Recovered vegetal materials included hackberry, and other as yet unspecified seeds. Fauna from the Hill Site (Frankforter 1959) included bison, deer, mole, bird, and turtle. At Logan Creek (Kivett 1962), bison bone and a range of other large mammalian species were represented. Finds such as these suggest that Plains Archaic groups, although exploiting a broad spectrum of available resources, were relying on large mammals as a major source of nutrition. More detailed reconstructions of Archaic diet and exploitation patterns must await further research.

Burials:

Unlike the preceding Paleo-Indian period, finds of funerary remains are relatively common during the Archaic. Formal burial rites and the occurrence of definite cemetery areas, although not on the scale of the large eastern sites of the later Archaic, do suggest that these Archaic period societies were structurally different from Paleo-Indian period groups and may have had a progressively clearer definition of territoriality. Yet, except for a tendency towards flexed burial, and the occasional inclusion of grave goods, there is little evidence for common burial practices or traditions. Variation in burial treatment occurs both within and between known sites.

Burial sites in the region adjacent to the project area include two sites in western Iowa: Turin (Anderson 1957) and the Lewis Central School Site (Anderson et al 1978), and four sites in eastern and central Nebraska (25CD22; 25BT20; 25RW2; 25MP2). Notable among these sites for its size is the Lewis Central School Site (Anderson et al 1978) which dates to the Late Archaic (2815 ± 80 B.P.), and which yielded the remains of 26 individuals. All of the in situ skeletons were found in a flexed posture and in association with a modest number of utilitarian artifacts.

Lithics:

Both ground and chipped stone artifacts are recovered from Plains Archaic sites. Among chipped stone artifacts, the most commonly recognized types are small to medium-sized projectile points which typically are triangular in shape with concave, straight or convex bases (in decreasing frequency). The points most frequently are side-notched, although corner-notched and unnotched points are also found. Most points exhibit grinding on both bases and notches. Lanceolate projectile points also occur, but are not nearly as common as the triangular forms in this part of the Plains. Other chipped stone tools include: notched and unnotched side and end scrapers, knives, drills, gravers, retouched flakes, chopping tools, spokeshaves and ovoid bifaces.

Most distinctive of Plains Archaic ground stone tools are the atlatl weights, which vary widely in shape and size. Grooved axes, hammerstones, celts and polishing stones are also frequently encountered tool types. Although recovered less frequently, grinding slabs and manos appear to be regular components in the Plains Archaic tool inventory.

Bone, Antler and Shell:

Less frequently represented than stone tools, a variety of bone, shell and antler tools and ornaments occur in Plains Archaic sites. Bone forms include spatula-like tools, occasionally with serrated edges, awls, scrapers, punches and beads. Fishhook, needles and bone tubes are also found, although their occurrence is rare. Antler

tools are generally restricted to flaking tools, although shaft sections and shaft wrenches occasionally are found. Shell artifacts include scrapers, beads and pendants. Shell ornaments are most often found in burial contexts.

Subdivisions Within the Archaic:

The origins of the Archaic manifestations in region of the project domain and their relations with the increasingly differentiated Eastern and Western Archaic traditions are extremely difficult problems given the data available at the present time. Most such studies have relied heavily on projectile point morphology. Changes in the style of projectile points do seem to mark relatively gross time level changes and perhaps general social interaction, but we may be asking too much of the data to require the points to tell us the cultural affinity of the groups manufacturing them.

In a more general way, the division of the Plains Archaic into a western tradition, reflecting groups which are, in large part, a gradual development from the preceding Paleo-Indian adaptation; and an Eastern tradition, reflecting more radical departures from Paleo-Indian in economic and social organization, adapted to a more closed, but diversified environment, seems useful. This is the kind of distinction proposed for Nebraska Archaic sites by Carlson and Steinauer (1978) and one which is helpful in the present circumstance, where very little is actually known of the Archaic occupation in the project domain. Following this distinction, most Archaic manifestations in the project domain should exhibit closer affinities with the developing eastern Archaic tradition, as indeed do the few scattered Archaic sites recorded in this general region. If some movement of Plains Archaic groups east accompanied the Altithermal, then such sites in extreme eastern Nebraska, western Iowa and adjacent areas might well be expected to exhibit a blending of Eastern and Western Archaic traditions.

WOODLAND

David Benn has recently offered a synthesis of the Woodland Tradition as it is manifested on the on the Plains-Prairie border; his work is the first major reorganization of these data in thirty years. Benn boils down the character of Woodland culture into three generalizations:

- 1) the intensification and elaboration of ritual behavior, symbolic artifacts, and cooperative construction efforts seemingly associated with birth (rebirth) and death;
- 2) improved technologies (e.g. bow and arrow, ceramics, agriculture) and more cooperative production by larger or more complex human aggregates (i.e. an overall increase in productive efficiency);

3) a population increase that approaches limits perceived by Woodland people.

Benn n.d.: 2

Although each of the characteristics of these generalizations has an origin earlier in time or at some other place, during the period of the Woodland ascendancy these do come together as a definable unit.

In order to deal with the reorganized data, Benn borrows the culture-Historical framework developed in the Illinois region (esp. Griffin et al 1970) and modifies it slightly to fit the situation of the western Woodlands. His divisions are basically temporal, but with behavior-evolutionary implications. They will be utilized to organize our discussion. These divisions are: Early Woodland (ca. 400 B.C. to 50 B.C.), Middle Woodland (50 B.C. to 300-400 A.D.), Early Late Woodland (A.D. 300 to 700) and Late Late Woodland (A.D. 700 to 1200). Great Oasis materials present special problems due to controversy regarding its taxonomic placement. It is here considered, tentatively, more closely related to Woodland than to the Plains Village Tradition, although it is transitional in many respects (see "Research Problems"). Each of these has diagnostic artifact associations and inferred developmental significance; with respect to identifying Woodland manifestations in and near the project domain, however, it is still the presence of diagnostic pottery fragments (more rarely projectile points) which signals the presence of a Woodland component. This is a result of unexcavated or poorly documented sites of Woodland affinity within the project domain.

Woodland materials were first identified near the project domain by Fred H. Sterns at the Walker-Gilmore Site in Cass County, Nebraska. Super-position of Nebraska Phase deposits over Woodland strata allowed an early recognition of the relative temporal positions of these manifestations (Champe 1946). William Duncan Strong continued work at Walker-Gilmore, drawing the data from it into the web of information developed during the 1930's in Illinois (Strong 1935). Excavations by the Nebraska State Historical Society from 1939 to 1941 in Platte, Nance, Greeley, Sherman and Valley counties extended the distribution of known Woodland complexes westward. The resulting publication (Hill and Kivett 1941) was the first synthesis of Woodland in Nebraska. University of Nebraska excavations were reported in 1956 by Raymond Price, and included a number of sites with a direct bearing on the potential of the project domain. Following an interruption during World War II, research into Woodland archaeology was resumed, and soon Wesley

Hurt (1952) and Marvin Kivett (1952) published syntheses which have been standards ever since. This statement is not to detract from the results of salvage excavations conducted along the Missouri River mainstem during the period from 1949 to 1968, but these were aimed principally at the definition of mortuary practices (Neuman 1975 and references therein).

Early Woodland

Area:

Sites which can be related in some fashion to Early Woodland as that term is understood in Illinois (e.g. Perino 1966; Streuver 1968) fall into two categories. First, the Fox Lake Phase sites of southwestern Minnesota, and second, the recently excavated MAD sites near Dennison, Iowa. The Fox Lake Phase consists of some 13 identified sites in southwestern Minnesota (Anfinson 1979: 79). Bonney (1965, 1970) rather unhesitatingly attributed sites with what she called Fox Lake Incised pottery to an Early Woodland stage on the basis of similarity to incised pottery from Illinois and Wisconsin; today regional specialists tend to characterize the Fox Lake Phase as Middle Woodland (Anfinson 1979: 79; Hudak 1974, 1976; Gibbon and Caine 1980). Although it may have persisted later, we would argue that it began during Early Woodland. The MAD sites in Crawford County, Iowa, are at this time isolated from other occurrences of Early Woodland. There is a gap between them and the Fox Lake region and other Early Woodland manifestations in eastern Iowa. No sites attributable to Early Woodland have as yet been found in Nebraska and South Dakota, although there is no reason to believe that Fox Lake Phase sites do not occur in the prairie-lakes environment shared by Minnesota and South Dakota (James Haug and Robert Alex, personal communication).





Age:

There are three radiocarbon dates which may relate to Fox Lake Phase and Early Woodland manifestations at MAD (one of the MAD dates may relate to an underlying Archaic component). At MAD, one sample dated at 2470 ± 125 years B.P. (BA-1393); this date is from an aceramic context and may therefore date the terminal Archaic occupation at the site. Another sample (BA-1395) came from a feature with no diagnostic materials, but the result of 2345 ± 145 years B.P. has been interpreted as relating to the Early Woodland component at the site (Benn n.d.). Finally, a radiocarbon age of 2050 ± 80 years

FIGURE VII.2

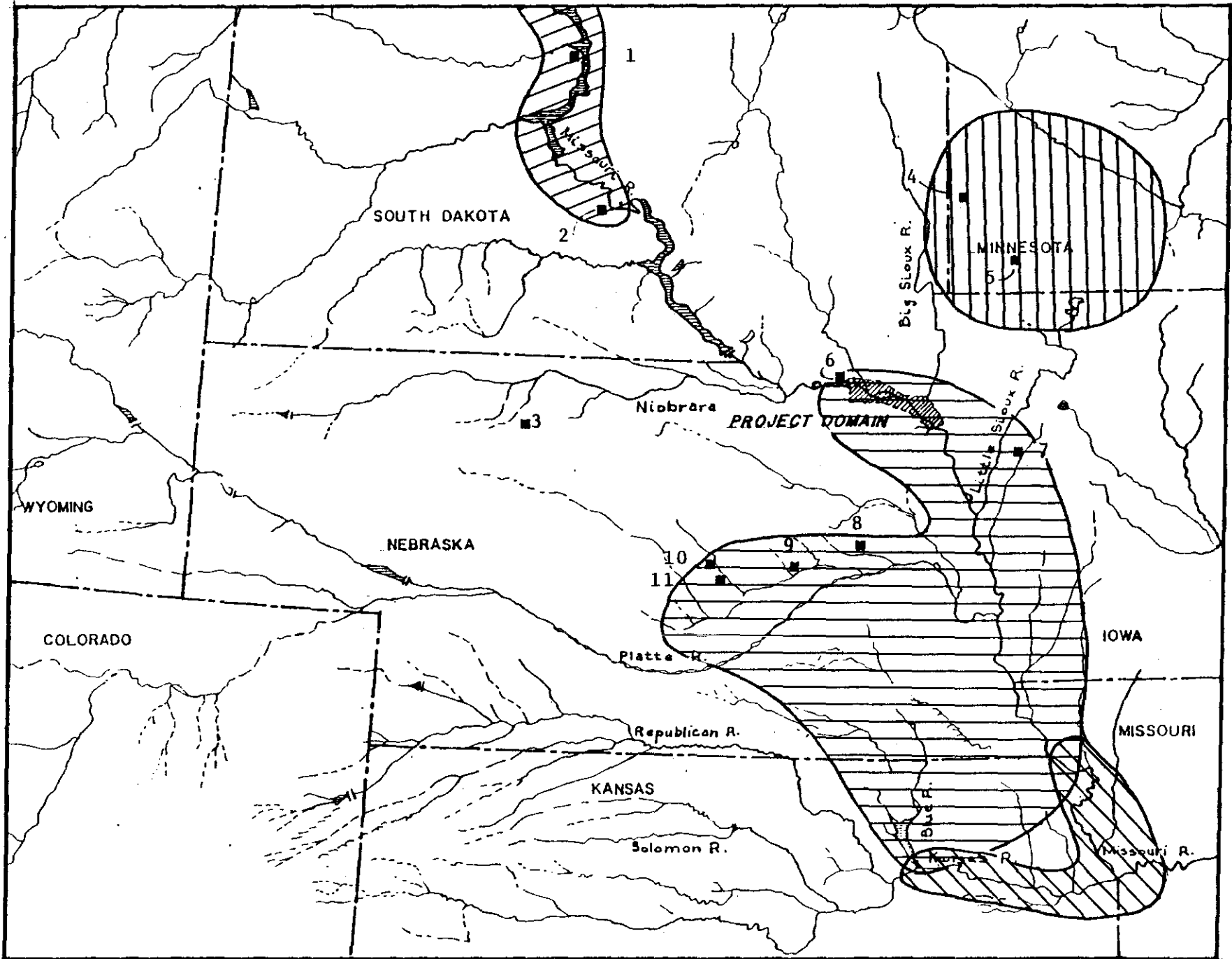
EARLY AND MIDDLE WOODLAND DISTRIBUTIONS

Complexes

- Fox Lake Phase 
- Valley Phase 
- Kansas City Hopewell 
- Sonota Complex 

Sites

- | | |
|--------------------------|-------------------|
| 1. Stelzer, SD | 7. Mad, IA |
| 2. La Roche, SD | 8. 25PT10, 11, NB |
| 3. Dad's Lake Valley, NB | 9. 25NC13, NB |
| 4. 21LN2, MN | 10. 25VY1, NB |
| 5. 21MU1, MN | 11. 25HW7, NB |
| 6. Gavins Point, SD | |



was determined for the Fox Lake Phase component at the Pedersen Site (Hudak 1976). The absence of Fox Lake materials in Great Oasis and Late Woodland Lake Benton Phase components, which sometimes are stratigraphically superior to Fox Lake Phase levels, helps establish a terminal date of well before A.D. 900 (Anfinson 1979: 79).

Environment:

Typical environments for Fox Lake Phase village and campsites are islands and peninsulas in the lakes of the prairies of southwest Minnesota. Three sites are, however, known from terraces overlooking the Minnesota River. Anfinson has suggested that most of the prairie lake sites represent spring-summer-autumn occupations and that those on the Minnesota River and around larger, wooded lakes were winter sites (Anfinson 1979: 79). The MAD sites were located on low buried terraces within the meanderbelt of the Boyer River. The site environment at MAD is virtually identical to that which Struever describes as characteristic of Black Sand, for example at the Peisker Site (Struever 1968).

Settlement Pattern:

Data are simply too meager to draw inferences about community patterning.

Architecture:

A putative Fox Lake Phase house, excavated by Hudak at the Mountain Lake Site (21C01), was an oval structure 20 feet long, but its Fox Lake Phase affiliations have been challenged (Anfinson 1979). Virtually no features relating to architecture could be associated with the Early Woodland component at the MAD sites.

Economy:

There is no evidence for horticulture in any Fox Lake Phase site. The subsistence orientation seemingly focused upon bison hunting, fishing and the taking of small aquatic mammals, especially muskrats (Anfinson 1977).

Disposal of the Dead:

No burials have been found which have been attributed to either the Fox Lake Phase or to the MAD manifestation. Clues to what might be expected can be sought from the Illinois River valley: twelve Black Sand burials were found at the Peisker Site. They were

flexed, articulated, and situated on the apex of the sand ridge overlooking the river upon which the site was found. The central burial, that of an adult male, was covered with red ocher, but except for a few potsherds there were no true grave furnishings with any of the dead. Two small groups of cremated bones were also found (Perino 1966: 8).

Ceramics:

Early Woodland ceramics from the western prairie area have been described in terms of two sets of typological nomenclature, but appear to be quite similar. Distinctive southwest Minnesota ceramics include Fox Lake Trilled, Fox Lake Vertical Cordmarked, and Fox Lake Horizontal Cordmarked. Vessels are grit tempered, with walls six to twelve millimeters thick, dark gray to reddish brown in color, with cordmarked exterior surfaces. Vessel form is that of a widemouthed jar with a flat to slightly rounding lip, vertical rim, slightly rounded shoulder and conoidal base. Fox Lake Trilled vessels have narrow trailed lines applied directly over the cord-marked surface on the rim and neck (rarely the shoulder). These take the form of horizontal lines, oblique lines or combinations of these. Bosses or punctates below the lip are common, and cord-wrapped stick or dentate impressions applied to the inner rim and lip occur occasionally. Fox Lake Vertical Cordmarked is similar, but lacks trailed decoration on the vessel exterior, although decoration with occasional bosses, punctates, or cord-wrapped stick impressions are common on the upper rim interior. Fox Lake Horizontally Cordmarked has horizontal to oblique exterior cordmarking and is entirely plain except for occasional punctates. Some fabric-impressed and dentate-stamped sherds have also been found (Anfinson 1979: 81).

Early Woodland vessels from the MAD sites include the remains of seven vessels. These are similar to Fox Lake ceramics. Six of seven vessels have a single row of bosses just below the lip and the seventh has a double row of bosses; three have trailed decoration applied directly over the cord-marked exterior. Those with trailing are identical to Fox Lake Trilled and are termed Crawford County Trilled in deference to the geographic isolation of the sites. The other four vessels are termed Crawford County Cord Roughened, and these are analogs to Fox Lake Vertical Cordmarked.

Lithics:

Chipped stone tools from Fox Lake components are not well described in terms of their stratigraphic context, and since many of these components often underlay later Woodland components, clear associations are lacking. Dart points with expanding stems or

or corner notches seem to be preferred. Bifacial knives, and scrapers and graters are also associated with Fox Lake ceramics at the Pedersen Site (Hudak 1974: 43-45). Also described with the assemblage was one grooved maul.

Bone, Antler and Shell:

Bone splinter awls, worked mammal teeth and a bone bead were associated with Fox Lake ceramics at the Pedersen Site (Hudak 1974: 45-46). No shell artifacts are reported.

Excavated Sites:

Fox Lake sites include the Pedersen Site, 21MUI (Hudak 1974); the Big Slough Site, 21MUI (Anfinson 1977); Fox Lake and Mountain Lake sites (Bonney 1965). The MAD sites are the only other excavated putative Early Woodland sites in the region.

Middle Woodland

Introduction:

The Middle Woodland period in the Central Plains and Middle Missouri subareas is characterized by at least three taxonomic divisions. First, Kansas City Hopewell (apparently the earliest) appears to be limited to the immediate area around Kansas City. Materials from the Leahy Site in Nemaha County, Nebraska, appear to have Hopewell traits (Hill and Kivett 1941: 196-199), but the site does not represent a great range extension north and west of the Kansas City area. The second taxon which has been used in the literature is the Valley Focus (Hill and Kivett 1941: 191) at first tentatively suggested but now rather entrenched in the thinking of Plains archaeologists. We feel that its temporal, spatial, and cultural dimensions are understood well enough to term it a phase in the Willey and Phillips (1958) system. Finally, the Sonota Complex (Neuman 1975) seems to be of basic Middle Woodland affiliation but is based primarily on mortuary remains. Of these three taxa, the Valley Phase is the most widespread and is the only identified Middle Woodland complex in the project domain.

Middle Woodland: The Valley Phase

Area:

The Valley Phase is represented by sites in a region bounded by Buffalo County, Nebraska, northeastern Kansas, western Iowa (specifically the Rainbow and MAD sites and the Mills County vicinity), and southeastern South Dakota, with at least one outlier at the LaRoche Site. Middle Woodland sites in North Dakota, Minnesota, and Iowa east and north of these tentative boundaries appear sufficiently different to be excluded on typological grounds.

Age:

Patricia J. O'Brien (1971) outlines an interesting argument for the dating of the Valley Phase on the basis of trait comparisons between Taylor Mound, Kansas City Hopewell, and Illinois Hopewell sites. She notes that ovate bifaces occur in early Havanna Hopewell sites and at Taylor Mound. Taylor Mound also yielded a copper ear ornament. A single zoned rocker-stamped body sherd from Taylor Mound suggested to James Griffin a date of A.D. 1 to 100. Paul Katz found Valley-like pottery stratigraphically below Kansas City Hopewell types (Katz 1969: 252), and the Renner Cordmarked of Roedl and Howard (1957: 62) appears identical to some Valley vessels. O'Brien records that a base sherd from a flat-bottom vessel was found--an Early Woodland trait farther east (1971: 170-171). A time span for the Valley Phase of from 50 B.C. to A.D. 100 is suggested by O'Brien (1971: 175), a range which was supported by 3 radiocarbon dates. Benn (n.d.) extends this time span to A.D. 3-400.

Environment:

Habitation sites have been found on alluvial terraces of rather narrow secondary stream valleys. Although they have not yet been identified, sites on major streams may exist. Site location preference was apparently for smaller streams with access to both riverine and upland habitats; location close to water and riverine resources were the prime considerations. Proximity to arable lands may have been a factor in site choice as well--the contemporary Kansas City Hopewell people were apparently horticultural, at least to a minor extent.

Settlement Pattern:

Too few data exist for a comprehensive characterization of Valley Phase settlement patterns. The Schultz Site, 25VY1, is a small village of ten lightly-built structures in a fairly dense cluster. Two, however, overlapped, and one was interpreted as unfinished. It seems likely that a series of smaller communities is actually represented. At the LaRoche Site in South Dakota, a single Valley Phase dwelling was discovered, and although more may have been present, there was nothing to suggest the small village at 25VY1.

Architecture:

At the Schultz Site, ten shallow oval depressions from 11 feet by 14 feet to 17 by 18 feet in size were found. Eight of the ten had circular firebasins near the center. A number had daub with stick and grass impressions, and several had internal subterranean storage features. They were interpreted as remains of shelters which had been roofed with light coverings such as skins,

bark, or thatch (Hill and Kivett 1941). It is possible these may have been tipi-like affairs, which would have left no postholes. At the LaRoche Site (39ST9) in South Dakota, an oval posthole pattern enclosing an area 23 feet by 27 feet was found with a large central hearth. The postholes of this house suggest a wigwam sort of structure (Hoffman 1968, Figure 5).

Economy:

An economy of hunting and gathering wild foods is suggested. No direct or indirect evidence of gardening has as yet been found in Plains Middle Woodland sites, except for Kansas City Hopewell, where it is rare. Fauna from the Schultz Site show bison to have been the most commonly represented species, with white-tailed deer being the only other large mammal represented (i.e. no pronghorn or wapiti). Rabbits, beaver, muskrat, dog, badger, prairie dog, pocket gopher, and skunk are also present. The orientation is clearly toward bison, however. Shellfish are abundantly represented. No data are given regarding the particular faunal remains from the Valley Phase lodge at the LaRoche Site, but the related Stelzer Site in South Dakota showed an economy dramatically oriented toward bison hunting.

Disposal of the Dead:

Many burial mounds (as opposed to habitation sites) attributable to Middle Woodland have been excavated in South Dakota and Nebraska. Often, the identification as "Valley" has been hampered by absence of diagnostic ceramics (c.f. Neuman 1975). O'Brien (1971) summarizes Valley mortuary behavior as interment of the dead of a fixed time period (a year?), in a cleared area on a prominent hilltop. The dead were defleshed by exposure (O'Brien suggests charnel "precincts") and were placed on the surface, not in a pit; a mound was then erected. Another burial mode involved primary interments with several accompanying secondary burials. Prepubescent youths apparently were not ceremoniously interred. The dead in the Taylor Mound were placed in a subsurface limestone cyst. Fire rituals on the mounds just prior to closing seem to have played a significant role in the ceremonialism. O'Brien's conclusions regarding political organization at a chiefdom level require more supporting data.

Ceramics:

Kivett (1949) proposed the type, Valley Cord-roughened. This pottery is sufficiently inclusive as to subsume most relatively simple midwestern and Plains Middle Woodland ceramics. Valley Phase pottery is a thick (3 to 12 mm.), predominantly sand-tempered ceramic, apparently built-up rather than coiled (although this unclear), with exterior cording which was apparently applied by rolling rather than paddling, and usually oriented vertically with less frequent oblique and horizontal applications. The conoidal vessels had nearly vertical

rims and flat, cord-roughened lips. Vessel diameter-to-height ratios vary from ca. 1:1.25 to 1:2.5, with vessel height reaching 73 cm. Punctating, embossing, dentate, and cord-wrapped stick stamping and impressing, incising or trailing were decorative techniques utilized. Benn (n.d.) suggests a Valley ware composed of the types, Valley Cord-roughened (undecorated), Valley Punctated, and Valley Embossed. Valley Phase pottery seems to be more amenable to trait analysis rather than typological treatment, however.

At least one clay bent tubular pipe (possibly intrusive) has been found (Hill and Kivett 1941: 210), and Neuman (1975: 56) describes one from a Sonota Mound.

Lithics:

Large projectile points with broad, shallow side notches, corner notches or expanding stems have been found in Valley Phase sites. Other forms include oval or lanceolate knives, abundant end scrapers and other scraper forms, drills and retouched and utilized flakes. Pecked, ground and/or polished stone tools include sandstone and clinker abraders, 3/4 grooved axes, hammerstones, and atlatl weights or "boatstones" (Neuman 1967).

Bone, Antler and Shell:

Non-ornamental bone tools from the Schultz Site (25VY1) include split metapodial awls, laterally perforated bison phalanges, serrated metapodial fleshers, a bison scapula beaming tool, a bison ulna pick, a bison radius digging stick tip (?), and a pottery modeling tool (?). Ornaments include beads, tubes, and a deer cranium gorget (25VY1). Antler tools are scarce, and shell artifacts include only a few ornaments made from local mussel shells. Finally, there is some evidence for copper ornaments at the Taylor Mound.

Excavated Sites:

Not including sites in the project domain and its immediate vicinity, excavated Valley Phase sites include the Schultz Site and the Sondergaard Site (Hill and Kivett 1941), several sites on Loseke Creek in Platte County, 25BF171 on Wood River (Bleed 1975), and a number of minor sites in eastern and central Nebraska (Hill and Kivett 1941). Other major collections include those from the Rainbow, MAD (Benn 1980, n.d.) and Mills County (Tiffany 1978a) sites in western Iowa, the Taylor Mound (O'Brien 1971) in northeastern Kansas, and a house at the LaRoche Site in South Dakota (Hoffman 1968).

A number of sites attributable to the Valley Phase within and immediately adjacent to the project domain have been excavated. These were briefly treated in Hill and Kivett (1941: 234-239) and were more fully described by Raymond Price (1956). These are the

Wellenstein "Village" sites and the Enders Ossuary (possibly mixed with Central Plains Tradition). Other sites which have produced Valley-like pottery in the project domain are the Jones Site (25CD7), and Vermillion Bluff (25CL1).

Subunits:

Middle Woodland manifestations in the Nebraska-South Dakota-western Iowa region are not yet divisible into units smaller in content, geographical extent or temporal subperiods than the Valley Phase, Kansas City Hopewell, and the Sonota "Complex." Indeed, these blend into one another along many axis. Some pottery in Sonota burials, for example, is identical to Valley types, which in turn blend without interruption into the Renner Cordmarked type of Kansas City Hopewell. Subdivision of the Valley Phase will require better chronological control and intensive re-analysis of all excavated sites.

Early Late Woodland

Area:

It is impossible at this point in time, to accurately estimate a geographic range for this manifestation. Benn (n.d.) refers components from three sites to this taxon: the Rainbow Site (13PM91), the MAD sites (13CF101 and 13CF102) and 25PT5. He tentatively suggests that the White Swan Mound may be included, and finds similarities between Early Late Woodland Held Creek Ware and Hurt's (1952) Scalp Punctate. The type, Ellis Plain, which was included in Hurt's definition of Scalp Ware, may have Central Plains Tradition rather than Woodland affinities. Site 25DX26, the Lembke Landing Site, has yielded one rim that may be an example of Held Creek Ware.

Age:

Early Late Woodland is radiocarbon dated at the Rainbow Site and at MAD. Analysis of these dates leads Benn to postulate a range of ca. A.D. 300 to 700.

Environment:

Known components are on terraces of large streams tributary to the Missouri (MAD), on small tributaries of that river (Rainbow), on the Missouri River itself (25DX26, if properly assigned) or on small tributary streams well away from the major water courses (25PT5). Seemingly, environmental desiderata were essentially the same as in Middle Woodland.

Settlement Pattern:

Data are very scarce with respect to settlements. Periodic seasonal reoccupation of sites is suggested at the Rainbow Site.

It may be that excavated sites are aggregated communities which represent only a segment of the seasonal round.

Architecture:

Two oval postmold patterns at the Rainbow Site suggest wigwam type structures.

Economy:

A mixed hunting and gathering economy with limited horticulture is indicated at Rainbow and MAD sites. There is, as yet, no good evidence for horticulture at Early Late Woodland sites, but a single corn kernel is reported from 25PT5 in the 1941 field notes; this specimen could not be found in the collection.

Disposal of the Dead:

If the Wheeler Mound is properly attributed to this complex, mound burial similar to Middle and Late Late Woodland would be suggested.

Ceramics:

Held Creek Ware is diagnostic of the Early Late Woodland. Vessels have thin walls, subconoidal bases, a rather globular form, constricted necks with curved, nearly vertical rims. Exterior vessel surfaces are either smoothed-over cordmarked or smooth. Decoration is applied with a cord-wrapped stick on the lip; stamped, embossed, or punctate decoration occurs on the rim and/or shoulder. Ceramic anthropomorphic and zoomorphic figurines are diagnostic.

Lithics:

Small, triangular corner-notched projectile points (suggesting use of bow and arrow), bifacial knives, scrapers, and utilized and retouched flakes are characteristic. At the Rainbow Site there was a tendency to utilize local, less desirable lithic materials. Ground stone forms are poorly known, but include abraders and a atlatl weight (from 25PT5).

Bone, Antler, Shell:

Few bone, antler or shell tools have been found in Early Late Woodland sites. Shell scrapers have been reported from Rainbow (Hovde 1980).

Excavated Sites:

Rainbow, MAD, and 25PT5 are the only sites now certainly ascribed a place in the Early Late Woodland. South Dakota sites

such as Scalp Creek, Ellis Creek, Arp and White Swan Mound may be included upon reanalysis.

Subunits:

The Early Late Woodland is itself newly proposed subdivision of Late Woodland.

Late Late Woodland

Area:

The Loseke Creek Phase is distributed in eastern Nebraska, western Iowa and southeastern South Dakota. Identified sites are found exclusively in the Missouri River drainage and its major tributaries, including the Niobrara, Big Sioux, and Platte. Sites are found on small tributaries within this broad region. The Sterns Creek Phase overlaps the Loeske Creek distribution at its southeastern extreme in southwest Iowa and southeast Nebraska (Haas 1980a Figure 6). Lake Benton Phase sites are found in the prairie lakes region of southwest Minnesota (Anfinson 1979: 109).

Age:

Radiocarbon dates are sparse and confusing for Late Late Woodland sites. The Loseke Creek Phase is conceded to be older than Sterns Creek (Haas 1980a; Benn n.d.) but by what increment is unclear. Elaborate cord-impressed decorative techniques, diagnostic of Loseke Creek ceramics diffused into the eastern Plains by A.D. 700 to 800 (probably from the Iowa-Wisconsin-Minnesota-Illinois region). Four radiocarbon dates are available from the Arp Site; these vary from A.D. 420 to 810 (Gant 1967), but suggest a "best-guess" of ca. A.D. 700 to 800. This is consistent with dates from the Wheeler Bridge Mounds of 720 ± 120 , the Old Quarry Mound of 700 ± 100 and the Side Hill Mounds of 750 ± 90 . The Sterns Creek Phase is dated at the Walker-Gilmore Site at between about A.D. 1100 and 1250 (Haas 1980b) although a solitary date run earlier (M-1129) was A.D. 920 ± 150 .

The Lake Benton Phase has a suggested time range of A.D. 900 to perhaps A.D. 1500 (Anfinson 1979: 109). Although Eldon Johnson (1969b) suggested Plains village and/or Mississippian peoples truncated Lake Benton Phase occupation in southwest Minnesota, Anfinson rejects this idea (Anfinson 1979: 110).

Environment:

Loseke Creek Phase sites are located high on secondary streams tributary to the Missouri (Feye, Lawson and Eagle Creek sites) and on the Missouri near the mouths of creeks (Scalp Creek, Ellis Creek, and 25DK3). Sites are often on terraces or low spurs near these

streams and thus appear to show a selection for sites proximal to floodplain habitats. Although the data are very limited, the same situations appear to apply to Sterns Creek Phase sites. A number of these sites have been found (via gulleys) deeply buried in alluvial/colluvial sediments which totally prohibit discovery by traditional survey techniques except observation of cut banks.

Lake Benton Phase sites occur in the prairie lakes region of southwestern Minnesota, where preferences is shown for islands and peninsulas in these lakes. A few sites are also known on the Minnesota River.

Settlement Pattern:

Kivett states that four structures were identified at the Feye Site (Kivett 1952: 47). The evidence for them was so amorphous, however, that little can be said of their character or arrangement in the site. The size of the Ellis Creek Woodland component was thought to be 700 by 350 feet, but neither here nor at the Scalp Creek Site could a village plan be detected (Hurt 1952: 16-17). There just does not seem to be enough information to support inferences regarding settlements. The situation is similar at the Sterns Creek Site (Walker-Gilmore) where what may have been house structures were exposed in profile in the creek bank (Strong 1935: 185-186), but obviously cannot be used to characterize the settlements. Haas suggests the site consists of a series of components representing periodic reoccupation of a favored locus (a base camp?) and speculates on the existence of temporary specialized camps (Haas 1980). Most excavated Lake Benton Phase sites have been explored using test pits; hence the settlement pattern is not known.

Architecture:


The character of the Feye Site houses could not be determined. A variety of pits, hearths, and scattered postholes and "pot holes" (i.e. holes dug to hold pots upright) were found at both Loseke Creek "type" sites however. Evidence for Sterns Creek Phase habitations at the Walker-Gilmore Site has been given above, but Haas disputes the interpretation as houses. Based on posthole patterns exposed in plan, he suggests that they represent the remains of drying racks erected at the stream bank with the hearths and pits in close association (Haas 1980). A Sterns Creek house was excavated at the Thomas Site in Mills County, Iowa (Brown 1967: 54-56, 61-62). A somewhat irregular, basin-shaped pit, 17 by 14 feet in size, which contained pits and "pot holes" but no posts or hearths were exposed. It is unclear what sort of structure this could have been.


A possible Lake Benton Phase (or Fox Lake?) house was excavated at the Mountain Lake Site, 21C01. This consisted of an oval posthole pattern 20 feet in diameter (Hudson 1979).


FIGURE VII.3


LATE WOODLAND SITES AND DISTRIBUTIONS

Complexes

Lake Benton Phase 

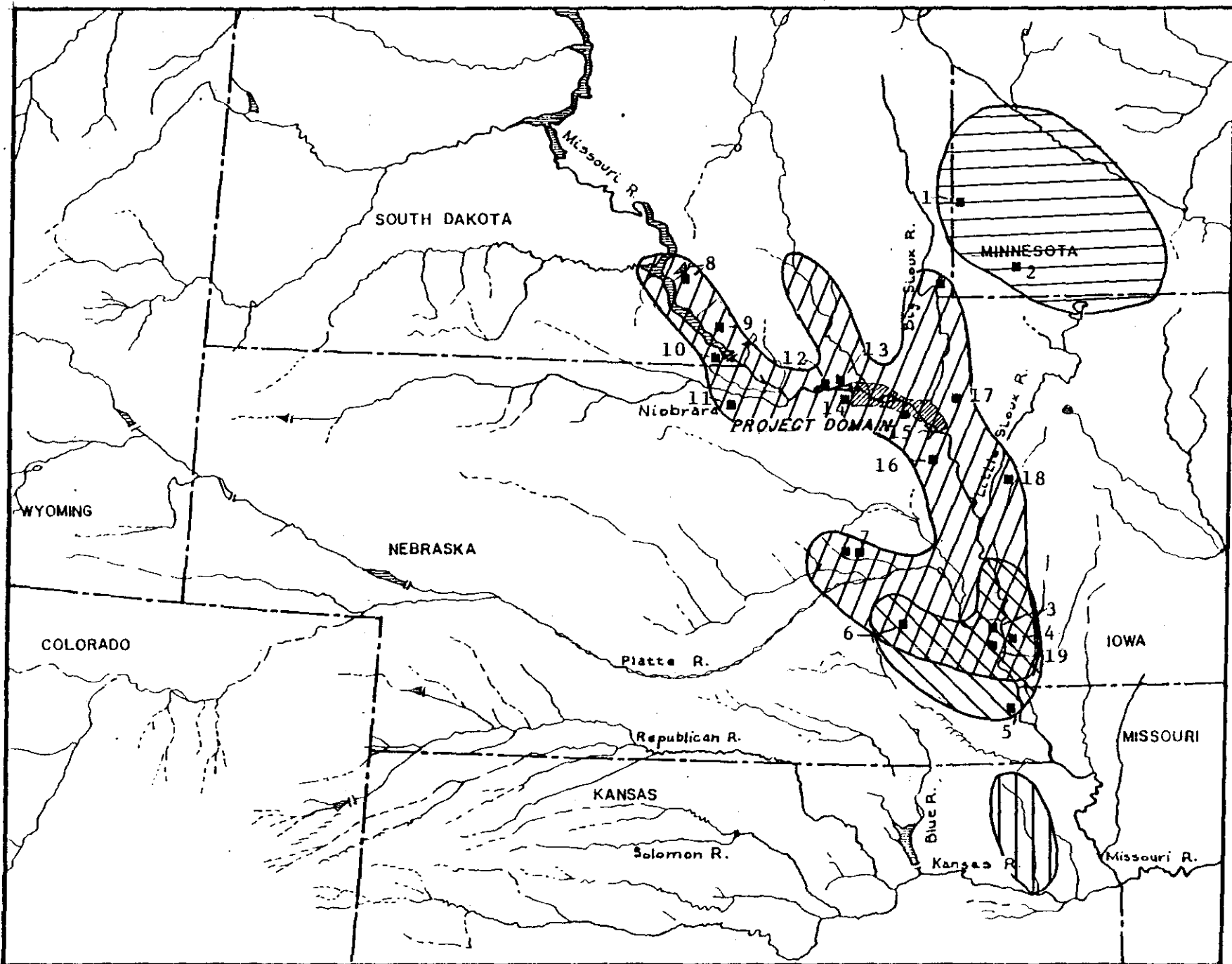
Loeske Creek and Similar Materials 

Sterns Creek 

Grasshopper Falls Phase 

Sites

- | | |
|---------------------------------------|---------------------------------|
| 1. 21LN2: Lake Benton | 10. 39GR1: Scalp Creek |
| 2. 21MU1: Lake Benton | 11. 25HT1: Loeske Creek |
| 3. 25CC28: Sterns Creek | 12. 39B0201: Late Woodland |
| 4. 13ML42, 204: Sterns Creek | 13. Gavins Point: Late Woodland |
| 5. 25NH6: Sterns Creek | 14. 25KX204: Loeske Creek |
| 6. 25BU20: Sterns Creek, Loeske Creek | 15. 25DX26: Early Late Woodland |
| 7. 25PT9, 12: Loeske Creek | 16. 25DX3: Late Woodland |
| 8. 39BR101, 102: Lake Woodland | 17. 13PM91: Held Creek |
| 9. Hitchell: Late Woodland | 18. Mad: Held Creek |
| | 19. 25CC16: Loeske Creek |



Economy:

Faunal remains from the Feye and Lawson sites have not been described. An analysis of faunal remains from the Eagle Creek Site shows bison predominant with deer, pronghorn, and canids present (Lueck n.d.). A list of species from 25DK3 reveals that 72 deer elements represent five individuals while five bison elements represent one animal (Price 1956: 102). Hurt characterizes faunal remains at the Scalp Creek and Ellis Creek sites by stating that deer bone was far less abundant than bison (Hurt 1952: 17). Kivett (1952: 58) reports finding corn kernels at the Lawson Site.

Faunal remains from the Walker-Gilmore Site include a variety of mammals, birds, amphibians, reptiles, fish, and freshwater molluscs. Migratory waterfowl and mammal bone, mostly deer, were abundant; bison were also present. Also found were remains of tubers, nuts (infrequent), bottle gourd and squash. The remains reflect a broad range of subsistence activities including bottomland horticulture, gathering wild plant foods and hunting in both upland and riverine environments (Haas 1980).

The only detailed analysis of a Lake Benton Phase faunal sample (and it is a mixed sample) reveals abundant bison remains, small mammals (especially muskrat) and fish which reflects the mixed prairie and lake habitat of the region (Anfinson 1977). Wild vegetal food, e.g. cattail and prairie turnip, were probable exploited species (Anfinson 1979: 109).

Disposal of the Dead:

Mounds are abundant in Minnesota and at least some of these may relate to the Lake Benton Phase (Anfinson 1979). Loseke Creek Phase dead were interred in artificially constructed, low conical mounds. This is documented for northeastern Nebraska (Howard and Gant 1966; Price 1956), South Dakota along the Missouri River (Hurt 1952; Neuman 1960), the James (Kant 1979), the Big Sioux (Myer 1922; Over and Meleen 1941) and for the prairie-lakes region in southeastern South Dakota (Howard 1968). Multiple secondary reburial in sub-mound pits with a variety of grave goods (one primary flexed burial each was noted at 25KX6 and 25HT1) was followed by erection of the mound. From one to 38 mounds appear to be associated as "sites." Grave goods include pottery (sometimes suggesting whole-vessel inclusions, e.g. 25KX8), lithics, bone ornaments, tools and unmodified mammal bone, and shell objects. The shell includes small disc-shaped beads, occasional conch (?) barrel-shaped beads, mussel shell spoons, and larger shell "rings." Rings have been found in the Truman Mounds (Neuman 1960), Site 25KX6 (Price 1956) and the Split Rock Creek Mounds (Over and Meleen 1941) where they are abundant. Many Split Rock Creek specimens resemble miniature toilet seats.

Ceramics:

Late Late Woodland ceramics are grit or sand tempered and characterized by a more pronounced shoulder than Middle Woodland pots, producing a more globular vessel shape with a distinct rim. Vessel walls are thinner, with smoothing over cord roughening or simple stamping. Rims tend to be high, up to more than one-third of the total vessel height. Vessels do not have appendages.

Loseke Creek Phase ceramic types include those characterized by a variety of single-line cord impressed decorations on the rim (Feye Cord Impressed, Feye Cord Roughened, "Missouri Bluffs" Cord Impressed, Ellis Cord Impressed, Scalp Cord Impressed), or cord-wrapped rod impressed decoration (Ellis Cord-wrapped Rod, Lake Benton Cord-wrapped Stick Impressed and/or Onamia Cord-wrapped Stick Impressed). Hurt's (1952) type, "Ellis Plain," appears to be Central Plain Tradition pottery. One is also led to believe that "Randall Incised" is probably more economically considered as Great Oasis High Rim Trilled. Rare examples of cord impressing and trailing on the same rim do occur at the Scalp Creek Site, however. The type Scalp Punctate is probably a synonym for late Valley Punctate/Embossed.

Sterns Creek pottery is plain, with the exception of tool-impressing at the lip exterior. Surface finish is predominantly smooth. It is undistinguished but diagnostic.

Fragments of tubular or bent tubular ceramic pipes, a pottery discoidal, and fired clay balls have been found in Late Late Woodland sites.

Lithics:

Chipped stone tools which relate to Late Late Woodland include small, corner and/or side-notched projectile (arrow) points, drills or perforators, bifacial knives, choppers and the usual range of scrapers, retouched and utilized flakes.

Pecked and ground stone implements include celts, grooved mauls, a variety of abraders of sandstone and clinker, manos, grinding stones, and hammerstones.

Bone, Antler and Shell:

Bone tools are rare but include needles, pendants, beads, bracelets, fishhooks, perforated deer phalanges, a perforated mammal canine tooth, and canid mandibles. Modified scapulae (knives or hoes) are rarely found. Most of the bone tool types are found only in the Sterns Creek Phase. Antler tools include only tine flakers. Shell artifacts are discussed under "Disposal of the Dead." The scarcity of artifacts of organic materials, and the lack of variety are hard to explain; unmodified bone and antler is not scarce.

Excavated Sites:

Loseke Creek Phase sites include the Feye and Lawson sites (Kivett 1952), the Eagle Creek Site, and 25DK3 (Price 1956) in Nebraska; the Scalp Creek and Ellis Creek sites (Hunt 1952), the Arp Site (Gant 1967), the Hitchell Site (Johnston 1967), the Tabor Site (Hurt 1961), the Gavins Point Site (Brown 1968; Hall n.d.), the Spawn Mound (Howard 1968) and the Split Rock Creek Mounds (Over and Meleen 1941) in South Dakota; and the Rainbow and MAD sites in Iowa (Benn 1980, n.d.).

Sterns Creek Phase sites include the Walker-Gilmore (Sterns 1915; Strong 1935; Haas 1980) in Nebraska, and the Thomas (Brown 1967) and the Sharp's Site (Tiffany 1977) in Iowa. The Lake Benton Phase is represented at the Pedersen Site (Hudak 1974, 1976), Mountain Lake, Great Oasis, Fox Lake and Big Slough sites (Anfinson 1977; 1979). An important Late Late Woodland site unassignable to a taxon is Truman Mounds (Neuman 1960).

Subunits:

Three phase-level taxa are discerned at this time: Sterns Creek, Loseke Creek, and Lake Benton. Sterns Creek and Loseke Creek have been termed "Variants," but seem more economically considered as phases. It is unclear if the Lake Benton and Loseke Creek Phases are essentially a spatial/cultural continuum, but cord impressing (as opposed to cord-wrapped-stick impressing) is far more common in the latter than the former.

GREAT OASIS

Area:

Great Oasis cultural materials, particularly ceramics, are found over a wide area in the Plains region, including extreme southeastern North Dakota (Anfinson 1979: 87), eastern Iowa (Caldwell 1961: 118), and even western Illinois (Henning 1967: 189). The core area of Great Oasis distribution, however, centers on northwestern Iowa (Banks 1966; Flanders and Hansman 1961; A. Henning 1967; D. Henning 1969, 1980; McAlister 1972; Peterson 1967; Williams 1973, 1974, 1975a, 1975b, 1975c), and includes southeastern South Dakota (Cooper 1949; Hall 1961, n.d.; Johnston 1967; Neuman 1964), southwestern Minnesota (Wilford 1945, 1955, 1960, n.d.a, n.d.b), and northeastern Nebraska (Frantz 1958; Ludwickson et al n.d.). Henning (1971a) provides a convenient summary.

Age:

Radiocarbon dates from Great Oasis sites range from A.D. 800 \pm 55 to as late as A.D. 1260 \pm 80. The apparent meaning of these dates, however, must be viewed in light of the possibility of rapid, short-term fluctuations in the content of atmospheric C14 during this time period (see Part IX).

Environment:

Great Oasis sites are found most frequently on lower terraces immediately adjacent to the normal floodplain or other bodies of water (Henning 1971). Sites which are located on major drainages, such as the Big Sioux or Missouri rivers seem most often to be located at or near the junction of a tributary stream. Not all Great Oasis sites are located on terraces; in Minnesota, sites tend to be located on islands or peninsulas in shallow lakes. Unlike Mill Creek site locations, Great Oasis sites do not seem to avoid areas with high flood potential, nor do these settlements seem to result in the midden-mound accumulation characteristic of Mill Creek habitation sites.

Settlement Pattern:

Settlement pattern and site layout are not well known for Great Oasis. Patricia Williams (1975b) has proposed a settlement model composed of "primary village sites" including sites such as Broken Kettle West, and "camps" which were smaller and more ephemeral locations concerned primarily with subsistence activities. Williams (1975: 28-29) sees many of the Great Oasis sites of northwest Iowa as camps which were associated with seasonal garden plots and occupied by relatively small groups of people. Although several Great Oasis houses have been excavated (see next section), virtually nothing is yet known of the internal organization of Great Oasis settlements.

Architecture:

Great Oasis house structures are known only from the Broken Kettle West Site in extreme northwest Iowa, where four houses were excavated. These houses were rectangular in shape, semi-subterranean, from 21 to 40 feet long and 17 to 25 feet wide, with entryways to the southwest. All four walls of these houses were supported by posts of various sizes and these were supplemented by varying numbers of larger central posts. The fire pit was centrally located, although slightly nearer to the entrance than to the back wall. Numerous pits also were encountered in the house floors.

Given that only one site has yielded house remains, it is not possible to assert that these are necessarily characteristic of all Great Oasis dwellings. The lack of similar finds from other sites might suggest that the typical Great Oasis house was a lighter, surface structure, rather than the substantial dwellings observed at Broken Kettle West.

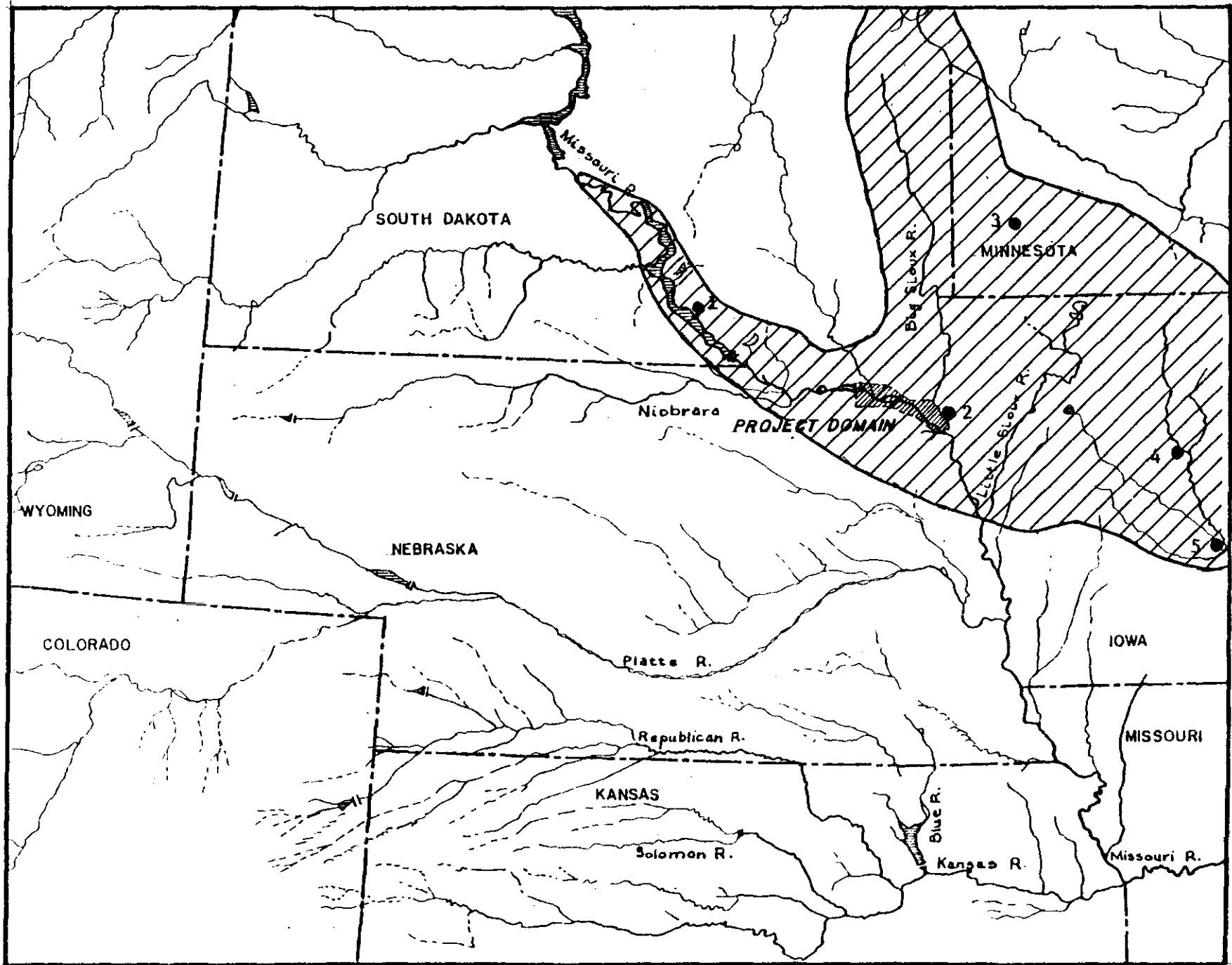
Pits frequently are found on Great Oasis sites, even when house structures are not encountered. These pits usually are between 18-55 inches in diameter, and may be either cylindrical, basin or bell-shaped.

FIGURE VII.4

DISTRIBUTION OF GREAT OASIS

Sites

1. Hitchell.
2. Broken Kettle West
3. Great Oasis
4. 13WB1
5. 13PK8



Economy:

The subsistence practices employed by the Great Oasis peoples seem to have coupled broad spectrum hunting and gathering with maize horticulture. The full range of large mammalian species have been recovered from Great Oasis sites, although considerable site to site variability in the incidence and abundance of different game species has been noted. In addition, sites frequently evidence numerous smaller mammalian species, bird (Scott 1970), molluscs and fish; apparently, a broad range of seeds, nuts and berries were also gathered (Dallman 1970).

The extent to which maize was cultivated by Great Oasis groups is a subject of some controversy. Corn kernels, sometimes in large quantities, are a frequent find at Great Oasis sites, but carbonized cobs are usually rare. On occasion, however, great quantities of corn cobs are found (Mead 1974). This coupled with the infrequent occurrence of scapula hoes, or other recognized agricultural implements, has led some to speculate that although the Great Oasis groups made regular use of maize, they did not grow it themselves, but rather obtained it through trade (Henning 1980: 9). The typical location of sites (see environment), emphasizing water and floodplain resources may also argue that food collecting may have occupied a more prominent role in Great Oasis subsistence than did horticulture.

Anfinson (personal communication) has suggested distinguishing the Great Oasis sites found in the Prairie-Lakes region from those on river terraces in Iowa, Nebraska, and South Dakota. He believes that the Prairie-Lakes Great Oasis sites represent an essentially Woodland type hunting-gathering economy with a strong emphasis on aquatic resources. Maize found in these sites probably would represent trade, rather than horticulture. Whether all Great Oasis groups actively practiced horticulture, or whether they obtained maize through exchange networks remains a moot question. Most likely, there was considerable variation in the actual subsistence activities performed at any given site, and perhaps also between different Great Oasis groups.

Disposal of the Dead:

Human remains from Great Oasis sites occur as formal burials and as scattered finds within habitation debris. The West Des Moines Burial Site is the largest occurrence of burials which can be associated unambiguously with Great Oasis. Here, the remains of at least 18 individuals were found. The cemetery was in a hilltop location and contained both single and multiple interments. Intact graves exhibited individuals in a flexed posture associated with a wide variety of grave offerings, including shell beads, pottery and eight crosses of clam shell (Knauth 1963).

At the Ryan Site (25DK2A), a multi-component burial site in northeastern Nebraska, a number of Great Oasis burials were encountered;

these may have been associated with Woodland burials. It appears that all of the Great Oasis burials represented secondary interments. The remains of a number of individuals occurred within each feature, but it appears some effort was made to place the remains of each individual into a spatially distinct pile. Few grave goods, excluding pottery, were found with these burials. In addition, an undetermined number of the burials in the vicinity of the Broken Kettle West Site may be attributable to Great Oasis rather than Mill Creek (see "Disposal of the Dead" in Mill Creek Overview). Scattered human remains are known from the Great Oasis Site (21MU2), the Williams Site (13PM50), and the Ferber Site (25CD10) among others.

Ceramics:

Great Oasis ceramics traditionally have been divided into two distinct ware groupings on the basis of rim and neck form: Great Oasis High Rim and Great Oasis Wedge Lip (Henning and Henning 1978). Both ware groups are grit tempered and vary in color from orange through tan to gray and black. Vessels were manufactured by the paddle and anvil technique and the body surfaces in most cases were smoothed over subsequently. Typical Great Oasis vessels are globular in outline "with rounded bottoms and shoulders, constricted necks, and outflaring rims. High rims are generally parallel sided with flattened lips. Wedge lip rims are short and thickened with flat lips that are steeply beveled towards the exterior" (Anfinson 1979: 88).

Decoration on Great Oasis High Rim sherds is usually confined to the rim exterior, although occasionally crosshatching and oval tool impressions are found on the flat lip surface. The rim area is frequently divided into an upper and lower band for the purpose of decoration. Upper rim decorative motifs seem to be independent of those designs found on the lower rim surface (Johnson 1969a: 272). Upper rim decoration generally consists of horizontal or oblique lines, elongated punctated impressions, crosshatching or a plain surface. Lower rim designs include zig-zag motifs (which are commonly made with paired or single incised lines) and continuous oblique lines. Both motifs are often applied over a horizontal lineate field. Other designs found in the lower rim area include pendant triangles, trapezoids, inverted 'turkey tracks', and conventionalized deer, maize and trees. It is of interest to note that major categories of motifs, such as the zig-zag, pendant triangle and oblique line, show considerable internal variation (Johnson 1969a: 275).

Great Oasis Wedge Lip, although usually lacking in decoration, occasionally has crosshatching, tool impressions and a combination of the two, on the lip surface. Other ceramic forms reported from Great Oasis sites include ceramic beads found at 13PM50. The beads were orange-brown in color, and were made of untempered clay.

Lithics:

Great Oasis chipped stone artifacts include side-notched, side and base notched, unnotched and stemmed triangular projectile points; side and end scrapers; bifacial and unifacial knives; choppers, gravers, drills, punches and spokeshaves. Utilized cores and both retouched and utilized flakes are also common.

Ground stone forms, although not common, do occur, most frequently as celts, arrowshaft smoothers, manos, hammerstones, anvils, abraders and metates. A Catlinite animal effigy was reported from 13PM420 (Henning 1980: 177-178).

Bone, Antler and Shell:

Bone tools recovered from Great Oasis sites include awls, chisels, quill flatteners, shaft wrenches and (rare) scapula hoes. Antler tine flaking tools are also found. Shell objects from Great Oasis sites include dippers, ancilosa shell beads, and clam shell pendants. Unique among Great Oasis shell artifacts are the eight crosses cut from clam shell recovered at the West Des Moines burial site.

Excavated Sites:

The Big Slough and Great Oasis sites have been excavated in Minnesota; in western Iowa the Beals Site, the Williams Site and the Broken Kettle West Site are the outstanding excavated sites. In South Dakota, the Hitchell, Oldham, Benge Creek, Pease Creek, Gavin's Point, Good Soldier, Arp, Ree Heights, and St. John's Site have been excavated. In Nebraska, the Ryan and Beardshear sites have been excavated outside the project domain, while the Ferber and Wissler Sites have been excavated within the project domain.

Subdivisions:

Great Oasis has not formally been divided into distinct phases. This is due, in part, to uneven knowledge of the Great Oasis complex and ironically also due to the apparent heterogeneity of Great Oasis manifestations. Great Oasis usually is viewed as a complex bridging the Woodland and Plains Village traditions, on both economic and ceramic grounds. Great Oasis, like Mill Creek, with some validity may be seen as essentially an eastern manifestation of the Initial Middle Missouri Tradition, although it lacks many diagnostic elements.

Perhaps the most controversial aspect of Great Oasis cultural taxonomy concerns the relationship between Great Oasis and a series of what may be partially contemporaneous complexes in the same region, including Mill Creek, Over Phase, and Cambria. The difficulty haunting such studies is the fact that the ceramic styles and motifs

observed seem to be widely shared and of Late Woodland inspiration. The widespread occurrence of at least small numbers of Great Oasis sherds on Mill Creek, Over Focus and Cambria sites further complicates the picture. Until other classes of non-ceramic evidence can be marshalled to explain the similarities between these groups, a resolution of this problem is unlikely.

INITIAL MIDDLE MISSOURI

Introduction:

The Middle Missouri Tradition, more precisely the Initial Variant of that cultural unit (Lehmer 1971) is distributed in an arc northwest and northeast of the project domain. No sites which can be attributed to the Initial Middle Missouri Variant are presently identified within the project domain, although the Big Sioux Phase Mill Creek sites are immediately across the Big Sioux River in Plymouth County, Iowa. A poorly documented collection from a gravel pit in the terraces on Lower Brule Creek at the northeast boundary of the project domain strongly suggests that Mill Creek, or perhaps "Great Oasis/Mill Creek" (Henning 1980: 15, 204-206), will be identified in that area when adequate archaeological survey is done.

It is generally recognized that Mill Creek and Cambria too, is an eastern member of the Initial Middle Missouri Variant. Internal division to the phase level of Mill Creek has been suggested by various authors (see below), and the term "Mill Creek" is today used "...as a convenient term in referring to the Middle Missouri Tradition Sites in northwest Iowa" (Alex 1980: 19) although at one time it was used formally as an Aspect name in the Midwest Taxonomic System.

The remainder of the Initial Middle Missouri Variant sites are conventionally thought of in terms of phases named Over, Grand Detour, and Anderson. It is not clear that these terms are applied to equivalent units of content, or that these terms are equivalent to Mill Creek phases at all.

Robert Alex has recently suggested that four sites on the James River previously referred to the "Over Phase" be placed in a James (or Jim) River Phase (Robert Alex personal communication, January 1981). Such a proposal has the advantage of placing these four sites (and survey has shown that these four are all the Initial Middle Missouri sites in the lower James basin) in an interpretable space-time-content matrix and is endorsed here. The removal of these four sites, and the Mitchell Site in particular, from the Over "Phase," a direct conversion from the original Over Focus by Caldwell and Jensen (1969),

FIGURE VII.5

CENTRAL PLAINS TRADITION

AND

INITIAL MIDDLE MISSOURI VARIANT

Central Plains Tradition Complexes ///

Nebraska Phase

Smoky Hill Phase

Solomon River Phase

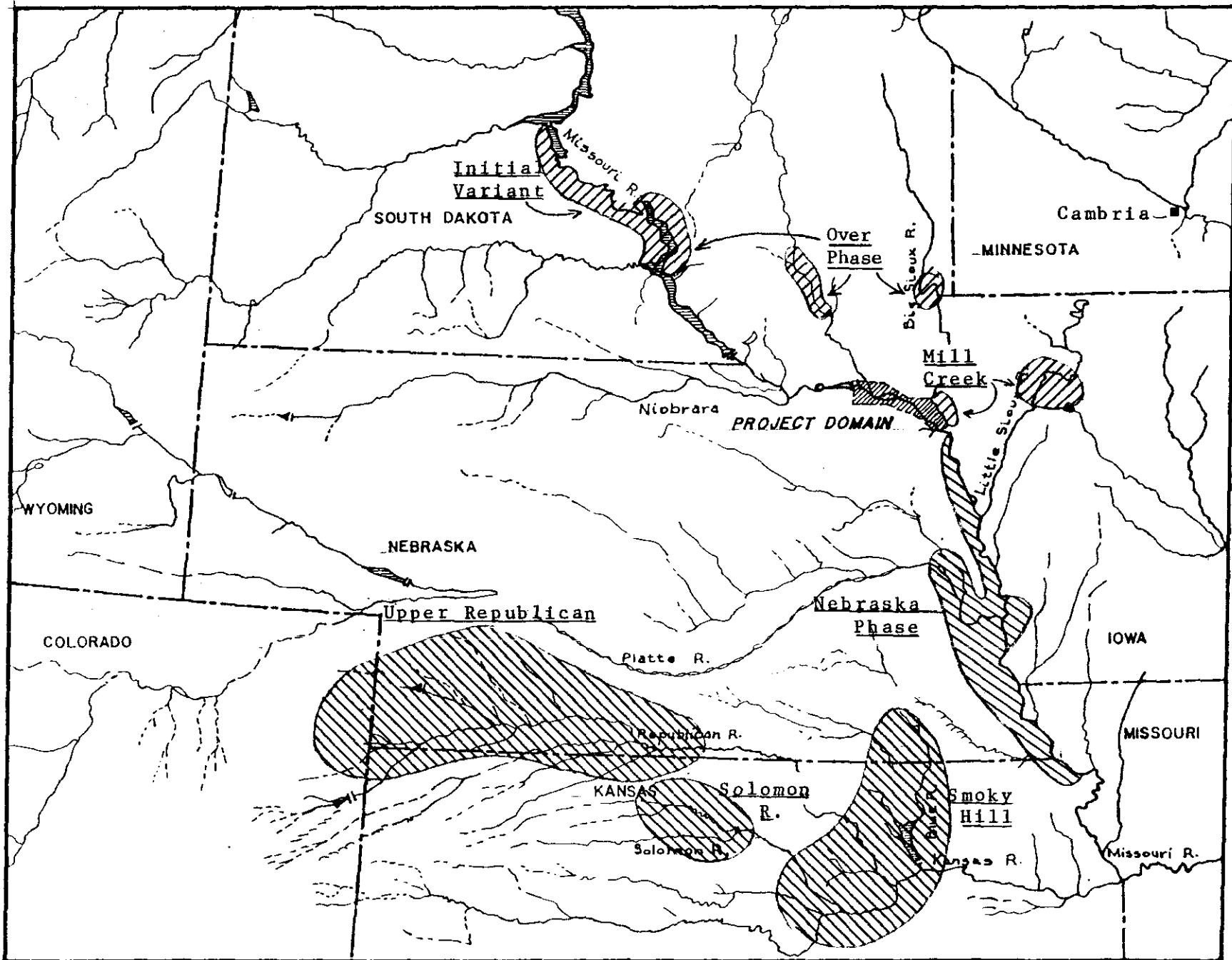
Upper Republican Phase

Middle Missouri Tradition Complexes ///

Mill Creek

Over Phase

Initial Middle Missouri Variant



removes the "type" site from that taxon and makes taxonomic treatment of former Over Phase sites such as Brandon on the Big Sioux and several components in the Missouri River trench speculative. A new manipulation of the published data will not resolve the problem, and for this reason a resolution of this dilemma is beyond the scope of the present work.

Two potential solutions might be suggested, however. The first is that the Initial Middle Missouri Variant will be divided into five (possibly more) phases: Upper Big Sioux (i.e. Brandon), James River, Over or to-be-named (Missouri trench components such as Swanson, Pretty Head B and Chapelle Creek), Grand Detour and Anderson. The second possible solution is that the Initial Middle Missouri Variant in South Dakota is but a single phase with a number of discrete local sequences. The Grand Detour and Anderson Phases seem to differ little in terms of any material culture parameter, and the differences perceived between the Missouri trench sites and the James and Big Sioux sites might change if a single, consistent ceramic typology was applied. This solution would probably make the "Initial Middle Missouri Phase" somewhat more comparable to phases of the Central Plains Tradition, although this is not reason (by itself) to formalize it.

For this discussion, it was felt that a simple division between Mill Creek and the South Dakota Initial Variant sites would be sufficient and particularly adapted to the way the corpus of literature on the Initial Variant is organized. No advocacy is implied by this. The significance of the Initial Variant (in any of its manifestations) to the project domain cannot be overstated, for in spite of its apparent absence from the area under scrutiny, its proximity and its obvious influence on resident peoples (especially St. Helena) was crucial to later developments in the Central Plains and Middle Missouri Subareas. Explicitly stated, one may search for the cultural and biological antecedents of many of the later Plains Villagers here.

Mill Creek

Area:

Mill Creek sites, based on present knowledge, are restricted in their distribution to the northwestern corner of the state of Iowa, and are not now known within the area of the project domain. Mill Creek sites are found immediately across the Big Sioux River, however. Mill Creek sites are found within an area "...bounded by the Big Sioux on the West; the Iowa-Minnesota border on the North; the 94th meridian on the East; and the 42 parallel on the South" (Vis and Henning 1969). Within this region, Mill Creek sites cluster in two discrete areas: one on the Big Sioux River, including sites such as Kimball and Broken Kettle, and a second cluster in the upper drainage area of the Little Sioux River, including Mill Creek, Waterman Creek, and Brooke Creek. Sites from this second area include Brewster, Phipps, and Chan-ya-ta.

Age:

A multitude of radiocarbon dates are available from a number of Mill Creek sites. These dates range from as early as 930 A.D. + 55 to as late as 1425 A.D. + 150 in uncorrected radiocarbon years. Based on these dates, the generally accepted temporal span for Mill Creek is from about A.D. 950 to approximately A.D. 1400. Because of the wide dispersion of the radiocarbon dates and apparent variation in the frequency of a number of ceramic attributes (Ives 1962: 32), an early (A.D. 900 - 1100) and a late (A.D. 1100 - 1400) phase have been proposed for the Little Sioux Mill Creek occupation (Bryson and Baerris 1968; Vis and Henning 1969). Given this division, the Mill Creek occupation on the Big Sioux would be approximately contemporary with the later of these two phases.

Environment:

Mill Creek sites generally are located on terraces above streams and cover from one to several acres (Henning 1980: 10). Sites tend to be located in deep valleys with access to fertile bottom land, a permanent water supply, and nearby gallery forest (Sumner 1975). Precise site location also seems sensitive to flooding with areas of high flood potential being devoid of Mill Creek sites (Sumner 1975: 14), although soil deposition associated with such flooding might well obscure evidence for such settlements if they did exist.

Settlement Pattern:

The majority of known Mill Creek sites are small clustered villages, although the existence of more ephemeral camps has been suggested (Tiffany 1978b). Some of these villages were occupied for extended periods of time or were periodically reoccupied as is evidenced by deep midden deposits and a number of superimposed house structures. The midden at Broken Kettle may be twelve feet deep (Vis and Henning 1969).

Indications of site organization have been obscured by years of cultivation in many cases, but some indications of settlement plan were observed at three sites: Wittrock, Kimball and Chan-ya-ta. Excavations at the Kimball Site identified three houses arranged in rows (Orr 1963). At Chan-ya-ta, the arrangement of houses appeared to be haphazard, and several overlapped earlier structures (Tiffany 1978b). The reconstructed site plan from the Wittrock Site also suggests a haphazard location of houses. It may be relevant to note that at both the Wittrock and Chan-ya-ta sites, site area was constrained by site fortifications. Since they were occupied over an extended period of time, it is possible that an originally more ordered arrangement of houses was obscured by reguilding or subsequent reoccupation.

A number of Mill Creek villages appear to have been fortified, and in most cases, this took the form of a partially or completely encircling ditch. In addition to the ditches, an internal log palisade was used in at least one instance (the Wittrock Site). Although recent farming activity undoubtedly has obscured evidence of defensive ditches, it does not appear that all Mill Creek sites were fortified. Anderson (1969: 243) has suggested that fortifications may be a relatively late innovation, a response to intensifying contact with Oneota groups.

Architecture:

Mill Creek dwellings were semi-subterranean, earthlodge-like structures, which were probably covered with earth, grass and sod. In addition, recent evidence suggests that the external walls were banked with earth (Baerreis and Alex 1974: 147-148), which may explain the rapid rate of soil deposition producing the Mill Creek midden-mounds. The structures typically possessed a long covered entryway (although with no regular pattern of orientation), a central hearth and a number of internal storage pits, both basin-shaped and bell-shaped. Mill Creek houses also appear to have been constructed with earthen benches along the back wall.

Mill Creek dwellings are frequently described in the literature as rectangular in shape and of Middle Missouri Tradition type, but this is not an entirely accurate generalization. At least 13 structures have been excavated (excluding 1 possible house encountered by Orr at Broken Kettle) including three from the Kimball Site (Orr 1963), three or more at the Wittrock Site (Anderson 1966), and seven from Chan-ya-ta (Tiffany 1978b; Van Voorhis 1978). These structures vary from rectangular to square to irregular or even diamond-shaped and exhibit a similar variability in size. These figures are summarized below:

Shape	Length (feet)	Width (feet)	Site	Source
Rectangular	25'*	20'*	Kimball	Orr 1963
Rectangular	22'	15'	Chan-ya-ta	Tiffany 1978b
Rectangular	40'	32'	" "	Van Voorhis 1978
Rectangular	48'	36'	" "	Van Voorhis 1978
Rectangular	32'	20'	Wittrock	Tiffany 1978b
Rectangular	28'	18'	" "	Tiffany 1978b
Square	17'	16'	" "	Tiffany 1978b
Square	20'	20'	Chan-ya-ta	Tiffany 1978b

*average of the three excavated houses

Mill Creek houses do not possess the standard Central Plains Tradition configuration of central weight bearing posts, but more closely resemble the Middle Missouri Tradition technique of wall support. They differ from some Middle Missouri houses in that post-molds are found in equal frequency and spacing along the front and back walls of the structure as along the longer, side walls. Houses of this Mill Creek type are also found in some South Dakota Initial Middle Missouri Variant sites.

Economy:

The subsistence techniques employed by the Mill Creek inhabitants included hunting, gathering, fishing, and horticulture. A wide range of large mammalian species was regularly hunted, including species common in woodland and prairie environments: bison, elk, deer, antelope and numerous smaller mammals (Frankforter 1968; Dallman 1977). Extensive use was made of riverine resources as well by harvesting many species of aquatic birds (Scott 1979), molluscs and fish.

Remains of beans, squash and often plentiful finds of maize, along with the frequent occurrence of scapula hoes and other digging tools suggest that the Mill Creek inhabitants were successful horticulturalists (Henning, Henning and Baerreis 1968; Ruppe 1955; Orr 1963). The location of settlements near good, arable soils suggests the importance which cultivation played in the Mill Creek subsistence economy. Gathered plant resources supplemented the Mill Creek diet.

Disposal of the Dead:

Although human osteological remains are frequently encountered in Mill Creek sites, few intact examples of Mill Creek funerary remains are known. The most complete representation of Mill Creek funerary treatment comes from the hillsides adjacent to the Broken Kettle Site (it should be noted that a Great Oasis village is also located in the immediate area and that some of the reported burial remains may be associated with the Great Oasis occupation).

Four alternative burial types have been identified: primary inhumation in an extended posture, primary inhumation in a flexed posture, secondary interment after burning, and secondary interment without burning (Lilly and Banks 1965: 5). In those cases for which data are available, primary burials tend to be oriented to the south-east. The spatial relationship and cultural significance of these various treatments is not clear. At Broken Kettle, both varieties of primary burial occur within the same hilltop burial area, and primary inhumations are also found in the midden areas of the settlement (Orr 1963 XI: 54). Inhumations were also found in the immediate vicinity of an ossuary area. There is some suggestion, however, that discrete areas were employed for the incineration of mortuary remains. One such location was discovered northeast of the Broken Kettle Site (Henning, personal communication). No evidence of

structures, such as charnel houses, have been found in association with either variety of secondary interment area.

Based on present evidence, it is not possible to determine whether these alternative disposal types represent sequential steps in a single mortuary program, or whether several distinct burial programs existed among the Mill Creek inhabitants. Grave goods found in association with Mill Creek burials are relatively sparse, and are found more often with primary rather than secondary burials. Virtually all classes of artifacts could occur as burial offerings, including ceramics, shell beads, lithics, bone and shell implements and ornaments (Lilly and Banks 1965).

Ceramics:

Four major ware groups (each with several types) are associated with the Mill Creek culture: Sanford, Chamberlain, Mill Creek, and Foreman (Ives 1962). These ware groups are listed in order of decreasing frequency (Henning 1968).

The typical temper of Mill Creek ceramics consists of crushed granite or sand. A very small percentage of shell tempered ceramics has been recovered from most Mill Creek sites, and are usually interpreted as trade wares. Vessel surfaces are usually plain, with some smoothed-over cord roughening and with either a dull or polished lustre. Decoration typically consists of incised lines with occasional punctates, modeling, red slipping and (rarely) black paint. Cord impressed decoration is rare. With the exception of red slipping and black paint, decoration is usually confined to the lip, rim and shoulder areas. Handles appear on some Mill Creek wares and are usually of a loop variety, often with notches or grooves (Ives 1962: 11). Effigy figures are found, occasionally, mounted on these handles. Vessel shapes include bowls, flat-bottomed sub-rectangular pans, seed jars, hooded jars, insloping-necked jars and both wide and constricted mouth ollas (Ives 1962: 11). Other pottery forms found in Mill Creek sites include discs, beads and pipes.

Lithics:

Lithic materials recovered from Mill Creek sites lack, for the most part, distinctive or diagnostic features useful as chronological indicators (Baerreis 1968: 151). Chipped stone artifacts include side notched, triple notched, and unnotched triangular projectile points, side and end scrapers, drills, gravers, burins, knives, and other bifaces. Retouched and utilized flakes are common on Mill Creek sites. Ground stone forms include manos, metates and other grinding stones, anvils, grooved abraders, shaft smoothers, hammerstones, polishing stones, celts, axes, and discoidals. Some Catlinite is reported.

Bone and Shell:

Bone tools known from Mill Creek sites include awls, fleshers, scapula hoes and other digging tools, fishhooks, needles, knives, hide graining implements and flaking tools. Perforated teeth and other ornaments of bone are found, such as bone tubes, beads and bracelets. Most items were made from bison bone, although deer, elk, bird, beaver and fish bones were also utilized (Fugle 1962).

Shell objects known from Mill Creek sites include spoons, scrapers, a variety of disc and barrel shaped beads, and beads of marginella, ollivella, conch columbella and ancusosa.

Excavated Sites:

There have been three major episodes of excavation in Mill Creek sites, not including early 20th century digging with compromised excavations and collections. First, Ellison Orr and Charles Keyes dug extensively at the Broken Kettle (13PML), Kimball (13PM4, Waterman (13)B2), and Phipps (13CK21). Second, during the 1950's the Tiel Sandford Museum and the University of Iowa sponsored excavation at the Phipps, Wittrock and Waterman Creek sites under the leadership of Weldon Frankforter and R. J. Ruppe. Finally, during 1963 and again in 1971 and 1973-74, field parties from the University of Wisconsin under the leadership of David A. Baerreis excavated small tests in five Mill Creek sites in 1963, long trenches at the Brewster Site in 1971, and a number of structures and extramural tests at Chan-ya-ta in 1973-74. Marshall McKusick (1971) from the University of Iowa directed further excavation at the Wittrock Site in 1965. The majority of this work is available in published or manuscript (mainly Ph.D. dissertation) form. Also available is F. L. Van Voorhis' report on his amateur excavations at Chan-ya-ta and Old Englishman's Ranch sites (Van Voorhis 1978).

Subunits:

After the initial definition of the Mill Creek culture by Keyes (1927), Mill Creek taxonomy has focused on two basic problems: the relationship of Mill Creek to the contemporary Initial Middle Missouri Tradition in South Dakota, and possible internal divisions of the Mill Creek culture.

Concerning the first problem, most investigators now feel Mill Creek to be a legitimate part of the Initial Middle Missouri Tradition (cf. Anderson 1969; Henning 1971b), although some disagreement persists as to the relationship of either entity to Great Oasis. Preliminary analysis of cranial measurements from the Broken Kettle Site (Owsley, Morey and Turner 1980) however, raises some possible doubts concerning the biological association of Mill Creek with the Middle Missouri Tradition, arguing greater similarity with contemporary Initial Coalescent populations.

Taxonomic distinctions within Mill Creek recognize two phases, Big Sioux and Little Sioux (Ives 1962; Anderson 1972). As mentioned in the section on dating, the Little Sioux manifestations are frequently subdivided into an Early and a Late phase (Henning 1968), although such a division is not universally recognized (Anderson 1972).

Initial Middle Missouri (South Dakota)

Area:

Initial Middle Missouri Variant (IMM) sites are found on the upper Big Sioux in the vicinity of Sioux Falls, South Dakota (the Brandon Site), the lower James River (the Mitchell, Bloom, Goehring and Twelve-Mile Creek sites) and about thirty sites on the Missouri River mainstem. The latter are found on both sides of the river from the mouth of the White River to Chapelle Creek, and on the right or west bank above that point to the mouth of the Cheyenne (Lehmer 1971: 66). Caldwell notes, however, that of 28 villages in the Missouri trench, only seven are on the east side of the river (Caldwell 1966). Sites lying outside these restricted segments of river valleys are rare; occurrences of IMM pottery at sites such as Arp, Pease Creek, and Bengé Creek suggest that a southward extension down the left or east bank of the Missouri trench would be the only major amendment. No Initial Middle Missouri Variant sites have been identified in the project domain with the exception stipulated in the Introduction regarding Brule Creek.

Age:

Fewer radiocarbon dates exist for South Dakota IMM sites than for Mill Creek, and less attention has been paid to correlating them with ceramic seriations. This has been done only for the James River sites, and Alex (1981) has used this technique to estimate a duration of from A.D. 1000 to 1200 there. Terminal dates as late as A.D. 1350 for the variant as a whole have been argued (Caldwell and Jensen 1969: 78), and beginning dates as early as "...the 8th century A.D., or a little earlier" (Wood 1967: 119) have been suggested. A span from A.D. 1000 to 1300 is more likely. The potentially troublesome issue of a "Modified Initial Middle Missouri Variant (Lehmer 1971: 97-105) seems to have been disposed of (Johnson 1977, 1979) and need not detain us.

Environment:

Initial Middle Missouri Variant sites in the Missouri trench were located on terraces above the floodplain. Often, settlements were on narrow spurs of these terraces, chosen so as to protect the village on three sides by precipitous slopes, with a trench and stockade across the end of the spur. Village location was thus convenient to the resources of both the floodplain and the uplands (Wood 1974).

It has been suggested by a number of authors that movements and/or florescence of the Initial Middle Missouri Variant was synchronous with the Neo-Atlantic climatic episode of Baerreis and Bryson (Caldwell 1966: 24; Caldwell and Jensen 1969: 80-82; Ehrenhard 1972; Lehmer 1970, 1971). D. Griffin, however, has cogently argued that the postulated environmental responses would not necessarily have precipitated migration; rather, he postulates that stress upon critical resources in localities lead to the founding of new villages (Griffin 1976: 33-35). Villages were often established near the mouths of major tributary streams (Caldwell and Jensen 1969: 69).

Somewhat similar situations pertain to the four sites on the James River and to the Brandon Site on the Big Sioux, although the character of these rivers is different. Robert Alex (personal communication) has noted that the James River may virtually dry up during a severe summer but Firesteel Creek, upon which the Mitchell Site is located, will continue to be charged from an aquifer rising in the Wessington Hills. Timber may also have been a crucial environmental parameter since trees in these valleys were limited to groves at favorable spots rather than occurring as gallery forest as in the case of the Missouri River.

Settlement Pattern:

Many IMM villages studies in recent years have been in pasture lands, and the numbers and organization of houses in them are estimable from surface depressions. Sites contain from fewer than a dozen (the Breeden and Swanson sites may have had as few as four each) to over 100 (the Sommers Site). About half are fortified, most by the ditched spur plan described above. Some (specifically the Pretty Head Site) may have had more complex rectangular fortifications with ditches (Caldwell and Jensen 1969: 76). Away from the Missouri River, village sizes of 37 (Brandon), 40-45 (Mitchell) and 70 lodges (Goehring) have been recorded. Some are fortified by the ditched spur, but Mitchell has a more complex system. Most villages seem to be arranged in vague lines of lodges, but Brandon, Mitchell and Langdeau (as examples) seem to have no apparent rows or lanes. Sites vary from two to three acres to over twenty-five.

Architecture:

Houses of the IMM variant in South Dakota are of two broad styles. First, houses with posts equally distributed at fairly frequent intervals around all four walls like those of Mill Creek, are present at the Mitchell, Twelve-Mile Creek, Dodd, Pretty Head and Crow Creek sites, among others. Lehmer (1954: 32-33, 74-76) and Hurt (1951: 16) suggest that this style may be early; Caldwell and Jensen (1969: 76-77) support this inference. The second style includes houses at such sites as Brandon and the majority of Missouri River villages. In these, the side walls have posts at regular

intervals but the front and rear walls lack regular lines of posts. A "king post" is almost universally present in the center of the rear wall in this arrangement. A number of sites (Brandon, Dodd, Pretty Head) have some examples of both styles of house. Alex (1973; Baerreis and Alex 1974) has suggested that houses at the Mitchell Site were banked with earth and refuse.

All houses share the long rectangular form with an extended entry oriented to the southern quarters, a main fire basin offset toward the front, and often a second in an analagous position in the rear of the house, and interior storage pits. Ramps, channels, benches or platforms at the front of the house and other variations seem to be found more often in houses with front and rear walls which lack regularly spaced posts.

Economy:

The economic orientation of IMM peoples seems to have been directed toward the exploitation of bison as the major prey species, with lesser emphasis on floodplain fauna, and towards gardening with an emphasis on maize. Detailed analysis, however, reveals variation from this characterization. Gilbert (1969) and Chomko (1976) have studied faunal exploitation in some detail. Chomko's study concluded that 94.8% to 98.9% of the animal flesh represented in IMM sites were upland species (overwhelmingly bison) and that bottomland forest species merely provided supplements to this. Lynn Alex has studied the fish remains from two James River IMM sites and has concluded that this resource was supplemental only (Alex 1977).

Horticultural produce from IMM sites has been in the form of maize cobs and kernels with a few other species represented, but this is obviously due to collection bias. A study by Benn (1974) on seeds recovered from the Mitchell Site revealed that upland, bottomland and disturbed locations were exploited and that wild seeds were being eaten with maize and sunflower. Cucurbits, beans, sunflower seeds and maize demonstrate dependence on horticulture.

Disposal of the Dead:

Data regarding disposal of the dead are particularly meager for the Initial Middle Missouri Variant. During the River Basin Surveys excavations at sites on the Missouri trench, few human remains were recovered. The human remains from the Fay Tolton Site (Butler 1976) are clearly interpretable as victims of violence, and the provenience of the adult skeleton from the Langdeau Site is not given in the site report (Caldwell and Jensen 1969: 87-89).

The data from the James River sites are more informative. The Mitchell village has a burial mound close by (Meleen 1938). The burial pattern in one mound at the Mitchell Site was that of single and

and multiple flexed primary interments showing no preferred orientation (one skeleton was in an extended position), and scattered crania fragments suggested some secondary reburial. Abundant red ocher, spear and arrow points, local and exotic shell ornaments, bone implements, copper and (rarely) ceramics in association. The other mound contained an ossuary of secondary interments; no red ocher was found. The Twelve-Mile Creek mound was also an ossuary.

Ceramics:

Two overlapping and conflicting ceramic classification systems have been applied to Initial Middle Missouri Tradition components. The system devised by Wesley Hurt subdivides unthickened rims into Chamberlain Ware and Sanford Ware on the basis of both form and decoration. Lehmer's original taxonomy included Anderson High Rim and Anderson Low Rim categories. Neither taxonomy can be translated simply into the other because there are many nuances in the original descriptions which are not explicitly included in typical site reports. As a result, only the S-rim types are broadly comparable. Lehmer's system (1951, 1954) as modified by Caldwell and Jensen (1969) continues to be utilized in the Missouri River trench in central South Dakota (Brown 1974; Johnson 1976, 1979). The system devised by Wesley Hurt (1951) for application to the Swanson Site, 39BR16, and applied to the components of the Initial Variant in eastern South Dakota (Hurt 1954), was borrowed, altered, and significantly improved by John Ives (1962) for application to pottery from the Mill Creek area. Henning (1968), Vis and Henning (1969), Anderson (1972) and Tiffany (1978b) have continued to improve and refine this system so that today it is both highly formalized and apparently very useful for eliciting temporal change. The Lehmer/Caldwell and Jensen system is significantly different in terminology, however the ceramic materials treated are quite clearly similar to those treated by Mill Creek and James/Big Sioux analysts.

Robert Alex (1981) has borrowed back the evolved Mill Creek ceramic system for application to analysis of the ceramics from IMM Variant sites from the lower James River basin, with significant improvement in the treatment of the heterogeneous "Mill Creek Ware/Group."

Initial Middle Missouri Variant ceramics are grit-tempered indigenous wares with a variety of forms. Some shell tempered ware is present on most sites, and exotic motifs on the indigenous vessels are sometimes noted. Jar forms, often with appendages, and rimless bowl and seed jar forms are present. Jar forms are grouped into four ware categories. Chamberlain Ware is characterized by a flared rim, thicker at the rim base than at the lip, with a variety of incised or cord impressed designs on the rim exterior. Sanford Ware has vertical to flared rims, usually thickest at the lip, and it is basically synonymous with Anderson rims in the Lehmer/Caldwell and Jensen system; Sanford Ware is divisible into Mitchell Modified Lip,

Kimball Modified Lip and Sanford Plain on the basis of lip decoration. Foreman Ware is characterized by S-shaped rims with a variety of incised or cord-impressed decoration. Alex proposes placing rims with vertical to slightly flaring rims over 30 mm. in height into Tschetter High Rim Ware. The second basic vessel form consists of Dimock Ware (Bowls) and Ethan Ware (Seed Jars).

Shoulders often have trailed or incised decoration in various geometric motifs and motifs associated with the "Southern Cult" or Southeastern Ceremonial Complex.

Lithics:

A variety of chipped stone tools are found in IMM Variant village sites; most are shared with other contemporary Plains village cultures. These include side-notched and unnotched triangular projectile points, narrow asymmetrical knives, leaf-shaped and triangular knives (some with stems or side-notches), broad bifacial knives or choppers of Bijou Hills quartzite, plate chalcedony knives, drills and gravers, small end scrapers, and a variety of retouched and utilized flakes. There is a clear preference for Knife River chalcedony. Tools of pecked, ground or polished stone include grooved mauls, greenstone celts, manos and metates, a variety of sandstone and clinker abraders, so-called "pitted stones," stone spheres, and perhaps grooved axes. Stone tobacco pipes are virtually absent.

Bone, Antler and Shell:

Bone tools commonly found in IMM Variant sites include bison scapula hoes (some with sockets in the glenoid), bison horn core-and-frontal scoops, picks made from socketed bison long bones, rectangular and hooked scapula knives, metapodial fleshers (both "gouges" and beveled and serrated forms), "spatulas," a variety of bone awls, bone and antler punches and bracelets (bow-guards), bison vertebra or rib shaft straighteners, fishhooks, hollowed and perforated deer phalanges, bone tubes, whistles, cancellous tissue abraders, bone rectangles with cut-out centers ("buckles"), and bone "arrowheads."

Antler tools include elk antler fleshers, antler cylinders, and antler shaft wrenches. Shell artifacts include thunderbird silhouettes, and "geometrics," shell (and horn) discs, disc beads, tubular beads, anculosa beads, columnella pendants and "raw" Busycon shells (particularly abundant at the Twelve-Mile Creek Site). Also noted from IMM Variant sites is copper. All of the last several items are suggestive of far-ranging trade contacts.

Excavated Sites:

The most important excavated components of the Initial Middle Missouri Variant include the Mitchell and Twelve-Mile Creek sites in

the lower James River, the Brandon Site near Sioux Falls, the Swanson, Crow Creek, Chapelle Creek, Pretty Head, Langdeau, Jiggs Thompson, Cattle Oiler and Sommers sites below Pierre, and the Dodd, Breeden and Fay Tolton sites above Pierre. The Arp Site and Pease Creek sites may represent extensions of Over Phase people south of these limits.

Subunits:

The Initial Middle Missouri Variant is today composed of three phase level taxa. The Over Focus (Over and Meleen 1941: 91; Hurt 1951; Caldwell and Jensen 1969) is the earliest and broadest in distribution. It has been suggested that "...the distinctions between Over Focus and Mill Creek may be no greater than the differences between the proposed Big Sioux and Little Sioux phases of Mill Creek" (Baerreis and Alex 1973: 144), although it has been argued (Caldwell and Jensen 1969: 77) that the Over Focus is internally divisible, and Alex (1981) proposes that the James River sites form a distinct phase. The Anderson (Brown 1974) and Grand Detour (Caldwell and Jensen 1969) phases are restricted to the Missouri River trench, the former distributed from about Pierre north to the Cheyenne River, the latter south of that in the Lower Brule and LaRoche localities.

CENTRAL PLAINS TRADITION

As we define it, this important culture historical unit includes the Upper Republican, Smoky Hill and Nebraska phases. We depart from convention in that we specifically do not include the Loup River and St. Helena phases in the Central Plains Tradition, but place them instead in a new taxon of the Coalescent Tradition. The reasons for this will be explained below.

Of the phases defined within the Central Plains Tradition, only the Nebraska phase lies close to the project domain. This does not mean that other units, specifically the Smoky Hill and Upper Republican phases are not of significance to some of the research problems of the region. Indeed, we feel that they may have been ancestral to the Coalescent Tradition in both the cultural and biological sense. The other unit of the Central Plains Tradition, the Solomon River phase (Krause 1969; Lippincott 1980) lies far from the project domain and is not considered here.

Nebraska Phase

Area:

Sites of this phase are found in northeastern Kansas and along the eastern border of Nebraska at least as far north as Thurston County. Sites are found as far west as Salt Creek and the Lower

Platte River near Fremont. To the east they are restricted to the Glenwood locality in western Iowa and possibly to northeastern Missouri. The possibility of the presence of Nebraska phase sites in southernmost South Dakota should not be excluded.

Age:

A multitude of radiocarbon dates are available for the Nebraska Phase, and these indicate a temporal span from A.D. 1050 to approximately 1400.

Environment:

Sites of the phase are restricted to the deeply dissected loess bluff edges near springs or streams. The archaeological evidence especially the faunal remains, suggests heavy utilization of the gallery forests along streams.

Settlement Pattern:

Isolated lodges and small loose (often linear) groups of lodges termed hamlets are the common settlement types. A few larger villages with as many as 25 lodge depressions are known. Whether most of the lodges in the hamlets and villages were occupied simultaneously is not known. It is possible that the "villages" represent accretions of house remains in favorable environments. No functional differences between the various types of settlements have been demonstrated (Blakeslee 1978; Gradwohl 1969; Hotopp 1978, 1979; Zimmerman 1977).

Architecture:

The usual house type is a semi-subterranean square earthlodge ranging in size from 5 meters square to more than 16 meters square. Central roof supports consist of four posts or sets of posts arranged in a square around the central fireplace. Wall posts are vertical and often irregularly spaced. The long extended entryways have no preferred direction of orientation. Internal and external cache pits, both bell-shaped and cylindrical, occur. Charnel houses are of the same form as residences. Small structures, which have four center posts but which lack wall posts, may have resembled Hidatsa eagle-trapping lodges.

Economy:

Subsistence techniques included hunting, gathering, fishing, and horticulture. Woodland animals were more important numerically than bison. Crops included corn, beans, squash and sunflower seeds.

Disposal of the Dead:

The deceased were prepared for burial in charnel houses, where some partial cremation occurred. Interment was in shallow pits,

sometimes covered with limestone slabs. Burial places tended to be on high points of ground. Grave goods are minimal.

Ceramics:

Two unnamed indigenous wares occur. The majority ware consists of grit-tempered vessels, usually lacking shoulder decoration. The other ware is shell tempered, sometimes slipped and often has rectilinear decoration on the shoulder. Both wares are composed primarily of globular jars with distinct vertical to outsloping rims. Rim forms include unthickened, collared and collared with an internal channel. Ceramic types within the grit-tempered ware corresponding to these rim forms are named McVey, Beckman and Swoboda (Anderson 1961; Gunnerson 1952; Ives 1955a). Small straight-walled and incurving bowls occur regularly, while short-necked bottles are rare. Miniature vessels occur regularly. All vessels except the miniatures were formed by lump modeling with cord-wrapped paddle and anvil. The miniatures were pinch-modeled.

Appendages include loop and strap handles, lugs and vertically perforated lugs. Effigy form appendages also occur. Decoration is often restricted to the lip of unthickened rims and to the collar face and base of thickened rims. Pinching, incising and trailing are the most common modes of decoration. Surface treatments include cord-roughening, smoothed-over cord roughening, smoothed and slipped or self-slipped. Slips are black, brown or gray.

Other ceramic artifacts include human effigies, tobacco pipes, beads, and edge-abraded sherds. The tobacco pipes are predominantly bent tubular forms; the remainder are elbow forms. Effigy pipes occur frequently.

Lithics:

Chipped forms include small triangular points, usually side-notched and sometimes with a basal notch or multiple side notches. Also found are larger unnotched triangular dart points, drills, gravers, knives, end and side scrapers, concave scrapers, choppers and celts, both with and without polished bits. Ground stone forms include greenstone celts, small ovoid grinding stones, hammerstones, sandstone abraders, clinker abraders, sandstone shaft smoothers, manos, metates, nutting stones, and pipes, some of which are of red pipestone. At least some of the pipestone is not Minnesota catlinite (Blakeslee and Gundersen n.d.)

Bone Antler and Shell:

Bone tools include bison scapula hoes, bison scapula knives, several varieties of awls, flakers, pins, needles, pendants, fishhooks, beads, metapodial fleshers, bison frontal hoes, cranial spoons, deer mandible sickles, hide grainers, shaft wrenches, bison spine beamers, and knife handles. Antler tools are cylinders, flaking tools, bracelets, hammers, toggle head harpoons, pins, spatulate tools and shaft

wrenches. Shell objects include a variety of pendants and beads, spoons, and scrapers.

Excavated Sites:

The number of excavated Nebraska phase lodges is greater than 100. Only a few have been fully reported (Bell 1936; Brown 1967; Cooper 1939; Gradwohl 1969; Hill and Cooper 1936, 1938; Shaw 1974; Strong 1935; Wedel 1959).

Subunits:

Brown (1967) proposed two temporal subphases in his Nebraska Phase, and Krause (1969) defined the Doniphan and Douglas phases. These latter units do not correspond well to the actual distributions within the variant and should not be used. The Glenwood material may be distinct from that in Kansas and Nebraska, and two units can be distinguished within the Nebraska and Kansas material (Blakeslee and Caldwell 1979).

Upper Republican

Area:

Sites of this phase are found in northwestern Kansas, eastern Colorado and southcentral to southwestern Nebraska (Grange 1980; Kivett 1949; Krause 1969; Wedel 1934, 1935a, 1959, 1970; Wood 1969). The westernmost sites do not contain earthlodges or agricultural implements (Wood 1971b).

Age:

Raw radiocarbon dates range from before A.D. 1000 to the historic period--an impossibly long span; some are obviously in error. Analysis of these suggests a more acceptable span of A. D. 1050 - 1350 for the phase as it is defined here (i.e., distinct from the Loup River Phase).

Environment:

Sites of the phase are found on the high plains and loess plains physiographic provinces of Colorado, Kansas and Nebraska. Sites are found on terraces along the Republican River and its tributaries.

Settlement Pattern:

Isolated lodges, small hamlets of up to ten lodges and camps lacking evidence of earthlodges are found. It is not certain that all of the lodges in the hamlets and villages were contemporaneous. The western camps may be the remains of seasonal hunting expeditions.

Economy:

Subsistence was provided by a mix of hunting and horticulture; game animals included a very wide range of species, suggesting heavy use of floodplain species such as white-tailed deer. Upland species such as bison also were represented, but not to the extent that is true of later sites. Wild vegetable products were also gathered. Maize, beans, squash, and sunflowers were cultivated.

Disposal of the Dead:

A number of Upper Republican ossuaries have been excavated, and these sometimes have been associated with individual burial pits in which bodies were kept until reburial in the ossuary. Pots, potsherds and other artifacts (sometimes exotic) were included in the ossuaries as grave goods (Strong (1935)).

Ceramics:

Most Upper Republican vessels are sand tempered globular jars. Rim forms include both unthickened and collared rims. Decoration is usually confined to the lip of unthickened rims and to the face and base of collars. Collar face decoration is usually trailed, and the dominant motif is composed of horizontal parallel lines. Collar bases are pinched or tool-impressed. Body surfaces are normally smoothed-over cord-roughened. Handles and lugs, common in the Nebraska Phase, are usually lacking. A few ceramic pipes occur.

Lithics:

Upper Republican chipped stone tools include small triangular unnotched and side notched points, drills, perforators, graters, spokeshaves, bevelled and unbevelled knives, and endscrapers. Most of these are made from locally available jasper. Ground stone items include (rare) celts, elbow and pebble pipes, shaft smoothers and other abraders, and hammerstones.

Bone, Antler and Shell:

Bone implements include scapula hoes, scapula cleavers, other scapula knives, shaft wrenches made from long bones (less commonly from ribs), bison ulna picks, rare metapodial fleshers, metapodial and other awls, and fishhooks. Antler tools include tine flakers, cylinders, shaft straighteners, and bow guards. Shell items include beads, pendants and scrapers.

Excavated Sites:

Major excavated sites are reported by Strong (1935) from the Lost Creek and Prairie Dog Creek localities and by Kivett (1949) and Wedel (1934, 1935a) for the Medicine Creek locality. Grange (1980) calls all

Central Plains Tradition remains from the Red Willow locality Upper Republican, but some of the sites may not belong in this phase.

Subunits:

Upper Republican, as a taxonomic unit, has had a checkered history (Ludwickson 1975, 1978). As the term was originally used, Upper Republican referred to both the materials described here and those we call Loup River Phase (Strong 1935; Champe 1936). The term was later extended as the Upper Republican "Regional Variant" to include what is now called the Solomon River Phase as well (Krause 1969). Temporal subphases within Upper Republican as we define it, may eventually be justified (cf. Ludwickson 1979b).

Smoky Hill Phase

Area:

As originally defined, this taxon included an area surrounding the junction of the Smoky Hill and Solomon rivers and the junction of the Republican and Kansas rivers. It extends north into Nebraska on the Blue River and its tributaries and along streams tributary to the Missouri River (Steinacher 1976; Blakeslee and Caldwell 1979). Similar materials may also extend along the Arkansas River and Little Arkansas River as far south as northern Oklahoma (Galm 1979).

Age:

A temporal span of from circa A.D. 900 to 1300 is suggested by scattered radiocarbon dates. The northerly sites, whether or not they are appropriately lumped in Smoky Hill, are late in this range.

Environment:

Sites of this phase are found on terraces and bluffs along major and minor streams in the Loess Plains and MacPherson Lowlands. Most of these streams would have supported sparse gallery forests.

Settlement Pattern:

Isolated lodges, loose hamlets and rare villages (e.g. the Minneapolis Site) occur. The extent to which houses in hamlets and villages were contemporaneous has not been determined.

Architecture:

Square to rectangular earthlodges range widely in floor area. Four central support posts surround a hearth. Wall posts are often irregularly spaced. Extended entryways and subfloor caches are ubiquitous features. Shallow floor pits seem to have been the norm, with the results that lodge ruins often appear as low mounds rather than as depressions.

Economy:

Subsistence was derived from a mixture of hunting, horticulture, and gathering. Cultigens included corn, beans, squash and sunflower. A wide range of species were hunted, but bison, deer and elk appear to have provided the bulk of the meat.

Disposal of the Dead:

Partially to completely flexed individual burials were recovered at the Whiteford Site (Whiteford 1937, 1941). Grave goods included small pottery vessels, sherds, chipped and ground stone tools, and shell beads and pendants. A very small proportion of the human bone exhibited some charring.

Ceramics:

Smoky Hill Pottery includes sand tempered jars with constricted necks and unthickened or collared rims, grog and burned bone temper also occurs. Vessels are usually cord-roughened and seldom decorated. Coconut-shaped jars which lack rims also occur but are rare. Shell-tempered low rimmed vessels often with incised shoulder decoration occurs in some sites.

Lithics:

Points include triangular side notched and unnotched forms. Other chipped stone tools include lanceolate and diamond bevelled knives, end scrapers, and celts. Ground stone items are flat grinding slabs, "nutting stones," manos, arrow shaft abraders, celts, and elbow pipes.

Bone, Antler and Shell:

Bison scapula hoes, digging stick tips, awls, ulna picks, deer metapodial beamers, deer mandible sickles, shaft wrenches, and beads occur. The Whiteford Site has yielded shell disc beads, tapered pendants and a few barrel-shaped beads.

Excavated Sites:

Important excavated sites include the Minneapolis Site (Wedel 1935b; Witty 1974), Whiteford (Wedel 1959), and Griffing (Wedel 1959). O'Brien (1979) has excavated 14GE105, which contained both Woodland and Smoky Hill burials, and the Witt Site, 14GE600, which contained a single lodge. Witty (1962b, 1963) has excavated the Root and Woods sites. The Budenbender Site (Johnson 1973) contains a lodge which yielded a significant amount of shell tempered pottery, as have the Miller and Rush Creek sites (Sperry 1965).

Subdivisions:

It is clear there is great variability in what has been termed Smoky Hill. At this point it remains as a unit, but with unclear relationships internally, and with the Pomona, Nebraska, and Loup River phases.

THE COALESCENT TRADITION

The term, "coalescent," as it applies to this taxon, appears to mean different things to different people. In the original formulation, it referred to a fusion of cultural characteristics derived from the Middle Missouri and Central Plains traditions. People, whose cultural tradition was marked by this fusion, entered what had been Middle Missouri Tradition territory from the south, i.e., from the Central Plains (Lehmer 1954). Spaulding (1956) later emphasized the contribution to this cultural amalgamation from the Oneota tradition, and Caldwell (1966) noted that coalescence must have begun some time prior to the intrusion of these people into South Dakota.

A second type of coalescence may have taken place concurrently with the first. This consisted of the apparent concentration into a small region of peoples who had inhabited a considerably wider area. As the Coalescent Tradition formed, a whole host of earlier cultural lines terminate. These include the Upper Republican, Smoky Hill and Nebraska phases, the Steed-Kisker complex and the Initial Variant of the Middle Missouri Tradition. While all of these may not have been ancestral biologically to the Coalescent Tradition, it is likely that most of them were; at any rate, there have been no serious alternatives suggested regarding the fate of these peoples.

A third type of coalescence is embodied in the formation of large compact villages from the scattered farmsteads and loose hamlets of the earlier Central Plains Tradition. The fortified villages of the Initial Coalescent variant appear to be a response to the period of intense warfare which marked the movement of these southerners into what had been Middle Missouri Tradition territory. This is especially evident at the Crow Creek Site (Zimmerman et al 1981). This early period of village life was succeeded by an era during the Extended Coalescent variant when some of these people reverted to their older, less nucleated form of settlement. "The Shannon and Felicia phases within the Lower Brule Locality are characterized by diffuse occupations, scattered houses, thin deposits of refuse, and a relative poverty of artifacts" (Caldwell and Jensen 1969: 83).

The third of these meanings of coalescent is the easiest to see archaeologically and the easiest to account for in terms of human behavior. Unfortunately, it is also the least significant. We therefore emphasize the need to understand the fusion of formerly separate cultural traditions and the concentration of formerly

scattered populations. There is no one-to-one correlation between the two. The cultural elements most visible in the Coalescent Tradition derive from the Central Plains Tradition. Furthermore, the processes which led to the diffusion of traits between cultures need not have been the same as those which fostered the funneling of various populations into the Missouri River trench. Both drought and the arrival of Oneota peoples have been suggested as reasons for the northward migration, but neither seems adequate to explain all of the movements which occurred.

Blakeslee (1975, 1980) has provided a model for explaining the rapid diffusion of a wide range of cultural characteristics between formerly discrete cultural traditions. This model envisions a rapidly expanding trade network which involved annual visits between various Plains groups, regardless of ethnic identity. The individual links in the trade network regularly involved quite long distances, and a very wide range of goods were exchanged. Furthermore, regular trade visits allowed each group to copy the traits of their trade partners in items of their own manufacture.

We use this approach in defining the Coalescent Tradition, and in so doing, find ourselves obliged to reallocate the Loup River and St. Helena phases from the Central Plains Tradition to the Coalescent Tradition. We have created a new subdivision of the Coalescent Tradition, the Basal Coalescent Variant, to encompass these units. During the examination of collections called for in the contract, a very basic similarity between the ceramics of the Loup River Phase and the St. Helena Phase were noted. These similarities include vessel and rim form, decoration motifs and modes of decoration, and the presence of both trade vessels and copies of vessels of other traditions, such as the seed jar typical of Mill Creek. They share high proportions of decorated rims and multiple bands of decoration on collar faces. Loup River ceramics include local copies of Mill Creek vessels, and St. Helena ceramics include local versions of Lake Winnebago Phase vessels. It is on the basis of these similarities that both of these phases are placed in a single taxon. This taxon is separated from the Central Plains Tradition and placed in the Coalescent Tradition because of the presence of the types of evidence for exchange predicted by the model (Blakeslee 1978); these include trade vessels, local copies of foreign vessels and lithic forms such as disc pipes and calumet form pipes.

The Coalescent Tradition, as we define it, includes the Basal Coalescent, Initial Coalescent, Extended Coalescent, Post Contact Coalescent and Disorganized Coalescent Variants. Of these taxa, only the Basal Coalescent and Initial Coalescent variants are described here. The others are fairly remote from the project domain, and therefore are not discussed.

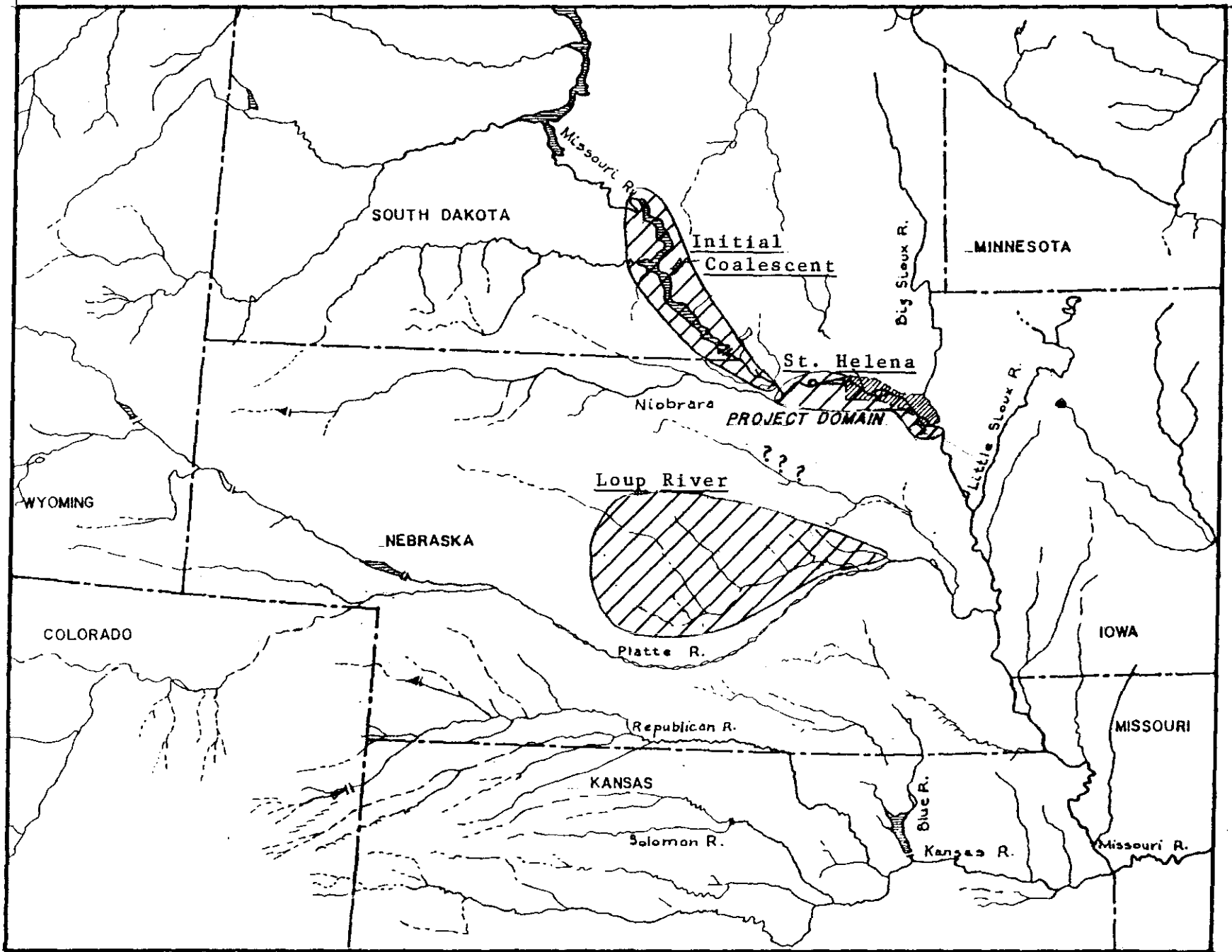
FIGURE VII.6

BASAL AND INITIAL COALESCENT VARIANTS

Loup River Phase, Basal Coalescent Variant

St. Helena Phase, Basal Coalescent Variant

Initial Coalescent Variant



Basal Coalescent Variant

Area:

Sites of this variant are found in central Nebraska (Loup River Phase) and from northeastern Nebraska to southeastern South Dakota (St. Helena Phase).

Age:

Few trustworthy absolute dates are available for the Basal Coalescent (Frantz 1963; Ludwickson 1978). Comparisons with partially contemporary complexes suggests an age of from A.D. 1250 to 1400.

Environment:

In northeastern Nebraska, sites of the Basal Coalescent are found on bluff tops overlooking the Missouri River and on terraces and slopes along tributary creeks (Cooper 1936). The Gavins Point Site in South Dakota is on a low terrace of the Missouri River (Hall n.d.). Sites of the Loup River Phase in central Nebraska are found on stream terraces and (rarely) on upland edge promontories.

Settlement Pattern:

Sites tend to contain more lodges than those of the Central Plains Tradition, but long-term occupation of some sites may cause villages to appear larger than they actually were at any one time. This is the result of rebuilding old lodges or creating new ones every decade or so. Sites with up to 22 lodge depressions are known for the Loup River Phase and up to 31 for the St. Helena Phase.

Architecture:

Semi-subterranean square to rectangular lodges with extended entryways occur. These are quite small in the Loup River Phase and variable in size in the St. Helena Phase. Loup River Phase lodges often have bulging walls and few wall posts. Internal cache pits and external caches are present in both phases, as are molds of wooden mortars.

Economy:

Subsistence involved horticulture, hunting, and gathering. Adequate analyses of faunal remains are lacking for the most part, but bison may be more important in the diet than in the Central Plains Tradition (Ludwickson 1978).

Disposal of the Dead:

Both individual pit burials and ossuaries are found (Cooper

1936; Metcalf n.d.). At the Wiseman Mound Site (Cooper 1936) it is evident that both types are part of a single mortuary process. Charnel houses may also have been used; for example, the unpublished Brewer Site, 25DX3, in the project domain. Grave goods are minimal.

Ceramics:

Grit or sand tempered jars and bowls occur. Cord roughened and smooth surfaces are common. Jars have unthickened, collared or collared and channeled rims. A high proportion of the rims are decorated, especially among the collared specimens. A very wide range of motifs occur, and these are usually incised or trailed. Multiple bands of decoration sometimes occur on the collar face. A significant number of copies of Oneota, Mill Creek, and other Middle Missouri Tradition vessels occur. A small red jar type was used for making red paint, and miniature pinched vessels also occur. Bowls and seed jars are present.

Loop and strap handles, lugs and nodes occur, including tabs pendant from the collar base. Occasionally, effigy appendages occur. Unfired ceramic effigies and a variety of ceramic pipes are also found.

Lithics:

Chipped stone artifacts include triangular side notched and unnotched points, drills, gravers, perforators, bevelled and unbevelled knives, end scrapers, and celts. Ground stone specimens include celts, manos, hammerstones, grooved mauls (rare), shaft smoothers, abraders, and pipes. Stone pipes include elbow and disk forms.

Bone, Antler and Shell:

Bone tools include bison scapula hoes and cleavers, deer mandible sickles, a variety of awls, needles, fishhooks, beads, knife handles, shaft wrenches, and metapodial fleshers. Antler items are less numerous but include cylinders, flakes, shaft wrenches, and bow guards. Shell objects include disc and barrel-shaped beads, claw-shaped pendants, whole shell pendants, effigy pendants, scrapers, spoons, and a variety of rare cutting tools.

Initial Coalescent Variant

Area:

From Ponca Creek in northeastern Nebraska north along the Missouri River to the vicinity of Pierre, S. D. (Caldwell 1966; Kivett and Jensen 1976; Smith 1977; Spaulding 1956; Witty 1962a).

Age:

Roughly A. D. 1300 to 1550.

Environment:

Sites are located along the Missouri River or along Ponca Creek, on terraces, terrace remnants, and bluffs adjacent to extensive floodplains.

Settlement Pattern:

Sites are large, both in terms of a number of houses and in terms of area. The Lynch Site (Witty 1962) covers approximately 300 acres, and the Arzberger Site (Spaulding 1956) covers approximately 44 acres. Most Initial Coalescent sites do not appear to have been densely populated; the Arzberger Site, for instance, contained only about one house per acre. The Arzberger, Black Partizan, Talking Crow, and Crow Creek sites were fortified by dry moat and palisade systems. The Ponca Creek sites were not fortified but were situated in naturally defensible locations.

Architecture:

Both square earthlodges of the Central Plains type and round earthlodges occur. Both types share the pattern of central hearth, four sets of central support posts, vertical wall posts, and extended entryways. Both small and large lodges occur. Internal and external caches are present.

Economy:

Subsistence involved a mixture of horticulture, hunting, and gathering. Game animals included bison, elk, deer, pronghorn, and small game. Birds, fish and shellfish were also eaten.

Disposal of the Dead:

Flexed burials in shallow individual pits were found on a knoll near the Arzberger Site. No grave goods were present, but several burials lay under rock slabs. Burials in refuse pits were found in the Initial Coalescent components at the Lynch, Talking Crow, and Black Partizan sites. These are not numerous enough to represent the only mode of burial. By far the most spectacular Initial Coalescent mortuary remains derive from the Crow Creek Site, but this is a special case. Hundreds of victims of a massacre of the inhabitants of the village were buried in a mass grave in the dry moat around the village (Zimmerman et al 1981).

Ceramics:

Collared rims, with and without internal channels and flaring and vertical rims occur on Initial Coalescent jars. The percentage of collared vessels varies considerably from site to site. A very high percentage of all categories of rims are decorated, but (again)

the dominant motifs vary from site to site. Cord-impressed decoration is fairly rare but consistently present. Plain, cord roughened and simple stamped vessel bodies are found. Cord roughening is more common at the Lynch Site than in Initial Coalescent sites in South Dakota.

Lithics:

Plain triangular points outnumber side notched forms. End scrapers are numerous, as are side scrapers. Diamond-shaped alternately bevelled knives, leaf-shaped knives, blade knives and plate chalcedony knives occur. Drills, gravers, perforators, celts and choppers are also found. Ground stone tools include a few mauls, abraders, milling stones, and hammerstones. Catlinite pipes occur in small numbers.

Bone, Antler and Shell:

Scapula hoes with unmodified glenoids predominate. Cleavers and flat scapula knives and scrapers were made from broken hoes. Other bone artifacts include scored bison ribs, shaft wrenches, ulna picks, a variety of awls, fishhooks, fish gorges, and knife handles. Antler cylinders, antler flakers, and shell pendants and spoons have been found.

Excavated Sites:

The most important Initial Coalescent sites reported to date are Arzberger (Spaulding 1956), Black Partizan (Caldwell 1966), Crow Creek (Kivett and Jensen 1976; Zimmerman et al 1981), Talking Crow (Smith 1977), and Lynch (Witty 1962).

ONEOTA

Area:

This widespread and diverse complex is represented in sites from Michigan (Fitting 1970: 188-189) and Indiana (Faulkner (1971) in the east to Kansas (W. Wedel 1959) and Nebraska (Hill and Wedel 1936; Gunnerson n.d.) in the west, and from Wisconsin (Gibbon 1969; Hall 1962) and Minnesota (Gibbon 1972) in the north to Missouri (Henning 1970) in the south.




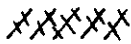


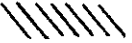
Age:

A large number of radiocarbon assays are available from Oneota sites. These range from prior to A.D. 1000 to modern. The earliest of these are certainly incorrect, and classic Oneota ceramics should postdate the Ramey Incised variant from which they appear to derive

FIGURE VII.7

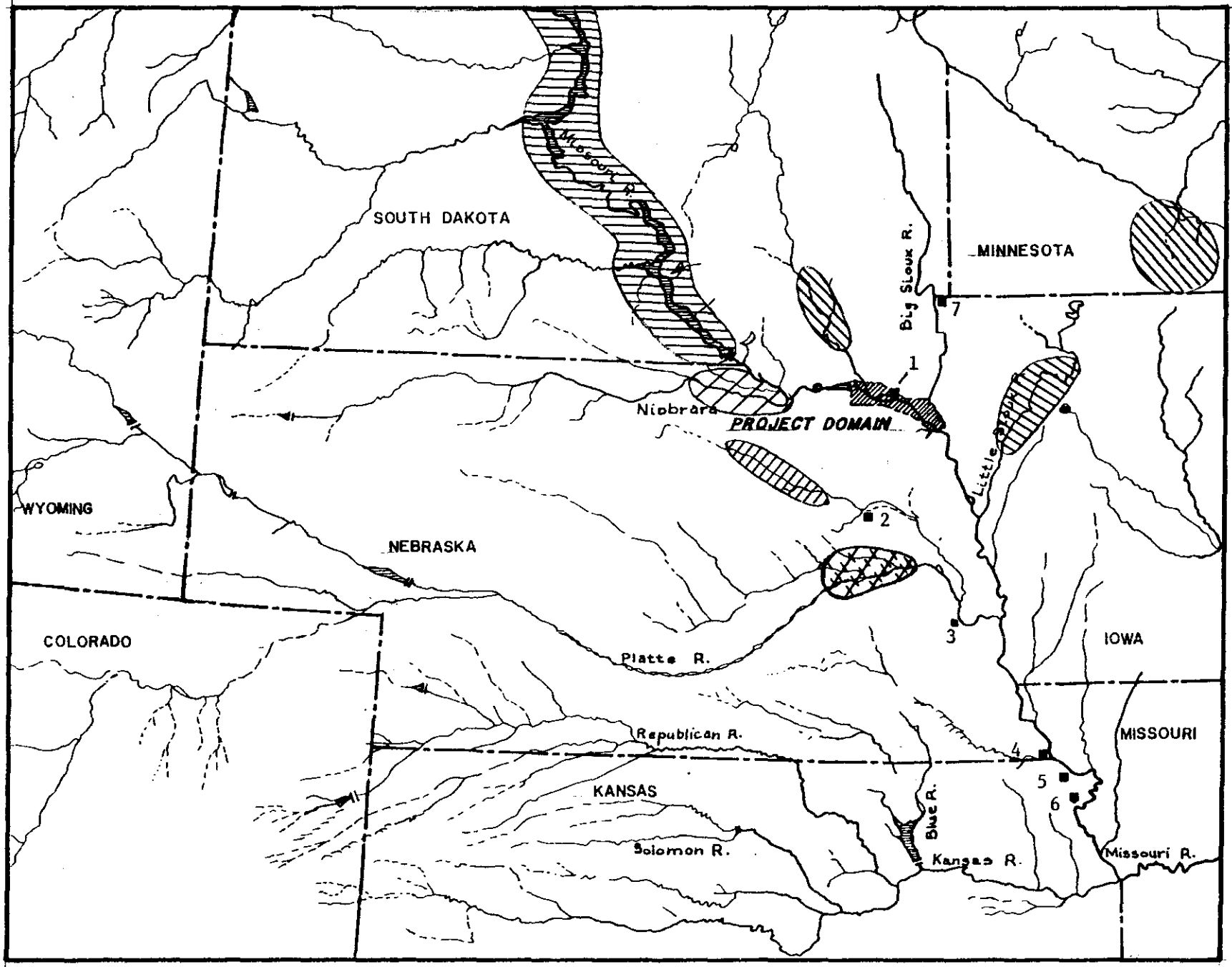
SELECTED PROTOHISTORIC SITES AND COMPLEXES

Complexes

- Extended Coalescent 
- Redbird Phase 
- Redbird or Lower Loup  (Elkhorn River)
- Lower Loup 
- James River Oneota Sites 
- Correctionville Oneota Sites 
- Blue Earth Oneota 

Western Oneota Sites

1. Vermillion
2. Stanton
3. Ashland
4. Leary
5. Fanning
6. Doniphan
7. Blood Run



(Hall, personal communication). Hall (1962) has proposed a classificatory scheme for an Oneota Tradition which incorporates Emergent, Developmental and Classic horizons. The Emergent Horizon is primarily an eastern entity, limited to northwestern Illinois, Wisconsin, and southeastern Wisconsin (Glenn 1974: Map 2.1). The earliest Oneota manifestation near the project domain is the Dixon Site, which may be as early as the 13th century (Harvey 1979: 107-108, 133-134) but which may well be a bit later (cf. *infra*, discussion of chronology under Research Problems). Other western Oneota sites include both prehistoric and historic components.

Environment:

The Oneota adaptation differs considerably from those of contemporary societies to the west. It was an adaptation to a prairie-hardwood forest environment based on a broad spectrum of foodstuffs including hunting, fishing, horticulture, and gathering. Sites are usually located along major streams or on lakeshores. In western Iowa, Oneota sites tend to occur in broad shallow stream valleys, whereas Mill Creek sites tend to be located in more protected situations (Henning, personal communication).

Settlement Pattern:

Oneota sites range in size from a few acres to major settlements sprawling over more than 100 acres, as at Leary in southeastern Nebraska. Earthen enclosures occur at a few sites which yield Oneota materials, and it is likely that they are associated with the Oneota components.

Architecture:

The types of structures which have been found in Oneota sites are quite varied, a fact which reflects the time depth, geographic spread and cultural diversity reflected in the Oneota tradition. These include circular and rectangular earthlodges in western sites (Hill and Wedel 1936; W. Wedel 1959), wall trench houses in some early eastern sites (Hall 1962), and longhouses in at least some sites in eastern Iowa (McKusick 1973, 1974). Other excavated Oneota villages lack coherent evidence for structures.

Economy:

The Oneota peoples appear to have had a particularly broad-based subsistence economy. Woodland animals are often more common than bison in Oneota sites and included deer, elk, canids, raccoon, beaver, other small game, waterfowl and other birds, fish, turtles and mussels. Maize, beans and squash have been recovered from Oneota sites along with such gathered foods as walnuts, hazelnuts, pawpaw, and groundnuts.

Disposal of the Dead:

Judging from the archaeological record, Oneota mortuary practice was highly varied. Some of this variation represents change through time and some represents differences between contemporaneous groups. Some may reflect the vagaries of archaeological sampling, and still more may be the result of alternative modes of burial within a single group.

Burial mound construction appears to be restricted to early Oneota remains. It is found in the Grand River Focus, possibly in the Koshkonong Focus component at Carcajou Point (Hall 1962: 134-5), and in the Lake Winnebago Focus remains at Lasley Point (ibid: 139-141). It is also found in Minnesota associated with material which could be ancestral to the Orr Focus (Wilford 1955: 141; M. Wedel 1959: 108-109). Other Oneota manifestations are not associated with burial mound construction, but Oneota burials intrusive into earlier mounds do occur.

The most common form of Oneota burial consists of extended primary burials with a few grave goods in a cemetery area (Bray 1961). Many variations occur, however. Scattered burials of this type occurred in the village area at the Leary Site (Hill and Wedel 1936). Flexed, semi-flexed and prone extended burials occur in the Grand River Focus; some burials were covered with stone slabs (Wilford 1955; Bennett 1945). Primary and multiple secondary burials were found in refuse pits at Carcajou Point, and refuse pit burials also occur in the Moingona Phase (Gradwohl 1974: 96). A few bundle burials have also been found in Oneota sites, and the remains of a single possible charnel house have been excavated in a Moingona Phase site (ibid: 96). What appear to be empty burial pits at the Walker-Hooper Site suggest that reburial may have been a part of the mortuary process there (Jeske 1927: 172-173).

Glenn (1974) provides a multivariate craniometric analysis for the bulk of Oneota skeletal remains. Although the crania are not grouped for analysis in a manner which best fits the current archaeological picture, some of the results are of interest. In a discriminant function analysis of Oneota males, Minnesota and Iowa Orr focus populations are partly discriminated. Three of four Blood Run males classify with Iowa Orr focus and the other with Fisher-Langford. Litz Site (N=2) and Correctionville (N=1; beware!) crania classify as Minnesota Orr focus and Leary Site specimens (N=2) fall on the border between Iowa and Minnesota Orr focus (Glenn 1974: Fig. 6.2).

Ceramics:

Oneota, as the term has been used by archaeologists, is primarily a "ceramic culture" (Harvey 1979: 42). Oneota vessels are generally fairly squat jars with a rounded base and flaring rims. They are almost always shell tempered and often have either two or four handles. Both loop and strap handles are common; lugs also occur, but less

frequently. Some jars have elliptical orifices. Decoration is typically applied to the shoulder, lip and/or lip interior, and handles. Rim exterior decoration is rare. Decorative motifs include circles, crosses, and quartered circles, chevrons, and punctates used as borders, between parallel lines, and in zones below handles. Early Oneota ceramics display various Mississippian traits, including decorative motifs and negative painting. Most decorated vessels have trailed or fluted shoulder designs, although a little incising occurs. Bowls are usually few in number and may often be trade vessels. Small funerary jars are a widespread trait (Henning 1961: 24-25).

There are a very large number of named ceramic types in Oneota ceramics including Allamakee Trailed (M. Wedel 1959; Henning 1961); Correctionville Trailed (Henning 1961); Diamond Bluff Trailed, Lake Winnebago Trailed, Lasley Negative Painted, Perrot Punctate, Carcajou Curvilinear, Carcajou Plain, Grand River Trailed, Grand River Plain, and Koshkonong Bold (Hall 1962); Fanning Trailed and Fanning Plain (W. Wedel 1959); and others too remote from the project domain to require consideration.

Other ceramic artifacts include tobacco pipes, beads, and perforated disks.

Lithics:

Chipped stone tools include plain triangular arrow points, long oval knives, a few diamond-shaped alternately bevelled knives, occasional drills with expanded bases, side scrapers, end scrapers, and possible fish gorges. Ground stone items include grinding slabs, manos, sandstone shaft smoothers, abraders, celts, a few axes, hammerstones, concave discoidals, disk and elbow pipes, and incised catlinite tablets.

Bone, Antler and Shell:

Bone artifacts include bison and elk scapula hoes with unmodified glenoids and notched blades, awls, needles, flat matting needles, bodkins, fishhooks and gorges, scapula knives, hide grainers, paint applicators, and tubular beads. Also found are antler flakers, notched elk antler picks, and socketed antler arrow points. Shell items include beads, pendants and spoons.

Metal and other Items:

Certain copper items are found in Oneota sites. These include rolled copper beads, and copper pendants in the form of serpents, maces, and eagles (Hall 1962: 143-144). Historic trade goods are found in late Oneota sites and include items of metal, glass, and the like.

Excavated Sites:

A very large number of Oneota sites have been excavated, but most of these have little bearing on the project domain. Excavated sites within a reasonable range of the project domain include Blood Run (Harvey 1979), Dixon (Henning 1961; Harvey 1979), Correctionville (Henning 1961), Stanton (Gunnerson n.d.), Vermillion Bluff (Mott 1938: 302), Ashland (Hill and Cooper 1938), and the Mohler Farm, Howard Goodhue, Clarkson, and Cribb's Crib sites (Gradwohl 1967, 1974).

Subunits:

The Oneota Tradition has been divided by Hall into Emergent, Developmental, and Classic Horizons. It is also seen as containing several lines of development leading to such historic entities as the Winnebago, Oto, Ioway, Kansa, and Missouri (Griffin 1937). Within the various lines of development (group continuities) are archaeological phases, some of which transgress horizon boundaries. The basic phases recognized include the Orr Focus, Blue Earth, Correctionville (sometimes lumped with Blue Earth), Lake Winnebago, Grand River, Koshkonong, Moingona, Huber and Fisher. A free floating and quite diverse set of sites sometimes called western Oneota includes the materials from Utz, the Osage villages, Fanning, Leary, Stanton, Ashland, and Blood Run. Most of the western Oneota sites do not yet fit comfortably within any of the named phases (Harvey 1979: 197-204; M. Wedel 1963).

REDBIRD PHASE

Area:

Known Redbird village sites number only five: 25HT2 "Redbird II," 25HT3 "Redbird I," 25KX4 "Wirth," 25KX9/2 "Minarik," and 25HT12. All but 25HT12 have been excavated to some degree (Wood 1956; Garrett 1964). Redbird village sites are known from the lower reaches of the Niobrara River and Ponca Creek in northwestern Knox and northeastern Holt counties, Nebraska. This area was subjected to archaeological investigations between 1936 and 1938; these were eventually reported by Wood (1956, 1965). The apparent absence of villages farther west on Ponca Creek and the Niobrara River may be due to lack of survey. In addition, a number of sites have been attributed to the Redbird phase on the basis of surface collections. These sites occur as far west in the Niobrara River drainage as northwestern Brown County, and on the Snake River in Cherry County. Another group of sites on the Elkhorn attributed to Redbird by Wood are represented by collections so small that accurate assignment to any taxon seems risky, especially considering the spatial discontinuity. The Redbird phase is, therefore, limited here to the lower courses of the Niobrara River and Ponca Creek. Partly because

this was the habitat of the Ponca during the late 18th, early 19th century period, Wood argues that the Redbird Phase is the archaeological manifestation of the 17th century Ponca (Wood 1965: 126-129). Howard (1970) has used oral traditions to support this identification.

Age:

No attempts have been made to date the Redbird sites by means of radiocarbon or dendrochronology. Wood suggests that the excavated sites date from between A.D. 1600 to A.D. 1700, arguing that the presence of trade materials at the 25KX9, the latest site chronologically based on ceramic seriation, provides a terminal base date of 1700 (Wood 1965: 116). Trade materials were limited to some found with a burial in a storage/trash pit, and an iron pick-mattock was found in another subterranean pit (Wood 1956: Plate 5 bottom).

Ethnohistoric accounts would place the arrival of the Ponca in this locality just after the end of the seventeenth century, i.e., later than the small amount of trade goods would suggest (Wood 1965: 127-128).

Environment:

The settlement pattern consists of small semi-permanent earth-lodge villages or hamlets situated on stream terraces or low bluffs near fertile bottomlands on the Niobrara and Ponca Creek. No evidence of defensive structures (ditches and embankments or palisades) have been discovered, nor do sites appear purposefully situated for defense, although 25HT3 could have been defended. In addition to earthlodges, village features consist of outside storage pits and extramural post-holes which may have supported drying racks or sun shades. At 25HT3, a large open plaza-like area in the center of the village was conspicuously lacking in pits or postholes; this may have been a locus for dances, games, or other gatherings. The situation of the Minarik Site on a low terrace of Ponca Creek subject to spring flooding, near its confluence with the Missouri led Wood to speculate that it represents a winter village (Wood 1965: 114).

Architecture:

Dwellings of the Redbird Phase (based on a sample of 10), were circular to somewhat oval earthlodges, each with a central hearth, 4 to 6 central roof-supporting posts and closely-spaced wall posts. An entry passage marked by 2 parallel lines of posts about 5 feet apart and up to 15 feet long usually extended in an easterly direction from the structure. Floors were neither excavated deeply into the ground nor prepared in any specific fashion.

Lodge floors varied from 28 feet to 62 feet in diameter, providing between 616 and 3019 square feet of living space ($\bar{X}=1312$,

s.d. 750). However, the five lodges from 25HT3 averaged 701 ± 397 square feet, while those from 25KX9 averaged 1784 ± 1127 square feet. This may suggest a seasonal aggregation of families if Wood has correctly interpreted 25KX9 as a winter village.

Economy:

Scapula hoes were abundant at all excavated sites but 25HT2, and since the single hoe from that site was the only bone tool reported, this may be due to differential preservation. Bison frontal bone scoops and an iron mattock, together with the hoes, combine to suggest that gardening was a very important activity, and charred corn cobs reveal one of the plants cultivated. Beans, squash and other plants were probably also grown.

Based on artifacts (unmodified faunal specimens were apparently not saved), bison was the most important animal species hunted, with deer, pronghorn, wapiti, small mammals and birds represented. Worked canid bone, identified as dog, suggest these may have been eaten.

Burial:

Practices regarding disposal of the dead are virtually unknown for the Redbird Phase. A single fragmented skull was found in a bell-shaped pit in House 3 at 25HT3; bundle burials in two knolls at that village are referred to earlier Central Plains Tradition peoples (Wood 1965: 114). Two adult females were buried in and near House 3 at 25KX9, the presumed winter village. Burial 1 was a primary interment in a straight-sided oval pit just outside the wall of Lodge 3. An elk antler scraper handle accompanied the dead woman. Just inside the walls of the pit were 2 slightly curving rows of postholes, which strongly suggest some manner of grave covering was erected over the dead. Burial 2 was a primary extended interment in a bell-shaped storage pit inside Lodge 3. Glass beads, copper and brass dangles and 3 mollusc shells were in the same pit. Fragments of another individual were also in the pit. These cases should probably not be taken as typical practices for the Redbird Focus.

Jantz (1974) has used craniometrics to demonstrate the close relationship between Redbird burials and historic Omaha and Ponca.

Ceramics:

Broken pottery vessels, representing globular jars of up to over 30 cm. diameter and 27 cm. height, occur in great numbers. The ceramic was generally sand-tempered, black to dark gray with frequent firing clouds, and was probably lump modeled, finished with a grooved paddle, and subsequently smoothed. Some shell-tempered Oneota pottery also occurs. Two broad divisions were defined on the basis of basic rim form: Evans Ware consists of those vessels with straight to

curving vertical to flaring rims, and MacKay Ware vessels which have recurved or collared rims; over 95% of all rims are of Evans Ware. Strap and loop handles occur with unknown frequency, but only on Evans Ware vessels. Lips, always rounded or flattened, are decorated on about 56% of the Evans Ware rims and 97% of MacKay Ware rims. Tool impressed and punctated lips occur; herring-bone patterns are rare. Rim exteriors are plain on 76% of Evans Ware rims, the balance being decorated with 3 to 11 horizontally incised or trailed lines. Six percent of Evans Ware rims are decorated on the rim interior by trough-like depressions. MacKay Ware rims have vertical or horizontal incised lines or triangular filled with diagonal or horizontal incised lines occurring in panels on the upper rim, and 91% have finger-pinched impressions along the base of the collar. Shoulders are decorated with incised, trailed, "finger-trailed" lines in geometric or curvilinear motifs, and punctates. Opposed diagonal, diagonal, herring-bone and vertical incised lines (singly or in combination) are most frequent; radial broad finger-trailing, curvilinear motifs and punctates are less frequent. Body sherds were either smooth (62%), simple-stamped (17%) or decorated (21%) and most of the latter were smoothed prior to decoration. A single miniature vessel is reported. No bowls and no sherds with an interior red-filming have been found.

Lithics:

Yellow jasper from the Smoky Hill Chalk ("Republican River Jasper"), Bijou Hills quartzite, other quartzites, chalcedony, chert and petrified wood were chipped into tools. Leaf-shaped and triangular projectile points (9 of 62 have side or corner notching), drills, narrow and broad knives, vein chalcedony knives, chopping tools (some with lateral notches), and end scrapers were recovered from four excavated sites.

Ground stone tools include grooved mauls, hammerstones, mullers, manos, pitted anvil stones, grooved axes (including one with a flange on either side of the groove), a "spud celt," other pecked and ground celts, sandstone abraders, clinker abraders, and pendant. Also, one catlinite tobacco pipe, a catlinite pendant, and 11 other catlinite pieces were found.

Bone, Antler and Shell Artifacts:

Bison scapula hoes were abundant. Other bone tools include a bison horn core scoop, bison ulna picks, cancellous tissue abraders, beads, scored bones, "squash knives," a rib arrowshaft wrench, serrated elk metapodial fleshers, awls of mammal longbones and ribs, and a plume holder. Antler cylinders, an "L"-shaped elk antler scraper handle, antler tine flaking tools, and a mussel shell pendant and "shaped" shell objects were found.

Trade Goods:

European-derived trade goods found included the iron mattock, a brass arrow point, a brass tube, 22 brass and copper bangles, and 16 glass "seed" beads found at 25KX9.

Remarks:

Wood (1956) originally suggested that Redbird might represent Pawnee Indians, but later concluded that it represents the Ponca. These possible historic relationships must be considered in the light of comparisons of Redbird with Lower Loup, La Roche, and Oneota. Redbird differs from Lower Loup in 1) settlement pattern, 2) architecture, and 3) pottery decorative patterns including absence in Redbird of cloistered rims, paired multiple handles, and wide strap handles. There is slightly more frequent curvilinear shoulder decoration in Redbird, horizontally incised lines frequent in Redbird are rare in Lower Loup, and broad finger-trailed "fluting" on shoulders is absent in Lower Loup and modestly frequent in Redbird (Wood 1965: 121). Redbird differs from the Talking Crow Phase in settlement pattern, pottery texture, and thickness, lip forms, and shoulder decorative patterns. To these can be added surface treatment frequencies, which range around 48% simple-stamped in Lower Loup, 55.5% at 39GR1 and 17% for Redbird; 37.3% smoothed for Lower Loup, 17% at 39GR1 and 62% at Redbird, the balance being composed largely of decorated bodies (12.5% in Lower Loup, 15.2% at 39GR1, and 21% in Redbird) and miscellaneous finishes (cf. Grange 1968: 72, Table 6: Hurt 1952). Red-slipped interiors found on 4.2% of Lower Loup body sherds are entirely absent in Redbird.

A number of Redbird ceramic traits, rim and lip form, shoulder decoration, and body surface treatment are reminiscent of Oneota. Redbird Focus pottery is not Oneota pottery, but Marshall (1967), Harvey (1979), and Alex (1980) have all suggested that some form of non-shell tempered ceramics may be considered within "Oneota." Further, Harvey has speculated that this ware may be "Omaha" pottery, at least at the Blood Run Site (Harvey 1979: 194). The Omaha and Ponca had been in contact with the Arikara and Chiwere Siouan speakers before settling in Nebraska. Thus, it is not surprising that their pottery exhibits affinities with the ceramics of both.

VIII

INVENTORY AND ASSESSMENT

Inventory

During the course of our investigations, we have attempted to generate as comprehensive an inventory of prehistoric cultural resources as possible, given the time limitations. The results can be divided into categories: professionally-documented archaeological sites, and sites suspected to exist but not field checked or evaluated.

The first category, documented sites, is composed of 33 entries (Table VIII.1). Site numbers which appear to be missing from the county sequences are historic, non-Native American sites (mainly territorial town sites and houses). We are bound at this point to remark that the historic archaeological remains within the project domain are particularly rich and have considerable potential for scientific significance; northeast Nebraska had a number of territorial (1854-1867) settlements which failed or were moved (e.g., St. James) and which for this reason have not been intruded upon by later urban development. Development of southeastern South Dakota, in contrast, has obliterated much of early settlement landscape, but isolated sites may still exist (Bradley 1980)

Figure VIII.1 summarizes graphically the data on Paleo-Indian and Archaic periods in and near the project domain. The only evidence for Paleo-Indian occupation in the project domain is a single lanceolate point discovered by an amateur in north Vermillion (No. 6); the location was searched by Sigstad, but no other material was discovered. Bones of extinct species of bison have been found in the Gavin's Point tailwaters area, and in northwest Cedar County (No. 1) showing that probable loci for Paleo-Indian sites exist. Playa lakes in the uplands (Nos. 2 and 4) may yield Paleo-Indian sites when properly surveyed. Archaic manifestations may be represented by aceramic lithic scatters (No. 5) in Dixon County. Immediately south of the project domain, burials possibly related to the Dry Lake complex (Carlson and Steinacher 1978) have been excavated (No. 3, 25CD22). The evidence for early occupation of the project domain is thus meager, probably as a result of a sampling bias. Most sites of this period are likely to be deeply buried.

Figure VIII.2 portrays the distribution of documented (filled symbols) and undocumented (open) Woodland and Great Oasis sites. It is clear that these remains are relatively abundant in and adjacent to the project domain. It should be pointed out, however, that the documented sites of this period were usually first discovered by amateurs and reported to authorities. Therefore, although the

FIGURE VIII.1

PALEOINDIAN AND ARCHAIC SITES, PROJECT DOMAIN

1. Reported remains of large fossil animal
2. Three reported playa lakes
3. 25CD22 Archaic (?) burial
4. Reported Playa Lake
5. Three reported lithic scatters

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--April 2013

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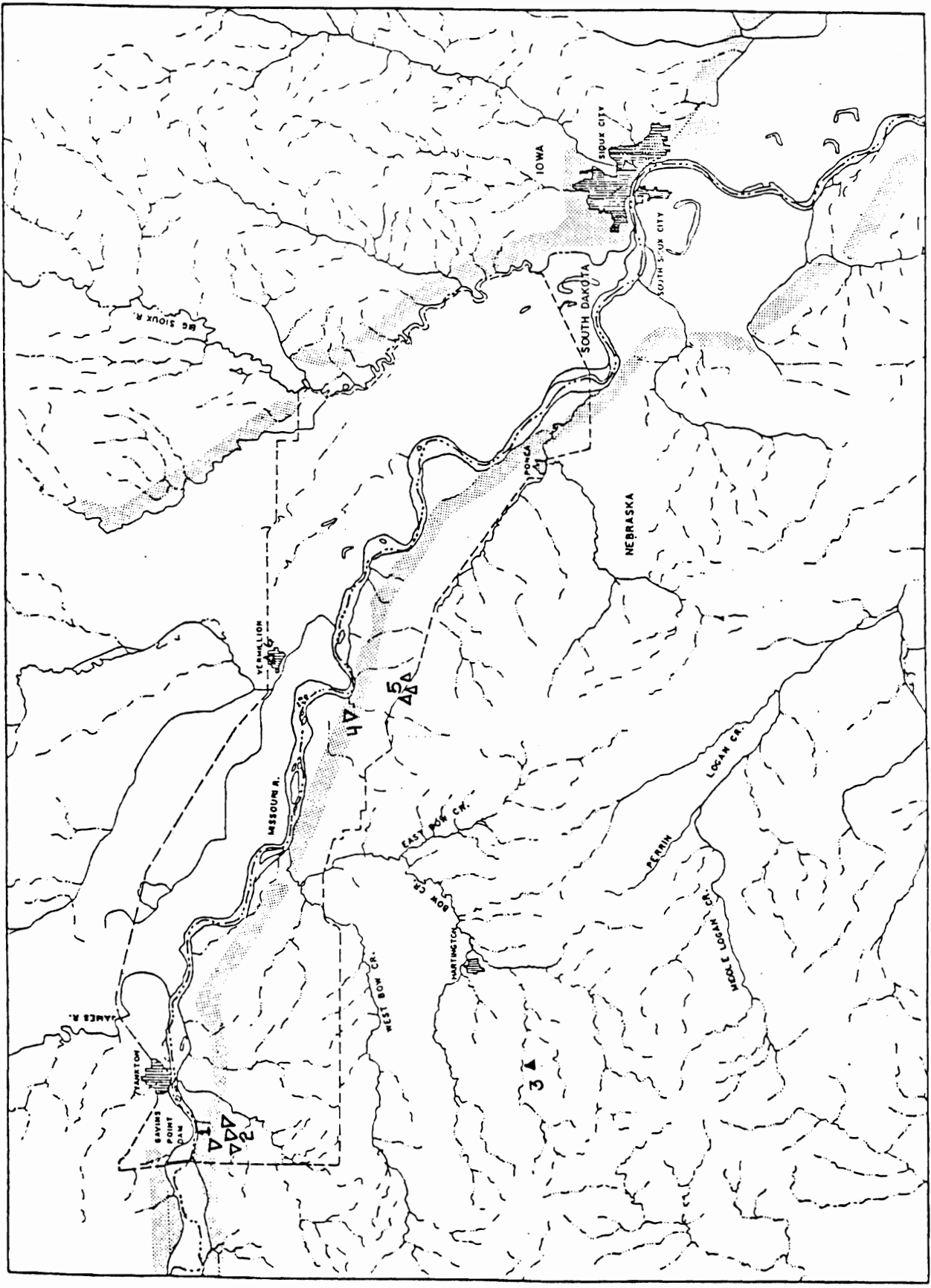
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LEGEND
 STATE BOUNDARIES
 DAM
 PERMANENT STREAM
 INTERMITTENT STREAM

SCALE: 1:250,000

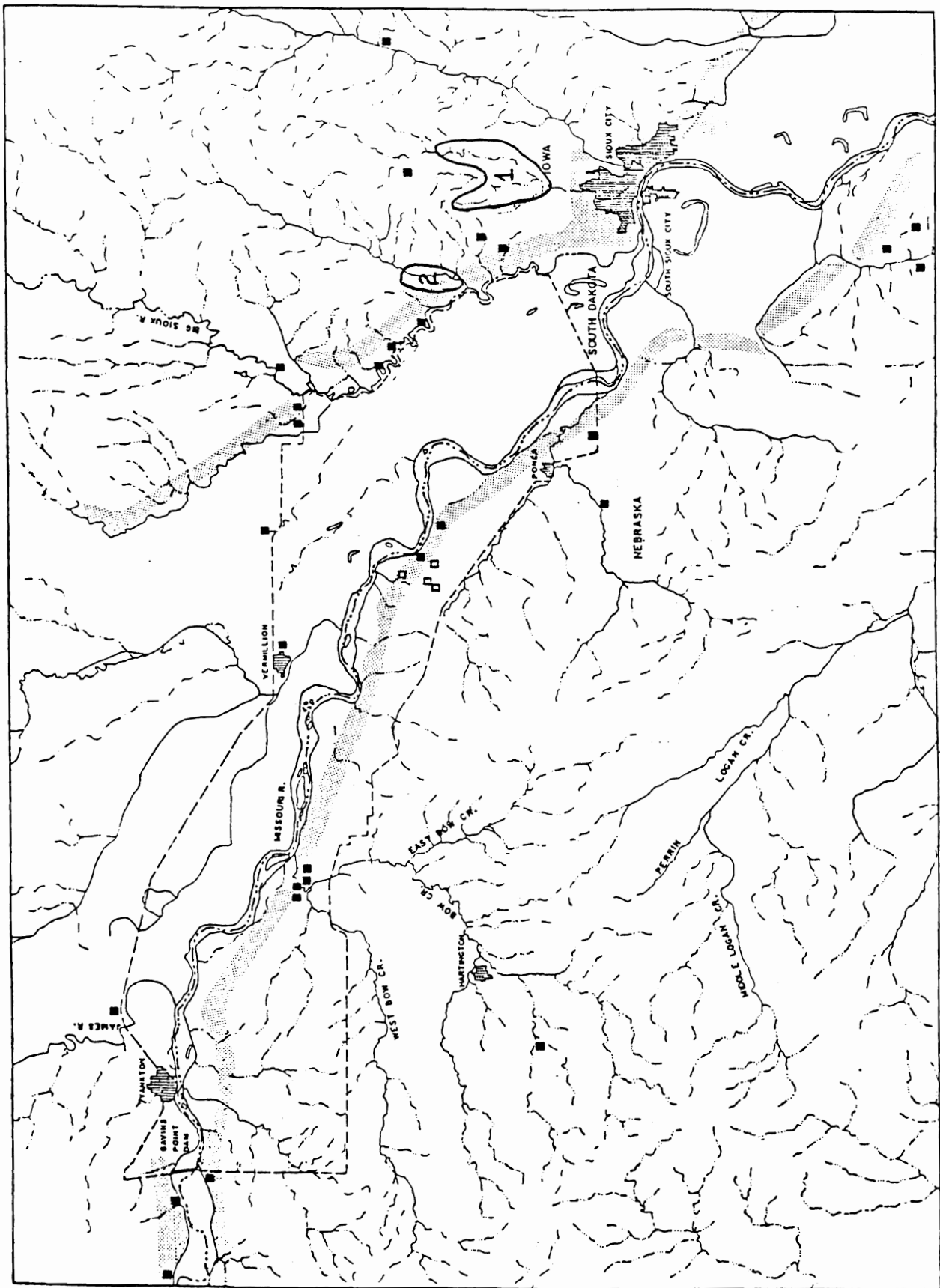


WOODLAND AND GREAT OASIS SITES IN THE PROJECT DOMAIN

Documented Sites

Reported by Collectors

1. Area containing 28 Great Oasis sites
2. Area containing 9 Great Oasis sites



SCALE: 1:350,000

LEGEND
 BOUNDARIES
 PROJECT DOMAIN
 INTERMITTENT STREAM

the distribution seems impressive, it is only a hint of the resources actually existing.

Figure VIII.3 displays the distribution of Central Plains Tradition and Initial Middle Missouri variant sites in and adjacent to the project domain. This is perhaps the most remarkable illustration since it shows only one poorly documented Great Oasis-Mill Creek site on the South Dakota side. Assuming this to be an early site, this map may reflect either that this territory was an unoccupied neutral and/or contested one between the Mill Creek peoples in northwest Iowa and the Central Plains Tradition peoples in northeast Nebraska, or that site visibility is low in South Dakota due to lodge depressions (typical of the Central Plains Tradition) and midden mounds (Mill Creek) being obliterated before interested observers could discover them. The Gavins Point Site, immediately west of the project domain has Central Plains Tradition, Great Oasis, and Mill Creek materials (in addition to Middle and Late Woodland) on the site (Hall n.d.; Howard and Gant 1966; Brown 1968). The apparent fall-off of sites west of Bow Creek on the Nebraska side can be attributed to an absence of local collectors to generate site leads, and the lack of survey. It must be pointed out that most sites in Nebraska are on upland ridges. We know much less about the distribution of sites in lower topographic situations, even in the eastern part of the project domain.

Figure VIII.4 illustrates sites and suspected sites of the protohistoric and historic period. Numbers 1, 2, and 4 are known Yankton and Yankton/Santee villages and number 5 refers to a possible Brule village hinted at in winter counts and Nicollet's notes (1976: 259-260). Only number 1, the Gavins Point Site, has been confirmed by archaeologists, but number 4, and possibly number 5, should be confirmable.

Omaha villages, numbers 3 and 8, refer to the "Bad Village" of Omaha Tradition and Little Bow's Village of the earliest historic period on Bow Creek (3) and the "Big Village" (8) near Homer, just south of the project domain. Archaeological sites 25CD7, 25CD8, and 25CD11 at the mouth of Bow Creek may represent one or more of the Omaha villages there. Site 25CD11 was fortified and is the only example of such a site within the project domain, with the possible exception of 25DX20, a site which requires more documentation.

Numbers 6, 7, and 9 refer to possible Ioway villages. - Because of confusion with regard to local toponymy, one cannot decide between J. O. Dorsey's descriptions of the location of an Ioway village on either Ionia Creek or Aowa Creek. The latter seems most probable on the basis of the Omaha name for Aowa Creek. The site at 9 is one portrayed on Delisle's 1718 map and possibly referred to in Bourgmund's Exacte Description. Of interest is the documented archaeological site, 25CL1, the Vermillion Bluff Village, which is the only site in the project domain to produce a significant amount of Oneota pottery.

This pottery does not greatly resemble the high rim Alamakee Trailed believed to have been made by the Ioway, however, but is more like Correctionville-Blue Earth pottery.

The second type of site inventory data we compiled is that based on interpretation of aerial photo imagery. The aerial survey resulted in approximately forty-five areas being identified as possible archaeological sites. The inventory was conducted using available imagery from the following sources

IMAGERY SOURCES

Source	Coverage Area	Date	Type
U.S. Army Corps of Enigneers, Omaha	Missouri River Channel	Nov. 1979	B & W
		Nov. 1979	Color
		Aug. 1975	Color IR
Conservation and Survey Division, Lincoln	Cedar County	May 1955	B & W
	Dixon County	1937 & 1938 July - Sept. 1940	B & W

The most useful results were obtained from the 1940 and 1955 black-and-white imagery of Cedar and Dixon counties. These two series of photographs did present a problem due to the absence of several essential frames along the Missouri River, and consequently, there are gaps in the coverage area. The 1979 black-and-white and color pairs were of excellent quality but had significant shadows. These flights were made directly over the Missouri River channel which consequently limited the coverage of the study area, and in most cases only a portion of the floodplain was shown and occasionally, the bluffs. The color infrared imagery was excellent but offered the same limitations because it was flown over the channel.

Known archaeological sites were checked first in order to establish their signatures, and the most rewarding areas were found near Ponca, Nebraska. This information was then used to search for other possible archaeological sites. Once an area was selected as a possible archaeological site, it was cross-checked on another form of imagery if available.

Few possible sites were found in South Dakota since the aerial coverage did not extend beyond the floodplain immediately adjacent to the river. Most of the Nebraska sites were on the bluffs, in

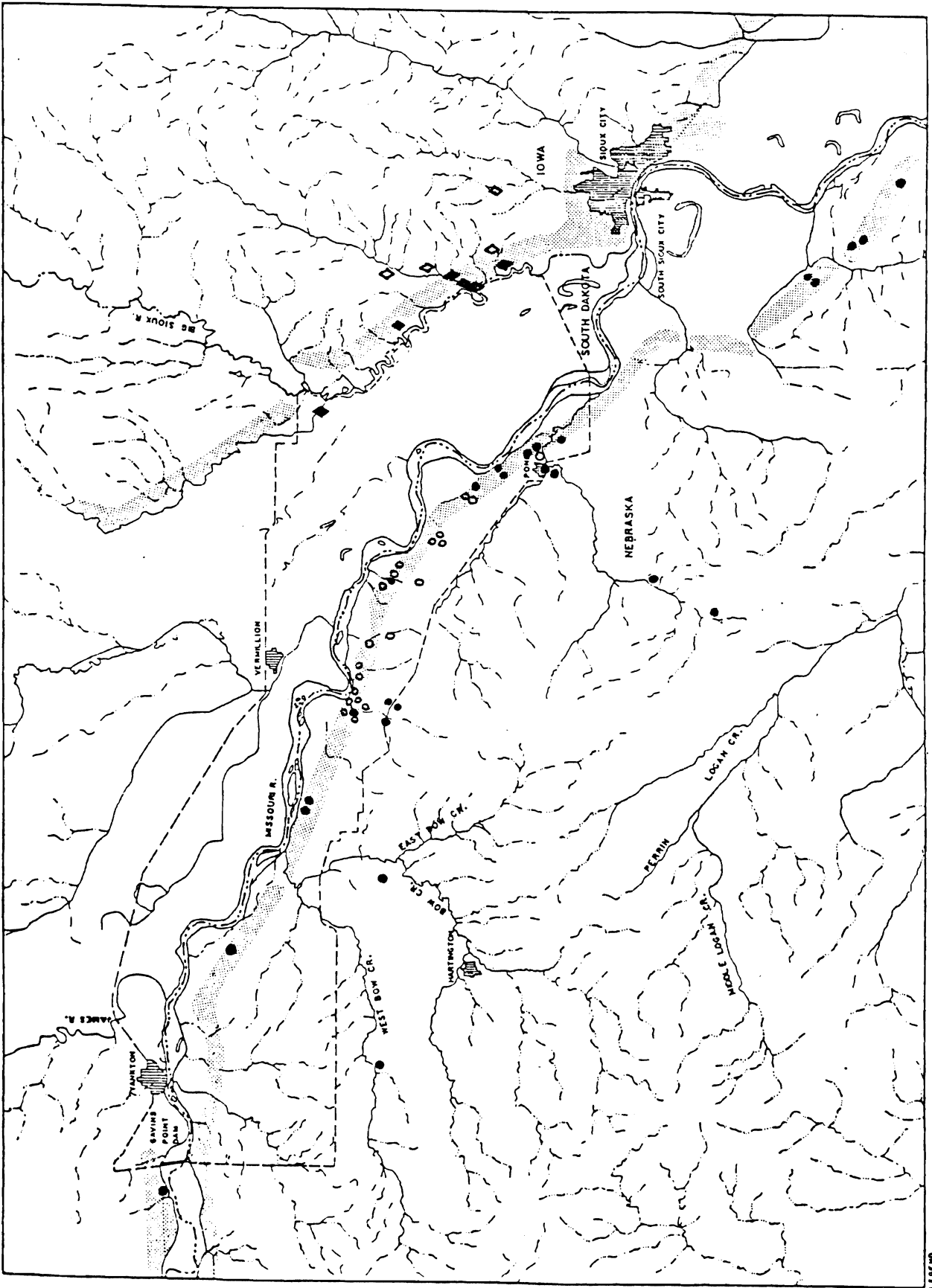
FIGURE VIII.3

SITES OF MILL CREEK, CENTRAL PLAINS, AND ST. HELENA

AFFILIATION IN THE PROJECT DOMAIN

- ◆ Mill Creek
- ◇ Mill Creek/Great Oasis
- Documented Central Plains/St. Helena
- Reported Earthlodge Depressions

N.B.: St. Helena and Central Plains Tradition sites are lumped because both are represented by lodge depressions and cannot be separated when an artifact collection is not available for study.



LEGEND
 STATE BOUNDARIES
 PROJECT BOUNDARY
 INTERMITTENT STREAM

SCALE 1:250,000

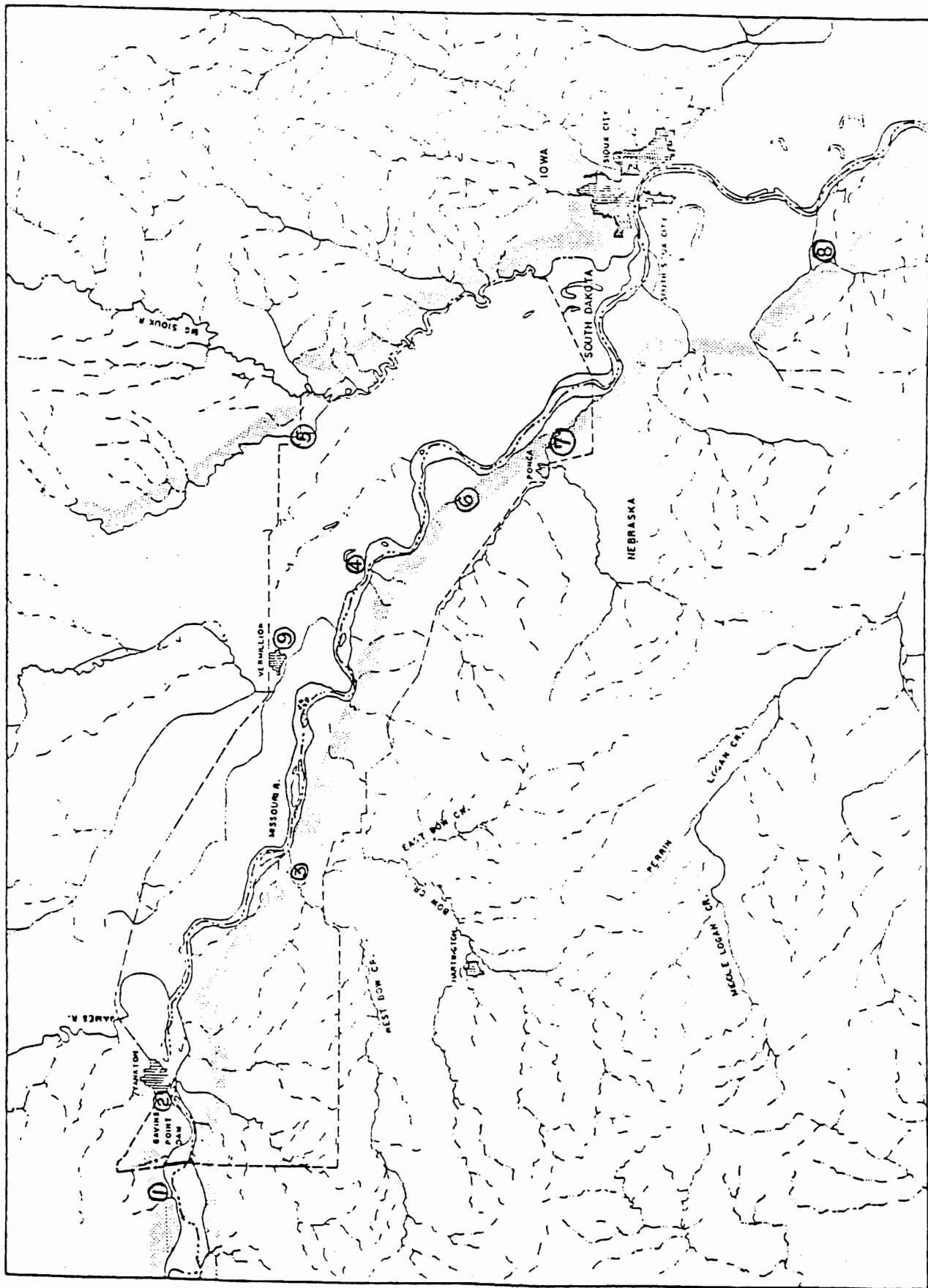
FIGURE VIII.4
PROTOHISTORIC TO HISTORIC SITES IN THE PROJECT DOMAIN

Documented Sites

1. Smutty Bear's Yankton Village
2. Yankton Village
3. "Bad Village" of the Omaha
4. Santee / Yankton Village
8. "Big Village" of the Omaha

Suspected Site Locations

5. Brulé ca. 1750-1770
- 6.-7. Possible locations of Ioway ca. 1750
9. Ioway location, Delisle map 1718



LEGEND
 STATE BOUNDARIES
 PROJECT DOMAIN
 INTERMITTENT STREAM

SCALE: 1:250,000

cultivated areas, and were indicated by soil marks. Others were on the floodplain, in uncultivated areas and were indicated by vegetation marks.

The results indicate three groups of surface marks: 1) those with large areas of disturbed soil containing numerous diffuse soil or vegetation marks, 2) small areas within the larger areas which may indicate individual dwellings, and 3) isolated indications of linear features on the imagery which did not appear to be associated with modern cultural or natural features of the landscape.

We also conducted informant interviews with an eye to identifying cultural resources known locally but not yet brought to the attention of archaeologists. We have combined the data from the aerial survey, informant interviews and known site distribution (where known sites show up on aerial images) in Figure VIII.5. Some of the circles represent several individual sites or areas which cannot be shown separately due to the scale. These "site" locations help flesh out our knowledge of the distribution of potential resources, but must be viewed with caution since they are undocumented and they do not reflect the true abundance of sites of low visibility, either to an airborne camera or amateur archaeologists. Not all of these sites will withstand scrutiny, but they are instructive in terms of demonstrating untapped archaeological potential.

Site Discovery Bias

To understand the existing archaeological resources, we must understand how the present sample of sites came into being, and determine to what degree this sample is representative of all the archaeological resources within the region. This critical evaluation of the existing collections is essential if we are to determine the usefulness of the sample for future research. Two particular considerations are involved in this assessment: 1) are the known sites representative of the true variety of sites which actually occur within the region, and 2) is the scatter of known sites representative of the true distribution of sites within the region? The methods of accumulation of the present corpus of archaeological sites will be documented in an attempt to identify biases in its collection.

The earliest archaeological investigation of the project region was performed by T. H. Lewis in 1890. Lewis mapped a number of earthwork features throughout the Midwest, including South Dakota and Nebraska. Virtually nothing is known of his working procedures, although he must certainly relied heavily on local informants. In September 1890 he located a site near the mouth of Bow Creek, which was visible as a raised, circular earthwork fortification and 2 low mounds. From here, he headed south into the vicinity of Hartington, Nebraska, and out of the project region, but returned to the Ponca area to note (but not map) a site near Ponca (Wood 1978). The Cedar County site identified by Lewis was later rediscovered by Spaulding in 1941, and cataloged as 25CD11; the other site, near Ponca

may be 25DX20. His investigations do not appear to have been by area surveys, but rather specific point-by-point examinations based on the presence of surface features reported by local informants.

A similar site discovery procedure seems to have been used by W. H. Over in South Dakota. Over investigated a large number of archaeological sites within South Dakota. His investigations, however, cannot be considered as systematic area surveys. Rather, he seems to have moved from location to location, based primarily on the reports of local informants. The sites within the project domain which were recorded by Over (1973) illustrate this point (Table VIII.1). All of these sites were discovered as a direct result of local information, and either had obvious mound structures (frequently in uncultivated areas) or had abundant cultural debris which was encountered during construction activities.

The first example of a site survey within the region was the work of Dr. G. H. Gilmore in 1932 (Gilmore 1933; Cooper and Bell 1936). Gilmore, a physician and a talented amateur archaeologist, not to be confused with Melvin R. Gilmore, the ethnobotanist, investigated the locality of the mouth of Bow Creek, in Cedar County, Nebraska, with the express purpose of locating the site of the Omaha Bad Village. During this survey, site discovery depended on local informants both directly, by inquiring about known site locations, and indirectly, through inquiry into the whereabouts of "bison wallows," which in fact were house depressions (Cooper and Bell 1936: 15). In this manner, Gilmore discovered a total of three sites, all visible on the surface as house depressions and all located in upland settings. Although Cooper and Bell claim several forks of Bow Creek were searched, no sites were reported in these lower topographical settings; later survey would in fact record some sites in these locations.

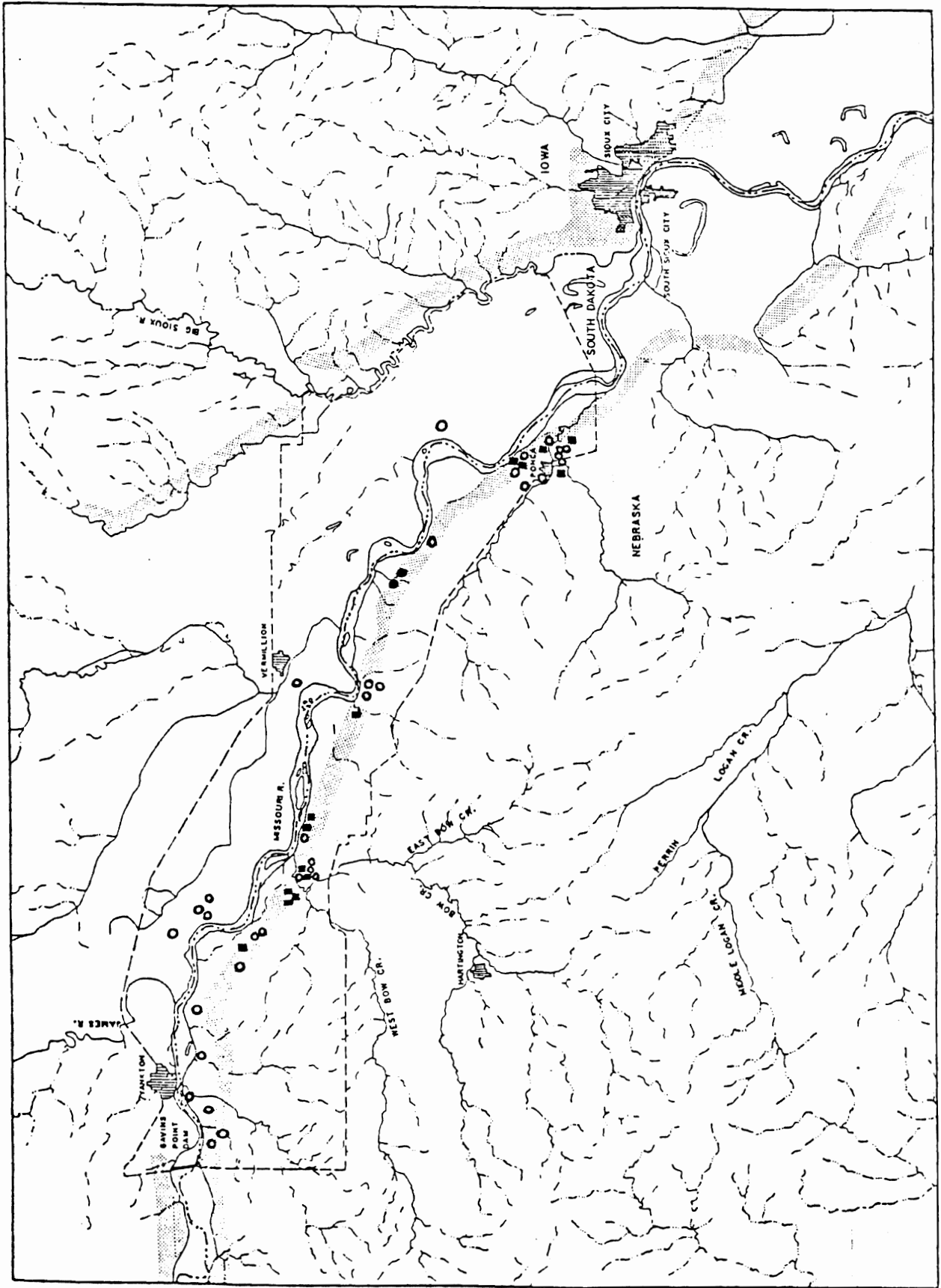
During the spring of 1938, Stanley Bartos and Steven Wimberly, working under the direction of Earl Bell, conducted surveys in eastern Dixon County near Ponca, Nebraska. These surveys recorded a total of ten sites. Like those just mentioned from Cedar County, these were predominantly located in uncultivated areas and had visible surface depressions. All ten of the sites recorded by Bartos and Wimberly were discovered by local informants, including two sites encountered during local construction activities. The only suggestion that any area survey was performed during this time appears in a letter from Bartos to Bell (Oct. 7, 1938) in which Bartos states, "I expect to hunt sites all Sunday." Based on the record of site finds, however, this probably refers to following up leads supplied by locals, rather than a purposive area search.

Following the work of Gilmore, Cooper and Bell in the Bow Valley area, A. T. Hill and John L. Champe visited the mouth of Bow Creek in 1940 to continue the search for the Bad Village. During their stay, they suggested that 25CD10 was the Bad Village (this was based on an examination of topographic maps and no actual examination of the

FIGURE VIII.5

POSSIBLE SITES LOCATED BY AERIAL PHOTO ANALYSIS

- Otherwise undocumented Site
- Also reported by collectors
- Previously documented site



LEGEND
 STATE BOUNDARIES
 PROJECT DOMAIN
 INTERMITTENT STREAM
 SCALE: 1:250,000

TABLE VIII.1

ARCHAEOLOGICAL ACTIVITIES IN THE PROJECT DOMAIN

Investigator	Site Number
H. T. Lewis	25CD11 *
W. H. Over	39CL1 39CL2 39UN1 39YK2
G. H. Gilmore	25CD1 25CD2 25CD3
S. Bartos and S. Wimberly	25DX1 25DX2 25DX3 25DX4 25DX5 25DX6 25DX7 25DX8 25DX9 25DX10
A. T. Hill and J. L. Champe	26CD7
A. Spaulding and R. Cum	25CD8 25CD10 25CD11 * 25CD12
R. E. Jensen	25DX19 25DX20
Highway Salvage	25DX23 25DX24
Chance Find	25CD13 25CD16 25DX17 25DX26
Local Informants	25DX16 25DX25

*Site first found 1890, rediscovered 1940.

location was made at this time). In addition, they recorded the existence of 25CD7. This site is located on a terrace of Bow Creek and was visible as surface mounds and depressions. It is not known whether this discovery was based on local information or to casual survey by Hill and Champe.

In 1941, Albert Spaulding and Robert Cumming began active survey and excavation in the Bow Valley. During this period, four new sites were recorded, and the location specified by Hill and Champe (25CD10) was tested (Spaulding 1941 field notes). Also among these newly recorded sites was 25CD11, representing the rediscovery of the site noted by Lewis in 1890. This survey represented something of a departure from earlier field activities in that it exhibited a definite regional character (this was at least partially forced on the investigators due to the logistics of W.P.A. crews), in that one circumscribed area was investigated intensively. The 1941 survey recorded both sites on ridge tops, and sites situated on lower terraces. The occurrence of visible surface mounds or depressions still played a major role in site identification, as did the information of local informants. Although a much wider range of sites were discovered in the Bow Valley than had been recognized by Gilmore, there is no evidence to suggest the use of purposive site survey on the part of Spaulding or Cumming.

Little further archaeological work was undertaken in the project area until 1973. Roye D. Lindsay of the Nebraska Game and Parks Commission then proposed to excavate a portion of a site just southeast of Ponca State Park, Dixon County, for development in connection with the park. No site number was given, but this must be a site recorded in 1978 by Richard Jensen of the Nebraska State Historical Society who reported two sites within the park. Both sites were located in ridge top locations and were visible on the surface as house depressions. The actual discovery of the sites was made by local Park authorities who reported the finds to the Historical Society. One site, 25DX20, may be the fortified village reported by Lewis in 1890. There is no record of any further search activity on the part of Jensen in this area.

In 1979, a Nebraska State Historical Society crew was in the project area in connection with a Highway Salvage survey. During the course of this survey, two sites were discovered which fall within the project domain. These sites were found in the vicinity of Maskel in Dixon County. They were located on low terraces above Lime Creek and were evidenced only by scattered cultural debris on the surface of cultivated fields. Both sites were discovered during a spot check survey in this area.

Of the remaining sites known in the project area, two were discovered and investigated by a local amateur, three represent "chance" finds by professional archaeologists involved in other specific work,

and one was discovered during a pre-implementation bank stabilization study by the Corps of Engineers (Nowak 1980). It also should be noted that only small portions of the project area have been systematically surveyed. These include the area covered by the James River survey (Robert Alex, personal communication) around the mouth of the James east of Yankton, South Dakota, and several surveys in connection with limited bank stabilization studies. The James River survey found no evidence of sites within the project area, although archaeological finds were encountered just north of the project boundary. With the single exception noted above, no prehistoric sites have been found during bank stabilization surveys.

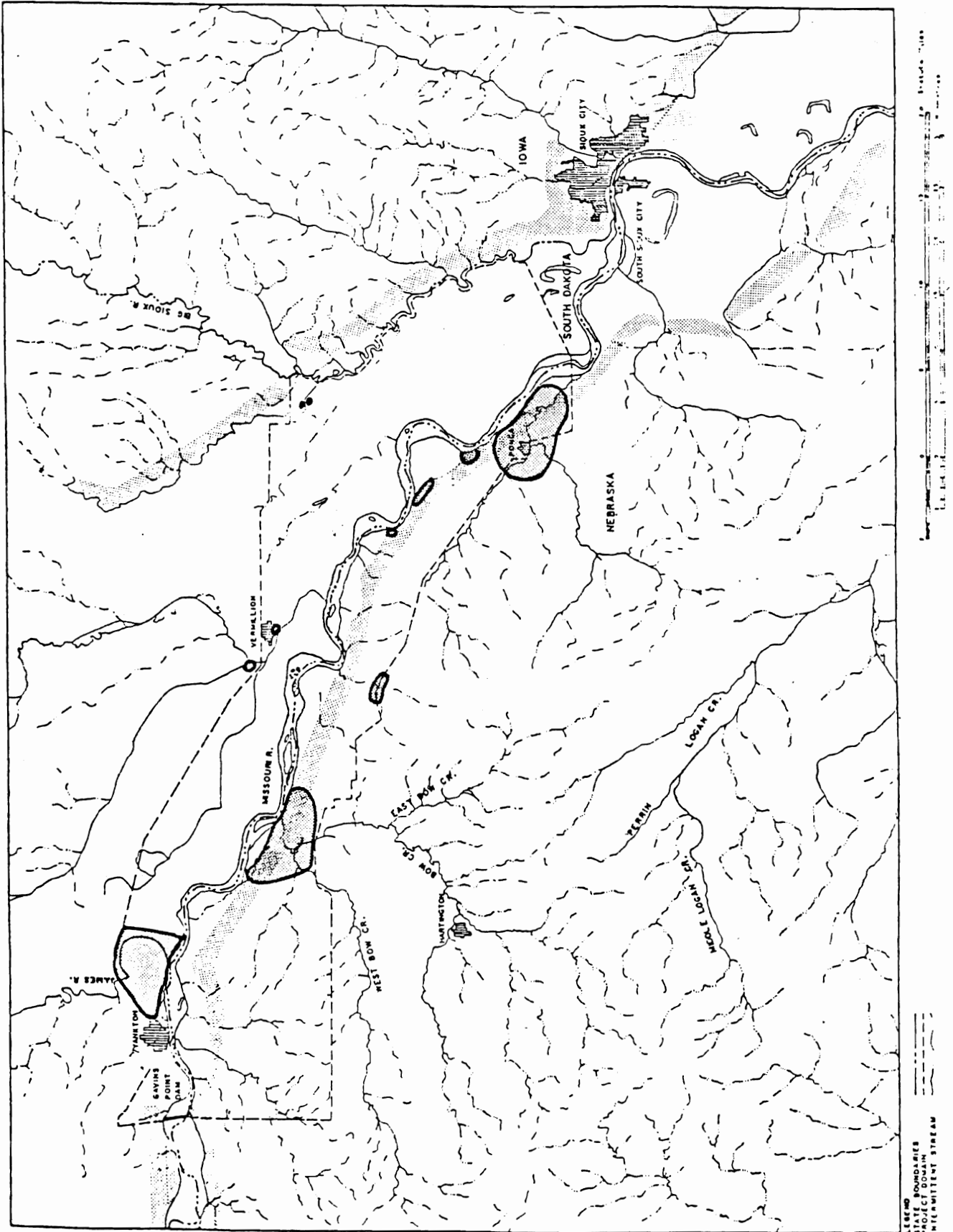
Conspicuously absent in this narrative is the search for sites in deeply buried situations. Although some sites have been found in this situation (25DX11, for example), discovery of such sites has been dependent upon exposure. The apparent absence of Paleo-Indian, Archaic, and some Woodland sites may be due, in part, to this survey bias. Recently, the use of pneumatic deep-coring of alluvial and colluvial sediments has met with success (Thompson and Bettis 1980) and may offer an efficient solution to this survey problem.

Assessment of Sample Bias

Two conclusions can be drawn from the summary of previous archaeological activity in the project domain. First, it is clear that site discovery was not based on area search, but relied on local informants as a means of locating sites. The clear goal of these surveys was to "find sites," and following the leads of local people was a very efficient way of doing this. Although this methodology allowed for the expedient discovery of sites, its unsystematic nature precludes statements about overall distribution of sites within the region. Current standards for archaeological reconnaissance require not only that sites be found, but that areas which are devoid of sites be similarly documented. Only then can the pattern and distribution of sites within a region be reliably understood (cf. Hammond 1980). Because of the manner in which previously reported sites have been identified, the existing sample of archaeological materials cannot legitimately be used as the basis for research concerning spatial distribution, such as settlement pattern reconstruction and creation of predictive models for site locations. This should not be construed as a criticism of the earlier research; rather, it is indicative of changes in the methods and aims of archaeology which have occurred in the forty years since most of the sample was collected.

The second conclusion which can be drawn is that archaeological activities have not been distributed evenly throughout the project domain. The bulk of research has centered on two locations, the mouth of Bow Creek and the mouth of Aowa Creek. Map VIII.6 illustrates the distribution of archaeological field research within the project area (Note: activities are represented as enclosed areas; since

FIGURE VIII.6



AREAS OF PARTIAL ARCHAEOLOGICAL SURVEY IN THE PROJECT DOMAIN

these surveys were not area based, however, the indicated zones may over-estimate the actual archaeological coverage). This has left the entire central portion of the project area, and the extreme western portion completely uninvestigated. A casual glance at the map reveals the considerable potential for site discovery in these uninvestigated areas. From the perspective of sampling the variety of landscapes within the project area, the existing sample again is incomplete, as it is derived principally from the lower drainage areas of two large tributary water courses, and has neglected the many smaller order streams and the upper drainage areas of all streams in the project area. As a basis for understanding the prehistoric utilization of the region, such a sample is totally inadequate, as it may systematically exclude special site types or even whole cultural periods.

As an aid to the assessment of further bias in the site sample, Table VIII.2 summarizes the setting and visibility of each known site at the time of its discovery, along with the method by which it was discovered. Since the great majority of known sites were recorded as a result of information from local people, the collection of sites has a strong, built-in bias towards sites with major surface features, such as lodge depressions or mounds, which were easily visible to the untrained eye. Furthermore, since land use and topographic setting are strongly correlated ($\phi = .6832$ in this sample), and since cultivation is likely to damage and obliterate surface features, it seems probable that the proportion of upland sites, where cultivation was least frequent, would be artificially inflated relative to lowland sites, where cultivation was pervasive. In other words, the present sample is biased in favor of upland site locations with major surface features, and biased against lowland site locations particularly those which did not result in the formation of major surface features. As such, neither the observed distribution of known sites nor the relative proportions of sites in different topographic settings is likely to be representative of the actual occurrence of sites within the project domain.

Based on these findings, it appears highly unlikely that the corpus of known sites from the project domain is a representative sample of either the abundance or distribution of the sites in the area. As such, the scope of research problems which might legitimately be pursued, based on the existing materials is severely limited. Virtually any research question which contains a spatial component at a scale greater than the single site must be excluded. Studies which do not contain a spatial component may be pursued, and several suggestions are discussed in Part IX. Yet, even these possibilities are limited due to the unrepresentative nature of existing site coverage.

The most direct and obvious solution to this sample problem is survey of the entire project domain, or at very least, survey of a substantial portion of it using controlled survey techniques including

TABLE VIII.2

SITE DISCOVERY CONDITIONS

Site No.	Setting	Condition	Surface Features	Means of Discovery
39CL1	Terrace	Cultivated	None	Construction
39CL2	High Terrace	Pasture	Mounds	Local Informant
39UN1	Terrace	Cultivated	None	Quarrying
39UN2	High Terrace	Cultivated	Mound & Depressions	Local Informant
25CD1	High Terrace	Pasture	Depressions	Local Informant
25CD2	Bluff Top	Pasture	Depressions	Local Informant
25CD3	Bluff Top	Pasture	Depressions (?)	Local Informant
25CD7	Terrace	Cultivated	Mound & Depression	Survey (?)
25CD8	Ridge Top	Pasture	Depressions	Local Informant (?)
25CD10	Low Terrace	Cultivated	Mound, Depressions	Local Informant
25CD11	Terrace	Cultivated	Mound, Embankment	Local Informant
25CD12	Low Terrace	Cultivated	None	Construction
25CD13	Bluff Top	Pasture	Mound feature	Chance
25CD16	Terrace	Cultivated	Cultural Debris	Chance
25DX1	Bluff Top	Pasture	Depressions	Local Informant
25DX2	Valley Floor	Cultivated	Mound	Local Informant
25DX3	Valley Floor	Cultivated	None	Construction
25DX4	Bluff Top	Cultivated	Mounds	Local Informant (?)
25DX5	Terrace	Pasture	Depression	Local Informant
25DX6	Terrace Remnant	Gullied	House Profile	Local Informant
25DX7	Slope	Pasture	Depressions	Local Informant
25DX8	Bluff Top	Cultivated	Human Bone/ Depressions	Local Informant
25DX9	Ridge Top	Pasture	Depressions	Local Informant (?)
25DX10	Ridge Top	Pasture	Human Bone/ Depressions	Local Informant
25DX16	Slope	Cultivated		Local Informant
25DX17	Low Terrace	Cultivated	Cultural Debris	Chance
25DX19	Bluff Top	Pasture	Depressions	Local Informant
25DX20	Bluff Top	Pasture	Depressions	Local Informant
25DX23	Low Terrace	Cultivated	Cultural Debris	Survey
25DX24	Low Terrace	Cultivated	Cultural Debris	Survey
25DX25	Valley Floor	Cultivated	Cultural Debris	Local Informant
25DX26	Valley/Ravine	Eroded	Cultural Debris	Survey

deep coring. Remote sensing and data gathered by us from local amateurs suggest a density and variety of archaeological resources far beyond those evidenced by recorded sites.

Although complete survey coverage is the preferable direction in which research should be channeled, it may prove necessary to limit the re-survey to a sample of the region. If this were the case, special consideration would have to be given in the sample design to assure its appropriateness to the project domain. Given the high degree of environmental diversity represented in the project area, the sampling design would require a much larger sample fraction than those normally employed in more homogeneous environments (Cowgill 1975: 263) and probably would require coverage in the range of fifty percent to achieve an acceptable level of reliability.

With the completion of a controlled survey, a full range of environmental, spatial and processual research problems could be addressed. Comprehensive survey would enhance the value of the existing site collections, since with the improved control provided by survey, the older collections could be integrated into future analyses.

Native American Informants

Our final goal regarding the project domain was to meet with members of the Native American tribes whose heritage falls within the scope of the present research. These meetings were designed both to inform people of the work being done, and to elicit information concerning possible cultural resources in the project domain, particularly sites of ritual or religious significance which might meet the criteria of the American Indian Religious Freedom Act (P.L. 95-341). Following earlier contacts by letter and telephone, individuals of the Omaha, Winnebago, Santee Sioux, and Yankton Sioux tribes were interviewed during the period January 5 - 8. Table VIII.3 lists the individuals contacted at each reservation, along with additional resource persons recommended by informants during these interviews.

From these discussions, two generalizations can be offered: 1) Little direct knowledge or memory of tribal activities relating to the project region was apparent among the informants, nor were they able to identify locations of areas within the project domain which they considered important to the tribe (see Yankton exceptions below); and 2) The primary concerns voiced, particularly by those on reservations downstream of the project area, related to anticipated secondary impact which would accompany the development of the Missouri National Recreational River, including the potential for increased trespassing, poaching, and pollution. There was also concern that bank stabilization and other construction in the project area might further alter the river and floodplain environment.

No specific recommendations can be made concerning the locations of cultural or religious significance within the project domain. This

TABLE VIII.3

NATIVE AMERICAN INFORMANTS

Tribe and Location	Interview Participants	Follow-Up Informants
Omaha Macy, Nebraska	Mark Merrick (Vice Chairman) Hollis Stabler, Jr. (Tribal Council Dennis Turner (Treasurer) Wilson Wolf	John Turner (Macy)
Winnebago Winnebago, Nebraska	Matt Pelcher (Treasurer) Reuben Snake	
Santee Sioux Santee, Nebraska	Jim James (former Chairman) Caroline Jones Schuyler Houser (Neb. Indian Community College - Santee Campus)	Edna Peniska (Center, Neb.) Dan Larve (Santee, Neb.)
Yankton Sioux Greenwood, South Dakota	Joe Dudley (Dakota Language Program Marty Indian School) Estelle Redlightning (Dakota Language Program) Sam Weddell (Tribal Council)	Hank Spotted Eagle (Lake Andes, S.D.) Lewellyn Selwin (Yankton, S.D.) Joe Rockboy (Vermillion, S. D.) Father Daniel Madlon (Stephan, S.D.) Hazel Ashes (Marty, S.D.) Dr. Agnes Picotte (Delora Project, University of S.D.)

finding must be tempered, however, by two important qualifications: 1) The time available for interviews was limited, and some knowledgeable individuals may have been missed in the interview process; 2) Some informants may not have revealed information relating to such locations for fear of desecration or development (this almost certainly was the case in at least one interview).

The exceptions to the above findings were the Yankton Sioux informants, who displayed considerable knowledge and interest in past tribal activities. Mr. Joseph Dudley, of the Marty Indian School, has generated considerable interest in traditional language and history through the Dakota Language Program. In conjunction with this program, a major tribal history is being prepared. Related to this, special notice should be made of Father Daniel Madlon of Stephan, South Dakota. Father Madlon lived for many years at Marty, South Dakota, and has amassed a large collection of genealogical and photographic material on the Yankton Sioux. As an historical resource, this collection is unique. An extremely useful interpretive enterprise would be to support the Yankton Sioux History Project currently underway and to expand it to incorporate the data collected by Father Madlon. Such a history would provide a valuable document on Yankton history, which is particularly relevant to interpreting the project area, and would have the added benefit of facilitating a serious tribal and regional history written by Native Americans.

Summary By Period

The following summary of the collections in and near the project domain is derived from the collection inventory performed during the course of the investigation.

Paleo-Indian: No Collections.

Archaic: No significant collections. There may be a minor Archaic representation in the collection from 25DX26.

Woodland: Represented in 25CD7, 25CD10; 25DX2, 25DX4, 25DX6, 25DX7, 25DX11, 25DX26 (2 components); 39CL2; 39YK1, 39YK2, 39YK201; and 39UN9. 39CL2, 25CD7 and 25DX4 have skeletal material that may be Woodland.

Great Oasis: Represented in 25CD10, 25CD12, 25CD16, and 39YK201. Skeletal material from 25CD10 may include Great Oasis. There are a multitude of Great Oasis sites on Perry Creek, a short distance from the project domain.

Central Plains Tradition: 25DK1, 25DK7, 25DK9, 25DK14 (immediately southeast of the project domain) may be considered late Nebraska Phase or early St. Helena. 25DK9 and 25DK14 have important skeletal materials.

St. Helena: 25CD1, 25CD2, 25CD3, 25CD4, 25CD7, 25DX1, 25DX3, 25DX8, 25DX9, 25DX16, 25DX17, 25DX23, 25DX24, and 39YK201 are St. Helena. 25CD4, 25CD7, and 25DX8 have yielded human bone.

Mill Creek: 13PM1, 13PM4, 13PM7, all immediately outside project area.

Great Oasis or Mill Creek: 39UN1. Skeletal material present but not necessarily associated with village.

Oneota: 39CL1

Historic: 25CD7, 25CD8, 25CD11, 39YK201, 39CL6. 25CD7 and 25CD11 have yielded human bone.

Unknown: 25DX19, 25DX20, 39UN9, 39UN10, 39YK2. 39UN10 has human bone. 25DX20 may be fortified.

IX

RESEARCH PROBLEMS

In the pages which follow, we summarize a long series of research problems which are based in part on what is known of the archaeology of the region and in part on consideration of the existing archaeological remains from the project domain. These include problems related to chronology, the environment, culture history, human behavior, and human biology. For each, we provide some indication of the applicability of the existing collections from the project domain and of the need for new fieldwork.

CHRONOLOGY

Understanding of the archaeological remains in the project domain is hampered by inadequate chronological control. Indeed, chronological assessment remains as a major problem in all of Plains archaeology-- a problem which must be solved if we wish to understand prehistoric culture change.

Various chronological techniques, such as stratigraphy (Champe 1946; Benn n.d.), seriation (Blakeslee and Caldwell 1979; Hoffman 1972; Smith 1963; Vis and Henning 1969) and dendrochronology (Will 1946; H. Weakly 1962; W. Weakly 1971), have been used to good effect in this region, but our understanding of the chronology of the Plains is essentially based on radiocarbon. As such, it suffers from all of the drawbacks inherent in the radiocarbon method, some of which are only now becoming clear.

A recent symposium on radiocarbon makes evident some of the problems associated with the radiocarbon method as it is currently applied to archaeology and paleoclimatology (Stuiver and Kra 1980). In addition to the long-term trend in the level of C-14 in the atmosphere, the existence of which has been recognized for a long time (Wada and Inoue 1966; Olsson 1970), there are a multitude of short-term variations (Suess Wiggles) which have very serious implications for the archaeologist (DeVries 1958; Castagliona and Lal 1980; Stuiver and Quay 1980; Suess 1980). These implications have hitherto been unrecognized by most archaeologists and by the radiocarbon experts. They include the following:

- 1) There is no published calibration curve adequate for most archaeological purposes. The curves published by the University of Arizona (Damon et al 1974), the University of Pennsylvania (Ralph et al 1973), i.e., those used most often by North American archaeologists are included in this statement. These curves are not useful because they omit short-term variations of up to 500 years in amplitude

(Blakeslee n.d.). Two curves which are sufficiently precise to be useful cover only the periods, A.D. 200-800 and 1450 to 1950 (Bruns et al 1980: Fig. 4; Pearson 1980: Fig. 1).

- 2) Averaging of radiocarbon dates, except for limited instances, is an inappropriate technique which does not yield more precise estimates of age than unaveraged assays. The averaging technique assumes that the differences in age between samples from a single event are the result of counting uncertainty only and that the assays are scattered normally around the actual age. The existence of significantly large short-term variations in C-14--large enough to throw dates off by 100 years--violates both assumptions. The differences between sample ages may be due to C-14 variations in the past, and these will create systematic errors.
- 3) Outlying dates in a set of dates for a single site or phase cannot be rejected by use of Chauvenet's criterion (Long and Rippeteau 1974) or by any other statistical technique. The reason for this is basically the same as the argument given in item 2 above: the existence of short term C-14 variations means that the standard deviation of an assay is not a reliable guide to the difference between the C-14 age and the calendar age. The statistical techniques for averaging dates use the standard deviation to weigh each assay, and hence must assume that the standard deviation is a reliable measure of the accuracy of the centrum.
- 4) The Suess wiggles can have the effect of making separate archaeological complexes appear to begin or end simultaneously when in fact they begin and end at different times (Blakeslee 1980). Figure 3 illustrates the effect.
- 5) The same wiggles can produce clusters of C-14 dates from samples whose calendar dates are evenly distributed in time (Fig. 2). These clusters of dates are readily misinterpreted as representing real events, such as climate changes (Wendland 1971; Wendland and Bryson 1974), unless they are very carefully analyzed (cf. Geyh 1980).
- 6) The Suess wiggles also have the effect of making many archaeological complexes appear to have lasted longer than they actually did. This is so because the amplitude of the Suess wiggles is fairly large relative to the lifetime of most archaeological phases. The result in a local sequence is to make a sequential series of phases appear to overlap one another in time (Fig. 1).

The impact of these radiocarbon problems on the archaeology of the project domain is enormous. The apparent overlap in time first between Great Oasis and Mill Creek, and then between Mill Creek and

FIGURE IX.1

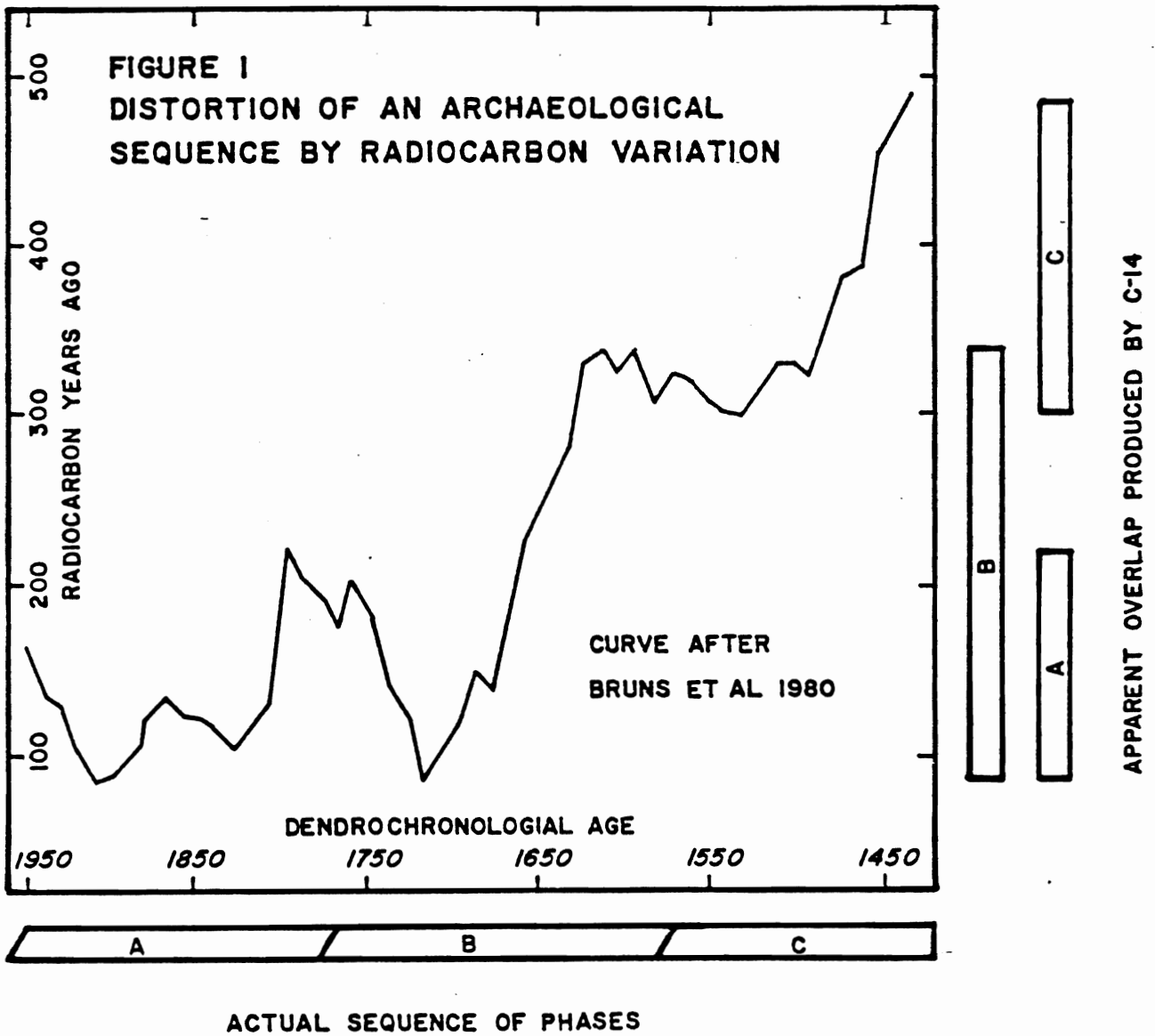


FIGURE XI.2

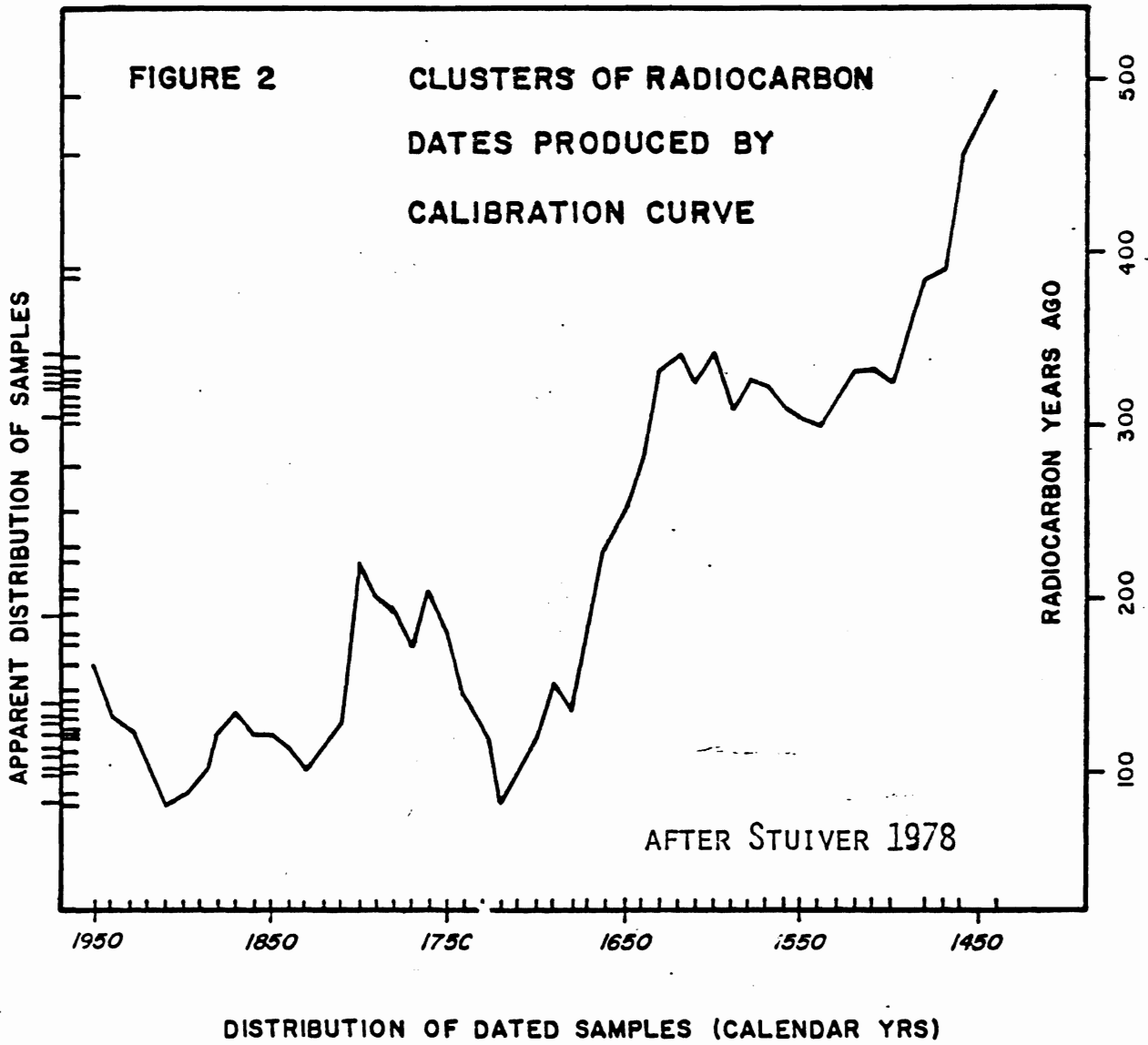
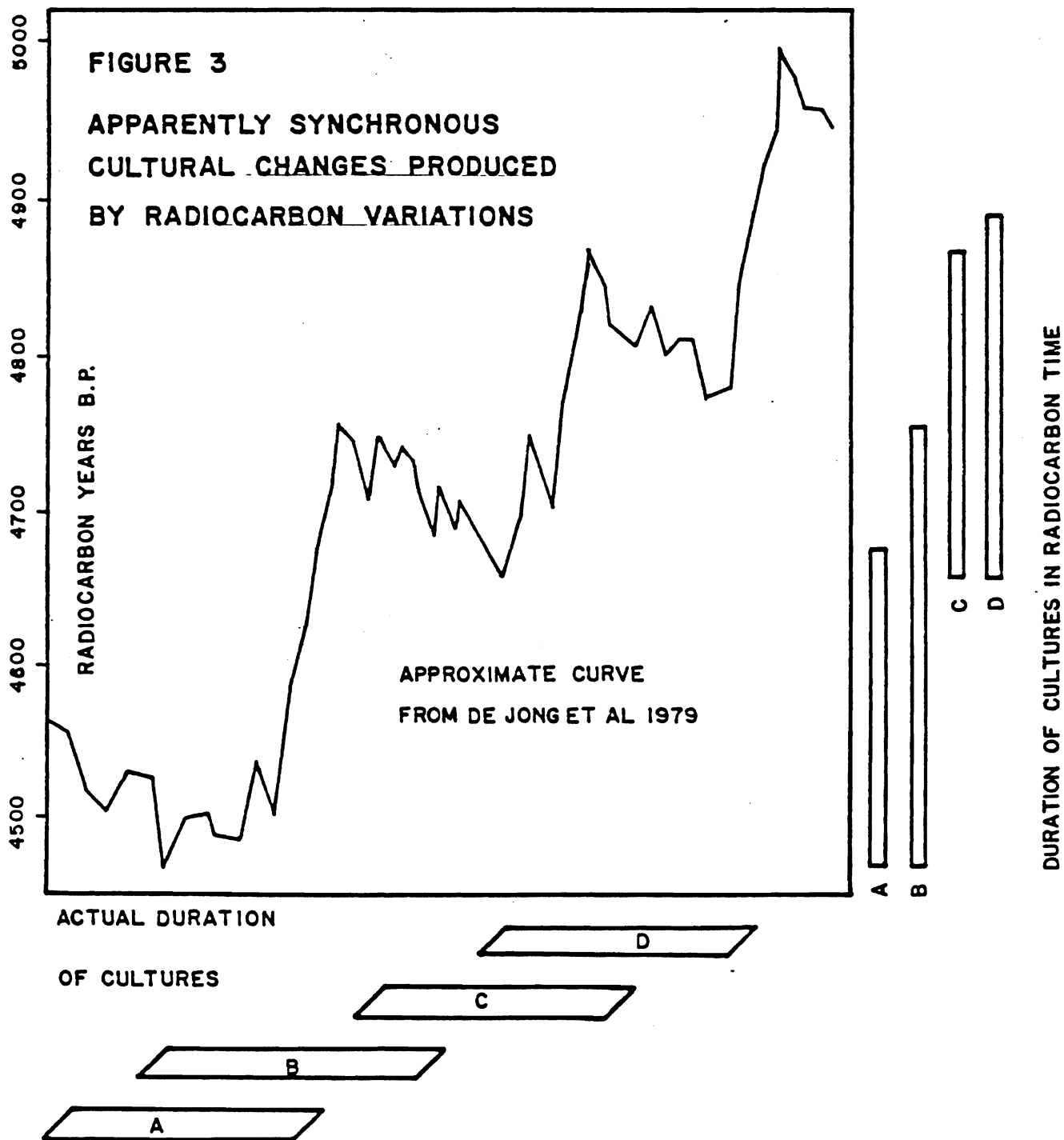


FIGURE IX.3



Oneota may be spurious or it may be real. At present we have no means of deciding which is the case. Until the chronology is resolved, specific descriptions of the nature of the transitions, such as the Hennings' suggestion that early Mill Creek villages often had a small Great Oasis community for a satellite, remains undemonstrable.

The climatological sequence developed by Bryson and his colleagues (Baerreis and Bryson 1965; Bryson, Baerriis, and Wendland 1970; Bryson and Wendland 1967) is based in part on the analysis of radiocarbon dates and may be an artifact of the problems associated with this method. On the other hand, all or parts of their sequence may have some reality beyond the dates themselves. At this point we cannot say--which means that all of the explanations of culture change which have been based on their climatic model (Baerreis and Bryson 1968); Ehrenhard 1972; Lehmer 1970) are open to serious question.

The need for improved chronological control is urgent. There are several routes by which it might be obtained. One of these is dendrochronology, a technique which holds considerable promise in the project domain. Dendrochronology requires the development of a master chart for the region, which is a labor-intensive investment. It offers as a reward dates which can be much more precise than any other available to the prehistorian. The project domain contains many mature trees which grow on well-drained slopes, numerous historic wooden buildings, and a multitude of archaeological sites of the historic, protohistoric, and late prehistoric times. Sites containing substantial structures have been built in the region since at least the Great Oasis times. Thus there is the potential for eventually building a master chart which covers at least a millenium. It would require sampling of living trees and standing structures and sampling of burned lodges in the archaeological sites.

Another approach to the chronological problem is to create an accurate radiocarbon calibration curve. This can be accomplished in samples consisting of single tree rings which are dated precisely so that a small standard deviation is achieved. When an accurate calibration curve has been constructed, it can be used to determine what pattern of radiocarbon dates can be expected for a given sequence of calendar years. This can be seen in Figure 2, where 50 samples (one per decade) dating between A.D. 1450 and 1950 produced two clusters of 21 and 14 dates respectively. One set of 21 dates is clumped between 80 and 150 years B.P.; the group of 14 dates lies between 285 and 330 years B.P. Between the two sets of assays are 135 radiocarbon years with only 11 dates. This bimodal distribution is the "radiocarbon signature" (we borrow this term from Robert Hall) of the calendar period, A.D. 1450-1950. Sites or phases which produce this pattern of dates must derive from this time period. Similar signatures can be derived for other periods.

The radiocarbon signature technique for assessing the age of sites requires a modification in the way in which samples are selected for assay. The best current procedure for an archaeologist faced with a burned structure, is to select the outer rings from a number of burned posts. Samples from short-lived materials, such as grass, twigs or cultigens may also be selected. Faced with the same situation but with radiocarbon signatures in mind, it should be obvious that sequential samples from within a few posts would be more appropriate than single samples from the outer portions of many posts. Sequential samples of tree rings have the advantage of indicating the shape of the calibration curve near the time the site was occupied as well as the approximate age of the site. In single assays from many samples, the archaeologist has to depend on luck to obtain a clear pattern. He will be lucky only if: 1) the samples actually vary somewhat in age, and 2) their ages correspond to an active portion of the calibration curve. It is obvious that with sequential samples, the first criterion will automatically be satisfied and the second is more likely to be satisfied.

Other precise chronological techniques are needed. Archaeomagnetism, thermoluminescence, alpha track dating and electron spin resonance are some techniques which might prove appropriate. None have been used to any extent in or near the project domain, but all have the potential to increase our understanding of the archaeological record. The sort of sampling of sites which would be required in order to build a dendrochronological sequence could include acquisition of paleomagnetism samples which could be calibrated by dendrochronology. Once a paleomagnetic curve for the region is established, sites which do not contain wood or charcoal but which do contain hearths could be dated by archaeomagnetism. Samples appropriate for thermoluminescent, alpha track and electron spin resonance dating are common in sites in the project domain and these could be obtained at the same time as the others. Alpha track and electron spin resonance are especially attractive because they offer the opportunity to obtain repeated measurements on the same specimen, allowing greater reliability.

ENVIRONMENTS PAST AND PRESENT

We have separated the possible environmental research in the project according to the basic sources of information available to the archaeologist. For each approach, we consider the extent to which the existing collections are useful and the extent to which new fieldwork will be required.

Faunal Analysis

There has been some analysis of the faunal remains from the project domain, but the existing collections are biased toward larger

animals by the recovery techniques used when the sites were excavated and by the practice of discarding elements considered to be not readily identifiable. Nonetheless, the faunal remains from at least some of the excavated sites (e.g. 25DX1, 25CD3) are adequate for at least limited analysis. They would be made more valuable by new fieldwork done with the aim of obtaining both microfauna and macrofauna. In some cases, the new collections could be obtained from the same sites as the old so that the existing collections could be built into the new synthesis.

Analysis of fauna from archaeological sites, of course, provides information about both environment and culture. Faunal collections from the full cultural sequence in the project domain would provide a record of the interaction of culture and environment which could be deciphered in part by the other aspects of environmental reconstruction proposed here and by research into some of the aspects of human behavior and human biology listed below.

Analysis of Vegetal Remains

Vegetal remains from excavated sites in the project domain are quite limited, and most of those that were recovered have already been analyzed. The small amounts available are more likely the result of inadequate recovery techniques than poor preservation. Modern recovery techniques should provide a wealth of data, and an adequate sample for the whole cultural sequence should provide important insights into cultural adaptations and interactions. In combination with the faunal analysis and the assessment of general nutritional status and diet indicators in human bone discussed below under Human Biology, this analysis could provide a better understanding of prehistoric diet here than is available anywhere else in the world.

Palynology

Palynology has not contributed significantly to Plains archaeology because pollen is seldom well preserved in Plains sites. The project domain may prove to be a happy exception to this rule. Pollen is best preserved in lake bottoms, bogs, and deposits that have been deeply and rapidly buried. During the visit to the project domain, local landowners and collectors reported the presence of a series of playa lakes along the Missouri River bluffs. These include what is called "Old Lake" near Maskell and "Buffalo Lake" near Beaver Creek school. Other probable playa lake beds were marked on the Dixon County soil survey maps.

Springs also occur in and around the project domain. Spring sites are often mapped in 19th century county atlases. One spring a short distance south of the project domain is known to feed into a boggy area likely to have preserved pollen. It is also thought to be the location of an historic Omaha village.

Paleosols also occur in the project domain, and late Holocene surfaces are often quite deeply buried. There are several instances of Woodland sites occurring at depths greater than 10 feet below the modern surface.

A pollen sequence for the whole period of human occupation of the area is desirable. This is so because the pollen rain reflects both the natural environment and certain types of human impact upon it. Slash and burn horticulture should be visible in the pollen record, possibly in terms of the pollen of cultigens such as maize, but even more probably as an increase in the pollen of disturbed habitat species. Development of a pollen record will require fieldwork in the form of survey for likely sites and core sampling.

Bedrock Geology

A detailed analysis of the geology of the project domain is needed in order to determine the sources of raw materials which appear in the archaeological remains. The sources of various lithic materials should be sampled so that these can be described in detail, including macroscopic appearance, crystallography, and minor element and trace element analysis. It is only when this has been done that archaeological materials can be attributed to any source with confidence and analysis of procurement and exchange systems performed. Prior to this, the existing archaeological collections can be inventoried to determine the numbers and types of materials whose sources need to be determined.

Geomorphology

Geomorphological considerations are critical to an understanding of both the archaeological and environmental record. Geomorphological processes can destroy or bury archaeological sites, and a study of local geomorphology can lead to an understanding of site visibility and to predictions of where buried sites are apt to be encountered. This is important not only for filling out the archaeological record but also for management purposes in terms of avoiding areas of high site potential.

Geomorphological considerations are often also essential to an understanding of site selection decisions by the prehistoric inhabitants of a region. Geomorphology may underlie such desiderata as soil drainage, accessibility to water, and vegetation (Hertha 1981).

An intensive program of geomorphological research should accompany any archaeological program in the project domain. Coring should be undertaken to determine valley fill sequences, terrace ages, time of tributary stream entrenchment and the like.

Soil Science

One means of developing a predictive model for site locations in the region and for analysis of the environment in which they existed is to analyze the soil types on which they are located. Unfortunately, the county soil surveys published by the Soil Conservation Service are not intended for the purpose of environmental reconstruction, and the way in which they are assembled limits their utility for this purpose (Blakeslee and Rohn n.d.). The county soil surveys include maps drawn at a scale of 1:20,000, but what is delineated on these maps are not soils, but soil mapping units. This is an important distinction for the archaeologist. A named soil mapping unit is at least five acres in size and can include patches of other similar and dissimilar soils (Harold Penner, personal communication). Up to 49 percent of similar soils may be included with any given soil in a soil mapping unit named for that soil, but only 15 percent dissimilar soils can be included in this way. If there are more than 15 percent of these dissimilar soils, a soil complex designated by two or more names will be delineated. The names which are applied to these soil mapping units are those of soil series. A soil series is a set of soils which share nearly identical soil profiles (Soil Conservation Service 1976: 1). Soils of a given series can vary in a number of traits, other than soil profile, which may have bearing on their native vegetational cover and their suitability for campsites. They may vary in surface texture, substratum, slope, stoniness, salinity, and moistness (ibid: 1). In many cases, there is a line between adjacent soils of one soil series and between soils of different soil series. Therefore, the lines drawn on the soil survey maps do not necessarily transmit all of the information the archaeologist needs.

For example, all of the remaining bottomland sites in the Bull Creek locality of northeastern Kansas are located in Hepler soil mapping units, at the edge of the unit (Blakeslee and Rohn n.d.). Topographically these sites are at the top of a break in slope, have good surface drainage, and show evidence of a more permeable subsoil. The latter is indicated by the absence of the blue-black cast typical of Hepler soils produced by the interaction of tannic acid and ferrous oxide. Thus even though these sites are mapped as Hepler, they differ significantly from Hepler soil, and the native vegetation listed for Hepler soils does not apply to them. In fact, the prehistoric inhabitants of this locality appear to have intentionally avoided the poorly drained Hepler soils when choosing campsites and even short-term activity areas. Thus the apparent correlation of soil mapping units labelled as Hepler with the locations of archaeological sites is a serious distortion of the true relationship.

An appropriate strategy with respect to soil types and site locations would be to determine the soil type for each of a sample of sites of different ages in the project domain. To the extent that the distribution of these soil types can be predicted (and this is possible to a certain extent using topographic maps), areas of high potential for similar archaeological sites can be delimited.

Another approach to the use of soils data would be the analysis of the distribution of the soil types most amenable to native horticultural practices. For the horticultural complexes of the last 2000 years or so, the distribution of these soils may have controlled the distribution of habitation sites. Access to large areas of these soils would have been most critical for the large villages of the historic period, while smaller patches may have been adequate in earlier times. A more refined soil map than those provided by the Soil Conservation Service for a single tributary valley such as Lime Creek, coupled with an intensive archaeological survey, should be undertaken to determine the actual relationship between sites and horticulturally productive soils in the project domain. For the large protohistoric and historic villages, the published Soil Conservation Service maps are probably adequate. A finer-grained survey of one drainage would serve to indicate whether they are also adequate to predict locations of earlier horticultural sites and pre-horticultural habitation sites which may be associated with these well drained soils.

This last study would be made doubly valuable by an experimental archaeology program in which an appropriate soil type is farmed using aboriginal techniques and aboriginal crops (available at the University of Iowa Agricultural School). It would be extremely valuable to learn how productive garden plots of corn and beans would be under these conditions and how long the soil would retain its productivity. The results may tell a great deal about the reasons for prehistoric movements from one valley to another and may also help to improve estimates of aboriginal population density.

Dendroclimatology

One benefit of creating a dendrochronological master chart for the project domain would lie in the climatological record it would represent. The variations in ring width could be correlated with precipitation and stream flow for the period for which records are available. This correlation would then serve as a basis for interpreting earlier ring width variations in terms of these parameters.

Other aspects of past climates may also be recorded in tree rings. C-13/C-12 variations from ring to ring in a single tree may reflect in part, variations in the amount of sunlight during successive growing seasons (Bryson 1980). These variations could be recorded for the whole period of the dendrochronological record. Deuterium/hydrogen (D/H) ratio variations appear to reflect temperature and humidity differences from year to year. These could be determined for the portion(s) of the dendrochronological sequence for which wood rather than charcoal is available. This record should be correlated with variations in degree days, a measure of growing season temperature which is directly applicable to the growth of maize.

A final possible climatic indicator which could be derived from dendrochronological samples is year-to-year variations in the amount of C-14 in the biosphere. The current consensus (Stuiver and Kra 1980) is that these variations are caused by a combination of solar variation and changes in the intensity of the earth's magnetic field. Solar variation obviously may be correlated with changes in climate, and the changes in the earth's magnetic field allow varying amounts of ionizing radiation to reach the upper atmosphere of the earth. This ionization causes changes in the electric potential of the earth's atmosphere, and this may prove to be one driving force in climate change. Thus year-to-year variations in C-14 levels, since they are caused primarily by the same radiation which causes the ionization, may be a direct measure of a mechanism causing short-term climatic changes.

A valuable by-product of a study of year-to-year variations in C-14 levels would be a usable radiocarbon calibration curve for the period covered by the dendrochronology. Year-by-year variations in C-14 of any floating sequences in the dendrochronological record could be used to calibrate the floating sequences to ca. ± 5 years by comparison with known C-14 variations worldwide (e.g. Becker 1980).

This sort of intensive fine-scale dendroclimatological record should prove invaluable in interpretation of the archaeological palynological and geomorphological records. It should provide the data necessary to test the models of climate change which have been proposed by Bryson and his colleagues.

Records of Annual Variation

One aspect of the Plains environment which is of considerable importance in understanding the human adaptations to it, is the variability from year to year in certain critical parameters. These include number of degree days and other measures of temperature, dates of first and last killing frosts, nature, amount and timing of precipitation, levels of stream flow and floods. Records for most of these parameters can be obtained from the appropriate record keeping agencies and given appropriate analysis. If the experimental archaeology suggested in the section on Soil Science is performed, the productivity of the gardens created could be matched with these variables. The correlations derived could be used to project regional productivity over longer periods through the modern records and into prehistory using the dendroclimatological record.

Summary

The utility of existing collections and the need for new field-work in climatological research can be abstracted as follows:

RESEARCH APPROACH	EXISTING COLLECTIONS	NEW FIELDWORK
Faunal Analysis	appropriate for limited interpretation of macrofauna	for microfauna, full interpretation of macrofauna
Vegetal Analysis	absolutely minimal	flotation of selected samples
Palynology	no data	survey for good locations, coring
Bedrock Geology	Existing literature not useful; collections appropriate for macroscopic analysis now; fuller analysis after fieldwork is done	survey and sampling of lithic sources
Geomorphology	Literature is very limited	Full survey, coring and trenching
Soil Science	existing soil surveys of limited use	determine exact soil types for sites; survey one drainage; experiment
Dendroclimatology	a few good wood samples exist	collect from trees, buildings, sites
Annual Variations	analyze existing records	

PROBLEMS OF CULTURE HISTORY

Considerations of culture history are basic to many of the problems which interest archaeologists today. We list here some basic problems in the culture history of the region which apply to the remains in the project domain.

Woodland-Central Plains Tradition Continuity

In Iowa and South Dakota, the cultural sequence from Late Woodland manifestations through Great Oasis to the Middle Missouri Tradition provides good evidence for cultural continuity. On the Nebraska side of the river, however, the evidence for cultural continuity is not as clear. Following the Great Oasis occupation are components of the Nebraska Phase and St. Helena Phase. In Dixon County, the few excavated sites containing earthlodges yielded ceramics which

could be assigned to an early episode of either of these phases, but the ceramics did not exhibit a strong resemblance to Great Oasis. Thus there is little reason to believe that Great Oasis is transitional from Woodland to Central Plains Tradition. The apparent lack of cultural continuity is problematic because the few Woodland crania which have been analyzed seem to indicate the existence of a biological continuum from Woodland through the Central Plains Tradition to St. Helena (Jantz et al 1978). Thus there is a contrast between the ceramic data, which suggest a break, and the biological data, which suggest a continuum.

There is probably enough data from excavated sites in the region to test the idea of cultural continuity from Woodland to the Central Plains Tradition and St. Helena. Phases which deserve consideration in this regard are Loeske Creek, Sterns Creek and Great Oasis. This study would not necessarily involve additional fieldwork, although it doubtless would be illuminated by such research.

St. Helena-Mill Creek Relationships

The St. Helena Phase is located almost directly across the Missouri River from sites of the Big Sioux Phase of Mill Creek. Both peoples made their living from a mix of horticulture and hunting. In spite of many similarities, these contemporaneous societies maintained cultural distinctions marked by distinct settlement patterns, architectural differences, separate ceramic traditions, and stylistic differences in stone and bone tools. It is surprising that there have been no attempts to determine the nature of the relationship between these two societies. This is probably the result of the fact that none of the students of Mill Creek are familiar with the St. Helena remains. The converse is also true.

A close comparison of the collections from St. Helena sites and sites of the various Mill Creek phases and subphases would doubtless provide many insights into the nature of the relationships between the societies which produced them. Ceramic paste and lithic source analyses should supplement traditional typological studies. Inclusion of some sites of the Loup River Phase would probably help to clarify the nature of the relationships. Such a study would not require new fieldwork.

Great Oasis-Mill Creek-Oneota

In the vicinity of the Big Sioux and Little Sioux rivers, there are a multitude of sites of the Great Oasis, Mill Creek, and Oneota cultures. The C-14 dates for the three appear to indicate a great deal of overlap, but as discussed in the section on chronology, this may be an artifact of the radiocarbon method. It is obvious that better chronological controls are needed, but chronology alone will not determine important facets of the sequence. What is also required

is a set of testable hypotheses regarding the nature of: 1) the transition(s) if there are no periods of overlap, and 2) the intercultural relationships which existed if there were. These hypotheses should derive from the data at hand but will probably require additional fieldwork if they are to be tested properly. Additional fieldwork is definitely required if the chronological problems are to be resolved.

The Nature of Great Oasis as a Cultural Entity

The Great Oasis Phase is well represented in and near the project domain. It may be one of the best represented archaeological complexes in the region and as such deserves special study. The character of Great Oasis is, however, not well understood. Great Oasis sites and ceramics have a very wide distribution, yet judging from the distribution of Great Oasis trade sherds, this cultural manifestation had a brief lifetime. The majority of the radiocarbon dates for Great Oasis lie between A.D. 950 and 1120. Within this apparently short span are a great number of sites found in several distinct environments including four in the project domain, with considerable variation in faunal remains from site to site within at least one of these environments. The unity seems to be supplied primarily by ceramics, and Great Oasis, like Oneota, can properly be termed a "ceramic culture." While the ceramics are quite beautiful and have drawn a great deal of attention, if the meaning of Great Oasis is to be understood in human terms, attention will have to be given to the total assemblage from all of the sites in the various environments. In its present form as a ceramic culture, Great Oasis is too amorphous to allow any clear statements as to how it came into and passed from being. The long rectangular lodges at Broken Kettle West suggest that Great Oasis includes the shift from a relatively nomadic to the sedentary way of life typical of later Plains villagers. This is an extremely important transition and one which we need to understand better.

Origins of the Coalescent Tradition

We have discussed the formation of the Coalescent Tradition in the archaeological overview of this report. Several problems in the earliest development of the Coalescent Tradition are apparent. One is the extent of the area in which it occurred. Caldwell (1966) has noted that the Initial Coalescent Variant reflects a lengthy period of interaction prior to its appearance in South Dakota. The St. Helena and Loup River phases appear to have shared in this development, and some Oneota and Mill Creek communities must have done likewise. Blakeslee (1978) has provided a model of the development of the Coalescent which is detailed enough to be testable through close re-examination of existing Loup River, St. Helena, Mill Creek, and Oneota assemblages. This would not require further fieldwork, at least during the initial stages of the inquiry.

The idea that the movement of Initial Coalescent people into South Dakota was in response to drought in the Central Plains (Wedel 1961: 101) could be made testable by the development of dendroclimatic sequences in several regions. We have suggested the development of a dendrochronological study in the project domain, and the Institute for Great Plains Studies is considering dendrochronological work in the Big Bend region of South Dakota and near Omaha, Nebraska. If master charts are developed in all three regions, the climatological implications of the ring width variations should provide a reasonable test of the climatological hypothesis.

Seriation of St. Helena Components

There are three excavated St. Helena sites in Cedar County and two in Dixon County; there are also four sites in Dakota County which may be either Nebraska Phase or St. Helena. In general, the assemblages from sites in each county tend to resemble one another more than they resemble those from any other county. A seriation of the ceramics and other time sensitive artifacts from these sites would provide the first adequate chronological control for this important phase. Cross-dating the St. Helena Phase with neighboring complexes such as the Nebraska Phase, Mill Creek, Loup River and Correctionville Oneota should also be possible. Such a study would not require additional fieldwork. This analysis may also provide for a temporal subdivision of the phase, allowing improved chronological control.

Concept of Valley Phase

The Valley Phase was one of the earliest Woodland complexes of the Great Plains to be identified. Since the initial work by Kivett and others, little advance has been made in our understanding of this complex. The Valley Phase appears to be of Middle Woodland age (Benn n.d.; Hall n.d.), yet it does not appear to have participated significantly in the Hopewellian Interaction Sphere. Other Plains border complexes such as Kansas City Hopewell, Cuesta Phase and the Cooper Focus did participate, at least to a limited extent. Thus a reason for the relative nonparticipation of Valley should be sought.

Another Valley Phase problem is the nature of the inter-site variation which can be observed. Hall (n.d.) has suggested that the Valley Phase components which contain a higher percentage of decorated vessels are earlier in time than those with lower percentages. Other forms of variation should be considered as well in an effort to determine their spatial and temporal meaning. Such studies would illuminate the character of the Valley Phase as it is expressed in the project domain.

Protohistoric and Historic Occupations

Far too little is known of the protohistoric and historic occupation of the project domain. The Gavins Point Site yielded remains which may represent Smutty Bear's Yankton village, and these appear to include the tools and debitage created by a pipemaker (Hall n.d.). A number of other Yankton, Santee, and possibly Brule villages once existed in the project area; new fieldwork would be required to identify these archaeologically. The efforts of John Champe have provided archaeological material from several historic sites in the project domain which may represent the Omaha tribe. These require full analysis and publication before the problem of the archaeological identity of the Omaha can be solved. The location of the historic Iowa village supposed to be in the area should be determined. When this is done it should be possible to determine the impact of the fur trade on the tribes which lived in the region.

Summary

The requirements of each of these research problems can be summarized in the following table in which the primary sources of data for each problem are categorized as either existing or requiring new fieldwork. This is obviously a shorthand guide, since all good research problems are open-ended and hypotheses generated will require testing by new data. Thus what we list are the initial requirements for each problem area.

PROJECT	EXISTING DATA	NEW FIELDWORK
Woodland-CPT	reanalysis of archaeological and skeletal data	
St. Helena-Mill Creek	macroscopic and other reanalysis of collections	
Great Oasis-Mill Creek-Oneota		dates other than C-14; additional fieldwork
Great Oasis	reanalysis of existing data	
Coalescent Origins	reanalysis of existing collections	dendroclimatology & dendrochronology
St. Helena Seriation	analysis of existing collections	some new dates for calibration
Valley Phase	analysis of existing collections	data on seasonality, new dates
Protohistoric-Historic	reanalysis of archaeological and skeletal data	survey for Ioway, Santee, Yankton and Brule villages

PHYSICAL ANTHROPOLOGY

A surprisingly large number of human skeletons have been recovered in and near the project domain. Bass (1961) recorded the remains of 804 individuals from Cedar, Dixon and Dakota counties, Nebraska. These are derived from Plains Woodland, Basal Coalescent, and Historic Omaha and Ponca populations. Some may eventually be attributable to Great Oasis and Central Plains Tradition manifestations. Other ossuaries were reported to us by residents of the project domain. On the South Dakota side of the Missouri River, a few fragments of human bone were recovered from the promontory overlooking the Gavins Point Site during road construction (Hall, personal communication). In Iowa, Mill Creek sites have also yielded a few skeletons (cf. discussions of Mill Creek above).

Some of these materials have already been the subject of various types of analysis. The most common approach has been the use of craniometric analysis to elucidate ethnic affiliation and inter-population distances (Bass 1964; Jantz 1974; Jantz et al 1978).

A great deal more could be learned if the skeletal materials at hand were subject to more thorough investigation. Because the skeletal materials from the project domain fit at the early end of a biological continuum which leads to the Arikara, they are all the more important because they can be used to extend what is known from study of a large series of protohistoric and historic remains. Some of the types of studies which could be pursued are listed below. These were developed in part with the kind cooperation of Dr. Douglas Owsley, who formulated approaches discussed below for paleodemography, paleopathology, osteological indicators of morbidity and nutritional stress and dental measurements. Dr. Paul Lin examined the collections from in and near the project domain that are housed in Lincoln, Nebraska, and his comments are incorporated here.

A total of 804 human skeletons are available from Cedar, Dixon, and Dakota counties, Nebraska. The completeness and condition of these materials is not all that it might be. The proportion of very young individuals from Cedar and Dixon counties is lower than expected, given the type of societies represented. The remains of newborns may have been reduced by cultural practices, natural processes after burial, by inadequate archaeological excavations, or by a combination of these factors. Many of the remains are in fragmentary and deteriorating condition. Any research funded should include their restoration, stabilization, and repackaging. (These comments are not intended to imply any criticism of the current curators of these materials. The human remains had suffered from decades of neglect before they passed into their care).

The human remains from Dakota County, immediately to the south of the project domain, were examined along with those from Cedar and

Dakota counties. These collections are in considerably better condition than those from the project domain. Since they derive from sites that are closely related to the St. Helena Phase sites in Cedar County which yielded some of the human remains (Frantz 1963), they should be included in any restudy of the skeletons from the project domain. Their inclusion would result in a corpus of material worthy of a major research project.

Other human remains may also be found in and near the project domain. On the South Dakota side of the Missouri, some human remains were uncovered by road construction on the promontory above the Gavins Point Site (Hall, personal communication). A collection of Archaic age skeletons is reported to be in the possession of a farm family near Hartington, Nebraska. Another set of crania, taken from an ossuary near Lime Creek in Dixon County, is supposed to have been reburied in the vicinity on the orders of the mother of the excavators. Still other possible ossuaries and cemetery areas were reported to the co-principal investigators by local collectors.

Paleodemography of Sites with Relatively Large Sample Sizes

The demographic parameters of New World populations have been explored in several studies (Bennett 1973; Blakely 1971; Blakely and Walker 1968; Buikstra 1972; Churcher and Kenyon 1960; Goldstein 1953; Hooton 1920, 1930; Howells 1960; Johnston and Snow 1961; Katzenberg and White 1979; Lovejoy et al 1977; Ubelaker 1974). These investigations have shown that valuable information concerning mortality and population number can be obtained from skeletons in archaeological contexts. In general, however, there remains need for "reliable demographic data from different geographical areas and chronological periods to better document prehistoric demographic variation" (Ubelaker 1976).

Previous research has not dealt specifically with changes induced by European contact with exceptions of Lovejoy et al (1977), Owlsey and Bass (1979), and Palkovich (1978). This is of particular interest because it is the focus of a major research grant funded by the National Science Foundation which involved demographic analysis of the Leavenworth and Sully sites. These data, combined with data for Larson and Mobridge, will help document the manner and degree to which disease, nutrition, warfare and other variables affected Arikara population structure. Clarification of the effects of these vectors of change on Arikara populations will contribute to our understanding of human population dynamics and the demographic trends associated with this transitional period. Baseline data for the Arikara study are badly needed. Prehistoric St. Helena sites are the best choice to fill this gap because they are precontact and apparently ancestral to the Arikara.

Criteria selected for determination of sex might include pelvic and cranial morphology and craniometric multivariate discriminatory analysis (Bass 1971; Krogman 1962; Lyon 1970; Phenice 1969; Stewart 1968, 1970; Washburn 1948).

Pooled sex dental calcification standards of Moorrees et al (1963a, b), Merchant and Ubelaker's (1977) standards for long bone growth, the development of ossification centers (Krogman 1962) and specific aspects of skeletal development (Redfield 1970) would allow assessment of pre-adult age. Adult ages could be estimated by examination of morphological changes in the pubic symphysis (Gilbert and McKern 1973; McKern and Stewart 1957; Suchey et al 1979), degree of epiphseal closure (Krogman 1962; McKern and Stewart 1957) and dental attrition (Miles 1963).

One of the demographic techniques selected for estimating mortality rates would be a life table based on a stationary population model (Acsádi and Nemeskéri 1970). From the age of distribution at death (D_x), the life table technique permits calculation of the probability of dying (q_x) between exact age x and exact age $x+n$; the percentage of survivors (l_x) from one age interval to the next; the number of years lived by survivors at each age interval to the next (l_x); the total number of person-years lived at each age interval or above age x (T_x); and the average number of years remaining to persons from birth and at each age interval (e_x). For discussion of the relationships between these values see Barclay (1958: 93-122) and Acsádi and Nemeskéri (1970). Life table data also allow calculation of the population's crude death rate (Acsádi and Nemeskéri 1970: 44-67). Procedures for constructing abridged life tables are given in Acsádi and Nemeskéri (1970).

The St. Helena data could be compared to Arikara data (Larson, Leavenworth, Moberge, Sully and Crow Creek). Sample comparisons could be accomplished through direct comparison of smoothed q_x values and age distributions (d_x values) at death. Smoothing implies a smooth continuation from one age to the next. Various smoothing formulae and procedures are applicable; see for example, Jaffe (1969) or Shryock and Siegel (1971). The significance of sample differences could then be evaluated using chi square or Kolmogorov-Smirnov two-sample tests (Hays 1973; Jaffe and Medina 1979; Massey 1951; Siegel 1956). A chi square test for goodness of fit could also be used for comparing the observed adult (15+ years) sex ratios to a theoretical 1:1 sex ratio

Bone and Dental Pathology Data

To interpret the demographic information, pathology data should be related to the mortality curves. The ethnohistoric record for the Arikara and pathology data indicate that the Arikara experienced increasing stress from infectious disease from A. D. 1600 to A.D. 1835.

Tuberculosis and the treponematoses are examples of such infectious diseases. To effectively answer the question of whether these diseases were prehistoric, it is imperative to have baseline data. The St. Helena populations could provide these.

The data collected should be age and sex information and observations of pathologies. A visual inspection of all bones and x-rays should be taken as an aid in the lesion survey. The following pathology categories could be coded:

I. Bone Loss

- a. resorptive lesion
- b. loss of bone density - bowing
- c. loss of bone volume
 - 1) osteoporosis
 - 2) cortical thinning

II. Bone Increase

- a. increase in bone density
- b. increase in bone volume
 - 1) bone tumors
 - 2) ossified thyroid cartilage
 - 3) external auditory exostoses
 - 4) periostitis
 - 5) osteomyelitis

III. Trauma

- a. fracture
- b. pseudarthrosis
- c. dislocation
- d. accidental death (archaeological information)
- e. projectile point in bone
- f. collapsed vertebrae, due to trauma
- g. scalping marks

IV. Degenerative Joint Disease

- a. hypertrophic bone formation (osteophytes)
- b. porosity
- c. eburnation

V. Dental Pathology

VI. Dental Wear

Osteological Indicators of Morbidity and Nutritional Status

Investigation of paleopathological indicators of environmental stress (i.e., malnutrition and disease) represent an important facet of recent skeletal biology research. Variables which should be examined to assess general health status include nonspecific indicators of environmental stress. The best known (and those for which data will be forthcoming on the Arikara) are Harris Lines and Enamel Hypoplasia.

Lines of Arrested Growth:

Lines and bands of increased density (Harris lines) are opaque transverse lines of increased mineral density visible in radiographs of the proximal and distal ends of long bones (Garn et al 1968). Lines form during the growing period, the most common time being early childhood (Dreizen et al 1964; Gindhart 1969). Transverse lines mark periods of growth arrest followed by subsequent recovery. Longitudinal radiographic studies of living children and research with animals demonstrate that malnutrition (protein-calorie deficiency, vitamin A deficiency, severe dehydration, starvation) or illness (febrile disease, anemia, whooping cough, measles, pneumonia, scarlet fever, congenital syphilis, chicken pox) can initiate line formation (Acheson 1959; Dreizen et al 1967; Garn 1966; Garn et al 1968; Harris 1933). Prenatal striae formation has been linked to poor maternal health and nutrition. Birth trauma and psychological stress are also associated with the development of lines (Sontag and Comstock 1938). Transverse lines have been used to estimate morbidity and nutritional status of prehistoric populations (Allison et al 1974; Bass and Rhule 1976; Birkby n.d.; Buikstra 1976; Cook 1979).

Radiographs of femoral and tibial distal diaphyses (including the mid-points of bones) should be obtained for sub-adults, adolescents and young adults (ages 20-30). The distal tibia is considered best for analysis (Garn et al 1968). The Arikara data should be used for comparison. Population samples should be matched by age and for older individuals by sex for comparison. Comparisons could then be based on the number of transverse lines per age group (the average number of lines per bone) and the percentages of individuals with and without lines.

Enamel Hypoplasia:

Another variable receiving considerable attention is defective formation of the dental enamel matrix termed enamel hypoplasia. Factors responsible for disrupting ameloblastic activity, resulting in defective enamel, include starvation, malnutrition, disease, and traumatic injury (Cobley et al 1971; Molnar and Ward 1975). To acquire this data, canines, at least one molar and maxillary central and lateral incisors should be examined for hypoplasia. These could be analyzed in a comparative framework, similar to that suggested above for Harris lines.

Pathological Enamel Microstructure (Wilson Bands):

Levels of childhood stress in earlier populations can also be measured through quantification of the number and distribution of abnormal striae of Retzius (Wilson bands) within tooth enamel. Striae are normally distributed evenly at intervals approximating 16 microns, a result of cyclic variation in ameloblastic secretory pressure (Osborn 1971, 1973). Stress-affected striae are identified by the presence of enamel prism discontinuities and/or severe accentuation in amplitude of prism curvature (Rose 1977, 1979). These alterations in striae morphology reflect disturbed cellular activity (i.e. disruption in ameloblastic activity) induced by detrimental factors such as infectious disease, malnutrition or metabolic disorder (Biggerstaff and Rose 1979; Boyd 1978; Garn, Lewis and Kerewsky 1965). Once formed, Wilson bands remain unchanged throughout existence of the tooth. This permanence provides another opportunity for deriving information regarding childhood morbidity and nutritional insufficiency.

Dental microdefects have paleoepidemiological application as a means of demonstrating 1) population differences in developmental stress, or 2) intrapopulation variation in levels of childhood as affected by social status differences (Cook and Buikstra 1979; Rose 1977, 1979). Rose et al (1978), for example, have examined the effects of increasing childhood stress associated with the adoption of maize agriculture in prehistoric skeletal samples from Illinois.

Specific teeth should be systematically examined for Wilson bands. Histological study would provide information regarding environmental pressure during the prehistoric period.

Stature:

Overall stature reflects general nutritional status during the growth period. Use of the standard formulae should allow discrimination of this effect among the closely related populations likely to be found in the project domain.

Collection of Buccolingual and Mesiodistal Dental Measurements

In recent years, attention has been focused on size of the dentition in human populations (Brace 1967, 1978; Greene et al 1967; Molnar 1971; Perzigian 1977; Ryan and Posner 1975; Scott 1974). Investigators have been particularly attuned to documenting changes in dental size and shape associated with adoption of agriculture or other significant cultural changes affecting diet. Metrically, the temporal trend for most populations has been reduction. This pattern has been shown for populations of Nubia (Green 1972), the Middle East, Europe, Asia (Brace 1978), Greece and Turkey (LeBlanc and Black 1974).

At present, however, interpopulation variability in dental size of American Indians remains poorly documented, reflecting a lack of appreciable samples for measurement. Limited data are published for Indian populations and a few groups are represented (Brace and Mahler 1971; Dahlberg 1963; Moorrees 1957; Perzigian 1975; Ryan and Posner 1975; Wolpoff 1971). Few studies have examined temporal change in dental size within a limited geographic area (Hinton et al 1980; Scott 1974).

Dental measurements should be collected and tied into the Arikara research (cf. Perzigian 1975). The first objective is to quantify dental variability through time and space among the populations and to determine whether directional and stabilizing selection affected dental size. Perzigian (1975) compared mesiodistal and buccolingual measurements of maxillary and mandibular dentitions of two age groups in the Larson Site population. He interpreted the results as suggesting a large dentition has survival value when attrition is pronounced. Dental wear was rapid in Arikara populations as food preparation techniques produced high levels of dietary grit (Butler 1969). Large teeth or morphologically complex teeth help resist attrition via the addition of supernumerary cusps and additional ridges. Similar explanations are offered by Greene et al (1967) and Angel (1966) for especially large dentitions found in other prehistoric populations. These authors, however, provide no test of the hypothesis.

An effective test to determine whether directional and stabilizing selection affected the dentition is whether interpopulation variation is patterned along chronological lines. Perzigian's (1975) hypothesis would be supported if samples from later sites show significantly larger tooth crowns and lower variances than earlier sites. Evidence of a gradual increase in dental size would contrast with current information concerning post-Pleistocene changes in the human dentition. Instead of increasing in size, the trend worldwide appears to be reduction (Brace and Mahler 1971).

Cranial Variation and Population Relationships

Some of the samples under consideration have been studied previously by Bass, Jantz and Owsley. These analyses should be expanded to include the following:

- 1) Comparisons between the populations in the project domain and other documented populations including Arikara, Mandan, Pawnee, Redbird, Omaha, and Oneota. The Oneota materials measured by Glenn (1979) would be made more valuable if they were arranged in proper chronological sequence.

- 2) Misclassifications of crania by discriminant function analysis should be analyzed for the possible effects of intermarriage, interbreeding, and captives (cf. Jantz 1974).

3) The internal variation in each population should be given careful consideration. Blakeslee (in press) indicates that intra-population variation should differ among Northern and Central Plains tribes.

4) Continued attention should be paid to the problem of which continuous variables discriminate most effectively among the populations being studied. Since the sample sizes are often small, the number of variables which can be used are also small. Therefore, use of the most discriminating variables is critical.

5) Statistical approaches other than discriminant function analysis should be used to assess the relationships in time and space of the various populations. Like the choice of variables, the choice of multivariate techniques is critical. To the extent that groups of populations are compared, techniques appropriate to this approach should be used.

6) After careful consideration, we recommend that discrete trait analysis not be performed. Discrete trait analyses involves the recording and analysis of presence/absence data for a variety of features of the cranium. This technique suffers from the use of nominal data, the statistics for which are not well developed. Indeed, since many of the discrete traits are rare, use of the Poisson distribution statistics is appropriate. This is seldom done, and the result of all this is that the results of discrete trait comparisons of different populations are very difficult to interpret.

Pre- and Postmortem Cultural Modifications

In addition to general nutritional status, disease and trauma, skeletal remains sometimes provide rather direct information with respect to cultural behavior. These can be divided into pre- and postmortem considerations as follows (Zimmerman et al 1981):

I. Pre-mortem cultural modifications

- A. Cranial deformation (cradleboard flattening)
- B. Squatting facets on leg bones
- C. Dental alterations including chipping from use of teeth as tools, occlusal grooves from use of teeth as tools, and interproximal grooves from tooth cleaning.
- D. Evidence of agonistic behavior including facial fractures, and projectile wounds.

II. Postmortem cultural modifications

- A. Scalping wounds
- B. Defleshing scars
- C. Ceremonial modification of human bone including perforation of long bones, artifacts manufactured from bone,

- D. Modifications attendant on exposure prior to burial including weathering cracks, canid and rodent gnawing, and missing bones.

Growth Rate Analysis

To the extent that the various skeletal populations can be accurately aged, it would be possible to determine and compare rates of bone growth. Any difference in growth patterns should be compared with the evidence for adult stature, general nutritional status, disease and diet indicators. Used in this way, such a study would help to corroborate the lines of evidence from these other analyses of the skeletal remains, cultural remains, and environmental indicators.

Diet and Trace Elements in Bone

Various trace elements and at least one isotope ratio offer the potential for making fairly precise statements about the nature of prehistoric diets. The ratio of meat to vegetable products and the significance of cultigens in prehistoric diets are questions for which standard archaeological evidence cannot provide adequate answers. Preserved vegetal remains, such as charred maize, are the result of accidental preservation and hence vary considerably from site to site and sample to sample within a site. Pollen is usually missing from Plains archaeological sites, and even when pollen from cultigens is present, it cannot indicate anything about the importance of the cultigens in the overall diet. Even the animal remains found in sites are not a sure guide to the importance of meat in the diet. In the historic period, Plains villagers regularly hunted bison at a distance from their homes and brought back dried meat and hides, not bone. Thus any technique which offers the promise of saying more about the specifics of diet is likely to add a great deal to our understanding of the archaeological record.

- C-13/C-12 ratios are an indicator of the importance of maize (and other tropical grasses) in the diet. Certain plants, such as maize, favor the heavier isotopes of carbon in their photosynthetic pathways (Baerreis and Bender 1979). Some of this carbon will be retained in human bone and is measurable using a mass spectrometer. A recent study (Baerreis and Bender 1979) demonstrated the feasibility of determining the differences in maize diet between populations and within single populations. In fact, the extent to which deer were raiding the corn fields could be determined!

Analysis of the C-13/C-12 ratios for all of the populations in the project domain would provide an indication of the extent to which they depended on maize and other tropical grasses. Analysis of bison bone from the same sites would be necessary in order to control for the presence of warm weather grasses in these animals. Indeed, the C-13/C-12 ratios of the bones of bison from different periods may reflect changes in the proportion of cool weather and warm weather

grasses in the region and hence provide an indication of general temperature fluctuations.

Analysis of the amount of strontium in human bone is another indicator of an aspect of diet, but in this case the feature being measured reflects the general proportion of meat to vegetable foods. This technique is based on the observation that there is a preferential exclusion of strontium relative to calcium in all animals, with the result that the levels of strontium in the bones of animals are lower than but correlated with the levels of strontium in their diets (Odum 1957). Compared to the plants in their diet, herbivores retain fairly little strontium, but they have high levels of it compared to the carnivores which prey on them (Toots and Voorhies 1965). In humans, the general ratio of plant (high strontium) to animal (low strontium) food in the diet should be reflected in their skeletal remains (Brown 1973, 1974; Schoeninger 1979).

The strontium technique is best applied within a restricted locale, since strontium in ground water can be deposited in bone (Elias 1980). Even within the project domain, likely drinking water sources should be checked for strontium content to provide control of this factor. This factor may also prove useful, however, if suspected intermarriage, capture, or residence rules are to be studied. If water sources in the region differ significantly in strontium or other minerals, skeletons suspected of representing people from another tribe (cf. Jantz 1974) could be checked to determine whether they differ from the presumably local skeletons in terms of trace minerals. In a site representing a community with local exogamy and either uxorilocal or virilocal residence, the skeletal remains of one sex of adults should have a higher variance in trace minerals levels than those of the other sex. Indeed, if this technique proves to be appropriate, the age at marriage for the in-marrying sex could be determined.

- Strontium content of bones and teeth is usually determined by atomic absorption spectrophotometry. The results of this technique may also reflect strontium deposited on and in bone by groundwater after burial, with the result that inter-cemetery variations may be produced. This problem also applies to other possible diet indicators, such as zinc, magnesium, and sodium (Lambert et al 1979). One of us (Blakeslee) is currently investigating a new technique for trace element analysis in bone which may overcome the problem of groundwater contamination.

HUMAN BEHAVIOR

In this section, we summarize possible avenues of research into some aspects of human behavior. These include patterns of exchange, mortuary behavior, subsistence patterns and seasonal rounds, ceramic

economy, symbol of analysis, regional social relationships, and three levels of analysis of settlement pattern: activity areas, community structure, and regional settlement pattern. For each of these, we discuss the utility of existing collections and records and indicate the types of fieldwork required.

Patterns of Exchange

While there is a good deal of theoretical interest in exchange systems in prehistory, relatively little analysis of exchange is forthcoming from the contract archaeology which forms the bulk of current archaeological fieldwork and analysis in North America. This dichotomy between theoretical interest and actual practice is the product of the conflict between the time constraints and local focus of most contract projects and the lengthy background analyses and regional or area focus required to do analysis of exchange systems. The geological research we have proposed (supra, Bedrock Geology under Environment) and the research into paleoclimatology should provide some of the necessary background data regarding sources and about the need for exchange.

The proposed research into the origin of the Coalescent Tradition is one facet of the research into patterns of exchange that is needed within the region. Some evidence for exchange can be expected for every cultural episode in the archaeological record; indeed, indications for some sort of exchange are evident from even the most cursory examinations of the extant collections. An excellent background for further research into exchange systems would be provided by a reanalysis of existing collections to determine the sources and types of (preserved) materials which were being exchanged. This research would have to include examination of selected sites outside the project domain so that the reciprocal flow of goods can be documented.

One potential area of research in the field of exchange behavior is the set of exchange requirements imposed by the development of sedentism. On the Great Plains, the combination of a highly variable environment and any degree of sedentism must have demanded a set of adaptations to the inevitability of localized food shortages. The research proposed under dendroclimatology and environment should provide the data necessary to predict the nature of changing regional economic strategies and exchange networks (cf. O'Shea 1981).

Mortuary Behavior

The project domain appears to be rich in cemeteries, ossuaries, and mounds, and a number of these have been excavated. These remain under-reported. They should be analyzed in terms of the mortuary behaviors that they represent. Mortuary behavior is an aspect of cultural activity which allows particularly rich insights into social

structure and ideology (cf. Brown 1971). The general region has also produced a large number of excavated burials, and the ethnographic and ethnohistoric literature dealing with this topic is extensive. It should be possible to delineate several patterns of burial in the project domain and to relate these to the mortuary practices seen in the various archaeological complexes in the region. A good beginning could be made with the collections and literature at hand, especially if the skeletal remains are analyzed as suggested in the section on human biology. Additional fieldwork directed toward determining whether or not infants were excluded from the cemeteries and ossuaries in the project domain would be most helpful.

Subsistence/Seasonal Round

The analysis of faunal and vegetal remains from archaeological sites, palynology, and investigation of diet indicators in human bone would provide a great deal of information regarding the subsistence patterns of the archaeological complexes in the project domain. As mentioned above, these would require additional archaeological fieldwork to obtain appropriate samples.

Perhaps the most difficult aspect of this field of inquiry is the determination of the season(s) that each site was occupied and the subsistence activities associated with each season. Annual rings in the teeth of deer and bison (Kay 1974) and the presence of charred vegetal remains have been successfully used to determine aspects of the seasonality of archaeological sites on the Plains. For the most part, however, precise determinations of seasonality have rarely been successful (with the notable exception of bison kill sites). At this point, we have little to add in the way of tested methodology to overcome the usual uncertainty concerning when sites were occupied. Investigations into the possibility of using bone histology to determine season of kill of deer are being conducted by Blakeslee, but to date no useful results have been forthcoming.

Ceramic Economy

One intriguing avenue of research was assessed during the inventory of collections in and near the project domain. This is the possibility of identifying the products of individual potters. Many of the prehistoric ceramic assemblages in the region exhibit decorative techniques which may allow the identification of the products of individual potters with a great enough degree of precision to be useful in answering questions about how the pottery vessels made by various people were distributed within the community.

One example of how this can work involves consideration of the pinching along the base of most collared St. Helena rims. Close examination of the nodes produced by this pinching reveals that several

ways of producing them are possible. Both index finger and thumb can be applied to the exterior of the vessel or the thumb may be applied to the exterior with the fingers applying counter-pressure from the interior. As the pinching is applied, the vessel can be rotated in either of two directions. The decoration can be applied with either hand, and the spacing of the decoration can vary. Finally, this pinched decoration can be applied either before or after incised decoration is applied to the collar face.

Different criteria will be necessary to distinguish individual potters in other assemblages. In Great Oasis assemblages, for instance, the sequences and directions in which the trailed decorative elements were applied can be determined, along with the direction of rotation of the vessel. The angle at which the tool was held to apply the trailing may also be important.

Luckily, it is not necessary to be able to determine all of the products of every potter or even to be able to distinguish all of the potters from one another to elicit anthropologically interesting information. It may never be possible to prove that all of the vessels in a class determined by the sort of criteria discussed above are the products of a single person. Yet the distribution of the vessels in such a class--restricted to one house, or one portion of a village, or throughout a village--may still indicate how the products of individual potters were distributed throughout their community. Similarly, to find the products of many potters in one house would also indicate something about exchange within the community. Fully excavated multi-household sites would provide the best data for this sort of analysis.

Analysis of Ceramic Symbolism

Since Wood's (1962) original study of decorative motifs in Plains ceramics, there has been no important work in this field. The time may now be appropriate for a deeper look at the meaning of these motifs. Hall's (1979) success in elucidating the meaning of some Hopewellian iconography suggests that some progress is possible on the Plains as well. The archaeological record is now much more complete than when Wood did his work, so that the distribution and associations of the motifs should be more clear. A study of the ceramic motifs would not require additional fieldwork. It would require a thorough knowledge of the ethnographic literature and of Plains and Midwestern archaeology.

Household Structure and Activity Areas

Sites of the Central Plains Tradition and Coalescent Tradition and a few sites of Great Oasis and Mill Creek present an unusual opportunity to the archaeologist. This is in the form of easily distinguishable and separable traces of households, i.e., earthlodges.

The internal distribution of features and debris within these structures should provide valuable insights into the domestic activities of these people. Indeed, such analysis would probably lead to better estimates of population than simple measurement of floor area (Naroll 1962; LeBlanc 1971).

Some such analysis could probably be attempted on the existing collections, in particular the excavated St. Helena lodges. This effort would be limited to an analysis of the distribution of features rather than artifacts and debitage, however, as the provenience of artifactual material on house floors was not recorded in the W.P.A. collections. Any new excavations should provide for the recording of exact proveniences to allow for fuller analysis of activity areas in the future. In addition, the excavations should be extended into the inter-house areas of villages and hamlets so that activity areas there may also be analyzed.

Community Structure

A recurring problem in Central Plains archaeology involves attempting to derive the nature of a community from the site it created. Earthlodges appear to have had a useful lifetime on the order of seven to ten years (Wilson 1934: 372). For moderately long-lived communities, this means that the number of lodges is not a good measure of the size of the community (Blakeslee and Caldwell 1979; Hotopp 1979). In the project domain, there is evidence for the accretion of earthlodge remains at the Wiseman Site, where three overlapping earthlodges were uncovered.

Earthlodge sites in the project domain appear to include everything from isolated lodges to large villages, and some of the apparent differences in site size may reflect length of occupation rather than community size. One approach to a measure of this sort of site accretion is to sample lodge depressions to determine how many have midden accumulations above the roof. Another is to record locations of sherds and other broken artifacts which can be fitted back together. A third approach which can be attempted when the appropriate samples are available, is to cross date charcoal and wood samples with a floating dendrochronological sequence (cf. Gradwohl 1969).

Another problem in those earthlodge communities with surface depressions is the assumption that all lodges are represented by depressions. In the Nebraska Phase, at any rate, this assumption does not hold (Gradwohl 1969). Structures not represented by surface depressions can be found and analyzed only by excavation. For this reason, at least some sites should be extensively excavated. Candidates for this honor might include some of the smaller earthlodge sites which have already been partially excavated (e.g. 25CD2). Excavation of the remainder of these sites could be used to provide samples for faunal and vegetal analysis, ceramic economy, and household activity area analysis as well as for the study of community structure.

Settlement Pattern above the Site Level

With a fairly precise chronology, an attempt can be made to understand settlement pattern on a larger scale. Several approaches may prove fruitful here. Multilevel site catchment analysis should help in understanding why sites are located in certain localities and in understanding their resource requirements. Once contemporary communities can be distinguished, their distribution in space and variation in size and function may become more meaningful. It will be most interesting to learn whether all St. Helena habitation sites are associated with ossuaries or whether there was a single ossuary for a set of communities.

It might also be possible to trace the development of the occupation of a single locality such as the Lime Creek valley from beginning to abandonment by several successive cultures. In conjunction with an intensive analysis of the local environment and the experimental archaeology already proposed, the reasons for the course of development and eventual abandonment might be clearly specifiable. It should also be possible to trace valley to valley population movements.

Regional Social Relationships

At an even larger scale of analysis, it should be possible to determine a good deal about social relationships. Some of the avenues of research proposed above (exchange, analysis of ceramic symbolism) should help to outline cultural contacts of one sort or another. The presence of warfare as indicated by fortification systems, arrowheads in human bone, and scalping wounds are obvious indicators of agonistic behavior. Perhaps the most fascinating problem in this regard is the warfare that appears to have been attendant on the movement of Coalescent peoples into the Dakotas. The massacre at Crow Creek (Zimmerman et al 1981) is a telling case in point.

Summary

The utility of existing collections and the need for more fieldwork if these research questions are to be pursued can be summarized thus:

RESEARCH QUESTION	EXISTING COLLECTIONS	NEW FIELDWORK
Exchange	macroanalysis of existing collections	geological survey and sampling; paleoclimatology
Mortuary Behavior	intensive reanalysis of field notes, skeletal remains, grave goods, literature search	sampling for beetles, missing infants
Subsistence/Seasonality	macrofauna analysis; diet analysis on human bone, dental annuli	sampling for fauna, flora; palynology
Ceramic Economy	reanalysis of Great Oasis, Central Plains Tradition, Coalescent ceramics	finish total excavation of one or more sites
Ceramic Symbolism	reanalysis of existing collections	
Household/Activity Areas	limited analysis possible	excavation with proper provenience in and out of lodges
Community Structure		total excavation of one or more sites; core sampling in a large site; dendrochronology
Settlement Pattern	site catchment	chronological sampling intensive work in one locality
Regional Relationships	little can be done at point	chronology, exchange, climatology fieldwork first

MANAGEMENT AND INTERPRETATION

Introduction

We have gathered together available data from in and near the Missouri National Recreational River as specified by the boundaries of the project domain. In the last section the potential that these materials might contain with reference to answering a number of research questions has been examined. It is not the same category of assessment which we want to address now, but the viability of the existing data base as an accurate inventory and potential guide for management of the resource. Further, some of the potential interpretive value of the sites will be discussed.

Review

First, the status of the existing site inventory is not representative of the probable true extent and variety of archaeological materials in the project domain. By stretching the definition, one could count 33 "officially" identified archaeological sites. This number is relatively insignificant when viewed from the perspective of the site leads generated before and during the progress of this project from the local collectors of just Dixon County alone. Therefore, although there have been some very interesting archaeological sites identified, we are really not in a position to state that any dimension of the local archaeological universe has been sampled. The reason for this is simple: there has been no comprehensive, purposive archaeological survey of any portion of the project domain.

The site leads generated from local collectors are not an entirely reliable guide for management purposes either. Although we had success in contacting many local collectors, the season was such that many were away vacationing, and some (we were told) stayed away because they did not wish to share information with us. Furthermore, some of the data supplied, such as reports of lodge depressions in the floodplain of the Missouri, suggest that the level of archaeological site discrimination may be low on the part of some locals. In other words, although these data supplement what we knew from previous research, the coverage is not of a scope or of a quality to be adequate for management purposes.

These stipulations should not apply to a search of the project domain for archaeological sites using aerial imagery. Such techniques, however, depend heavily upon conditions of light, vegetation and ground cover to yield successful results. In the present example, the color and black-and-white photos supplied were searched for sites, but due to prevailing conditions during the flight period the coverage

was not as good as it might have been. Also, the imagery supplied under the terms of the present contract did not cover the entire project domain; in fact it was limited to a rather narrow strip along the Missouri River itself. Alternate imagery for most of the project domain was secured, but large areas have not been searched due simply to an inability to secure coverage. Thus, although aerial imagery has great potential for discovering sites (and a number were found using this technique) this potential was not fulfilled due to these factors.

We have studied the concordance between the site leads generated from amateurs, aerial imagery, and professionally surveyed sites with this result: first, probable sites identified by amateurs often do not show up on aerial photos; second, the reverse situation is also true; third, some sites known to exist did not show on either of these supplemental site discovery techniques. There are, however, some striking examples of concordance between amateur and aerial imagery data including the identification of some impressive "sites" which need on-the-ground documentation.

Nothing we have attempted could be expected to reveal one class of archaeological manifestation. Neither aerial photography, amateur reports, or traditional surface survey techniques will disclose the presence of deeply buried archaeological sites (Thompson and Bettis 1980). Only a program of systematic, deep subsurface coring will reveal the existence of a majority of these sites; chance discovery in eroded cut-banks is a most unsatisfactory discovery mechanism.

Finally, we interviewed representatives of the Indian peoples of the region, including the Yankton, Winnebago and Omaha, with the hope that there might yet be some memory of traditional places within the project domain. We emphasized to those contacted the importance of the American Indian Religious Freedom Act (P.L. 95-341) for protecting sites of religious significance. No sites of traditional or religious significance were identified in this manner, but a list of names for follow-up interviews was gathered in each case. These interviews produced at least two unexpected and gratifying consequences. First, we heard expressions of concern that the Missouri National Recreational River might have an adverse effect upon planned economic or environmental programs; and second, there is a shoestring Yankton tribal history project that will benefit from at least some of the research generated by this project.

To summarize, the present inventory of data from the Missouri National Recreational River area is no basis for management of developments anticipated as part of the program. Systematic, purposive survey for archaeological sites will be the only method to develop the kinds of inventory information that will be required. Whatever form these surveys take, they should be designed and executed with the research problems outlined above in mind. In this fashion both

goals, research and management, can be enhanced.

The NATIONAL REGISTER OF HISTORIC PLACES is the primary management tool available for the protection of archaeological sites. Within the project domain there are but three archaeological sites listed on the Register: the Wiseman Site, 25CD3; the Schulte Site, 25CD1; and the Radke Site, 25CD2. There are a number of other National Register properties, but they are architectural and/or historical in nature. With but few exceptions we cannot identify additional sites from within the project domain which would today meet the criteria for eligibility in the National Register. The reason for this is not that the sites examined in the inventory lack merit, for indeed most appear to have sufficient merit for inclusion; rather the sites lack sufficient documentation. This is especially true for documentation regarding integrity and potential to yield scientifically important data. It has been amply demonstrated that site discovery has been biased along a number of dimensions; we can have virtually no idea of how representative of the range of temporal, cultural and functional site types suspected to exist in the project domain the presently known sites are. This is especially evident in the virtual absence of evidence for Paleo-Indian and Archaic sites.

We suggest that the research problems developed above might provide criteria for determination of a site's scientific potential. A comprehensive inventory of sites within the project domain through on-the-ground survey and subsurface probing, followed by or in conjunction with a program of subsurface testing would be an appropriate vehicle for utilizing the research problems to their fullest extent. The survey and testing would provide data for study by which an individual site's eligibility could be assessed. The analysis of the data would thereby further our understanding of the northeast Nebraska, southeast South Dakota area and provide sufficient information for determining National Register eligibility. Gradually, the information necessary for rational and prudent management of the Missouri National Recreational River would accrue.

Management

At this time there are a few sites which would qualify for National Register status if the basic documentation were assembled. The Fort Site, 25CD11, is the remains of a fortified village and burial mound complex, probably associated with an early or late eighteenth century Omaha village or villages known to have existed near the mouth of Bow Creek (Ludwickson n.d.; Wood 1978). When the site was tested in 1941, the existence of T. H. Lewis' detailed plan of the fortifications and mounds was not known to exist. The combination of the results of these two lines of evidence, enhanced by ethnohistorical study (most of which is documented earlier in this report), provides the basis for these statements. We would go as far

as to say that the site may have sufficient merit to be designated a National Historic Landmark. The Lembke Landing Site, 25DX26, appears also to be an immediate candidate for the National Register. In this case, however, subsurface probing and testing will probably be necessary in order to document the size of the site.

There is a second rank of sites which would require considerably more work in order to fully establish their National Register potential. These include many of the Central Plains Tradition and St. Helena hamlets in Dixon and Cedar counties, Nebraska; the Vermillion Bluff village in Vermillion, Clay County, South Dakota; and the site of Dixon's Post (Post Vermillion) and associated Yankton and Santee village near it. Were we to establish a priority of research for the Missouri National Recreational River area, documentation of these sites would be at the top.

Interpretation

One of the motivations for the creation of the Missouri National Recreational River was to provide for the public utilization of facilities to be developed in conjunction with its designation. We are confident that appropriate impact survey, testing and evaluation of areas to be affected directly by project-related improvements will be carried out. One of the specified goals of the Missouri National Recreational River designation was to protect and enhance the cultural resources within its scope; we see, however, the potential for their degradation and propose active intervention as a partial solution. We suggest that the cultural resources within the area are themselves something worthy of consideration for development. We do not know the proportion of Americans who find viewing archaeological parks edifying, but we suggest that some cultural resources be utilized for the purpose of educating visitors to the Missouri National Recreational River about its prehistory and early history. Admittedly biased as we are, we feel that the cultural resources of the Missouri National Recreational River are as potentially significant as the scenic beauty and recreational opportunity which led to its designation.

We feel that the Fort Site, 25CD11, has potential for development into a focus for this educational aspect of cultural resource management. By utilizing archaeological data and the detailed plans drawn in 1890 by T. H. Lewis, a replica of the original village could be constructed. No other site of Indian provenance within the project domain can be demonstrated to have this potential. Further, because the site has been under cultivation for almost 90 years, it can be predicted that relatively non-labor intensive large-scale stripping with heavy equipment to rapidly expose structural features at the site could be accomplished without damaging functional features of potential scientific importance. The historic Bow Valley Mill is almost immediately adjacent to the Fort Site and might be made available for an interpretive headquarters.

A number of things may prohibit execution of a plan such as this, even if the Government was willing to endorse it. First, there may be no willingness on the part of the present landowner to part with this small parcel of productive farm ground; he has just completed building a new house across the road from the site and may not wish to have to contend with the visitors. Second, although the site was in good condition the last time it was seen, its status can change at any time due to a number of factors. Finally, the Bow Valley Mill (which is currently listed on the NATIONAL REGISTER OF HISTORIC PLACES) is in need of emergency repairs in order to stabilize it and preserve it for the future. Although the mill and the Indian village are linked by nothing more than proximity, the feasibility of any plan for development and interpretation at this location would seem to depend upon the existence of both.

We suggest that if part or all of this plan is eventually implemented, execution of development and maintenance of an interpretive center be done in the form of a concession to another government agency, or preferably a private nonprofit organization. It is anticipated that if the Missouri National Recreational River is developed to its fullest potential, such a center, once established, would eventually be self-sustaining and therefore would not become a burden on the taxpayers.

The only means of access between the shores on either side of the Missouri River is presently the bridge at Yankton or by boat. We would suggest, therefore, that another center be established on the South Dakota side of the river to provide the same benefits. There is at present no obvious place for such a center. Should the archaeological existence of Dixon's Post/Post Vermillion and associated Indian village be established, this would be an obvious candidate. Until more work is done, however, this proposal can exist only as a tentative suggestion.

We are concerned that some who visit the Missouri National Recreational River will be drawn by the potential of the region for relic hunting. Activities of this sort are apt to be one of the indirect impacts of the designation of the project. One means of protecting the archaeological remains would be to obtain easements of sites on private property so that the sites would become protected by federal laws. This in combination with an educational effort directed at visitors would serve to reduce the impact of pothunting.

Recommendations

We can summarize this study by making some specific recommendations regarding the course of action to be followed in the Missouri National Recreational River development.

First. We perceive the urgent need for the emergency archaeological survey and evaluation of certain areas within the project domain. A number of locations along the Missouri River appear to be targeted for development as resort or residential areas, and given present knowledge regarding cultural resources, some of these developments may affect archaeological sites. Another class of emergency survey and evaluation is the case of the Bow Valley Mill/Fort Site area which should be investigated immediately to determine if there is a immediate threat to these properties.

Second. There is an urgent, but not an emergency, need to gather data from certain known and suspected site locations in order to make data available for National Register evaluations. We would urge that on-the-ground surveys be conducted in the immediate future to confirm and evaluate all known and reported cultural resources developed by this report. This action would significantly enhance the data base available for evaluating local criteria for National Register determinations and would allow for the scientific analysis of a portion of the archaeological data from the Missouri National Recreational River area.

Third. We recommend that a well-designed archaeological survey be initiated as soon as possible so that a predictive model for site locations may be generated. The survey should include provision for locating buried sites as well as those visible on the surface.

Fourth. We recommend that provision be made for the execution of data analyses on existing collections suggested under RESEARCH PROBLEMS. We believe that many answers to questions of interest to the informed public and the professional alike are already collected and awaiting only analysis to yield valuable results. This would be a cost-effective strategy to generate scientific and interpretive data for the project domain. Many of these sites were excavated under U. S. Government auspices in the 1930's and 1940's, but funding for analysis was not provided. Reports exist already in manuscript form which analyze data from four sites in the project domain. These should be published.

Fifth. Proposals should be solicited regarding implementation of new research on sites likely to yield important data to the understanding of the MNRR area. Mitigation efforts associated with development of the Missouri National Recreational River can be designed to answer many of the research questions developed here. Some research questions, however, will probably entail additional excavation.

The project domain is an appropriate focus for a long-term interdisciplinary research program. It offers unprecedented potential for providing important information to archaeology and other disciplines

through an integrated attack on the research problems discussed above. Certainly, the responsibility for the MNRR assigned to the U. S. Corps of Engineers does not necessarily entail funding of all of the research we have suggested. Still, the Corps or some other federal agency would be acting appropriately if they supported adequate survey and coordinated the research efforts of the many institutions which would have to be involved in such a program.

Conclusion

If these recommendations are implemented, a genuine contribution can be made toward the science of man in the Great Plains. There is no need here for contrived research designs; valid, even crucial, problems pertaining to our understanding of the area suggest themselves at every turn. We are all challenged by Waldo Wedel's remark quoted at the beginning of this volume. How shall we respond?

REFERENCES CITED

- Abel, A. H.
 1916 A New Lewis and Clark Map. GEOGRAPHICAL REVIEW 1(5): 329-345.
- Acheson, R.
 1959 Effects of starvation, septicaemia and chronic illness on the growth cartilage plate and metaphysis of the immature rat. JOURNAL OF ANATOMY, 93: 123-130. London.
- Accsádi, G. and T. Nemeskéri
 1970 History of Human Life Span and Mortality. AKADEMAI KIADO, Budapest.
- Agenbroad, L.D.
 1978 THE HUDSON-MENG SITE: AN ALBERTA BISON KILL IN THE NEBRASKA HIGH PLAINS. University Press of America.
- Ahler, S. A., A. M. Cuancara, D. B. Madsen, R. W. Kornbrath
 1977 ARCHEOLOGICAL RECONNAISSANCE AND TEST EXCAVATIONS AT THE TRAVIS 2 SITE, 39WW15, OAHE RESERVOIR, SOUTH DAKOTA. Report to the U. S. Army Corps of Engineers, Grand Forks, North Dakota.
- Ahler, S. A., D. K. Davies, C. R. Falk and D. B. Madsen
 1974 Holocene Stratigraphy and Archaeology in the Middle Missouri River Trench, South Dakota. SCIENCE 184: 905-908.
- Alex, L. M.
 1977 Fish and Fishing at Two Initial Middle Missouri Sites. SOUTH DAKOTA ARCHAEOLOGY 1: 38-51.
 1980 EXPLORING IOWA'S PAST. University of Iowa Press: Iowa City.
- Alex, R. A.
 1973 Architectural Features of Houses at the Mitchell Site (39DV2), Eastern South Dakota. PLAINS ANTHROPOLOGIST 18(60): 149-159.
 1981 THE PREHISTORIC VILLAGES OF THE LOWER JAMES RIVER BASIN, EASTERN SOUTH DAKOTA. Ms. filed at the South Dakota Archeological Research Center.
- Allen W. and J. Richardson, III
 1971 The Reconstruction of Kinship from Archaeological Data: The Concepts of Methods, and the Feasibility. AMERICAN ANTIQUITY, Vol. 36: 41-53.
- Allison, M., D. Mendoza and A. Pezzia
 1974 A Radiographic Approach to Childhood Illness in Precolumbian Inhabitants of Southern Peru. AMERICAN JOURNAL OF PHYSICAL ANTHROPOLOGY, 40: 409-416.

- Anderson, A. D.
 1957 Report on Turin Skeleton #3. IOWA ARCHEOLOGICAL SOCIETY NEWSLETTER 19: 4-5.
- 1961 The Glenwood Sequence. JOURNAL OF THE IOWA ARCHEOLOGICAL SOCIETY 10 (3).
- Anderson, D. C. (Editor)
 1966 Reconstruction of Wittrock Site. NORTHWEST CHAPTER OF IOWA ARCHEOLOGICAL SOCIETY NEWSLETTER 14(1).
- Anderson, D. C.
 1969 Mill Creek Culture: A Review. PLAINS ANTHROPOLOGIST 14(44) Part 1: 137-143.
- 1972 Ceramic Complex at the Brewster Site, 13CK15. Unpublished Ph.D. Dissertation. University of Wisconsin-Madison.
- 1973 Ioway Ethnohistory: A Review. ANNALS OF IOWA 41(8): 1228-1241; 41(1): 41-59.
- 1975 WESTERN IOWA PREHISTORY. Iowa State University Press: Ames.
- Anderson, D. C., M. Finnegan, J. Hotopp and A. K. Fisher
 1978 The Lewis Central School Site (13PW5). PLAINS ANTHROPOLOGIST 23(81): 183-219.
- Anderson, D. C., R. Shutler, Jr., et al.
 1980 The Cherokee Sewer Site and the Cultures of the Atlantic Climatic Episode. In: THE CHEROKEE EXCAVATIONS: 257-274. Academic Press, Inc.
- Anderson, Thomas G.
 1888 Narrative of Capt. Thomas G. Anderson. WISCONSIN HISTORICAL COLLECTIONS 9: 137-206.
- Anfinson, S. F.
 1977 AN ANALYSIS OF THE BIG SLOUGH SITE (21MU1) WITH PARTICULAR EMPHASIS ON THE CERAMIC BODY SHERDS. M. A. Thesis. University of Nebraska, Lincoln.
- 1979 A Handbook of Minnesota Prehistoric Ceramics. OCCASIONAL PUBLICATIONS IN MINNESOTA ANTHROPOLOGY 5.
- Anfinson, S. F. (Editor)
 1979 Great Oasis Phase. OCCASIONAL PUBLICATIONS IN MINNESOTA ANTHROPOLOGY 5: 87-94.
- Angel, J.
 1966 Early Skeletons from Tranquility, California. SMITHSONIAN CONTRIBUTIONS TO ANTHROPOLOGY 2: 1-19.

Angus, C. and C. Falk

- 1978 Cultural Resources Reconnaissance for Three Missouri River Bank Stabilization Projects in South Dakota and Nebraska: Sunshine Bottom, Goat Island and Ionia Bend. TECHNICAL REPORT 78(13) of the Division of Archeological Research, University of Nebraska-Lincoln.

Anonymous

- 1909 Arikara Creation Myth. JOURNAL OF AMERICAN FOLKLORE 22(83): 90-92.

- 1974 PREHISTORIC AND HISTORIC HABITAT OF THE MISSOURI AND OTO INDIANS. New York: Garland Publishing Inc.

Antevs, E.

- 1955 Geologic-climatic Dating in the West. AMERICAN ANTIQUITY 20: 317-335.

Arese, F. Count

- 1934 A TRIP TO THE PRAIRIES AND IN THE INTERIOR OF NORTH AMERICA [1837-1838]. Edited and translated by A. Evans. The Harbor Press: New York.

Audubon, J. J.

- 1897 AUDUBON AND HIS JOURNALS. Edited by E. Coues and M. Audubon. 2 Vols.

Baerreis, D. A.

- 1968 Artifact Descriptions Bone, Stone and Shell. JOURNAL OF THE IOWA ARCHEOLOGICAL SOCIETY 15: 107-191.

Baerreis, D. A. and R. A. Alex

- 1973 An Interpretation of Midden Formation--The Mill Creek Example. MINNESOTA PREHISTORIC ARCHEOLOGY SERIES 11: 143-148.

Baerreis, D. and M. Bender

- 1979 The Importance of Corn in Hopewell Diet: Results of Measurement of C-13/C-12 Ratios of Human Collagen. Paper read at the Midwest Archaeological Conference, Milwaukee.

Baerreis, D. and R. Bryson

- 1965 Climatic Episodes and the Dating of the Mississippian Cultures. WISCONSIN ARCHAEOLOGIST, Vol. 46, No. 4: 203-220.

- 1968 Introduction and Project Summary. In: Climatic Change and the Mill Creek Culture of Iowa. JOURNAL OF THE IOWA ARCHEOLOGICAL SOCIETY, Vol. 15: 1-34.

Banks, R.

- 1966 Excavations at the Beals Site (13CK62). NORTHWEST CHAPTER OF THE IOWA ARCHEOLOGICAL SOCIETY NEWSLETTER 14(5): 4-7.

- Barclay, G.
1958 TECHNIQUES OF POPULATION ANALYSIS. John Wiley: New York.
- Bartos, S.
1938 Unpublished field records, on file at the Department of Anthropology, University of Nebraska.
- Bartovics, A.
1974 The Experiment in Archaeology: A Comparison of Two Case Studies. JOURNAL OF FIELD ARCHAEOLOGY 1: 197-205.
- Bass, W. M.
1961 A Preliminary Survey of Skeletal Material from Archaeological Sites in Nebraska. PLAINS ANTHROPOLOGIST 6(12): 59-60, 108-109.
1964 The Variation in Physical Types of the Prehistoric Plains Indians. PLAINS ANTHROPOLOGIST 9(24) MEMOIR 1.
1971 HUMAN OSTEOLOGY: A LABORATORY AND FIELD MANUAL OF THE HUMAN SKELETON. The Missouri Archaeological Society, Columbia.
- Bass, W., D. R. Evans and R. L. Jantz
1971 The Leavenworth Site Cemetery: Archaeology and Physical Anthropology. UNIVERSITY OF KANSAS PUBLICATIONS IN ANTHROPOLOGY 2. Lawrence.
- Bass, W. M. and W. Rhule
1976 Human Burials from Rodgers Shelter. In: PREHISTORIC MAN AND HIS ENVIRONMENTS - A CASE STUDY IN THE OZARK HIGHLAND. Academic Press: New York, pp. 201-209.
- Bean, J. L.
1830 Letter to Clark, July 12, 1830. In: U.S. SERIAL SET No. 245, Document 512, V2: 97.
- Becker, B.
1980 Tree-Ring Dating and Radiocarbon Calibration in South-Central Europe. RADIOCARBON, Vol. 22, No. 2: 219-226.
- Bell, E. H. (Editor)
1936 CHAPTERS IN NEBRASKA ARCHAEOLOGY. University of Nebraska, Lincoln.
- Benn, D. W.
1974 Seed Analysis and its Implications for an Initial Middle Missouri Site in South Dakota. PLAINS ANTHROPOLOGIST 19 (63): 55-72.
1980 Diffusion and Acculturation in Woodland Cultures on the Western Prairie Peninsula. Paper delivered at the 38th Plains Conference, Iowa City.

- Benn, D. W. (continued)
 n.d. Mad Site Investigations. Ms. in possession of author.
- Bennett, J.
 1945 ARCHAEOLOGICAL EXPLORATIONS IN JO DAVIESS COUNTY. University of Chicago Press.
- Bennett, K.
 1973 On the Estimation of Some Demographic Characteristics on a Pre-history Population from the American Southwest. AMERICAN JOURNAL OF PHYSICAL ANTHROPOLOGY 39: 223-231.
- Biggerstaff, R. and J. Rose
 1979 The Effects of Induced Prenatal Hypothyroidism on Lamb Mandibular Third Primary Molars. AMERICAN JOURNAL OF PHYSICAL ANTHROPOLOGY 50: 357-362.
- Birkby, W.
 n.d. Problems in Paleopathology of Southwest American Indians. Ms. on file, Arizona State Museum, University of Arizona. Tucson.
- Blackbird, E.
 1916 Testimony before the U. S. Court of Claims.
- Blaine, M.
 1979 THE IOWAY INDIANS. University of Oklahoma Press: Norman.
- Blair, E. (Editor)
 1911 THE INDIAN TRIBES OF THE UPPER MISSISSIPPI VALLEY AND REGION OF THE GREAT LAKES. The Arthur H. Clark Company. Cleveland.
- Blakely, R.
 1971 Comparison of the Mortality Profiles of Archaic, Middle Woodland, and Middle Mississippian Skeletal Populations. AMERICAN JOURNAL OF PHYSICAL ANTHROPOLOGY 34: 43-53.
- Blakely, R. and P. Walker
 1968 Mortality profile of the Middle Mississippian Population of Dickson Mound, Fulton County, Illinois. PROCEEDINGS INDIANA ACADEMY OF SCIENCE 77: 102-108.
- Blakeslee, D. J.
 1975 The Plains Interband Trade System. Ph.D. Dissertation, University of Wisconsin-Milwaukee.
 1978 Assessing the Central Plains Tradition in Eastern Nebraska: Content and Outcome. OFFICE OF THE IOWA STATE ARCHAEOLOGIST REPORT 11: 134-143. Iowa City,
 1980 Kinks in the Calibration Curve: The Effects on Paleoclimatology. Paper read at the Great Plains Institute Symposium, April 1980. Lincoln, Nebraska.

- Blakeslee, D. J. (continued)
 in press Toward a Cultural Understanding of Human Microevolution on
 the Great Plains. PLAINS ANTHROPOLOGIST, Memoir Series.
- n.d. The Third Radiocarbon Revolution. Manuscript in possession
 of the author.
- Blakeslee, D. J. and W. W. Caldwell
 1979 THE NEBRASKA PHASE: AN APPRAISAL. J & L Reprint, Lincoln.
- Blakeslee, D. J. and J. N. Gundersen
 n.d. Kansas Pipestone and the Origin of the Calumet. Manuscript
 in possession of the authors.
- Blakeslee, D. J. and A. H. Rohn
 n.d. Environment and Man in Northeastern Kansas. Report to the
 U. S. Army Corps of Engineers, Kansas City District.
- Bleed, P.
 1975 A Report on 1973 Archeological Investigations in the Wood
 River Valley, Buffalo County, Nebraska. Report to the
 National Park Service. Department of Anthropology, Univer-
 sity of Nebraska. Lincoln.
- Bonney, R.
 1965 Evidence for Early Woodland Occupations in Southwestern
 Minnesota. MINNESOTA ARCHEOLOGIST 27(1): 2-48.
- 1970 Early Woodland in Minnesota. PLAINS ANTHROPOLOGIST 15(50)
 Pt. 1:302-304.
- Bougainville, L.
 1908 1757: Memoir of Bougainville. WISCONSIN HISTORICAL COLLECTIONS
 18: 167-195.
- Bowers, A. W.
 1948 A History of the Mandan and Hidatsa. Ph.D. Dissertation,
 University of Chicago.
- 1950 MANDAN SOCIAL AND CEREMONIAL ORGANIZATION. University of
 Chicago Press: Chicago.
- Boyd, L.
 1978 Evaluation of Wilson Bands as an Indicator of Childhood Stress.
 M. A. Thesis. University of Arkansas.
- Brace, C.
 1967 Environment, Tooth Form, and Size in the Pleistocene. JOURNAL
 OF DENTAL RESEARCH 46: 809-816.
- 1978 Tooth Reduction in the Orient. ASIAN PERSPECTIVES 19: 203-219.

- Brace, C. and P. Mahler
 1971 Post-Pleistocene Changes in the Human Dentition. AMERICAN JOURNAL OF PHYSICAL ANTHROPOLOGY 34: 191-203.
- Brackenridge, H. M.
 1814 VIEWS OF LOUISIANA, TOGETHER WITH A JOURNAL OF A VOYAGE UP THE MISSOURI RIVER, IN 1811. (facsimile edition) American Classics, Quadrangle Books: Chicago.
- Bradbury, J.
 1906 Travels in the Interior of America in the Years 1809, 1810, 1811. EARLY WESTERN TRAVELS...Vol. 5. R. G. Thwaites, editor.
- Bradley, L.
 1980 Historical Archaeology in South Dakota. Paper presented at the 38th Plains Conference, Iowa City, Iowa.
- Bray, R.
 1961 The Flynn Cemetery, an Orr Focus Oneota Burial Site in Allamakee County, Iowa. JOURNAL OF THE IOWA ARCHEOLOGICAL SOCIETY, Vol. 4, Part 1.
- 1978 European Trade Goods from the Utz Site and the Search for Fort Orleans. MISSOURI ARCHEOLOGIST 39: 1-75.
- Breternitz, D. A., A. C. Swedlund and D. C. Anderson.
 1971 An Early Burial from Gordon Creek, Colorado. AMERICAN ANTIQUITY 36(2): 170-182.
- Brown, A.
 1973 Bone Strontium Content as a Dietary Indicator in Human Skeletal Populations. Ph.D. Dissertation, Dept. of Anthropology, University of Michigan.
- 1974 Bone Strontium as a Dietary Indicator in Human Skeletal Populations. CONTRIBUTIONS TO GEOLOGY, Vol. 13: 47-48.
- Brown, J. A.
 1964 The Deer-jaw sickle. AMERICAN ANTIQUITY 29(3): 381-386.
- Brown, J. A. (Editor)
 1971 Approaches to the Social Dimensions of Mortuary Practices. MEMOIRS OF THE SOCIETY FOR AMERICAN ARCHAEOLOGY No. 55.
- Brown, L. A.
 1967 Pony Creek Archeology. PUBLICATIONS IN SALVAGE ARCHEOLOGY 5.
- 1967 THE CHAPPELLE CREEK SITE (39HU60), SOUTH DAKOTA. Ms. filed at the Midwest Archeological Center, Lincoln.

- Brown, L. A. (continued)
- 1968 The Gavins Point Site (39YK203). An Analysis of Surface Artifacts. PLAINS ANTHROPOLOGIST 13(40): 118-131.
- 1974 The Archaeology of the Breeden Site. PLAINS ANTHROPOLOGIST 19(66) Pt. 2, MEMOIR 10.
- Bruns, M., K. Munnich and B. Becker
- 1980 Natural Radiocarbon Variations from A.D. 200 to A.D. 800. RADIOCARBON, Vol. 22, No. 2: 273-277.
- Bryson, R. A.
- 1980 Ancient Climes on the Great Plains. NATURAL HISTORY 89(6): 64-73.
- 1981 Chinook Climates and Plains People. GREAT PLAINS QUARTERLY 1(1): 5-15.
- Bryson, R. A. and D. A. Baerreis
- 1968 Introduction and Project Summary. JOURNAL OF THE IOWA ARCHEOLOGICAL SOCIETY 15: 1-34.
- Bryson, R. A., D. Baerreis and W. Wendland
- 1970 The Character of Late-Glacial and Post-Glacial Climatic Changes. In: PLEISTOCENE AND RECENT ENVIRONMENTS OF THE CENTRAL GREAT PLAINS. W. Dort and J. Jones, eds. Special Publication 3: 53-74; Department of Geology. University of Kansas Press: Lawrence.
- Bryson, R. and W. Wendland
- 1967 Tentative Climatic Patterns for some Late-Glacial and Post-Glacial Episodes in North America. In: Life, Land and Water. W. Mayer-Oakes, ed. UNIVERSITY OF MANITOBA DEPARTMENT OF ANTHROPOLOGY OCCASIONAL PAPERS, No. 1.
- Buikstra, J.
- 1972 Hopewell in the Lower Illinois Valley: A Regional Approach to the Study of Biological Variability and Mortuary Activity. Ph.D. Dissertation, University of Chicago, Chicago.
- 1976 The Caribou Eskimo: General and Specific Disease. AMERICAN JOURNAL OF PHYSICAL ANTHROPOLOGY 45: 351-368.
- Buntley, G. H., W. C. Bourne and F. C. Weston
- 1953 Soils of Clay County, South Dakota, BULLETIN 430, Agriculture Experiment Station, South Dakota State College, Brookings.
- Bushnell, D. I.
- 1927 Burials of the Algonquian, Siouan and Caddoan Tribes West of the Mississippi. BUREAU OF AMERICAN ETHNOLOGY BULLETIN 83.

- Butler, M. C.
1976 Human Skeletal Remains context. MISSOURI ARCHAEOLOGICAL RESEARCH SERIES 13: 27-29
- Butler, R. J.
1969 The Heliocoidal Pattern of Dental Attrition in a Protohistoric Arikara Population from the Northern Plains. DISSERTATION ABSTRACTS INTERNATIONAL 30: 2513B UM69-21, 500.
- Butzer, K. W.
1973 Review of Climatic Change and the Mill Creek Culture of Iowa, Part I and II. PLAINS ANTHROPOLOGIST 18(61): 253-255.
- Calabrese, F. A.
1972 Cross Ranch: A Study of the Variability in a Stable Cultural Tradition. PLAINS ANTHROPOLOGIST 17(58) Pt. 2, MEMOIR 9.
- Caldwell, W. W.
1961 Archeological Investigations at the Coralville Reservoir, Iowa. River Basin Survey Papers 22, Smithsonian Institution. BUREAU OF AMERICAN ETHNOLOGY BULLETIN 169.
1966 The Black Partizan Site. PUBLICATIONS IN SALVAGE ARCHAEOLOGY, No. 2, Lincoln.
1966 The Middle Missouri Tradition Reappraised. PLAINS ANTHROPOLOGIST 11(32): 152-157.
- Caldwell, W. W. and R. E. Jensen
1969 The Grand Detour Phase. PUBLICATIONS IN SALVAGE ARCHAEOLOGY 13.
- Carlson, G. and T. L. Steinacher
1978 A Preliminary Culture-Historical Sequence for the Plains Archaic Period in Nebraska. Paper read at the Symposium, "Migration and Extinction in the Great Plains," Institute for Tertiary-Quaternary Studies, Lincoln, April 1978.
- Castagliona, G. and D. Lal
1980 Solar Modulation Effects in Terrestrial Production of Carbon 14. RADIOCARBON, Vol. 22, No. 2: 133-158.
- Champe, J. L.
1936 The Sweetwater Culture Complex. In: CHAPTERS IN NEBRASKA ARCHAEOLOGY. Edited by Earl Bell. University of Nebraska, Lincoln.
1946 Ash Hollow Cave. UNIVERSITY OF NEBRASKA STUDIES, No. 1 Lincoln.
1949 A Report for the Laboratory of Anthropology, University of Nebraska, 1940-1947. Proceedings of the Fifth Plains Conference for Archeology. NOTEBOOK No. 1: 14-17. Laboratory of Anthropology, University of Nebraska. Lincoln.

- Champe, J. L. (continued)
 1974 YANKTON CHRONOLOGY. Garland Press: New York.
- Champe, J. L. and F. Fenenga
 1974 NOTES ON THE PAWNEE. Garland Press: New York.
- Chaplin, R. E.
 1971 THE STUDY OF ANIMAL BONES FROM ARCHAEOLOGICAL SITES.
 Seminar Press: London.
- Charles, J.
 1908 Reminiscences of John H. Charles. ANNALS OF IOWA 8(6): 400-432.
- Charlevoix, P.
 1761 JOURNAL OF A VOYAGE TO NORTH-AMERICA. 2 Vols. R. and J.
 Dodsley: London.
- Chomko, S. A.
 1976 Faunal Exploitation in the Initial Middle Missouri Variant.
 MISSOURI ARCHAEOLOGICAL RESEARCH SERIES 13: 35-41.
- Choteau, A.
 1940 Notes on the Boundaries of Various Indian Nations. GLIMPSES
 OF THE PAST 7: 136-140.
- Christensen, C. M. and J. C. Stephens
 1967 Geology and Water Resources of Clay County, South Dakota.
 BULLETIN 19, South Dakota Geological Survey.
- Churcher, C. and W. Kenyon
 1960 The Tabor Hill Ossuaries: A Study in Iroquois Demography.
 HUMAN BIOLOGY 32: 249-273.
- Clark, W.
 1830a Letter to John Eaton, Nov. 1, 1830. In: U.S. SERIAL SET 245.
 Document 512, 1830b V. 2: 183.
- 1830b Letter to J. L. Bean, 1830. In: U.S. SERIAL SET 245,
 Document 512, V. 2, 66-67.
- 1964 THE FIELD NOTES OF CAPTAIN WILLIAM CLARK, 1803-1805. Edited
 by E. S. Osgood. Yale University Press.
- Cobley, R., D. Kerr and H. Robinson
 1971 COLOR ATLAS OF ORAL PATHOLOGY. J. B. Lippincott Co.: Philadelphia.
- Cook, D.
 1979 Subsistence Base and Health in Prehistoric Illinois Valley:
 Evidence from the Human Skeleton. MEDICAL ANTHROPOLOGY 4:
 109-123.

- Cook, D. and J. Buikstra
 1979 Health and Differential Survival in Prehistoric Populations: Prenatal Dental Defects. AMERICAN JOURNAL OF PHYSICAL ANTHROPOLOGY, 51: 649-664.
- Cooke, P. St.G.
 1859 SCENES AND ADVENTURES IN THE ARMY, OR, THE ROMANCE OF MILITARY LIFE. Lindsay and Blakiston: Philadelphia.
- Cooper, P. L.
 1939 Report of Explorations (1938). NEBRASKA HISTORY MAGAZINE, 20(2): 95-151.
 1949 Recent Investigations in Fort Randall and Oahe Reservoirs, South Dakota. AMERICAN ANTIQUITY 14(4), Pt. 1: 300-310.
- Cooper, P. L. and E. H. Bell
 1936 The Archeology of Certain Sites in Cedar County, Nebraska. CHAPTERS IN NEBRASKA ARCHAEOLOGY, pp. 11-145.
- Cowgill, G. L.
 1975 A Selection of Samplers: Comments on Archaeo-Statistics. In: SAMPLING IN ARCHEOLOGY, edited by J. Mueller.
- Culbertson, T.
 1952 Journal of an Expedition to the Mauvaises Terres and the Upper Missouri in 1850. Edited by J. F. McDermott. BUREAU OF AMERICAN ETHNOLOGY BULLETIN 147.
- Cumming, A.
 1856 Indians of the Upper Missouri. U. S. SERIAL SET 853, Document 65: 1-15.
- Dahlberg, A.
 1963 Analysis of the American Indian Dentition. In: DENTAL ANTHROPOLOGY. Edited by D. R. Brothwell. Pergamon Press: New York, 149-177.
- Dallman, J. E.
 1970 DIETARY STUDY OF THE BROKEN KETTLE WEST SITE. Manuscript on file, Office of the State Archaeologist: Iowa City.
 1977 Dietary Evaluation of Two Mill Creek Sites. Ph.D. Dissertation. University of Wisconsin-Madison.
- Damon, P., C. Ferguson, A. Long and E. Wallick
 1974 Dendrochronologic Calibration of the Radiocarbon Time Scale. AMERICAN ANTIQUITY, 39(2): 350-366.
- Deetz, J.
 1965 The Dynamics of Stylistic Change in Arikara Ceramics. ILLINOIS STUDIES IN ANTHROPOLOGY 3.

- Delanglez J.
 1945 Marquette's Autograph Map of the Mississippi River. MID-AMERICA 27(1): 30-53.
- DeLoria, E.
 1967a Some Notes on the Yankton. MUSEUM NEWS 28(3-4): 1-30. Vermillion.
 1967b Some Notes on the Santee. MUSEUM NEWS 28(5-6): 1-21. Vermillion.
- Denig, E. T.
 1961 FIVE INDIAN TRIBES OF THE UPPER MISSOURI: SIOUX, ARIKARAS, ASSINIBOINES, CREES AND CROWS. Edited by J. C. Ewers. University of Oklahoma Press: Norman.
- DeVries, H.
 1958 Variation in Concentration of Radiocarbon with Time and Location on Earth. KONINKL NEDELANDISCHE AKADEMIE WETENSCHAP, PROCEEDINGS, Vol. B61: 1-9.
- Dibble, D. and D. Lorraine
 1968 Bonfire Shelter: A Stratified bison kill Site, Val Verde County, Texas. TEXAS MEMORIAL MUSEUM MISCELLANEOUS PAPERS, No. 1.
- Diller, A.
 1946 Maps of the Missouri River Before Lewis and Clark. Edited by Ashley Montague. STUDIES AND ESSAYS IN THE HISTORY OF SCIENCE AND LEARNING. pp. 505-519.
 1955 James MacKay's Journey in Nebraska in 1796. NEBRASKA HISTORY 36(2): 123-128.
- Dorsey, G. A.
 1904 Traditions of the Arikara. PUBLICATION 17, Carnegie Institution of Washington.
 1906 The Pawnee, Mythology (Part I). PUBLICATION 59, Carnegie Institution of Washington.
- Dorsey, J. O.
 1884 Omaha Sociology. BUREAU OF AMERICAN ETHNOLOGY ANNUAL REPORT 3: 205-370.
 1886 Migrations of Siouan Tribes. AMERICAN NATURALIST 20(3): 210-222.
 1889 Camping Circles of Siouan Tribes: AMERICAN ANTHROPOLOGIST 2: 175-177.
 1890 The *ǂegiha* Language. CONTRIBUTIONS TO NORTH AMERICAN ETHNOLOGY 6: 1-794.

- Dorsey, J. O. (continued)
1896 Omaha Dwellings, Furniture, and Implements. BUREAU OF AMERICAN ETHNOLOGY ANNUAL REPORT 13: 263-288.
- Dorsey, J. O. and C. Thomas
1907 Iowa. BUREAU OF AMERICAN ETHNOLOGY BULLETIN 1 : 612-614.
- Dreizen, S., C. Spirakis and R. Stone
1964 The Influence of Age and Nutritional Status on "bone scar" Formation in the Distal End of the Growing Radius. AMERICAN JOURNAL OF PHYSICAL ANTHROPOLOGY 22: 295-306.
- 1967 A Comparison of Skeletal Growth and Maturation in Under-nourished and Well-nourished Girls Before and After Menarche. JOURNAL OF PEDIATRICS. 70: 256-263.
- Driesen, J. L.
1968 SOIL SURVEY OF UNION COUNTY, SOUTH DAKOTA. U.S.D.A. Soil Conservation Service.
- Dunbar, J. B.
1880 The Pawnee Indians: Their History and Ethnology. MAGAZINE OF AMERICAN HISTORY 4(4): 241-279.
- Ehernhard, J. E.
1972 Time, Space and Climate in the Middle Missouri. TRANSACTIONS OF THE NEBRASKA ACADEMY OF SCIENCES 1: 11-19.
- Elias, M.
1980 The Feasibility of Dental Strontium Analysis for Diet Assessment of Human Populations. AMERICAN JOURNAL OF PHYSICAL ANTHROPOLOGY 53 (1): 1-4.
- Ensz, E. H.
1979 SOIL SURVEY OF YANKTON COUNTY, SOUTH DAKOTA. U.S.D.A. Soil Conservation Service.
- Faulkner, C.
1971 The Late Prehistoric Occupation of Northwestern Indiana: A Study of the Upper Mississippi Cultures of the Kankakee Valley. INDIANA HISTORICAL SOCIETY PREHISTORY RESEARCH SERIES 5(1).
- Fitting, J.
1970 THE ARCHAEOLOGY OF MICHIGAN. Natural History Press.
- Flanders, R. E.
1977 The Soldow Site (13HB1): An Archaic Component from North Central Iowa. JOURNAL OF THE IOWA ARCHEOLOGICAL SOCIETY 24: 125-147.

- Flanders, R. E. and R. Hansman
 1961 A Woodland Mound Complex in Webster County, Iowa. JOURNAL OF IOWA ARCHEOLOGICAL SOCIETY 11(1).
- Fletcher, A and F. La Flesche
 1911 The Omaha Tribe. BUREAU OF AMERICAN ETHNOLOGY ANNUAL REPORT 27: 17-672.
- Folmer, H.
 1939 The Mallet Expedition of 1739. COLORADO MAGAZINE 16(5): 161-173.
- 1942 Etienne Veniard de Bourgmond in the Missouri Country. MISSOURI HISTORICAL REVIEW 36: 279-298.
- Fontanelle, H.
 1885 History of Omaha Indians. TRANSACTIONS AND REPORTS OF THE NEBRASKA STATE HISTORICAL SOCIETY 1: 76-85.
- Fortune, R. F.
 1932 Omaha Secret Societies. COLUMBIA UNIVERSITY CONTRIBUTIONS TO ANTHROPOLOGY 14. New York.
- Fowler, M. L.
 1956 Modoc Rock Shelter. REPORT OF INVESTIGATIONS No. 8, Illinois State Museum.
- Frankforter, W. D. (editor)
 1955 Early Indian Skeletons at Turin. NORTHWEST IOWA ARCHEOLOGICAL SOCIETY NEWSLETTER 3(5): 4-6.
- Frankforter, W. D.
 1959 A Pre-Ceramic Site in Western Iowa. JOURNAL OF THE IOWA ARCHEOLOGICAL SOCIETY 8(4): 47-72. -
- 1968 Faunal Study of Large Ruminants from Mill Creek Culture Sites in Northwest Iowa. JOURNAL OF THE IOWA ARCHEOLOGICAL SOCIETY 16: 286-301.
- Frankforter, W. D. and G. A. Agogino
 1959 Archaic and Paleo-Indian Archaeological Discoveries in Western Iowa. TEXAS JOURNAL OF SCIENCE 11(4): 482-491.
- 1960 The Simonsen Site. PLAINS ANTHROPOLOGIST 5(10): 65-70.
- Frantz, W.
 1958a The Wissler Site 25CD12, Cedar County, Nebraska. Ms. filed at the Nebraska State Historical Society, Lincoln.
- 1958b The Burney Site, 25CD21, Cedar County, Nebraska. Ms. filed at the Nebraska State Historical Society, Lincoln.

- Frantz, W. (continued)
- 1958c Report of the 1958 Field School, University of Nebraska, Department of Anthropology. Ms. filed at Nebraska State Historical Society, Lincoln.
 - 1963 Four Aksarben Sites in Dakota County. M. A. Thesis, Department of Anthropology, University of Nebraska, Lincoln.
- Frison, G. C.
- 1973 Early Period Marginal Cultural Groups in Northern Wyoming. PLAINS ANTHROPOLOGIST 18(62) Pts. 1-2: 30-312.
 - 1974 THE CASPER SITE: A HELL GAP BISON KILL ON THE HIGH PLAINS. Academic Press.
 - 1978 PREHISTORIC HUNTERS OF THE HIGH PLAINS. Academic Press.
- Fugle, E.
- 1962 Mill Creek Culture and Technology. JOURNAL OF THE IOWA ARCHEOLOGICAL SOCIETY 11(4).
- Gale, J.
- 1969 THE MISSOURI EXPEDITION, 1818-1820: THE JOURNAL OF SURGEON JOHN GALE WITH RELATED DOCUMENTS. Edited by R. L. Nichols. University of Oklahoma Press: Norman.
- Gallatin, A.
- 1836 Synopsis of the Indian Tribes within the United States East of the Rockies, and in the British and Russian Possessions in North America. TRANSACTIONS AND COLLECTIONS OF THE AMERICAN ANTIQUARIAN SOCIETY 2: 1-422.
- Galm, Jerry R.
- 1979 The Uncas Site: A Late Prehistoric Manifestation in the the Southern Plains. RESEARCH SERIES 5, University of Oklahoma Archeological Research and Management Center.
- Gant, R.
- 1967 Report of the Archeological Investigations at the Arp Site, 39BR101, Brule County, South Dakota, 1961. ARCHEOLOGICAL STUDIES, CIRCULAR 12, University of South Dakota, Vermillion.
- Garn, S., A. Lewis and R. Kerewsky
- 1965 Genetic, Nutritional and Maturational Correlates of Dental Development. JOURNAL OF DENTAL RESEARCH, 44: 228-242.
- Garn, S. and C. Rohmann
- 1966 Interaction of Nutrition and Genetics in the Timing of Growth and Development. Pediatric Clinics of N. A. 13: 353-379.
- Garn, S., F. Silverman, K. Hertzog, C. Rohmann
- 1968 Line Bands of Increased Density. MEDICAL RADIOGRAPHY AND PHOTOGRAPHY 44: 58-89.

- Garn, S., B. Wagner, C. Rohmann and W. Ascoli
 1968 Further Evidence for Continuing Bone Expansion. AMERICAN JOURNAL OF PHYSICAL ANTHROPOLOGY 28: 219-222.
- Garrett, J. W.
 1964 Highway Archeological and Historical Salvage Program 1961-1962. Ms. filed at the Nebraska State Historical Society. (excavations at 25KX9).
- Geyh, M.
 1980 Holocene Sea Level History: Case Study of the Statistical Evaluation of 14-C Dates. RADIOCARBON 22 (3): 695-704.
- Gibbon, G.
 1969 The Walker-Hooper and Bornick Sites, Two Grand River Phase Oneota Sites in Central Wisconsin. Ph.D. Dissertation, University of Wisconsin-Madison.
 1972 Cultural Dynamics and the Development of the Oneota Lifeway in Wisconsin. AMERICAN ANTIQUITY 37(2): 166-185.
- Gibbon, G. and C. Caine
 1980 The Middle Woodland to Late Woodland Transition in Southern Minnesota. MIDCONTINENTAL JOURNAL OF ARCHEOLOGY 2(1): 100-200.
- Gilbert, B. M.
 1969 Some Aspects of Diet and Butchering Techniques Among Prehistoric Indians in South Dakota. PLAINS ANTHROPOLOGIST 14(46): 277-294.
- Gilbert, B. M. and T. McKern
 1973 A Method for Aging the Female Os Pubis. AMERICAN JOURNAL OF PHYSICAL ANTHROPOLOGY 38: 31-38.
- Gilder, F.
 1909 Excavations of Earth-Lodge Ruins in Eastern Nebraska. AMERICAN ANTHROPOLOGIST 11(2): 56-84.
- Gilmore, G. H.
 1933 Report of An Exploring Trip to Dakota and Cedar Counties in Search of Omaha Village Sites. Ms. filed at the Nebraska State Historical Society.
- Gilmore, M. R.
 1913a A Study in the Ethnobotany of the Omaha Indians. COLLECTIONS OF THE NEBRASKA STATE HISTORICAL SOCIETY 17: 314-357.
 1913b Some Native Nebraska Plants with their Uses by the Dakota. COLLECTIONS OF THE NEBRASKA STATE HISTORICAL SOCIETY 17: 358-370.

- Gilmore, M. R. (continued)
- 1919 Uses of Plants by the Indians of the Missouri River Region. THIRTY-THIRD ANNUAL REPORT, BUREAU OF AMERICAN ETHNOLOGY (1911-1912): 43-153.
 - 1927 Notes on Arikara Tribal Organization. INDIAN NOTES 4: 332-350.
 - 1929 The Arikara Book of Genesis. PAPERS OF THE MICHIGAN ACADEMY OF SCIENCE 12: 95-120.
 - 1930 The Arikara Tribal Temple. PAPERS OF THE MICHIGAN ACADEMY OF SCIENCE 14: 47-70.
- Gindhart, P. S.
- 1969 The Frequency of Appearance of Transverse Lines in the Tibia in Relation to Childhood Illnesses. AMERICAN JOURNAL OF PHYSICAL ANTHROPOLOGY 31: 17-22.
- Giraud, M. (Editor)
- 1958 Etienne Veniard De Bourgmond's "Exact Description of Louisiana." BULLETIN OF THE MISSOURI HISTORICAL SOCIETY 15(1): 3-19.
- Glenn, E.
- 1974 Physical Affiliations of the Oneota Peoples. Office of the Iowa State Archaeologist, REPORT 7.
- Goldstein, M.
- 1953 Some Vital Statistics Based on Skeletal Material. HUMAN BIOLOGY 25: 3-12.
- Gradwohl, D. M.
- 1967 A Preliminary Precis of the Moingona Phase, an Oneota Manifestation in Central Iowa. PLAINS ANTHROPOLOGIST, Vol. 12, No. 36: 211-212.
 - 1969 Prehistoric Villages in Eastern Nebraska. Nebraska State Historical Society PUBLICATIONS IN ANTHROPOLOGY 4. Lincoln.
 - 1974 Archeology of the Central Des Moines River Valley: A Preliminary Summary. MINNESOTA PREHISTORIC ARCHEOLOGY SERIES 11: 90-102.
- Grange, R. T.
- 1968 Pawnee and Lower Loup Pottery. PUBLICATIONS IN ANTHROPOLOGY 3. Nebraska State Historical Society. Lincoln.
 - 1980 Archeological Investigations in the Red Willow Reservoir. PUBLICATIONS IN ANTHROPOLOGY 9. Nebraska State Historical Society. Lincoln.
- Great Plains Flora Association
- 1977 ATLAS OF THE FLORA OF THE GREAT PLAINS. Iowa State University Press: Ames, Iowa.

- Greene, D.
1972 Dental Anthropology of Early Egypt and Nubia. JOURNAL OF HUMAN EVOLUTION 36: 315-324.
- Greene, D., G. Ewing and G. Armelagos
1967 Dentition of a Mesolithic Population from Wadi Halfa, Sudan. AMERICAN JOURNAL OF PHYSICAL ANTHROPOLOGY 27: 41-56.
- Griffin, D.
1976 A Model of Culture Change for the Middle Missouri Subarea. MISSOURI ARCHAEOLOGICAL RESEARCH SERIES 13: 33-35.
- Griffin, J.
1937 The Archaeological Remains of the Chiwere Sioux. AMERICAN ANTIQUITY 2(3): 180-181
- Griffin, J. B., R. E. Flanders and P. I. Titterington
1970 The Burial Complexes of the Knight and Norton Mounds in Illinois and Michigan. MEMOIRS 2, University of Michigan, Ann Arbor.
- Grinnell, G. B.
1962 THE CHEYENNE INDIANS: THEIR HISTORY AND WAYS OF LIFE. Reprint Edition. Cooper Square Publishers: New York.
- Gunnerson, D.
n.d. The Stanton Site. Ms. filed at the Nebraska State Historical Society, Lincoln.
- Gunnerson, J. H.
1952 Some Nebraska Culture Pottery Types. PLAINS ARCHAEOLOGICAL CONFERENCE NEWSLETTER 5(3): 39-49.
- Gussow, Z.
1974 AN ANTHROPOLOGICAL REPORT ON INDIAN USE AND OCCUPANCY OF ROYCE AREAS 69 AND 120 WHICH WERE CEDED TO THE UNITED STATES BY THE SAC, FOX AND IOWA INDIANS UNDER THE TREATY OF AUGUST 4, 1824. Garland Publishing Inc.: New York.
- Haas, D. R.
1980a Walker-Gilmore: A Stratified Woodland Period Occupation in Eastern Nebraska-A Report of the 1968 Excavations. Technical Report 80-22, Division of Archaeological Research, University of Nebraska-Lincoln.

1980b A Discussion on the Sterns Creek Complex and the Late Woodland Period in the Central Plains. Paper presented at the 38th Plains Conference, Iowa City, Iowa.
- Haberman, T. W.
1980 Excavations at the Dirt Lodges Village Site, 39SP11 in Spink County, South Dakota. NEWSLETTER OF THE SOUTH DAKOTA ARCHEOLOGICAL SOCIETY 10(4): 1-2.

- Hall, E. R. and K. R. Kelson
 1959 THE MAMMALS OF NORTH AMERICA (2 Vols.) Ronald Press: New York.
- Hall, R. L.
 1961 An Archaeological Investigation in the Gavin's Point Area, Yankton County, South Dakota. MUSEUM NEWS 22(7). W. H. Over Museum, State University of South Dakota, Vermillion.
 1962 THE ARCHAEOLOGY OF CARCAJOU POINT. 2 Vols. University of Wisconsin Press.
 1979 In Search of the Ideology of the Adena-Hopewell Climax. In: HOPEWELL ARCHAEOLOGY, THE CHILLICOTHE CONFERENCE. Edited by D. Brose and N. Greber. 258-265
 n.d. Archeological Investigations at the Gavin's Point Site. Ms. in possession of the author.
- Hammond, F. W.
 1980 Biases Inherent in Archeological Fieldwork. ARCHAEO-PHYSIKA 7: 193-216.
- Harris, E.
 1951 UP THE MISSOURI WITH AUDUBON; THE JOURNAL OF EDWARD HARRIS. Edited by J. F. McDermott. University of Oklahoma Press: Norman.
- Harris, H.
 1933 BONE GROWTH IN HEALTH AND DISEASE. Oxford University Press, London.
- Harvey, A. E.
 1979 Oneota Culture in Northwestern Iowa. Office of the Iowa State Archaeologist, REPORT 12. Iowa City.
- Harvey, T. H.
 1845 Letter to Commissioner of Indian Affairs, September 10, 1845. U. S. SERIAL SET 470, Senate Executive Document 1:536.
- Haynes, C. V.
 1970 Geochronology of Man-Mammoth Sites and Their Bearing on the Origin of the Llano Complex. In: PLEISTOCENE AND RECENT ENVIRONMENTS OF THE GREAT PLAINS. Edited by W. Dort and J. K. Jones. Department of Geology, University of Kansas Special Publication 3: 77-92.
- Hays, W.
 1973 STATISTICS FOR THE SOCIAL SCIENCES. Holt, Rinehart and Winston: New York.

- Henning, A. E.
 1967 The Beals Site: Great Oasis and Woodland Components. PLAINS ANTHROPOLOGIST 12(36): 207-208.
- Henning, D. R.
 1961 Oneota Ceramics in Iowa. JOURNAL OF THE IOWA ARCHEOLOGICAL SOCIETY 11(2): 1-47.
 1967 Mississippian Influences on the Eastern Plains Border: An Evaluation. PLAINS ANTHROPOLOGIST 12(36): 184-194.
 1968 Ceramics from the Mill Creek Sites. JOURNAL OF THE IOWA ARCHEOLOGICAL SOCIETY 16: 192-280.
- Henning, D. R. (Editor)
 1968a Climatic Change and the Mill Creek Culture of Iowa, Part I. JOURNAL OF THE IOWA ARCHEOLOGICAL SOCIETY 15.
 1968b Climatic Change and the Mill Creek Culture of Iowa, Part II. JOURNAL OF THE IOWA ARCHEOLOGICAL SOCIETY 16.
- Henning, D. R.
 1969 University of Nebraska Archaeological Research in Northwest Iowa. NORTHWEST CHAPTER OF THE IOWA ARCHEOLOGICAL SOCIETY NEWSLETTER 15(5): 3-5.
 1970 Development and Interrelationships of Oneota Culture in the Lower Missouri River Valley. MISSOURI ARCHAEOLOGIST 32: 1-180.
 1971a Great Oasis Culture Distributions. In: PREHISTORIC INVESTIGATIONS, Edited by M. McKusick, Reprint 3: 125-133. Office of the State Archaeologist, Iowa City, Iowa.
 1971b Origins of Mill Creek. JOURNAL OF THE IOWA ARCHEOLOGICAL SOCIETY 18: 6-12.
 1980 A Prehistoric Cultural Resources Survey in the Proposed Perry Creek Reservoir. TECHNICAL REPORT No. 80-10. Department of Anthropology, Division of Archaeological Research, University of Nebraska, Lincoln.
- Henning, D. R., A. E. Henning and D. A. Baerreis
 1968 1963 Excavations in the Mill Creek Sites. JOURNAL OF THE IOWA ARCHEOLOGICAL SOCIETY 15: 35-106.
- Henning, D. R. and E. R. Henning
 1978 Great Oasis Ceramics. OCCASIONAL PUBLICATIONS IN MINNESOTA ANTHROPOLOGY 2: 12-26. Minnesota Archaeological Society.
- Hertha, S. P.
 1981 Prehistoric Settlement Patterns in the Bull Creek Locality, Kansas. Paper presented at the 3rd Flint Hills/Osage Plains Conference, Wichita, Kansas.

- Hickerson, H.
 1970 THE CHIPPEWA AND THEIR NEIGHBORS: A STUDY IN ETHNO-HISTORY.
 Holt, Rinehart and Winston: Chicago.
- Hill, A. T. and P. Cooper
 1936 The Schrader, Champe and Fremont 1 Sites. NEBRASKA HISTORY
 MAGAZINE 17(4): 223-292.
- 1938 The Archaeological Campaign of 1937. NEBRASKA HISTORY
 MAGAZINE 18(4): 243-353.
- Hill, A. T. and M. Kivett
 1941 Woodland-Like Manifestations in Nebraska. NEBRASKA HISTORY
 MAGAZINE 21(3): 141-243.
- Hill, A. T. and W. Wedel
 1936 Excavations at the Leary Indian Village and Burial Site,
 Richardson County, Nebraska. NEBRASKA HISTORY MAGAZINE 17(1):
 2-73.
- Hinton, R., M. Smith and F. Smith
 1980 Tooth size changes in prehistoric Tennessee Indians. HUMAN
 BIOLOGY 52: 229-245.
- Hoffhaus, C. E.
 1964 Fort de Cavagnial: Imperial France in Kansas, 1744-1764.
 KANSAS HISTORICAL QUARTERLY 30(4): 425-454.
- Hoffman, J. J.
 1968 The LaRoche Sites. PUBLICATIONS IN SALVAGE ARCHEOLOGY 11.
- 1972 Seriation of Certain Arikara Villages. NEBRASKA ACADEMY OF
 SCIENCES 1: 20-34.
- 1977 Archaeological Reference in Societal Modeling: Social
 Organization of the Bad River Phase. PLAINS ANTHROPOLOGIST
 22(78), Pt. 2 MEMOIR 13: 21-27.
- Hooton, E.
 1920 Indian Village Site and Cemetery Near Madisonville, Ohio.
 PAPERS OF THE PEABODY MUSEUM OF AMERICAN ARCHAEOLOGY AND
 ETHNOLOGY, No. 8. Cambridge.
- 1930 THE INDIANS OF PECOS PUEBLO: A STUDY OF THE SKELETAL REMAINS.
 Yale University Press.
- Hotopp, J.
 1978 Glenwood: A Contemporary View. Office of the Iowa State
 Archaeologist, REPORT 11. Iowa City.
- 1979 The Central Plains Tradition in Iowa. Ph.D. Dissertation,
 University of Iowa.
- Houck, Louis (Editor)
 1909 THE SPANISH REGIME IN MISSOURI. 2 Vols. Donnelly and Sons
 Co.: Chicago.

Hovde, D.

- 1980 Shell Tools from the Rainbow Site. Paper given at the 38th Plains Conference, Iowa City, Iowa.

Howard, J. H.

- 1960a The Cultural Position of the Dakota: A Reassessment. Edited by Gertrude E. Dole and Robert L. Carneiro. In: ESSAYS IN THE SCIENCE OF CULTURE IN HONOR OF LESLIE A. WHITE: 249-268. Thomas Y. Crowell Co.: New York.

- 1960b Dakota Winter Counts as a Source of Plains History. BUREAU OF AMERICAN ETHNOLOGY BULLETIN 173: 335-416. Smithsonian Institution, Washington.

- 1965 The Ponca Tribe. BUREAU OF AMERICAN ETHNOLOGY BULLETIN 195. Smithsonian Institution, Washington.

- 1966 The Dakota or Sioux Indians, A Study in Human Ecology. W. H. OVER MUSUEM ANTHROPOLOGICAL PAPERS 2. Vermillion.

- 1968 Archeological Investigations at the Spawn Mound, 39LK201, Lake County, South Dakota. PLAINS ANTHROPOLOGIST 13(40): 132-145.

- 1970 Known Village Sites of the Ponca. PLAINS ANTHROPOLOGIST 15(48): 109-134.

- 1972 Notes on the Ethnogeography of the Yankton Dakota. PLAINS ANTHROPOLOGIST 17(58) Pt. 1: 281-307.

- 1976 Yanktonai Ethnohistory and the John K. Bear Winter Count. PLAINS ANTHROPOLOGIST 21(73) Pt. 2 MEMOIR 11.

Howard, J. H. and R. Gant

- 1966 Archeological Salvage Investigations in the Gavins Point Reservoir Area, Lewis and Clark Lake, Nebraska and Vermillion, South Dakota 1963-64. ARCHEOLOGICAL STUDIES, CIRCULAR 11. University of South Dakota Museum.

Howells, W.

- 1960 Estimating Population Number through Archaeological and Skeletal Remains. In: The Application of Quantitative Methods in Archaeology. Edited by R. Heizer and S. Cook. VIKING PUBLICATIONS IN ANTHROPOLOGY 28: 158-185.

- 1966 Craniometry and Multivariate Analysis: the Jomon Population of Japan. PAPERS OF THE PEABODY MUSEUM 57: 1-43.

Hudak, G. J.

- 1974 The Pedersen Site (21LN2), Lincoln, Minnesota. M. A. Thesis, University of Nebraska-Lincoln.

Hudak, G. J. (continued)

- 1976 Woodland Ceramics from the Pedersen Site. SCIENTIFIC PUBLICATIONS OF THE SCIENCE MUSEUM OF MINNESOTA NEW SERIES 3(2).

Hudson, L.

- 1979 State's Oldest Human Dwelling Believed Found near Mountain Lake. MINNESOTA ARCHEOLOGIST 38(1): 28-31.

Hurt, W. R.

- 1951 Report of the Investigation of the Swanson Site 39BR16, Brule County, South Dakota, 1950. ARCHAEOLOGICAL STUDIES, CIRCULAR 3.
- 1952 Report of the Investigation of the Scalp Creek Site, 39GR1, and the Ellis Creek Site, 39GR2, Gregory County, South Dakota, 1941, 1951. ARCHEOLOGICAL STUDIES, CIRCULAR 4. University of South Dakota.
- 1954 Pottery Types of the Over Focus, South Dakota. PREHISTORIC POTTERY OF THE EASTERN UNITED STATES 2.
- 1957 Report of the Investigation of the Swan Creek Site, 39WW7, Walworth County, South Dakota, 1954-1956. ARCHEOLOGICAL STUDIES CIRCULAR 7, South Dakota Archeological Commission.
- 1961 Archaeological Work at the Tabor and Arp Sites. MUSEUM NEWS 22(8) 1-6. W. H. Over Museum, State U. of S.D., Vermillion.

Huse, W.

- 1896 HISTORY OF DIXON COUNTY, NEBRASKA. Press of THE DAILY NEWS: Norfolk (Nebraska).

Hyde, G. E.

- 1951 THE PAWNEE INDIANS. University of Oklahoma Press: Norman.

Irwin, H. T. and H. M. Wormington

- 1970 Paleo-Indian Tool Types in the Great Plains. AMERICAN ANTIQUITY 35(1): 24-34.

Irwin-Williams, C. H. Irwin, G. Agogino and C. V. Haynes

- 1973 Hell Gap: Paleo-Indian Occupation on the High Plains. PLAINS ANTHROPOLOGIST 18(59): 40-53.

Ives, J. C.

- 1955a Glenwood Ceramics. JOURNAL OF THE IOWA ARCHEOLOGICAL SOCIETY. 4: (3-4).

- 1955b Turin Man. IOWA ARCHEOLOGICAL SOCIETY NEWSLETTER 16: 3-5.

- Ives, J. C. (continued)
- 1962 Mill Creek Pottery. JOURNAL OF THE IOWA ARCHEOLOGICAL SOCIETY 11(3).
- Jablow, J.
- 1974 ETHNOHISTORY OF THE PONCA. Garland Press: New York.
- Jaffe, A.
- 1969 Smoothing Age Distributions. In: HANDBOOK OF STATISTICAL PROCEDURES FOR LONG RANGE PROJECTIONS OF PUBLIC SCHOOLS ENROLLMENT, Appendix B. Government Printing Office.
- Jaffe H. and C. Medina
- 1979 A Statistical Approach to Mortality and Fertility in Pre-historic American Populations. Paper presented at XLIII International Congress of Americanists.
- James, E. T.
1823. ACCOUNT OF AN EXPEDITION FROM PITTSBURGH TO THE ROCKY MOUNTAINS, PERFORMED IN THE YEARS 1819 AND '20, UNDER THE COMMAND OF MAJOR STEPHEN H. LONG. H. C. Carey and I. Lea: Philadelphia.
- 1905 ACCOUNT OF AN EXPEDITION FROM PITTSBURGH TO THE ROCKY MOUNTAINS PERFORMED IN THE YEARS 1819, 1820. In: EARLY WESTERN TRAVELS, 1748-1846, Vols. 14-16. Edited by R. G. Thwaites. The Arthur H. Clark Company: Cleveland.
- James, T.
- 1966 THREE YEARS AMONG THE INDIANS AND MEXICANS. Edited by M. M. Quaife. The Citadel Press.
- Jantz, R. L.
- 1972 Cranial Variation and Microevolution in Arikara Skeletal Populations. PLAINS ANTHROPOLOGIST 17(55): 20-35.
- 1973 Microevolutionary Change in Arikara Crania. AMERICAN JOURNAL OF PHYSICAL ANTHROPOLOGY 38: 15-26.
- 1974 The Redbird Focus: Cranial Evidence in Tribal Identification. PLAINS ANTHROPOLOGIST 19(63): 5-13.
- 1977 Craniometric Relationships of Plains Populations: Historical and Evolutionary Implications. PLAINS ANTHROPOLOGIST 22(78) Pt. 2, MEMOIR 13: 162-176.
- Jantz, R., D. Owsley and P. Willey
- 1978 Craniometric Relationships of Central Plains Populations. In: The Central Plains Tradition: Internal Development and External Relationships, edited by D. Blakeslee. Office of the Iowa State Archaeologist, REPORT 11: 144-156.

- Jantz, R. L., D. Owsley and P. Willey (continued)
 In Press Craniometric Variation in the Northern and Central Plains.
 PLAINS ANTHROPOLOGIST, MEMOIR series.
- Jeske, J.
 1927 The Grand River Mound Group and Camp Site. BULLETIN OF THE
 PUBLIC MUSEUM OF THE CITY OF MILWAUKEE, Vol. 3, No. 2.
- Johnson, A. E.
 1973 Archaeological Investigations at the Budenbender Site, Tuttle
 Creek Reservoir, North Central Kansas, 1957. PLAINS ANTHRO-
 POLOGIST 18(62): 271-299.
- 1979 Kansas City Hopewell. In: HOPEWELL ARCHAEOLOGY, THE CHILLI-
 COTHE CONFERENCE, edited by David S. Brose and N. Greber,
 p: 86-93. Wayne State University Press.
- Johnson, A. M.
 1976 Pottery. MISSOURI ARCHAEOLOGICAL SOCIETY RESEARCH SERIES 13:
 9-13.
- 1977 Testing the Modified Initial Middle Missouri Variant. PLAINS
 ANTHROPOLOGIST 22(78) Pt. 2 MEMOIR 13: 14-20.
- 1979 Extended Middle Missouri Components in the Big Bend Region
 of South Dakota. SPECIAL PUBLICATIONS OF THE SOUTH DAKOTA
 ARCHAEOLOGICAL SOCIETY 1.
- Johnson, E.
 1969a Decorative Motifs on Great Oasis Pottery. PLAINS ANTHROPOLOGIST
 14(46): 272-276.
- 1969b The Prehistoric Peoples of Minnesota. MINNESOTA PREHISTORIC
 ARCHAEOLOGICAL SERIES 4, Minnesota Historical Society.
- Johnston, F. and C. Snow
 1961 The Reassessment of the Age and Sex of the Indian Knoll Skeletal
 Population: Demographic and Methodological Aspects. AMERICAN
 JOURNAL OF PHYSICAL ANTHROPOLOGY 19: 237-244.
- Johnston, R. B.
 1967 The Hitchell Site. PUBLICATIONS IN SALVAGE ARCHEOLOGY 3.
- Jones, G. E.
 1971 An Early Mormon Settlement in South Dakota. SOUTH DAKOTA
 HISTORY 1(2): 119-131.
- Jones, J.
 1964 Distribution and Taxonomy of Mammals of Nebraska. UNIVERSITY
 OF KANSAS PUBLICATIONS, MUSEUM OF NATURAL HISTORY 16(1): 1-356.

- Kant, J.
 1979 Salvage Excavations at the Hofer Mound, (39HT2). SOUTH DAKOTA ARCHAEOLOGY 3: 91-113.
- Kappler, C. J.
 1904 INDIAN AFFAIRS. LAWS AND TREATIES. Three Volumes.
- Katz, P.
 1969 An Analysis of Archaeological Data from the Kelley Site, Northeastern Kansas. M. S. Thesis, University of Kansas. Lawrence.
- Katzenberg, M. and R. White
 1979 A Paleodemographic Analysis of the Os Coxas from Ossossane Ossuary. CANADIAN REVIEW PHYSICAL ANTHROPOLOGY 1: 10-27.
- Kaul, R.
 n.d. VEGETATION OF NEBRASKA CIRCA 1850. (Map) University of Nebraska Conservation and Survey Division.
- Kay, M.
 1974 Dental Annuli Age Determination on White-Tailed Deer from Archaeological Sites. PLAINS ANTHROPOLOGIST 19(65): 224-227.
- Kelly, M. E.
 1967 A Burial from Centerville, South Dakota. MUSEUM NEWS 28(11 & 12). W. H. Over Museum, Vermillion.
- Keyes, C. R.
 1927 Prehistoric Man In Iowa. THE PALIMPSEST 8(6): 185-229.
 1928 The Hill-Lewis Archeological Survey. MINNESOTA HISTORY 9(2): 96-108.
- Kinnaird, L. (editor)
 1945 Spain in the Mississippi Valley, 1765-1794. ANNUAL REPORT OF THE AMERICAN HISTORICAL ASSOCIATION FOR THE YEAR 1945. Four Volumes.
- Kivett, M. F.
 1949 Archaeological Investigations in the Medicine Creek Reservoir. AMERICAN ANTIQUITY 14: 278-284.
 1952 Woodland Sites in Nebraska. PUBLICATIONS IN ANTHROPOLOGY 1. Nebraska State Historical Society.
 1962 Logan Creek Complex. Mimeographed Report. Nebraska State Historical Society, 20th Plains Archaeological Conference.

- Kivett, M. F. and R. Jensen
 1976 Archaeological Investigations at the Crow Creek Site (39BF11).
 NEBRASKA STATE HISTORICAL SOCIETY PUBLICATIONS IN ANTHROPOLOGY
 7. Lincoln.
- Knauth, O.
 1963 Mystery of the Crosses. ANNALS OF IOWA 37(2): 81-91.
- Krause, R. A.
 1969 Correlation of Phases in Central Plains Prehistory. PLAINS
 ANTHROPOLOGIST 14(44), Part 2, MEMOIR 6: 82-96.
- 1972 The Leavenworth Site: Archaeology of a Historic Arikara
 Community. UNIVERSITY OF KANSAS PUBLICATIONS IN ANTHROPOLOGY
 3. Lawrence.
- Krogman, W.
 1962 THE HUMAN SKELETON IN FORENSIC MEDICINE. C. C. Thomas:
 Springfield.
- Kruz, R. F.
 1937 Journal of Rudolph Frederick Kurz...1846-1852. BUREAU OF
 AMERICAN ETHNOLOGY BULLETIN 115.
- Lahren, L. and R. Bonnicksen
 1974 Bone Foreshafts from a Clovis Burial in Southwestern Montana.
 SCIENCE 186: 147-150.
- Lambert, J., C. Sztunar and J. Buikstra
 1979 Chemical Analysis of Excavated Human Bone from Middle and
 Late Woodland Sites. ARCHAEOOMETRY 21: 115-130.
- Lampshire, W.
 1956 The Cretaceous Stratigraphy and Zonation in Cedar County,
 Nebraska. M. S. Thesis, University of Nebraska.
- Larpenteur, C.
 1898 FORTY YEARS A FUR TRADER ON THE UPPER MISSOURI. Edited by
 E. Coves.
- Lawrey, J. D., W. Winner, G. R. Hoffman and T. Van Bruggen
 1973a The Missouri River Floodplain Communities from Yankton,
 South Dakota, to Rulo, Nebraska: Their successional and
 Geographic Relationships, and Effects of River Bank Stabili-
 zation. Final Report to U. S. Army Corps of Engineers, Omaha
 District.
- 1973b The Upland Deciduous Forest Vegetation Types Adjacent the
 Missouri River Floodplain from Yankton, South Dakota to
 Rulo, Nebraska. Final Report to U. S. Army Corps of Engineers,
 Omaha District.

- LeBlanc, Stephen
 1971 An Addition to Naroll's Suggested Floor Area and Settlement Population Relationships. AMERICAN ANTIQUITY, Vol. 36: 210-211.
- LeBlanc, S. and B. Black
 1974 A Long Term Trend in Tooth Size in the Eastern Mediterranean. AMERICAN JOURNAL OF PHYSICAL ANTHROPOLOGY 41: 417-422.
- Lehmer, D. J.
 1951 Pottery Types for the Dodd Site, Oahe Reservoir, South Dakota. PLAINS ARCHAEOLOGICAL CONFERENCE NEWSLETTER 4(2): 3-25.
- 1954 Archaeological Investigations in the Oahe Dam Area, South Dakota, 1950-51. BUREAU OF AMERICAN ETHNOLOGY BULLETIN 158. (River Basin Surveys Paper 7).
- 1970 Climate and Culture History in the Middle Missouri Valley. SPECIAL PUBLICATIONS 3: 117-130. In: PLEISTOCENE AND RECENT ENVIRONMENTS OF THE CENTRAL GREAT PLAINS, edited by W. Dort and J. K. Jones. University of Kansas, Department of Geology. University of Kansas Press: Lawrence.
- 1971 An Introduction to Middle Missouri Archeology. ANTHROPOLOGICAL PAPERS 1, U. S. National Park Service. Washington.
- Lehmer, D. J., W. R. Wood and C. L. Dill
 1978 The Knife River Phase. Report to Interagency Archaeological Services, Denver.
- Lesser, A.
 1933 The Pawnee Ghost Dance Hand Game. COLUMBIA UNIVERSITY CONTRIBUTIONS TO ANTHROPOLOGY 16.
- Lewis, M. and W. Clark
 1893 HISTORY OF THE EXPEDITION UNDER THE COMMAND OF LEWIS AND CLARK. Edited by Elliott Coues.
- 1904- ORIGINAL JOURNALS OF THE LEWIS AND CLARK EXPEDITION 1804-1806.
 1905 Edited by R. G. Thwaites. 7 Vols. Reprint edition 1969, the Arno Press.
- Lewis, T. H.
 1891 Lewis and Clark and the Antiquities of the Upper Missouri River. THE AMERICAN ANTIQUARIAN AND ORIENTALISTS JOURNAL September 1891: 288-293.
- 1898 THE NORTHWESTERN ARCHAEOLOGICAL SURVEY. 16 pages. Pioneer Press: St. Paul.

- Lilly, D. and R. Banks
 1965 A Preliminary Description of a Mill Creek Cemetery Near the Broken Kettle Midden Mound. NORTHWEST CHAPTER OF THE IOWA ARCHEOLOGICAL SOCIETY NEWSLETTER 13(1): 2-6.
- Lin, P.
 1973 A Study of Arikara Skeletal Populations by Multivariate Analysis. Ph.D. Dissertation. University of Kansas, Lawrence.
- Lintz, C.
 1978 The Panhandle Aspect and Its Early Relationship with Upper Republican. Office of the Iowa State Archeologist REPORT 11: 36-55.
- Lippincott, K.
 1978 Solomon River Upper Republican Settlement Ecology. In: The Central Plains Tradition: Internal Development and External Relationships. Edited by D. J. Blakeslee. p. 81-93.
- Long, A. and B. Rippeteau
 1974 Testing Contemporaneity and Averaging Radiocarbon Dates. AMERICAN ANTIQUITY 39(2): 205-215.
- Lorenz, D. P.
 1956 The Bedrock Geology of Dakota and Dixon Counties, Nebraska. M. S. Thesis, University of Nebraska.
- Lovejoy, C., R. Meindl, T. Pryzbeck, T. Barton, K. Heiple and D. Kotting
 1977 Paleodemography of the Libben Site, Ottawa County, Ohio. SCIENCE 198: 291-293.
- Ludwickson, J. K.
 1975 The Loup River Phase and the Origin of Pawnee Culture. M.A. Thesis. University of Nebraska, Lincoln.
 1978 Central Plains Tradition Settlements in the Loup River: The Loup River Phase. In: The Central Plains Tradition: Internal Development and External Relationships. Edited by D.J. Blakeslee. Office of the [Iowa] State Archeologist, REPORT 11: 94-108.
 1979a Little Bow and the "Bad Village" of the Omaha. Paper read at the 37th Plains Conference, November 3, 1979. Kansas City.
 1979b Postulated Late Prehistoric Human Movements in the Central Plains: A Critical Review. TRANSACTIONS OF THE NEBRASKA ACADEMY OF SCIENCE 7: 53-60.
 1981 Volunteer Cavalry in Northeastern Nebraska, 1863-1866. Ms. filed at the Nebraska State Historical Society.

- Ludwickson, J. K. and S. Holen
 1979 NEBRASKA STATE HISTORICAL SOCIETY HIGHWAY SALVAGE ARCHEOLOGY
 FIELD REPORT, #79-8, June 25-29, 1979.
- Ludwickson, J. K., J. Buechler, M. Gunn and Nick Chevance
 n.d. The Ferber Site, 25CD10: A Great Oasis Phase Component in
 the Lower Bow Creek Locality. Ms. in possession of author.
- Ludwickson, J. K. and L. M. Snyder
 n.d. Ethnohistorical and Archeological Studies Regarding Omaha
 Indian Residence on Bow Creek, Cedar County, Nebraska.
- Luttig, J.
 1920 JOURNAL OF A FUR TRADING EXPEDITION ON THE UPPER MISSOURI,
 1812-1813. Edited by S. Drumm. Missouri Historical Society.
- Lyon, W.
 1970 A Multivariate Statistical Analysis of Arikara Crania from
 the Northern Plains. Ph.D. Dissertation, University of
 Kansas. Lawrence.
- MacKay, J.
 1799 Indian Notes. Ms. in William Clark Collection. Missouri
 Historical Society.
- Mallery, G.
 1893 Picture Writing of the American Indian. ANNUAL REPORT OF
 THE BUREAU OF AMERICAN ETHNOLOGY 10: 3-807.
- Margry, P. (editor)
 1876 DECOUVERTES ET ETABLISSEMENTS DES FRANCAIS DANS L'AMERIQUE
 SEPTENTRIONALE (1614-1854); MEMOIRES ET DOCUMENTS ORIGINAUX.
 D. Jouaust: Paris.
- Marks, C.
 1904 PAST AND PRESENT OF SIOUX CITY AND WOODBURY COUNTY, IOWA.

 1908 Theophile Bruguier. SOUTH DAKOTA HISTORICAL COLLECTIONS 4:
 263-274.
- Marshall, J.
 1967 The Glen Elder Focus. Cultural Affiliations of Archaeological
 Material from the Glen Elder Site, 14ML1. M.A. Thesis,
 University of Nebraska, Lincoln.
- Martin, P. S. and H. E. Wright Jr.
 1967 PLEISTOCENE EXTINCTIONS: THE SEARCH FOR A CAUSE. Yale
 University Press.
- Massey, F.
 1951 The Kolmogorov-Smirnov Test for Goodness of Fit. AMERICAN
 STATISTICAL ASSOCIATION JOURNAL 46: 68-78.

Mattison, R. H.

- 1956 Report on Historic Sites Adjacent to the Missouri River, between the Big Sioux River and Fort Randall Dam, Including Those in the Gavins Point Reservoir Area. SOUTH DAKOTA HISTORICAL COLLECTIONS 28: 22-98.

Mayer, F. B.

- 1932 With Pen and Pencil on the Frontier in 1851. The Diary and Sketches of Frank Blackwell Mayer. Edited by B. L. Heilbron. NARRATIVES AND DOCUMENTS 1, PUBLICATIONS OF THE MINNESOTA HISTORICAL SOCIETY. St. Paul.

McAlister, P. A.

- 1972 The Larson Site (13PM61): Great Oasis or Mill Creek - or Both? NORTHWEST CHAPTER OF THE IOWA ARCHEOLOGICAL SOCIETY NEWSLETTER 20(5): 3-8. Cherokee.

McDermott, J. F.

- 1970 Up the Wide Missouri: Travelers and their Diaries, 1794-1861. TRAVELERS ON THE WESTERN FRONTIER: 3-78. University of Illinois Press: Urbana.

McKern, T. and T. Stewart

- 1957 Skeletal Age Changes in Young American Males Analyzed from the Standpoint of Identification. HEADQUARTERS QUARTERMASTER RESEARCH AND DEVELOPMENT COMMAND, TECHNICAL REPORT EP-45. Natick, Mass.

McKinney, T. L. and J. Hall

- 1933- THE INDIAN TRIBES OF NORTH AMERICA. 3 Volumes. John Grant:
1934 Edinburgh.

McKusick, M.

- 1973 The Grant Oneota Village. OFFICE OF THE [IOWA] STATE ARCHAEOLOGIST, REPORT 4.
1974 Reconstructing the Longhouse Village Settlement Patterns. PLAINS ANTHROPOLOGIST 19(65): 197-210.

McKusick, M. (Editor)

- 1971 Prehistoric Investigations. REPORT OF THE OFFICE OF THE [IOWA] STATE ARCHAEOLOGIST 3. Iowa City.

Mead, B. E.

- 1974 Seed Analysis of the Meehan-Schell Site (13BN110), A Great Oasis Site in Central Iowa. M. A. Thesis, Department of Anthropology, University of Wisconsin-Madison.

- Mead, M.
 1932 The Changing Culture of an Indian Tribe. COLUMBIA UNIVERSITY CONTRIBUTIONS TO ANTHROPOLOGY 15. Columbia University Press: New York.
- Meleen, E. E.
 1938 A Preliminary Report on the Mitchell Indian Village Site and Burial Mounds, on Firesteel Creek, Mitchell, Davison County, South Dakota. ARCHAEOLOGICAL STUDIES CIRCULAR 1(1), University of South Dakota Museum.
- Merchant V. and D. Ubelaker
 1977 Skeletal Growth of Protohistoric Arikara. AMERICAN JOURNAL OF PHYSICAL ANTHROPOLOGY 46: 61-72.
- Metcalf, G.
 n.d. Davis Creek Archaeology. Ms. on file, Nebraska State Historical Society.
- Miles, A.
 1963 The Dentition in the Assessment of Individual Age. In: DENTAL ANTHROPOLOGY, edited by D. R. Brothwell, pp. 191-209. Pergamon Press.
- Molnar, S.
 1971 Human Tooth Wear, Tooth Function and Cultural Variability. AMERICAN JOURNAL OF PHYSICAL ANTHROPOLOGY 34: 27-42.
- Molnar, S. and S. Ward
 1975 Mineral Metabolism and Microstructural Defects in Primate Teeth. AMERICAN JOURNAL OF PHYSICAL ANTHROPOLOGY 43: 3-17.
- Moorrees, C.
 1957 THE ALEUT DENTITION. Harvard University Press: Cambridge.
- Moorrees, C., E. Fanning and E. Hunt, Jr.
 1963a Formation and Resorption of Three Deciduous Teeth in Children. AMERICAN JOURNAL OF PHYSICAL ANTHROPOLOGY 21: 205-213.
 1963b Age Variation of Formation Stages for Ten Permanent Teeth. JOURNAL OF DENTAL RESEARCH 42: 1490-1502.
- Morgan, D.
 1955 The Reminiscences of James Holt; A Narrative of the Emmett Company. UTAH HISTORICAL QUARTERLY 23: 1-33.
 1964 JEDEDIAH SMITH AND THE OPENING OF THE WEST. University of Nebraska Press: Lincoln.
- Morse, J.
 1822 A REPORT TO THE SECRETARY OF WAR ON INDIAN AFFAIRS. New Haven.

Mott, M.

- 1938 The Relation of Historic Indian Tribes to Archaeological Manifestations in Iowa. IOWA JOURNAL OF HISTORY AND POLITICS 36(3): 227-314.

Mulloy, W.

- 1954 The McKean Site in Northeastern Wyoming. SOUTHWESTERN JOURNAL OF ANTHROPOLOGY 10(4): 432-460.

Myer, W. E.

- 1922 Field Work in South Dakota and Missouri. SMITHSONIAN MISCELLANEOUS COLLECTIONS 72(15): 118-122.

Naroll, R.

- 1962 Floor Area and Settlement Population. AMERICAN ANTIQUITY 27: 587-589.

Nasatir, A. P.

- 1927 Spanish Exploration of the Upper Missouri. MISSISSIPPI VALLEY HISTORICAL REVIEW 24(4): 521-536.

- 1952 BEFORE LEWIS AND CLARK; DOCUMENTS ILLUSTRATING THE HISTORY OF THE MISSOURI 1785-1804. St. Louis Historical Documents Foundation: St. Louis.

Neuman, R. W.

- 1960 The Truman Mound Site, Big Bend Area, South Dakota. AMERICAN ANTIQUITY 26(1): 78-92.

- 1964 The Good Soldier Site (39LM238), Big Bend Reservoir, Lyman County, South Dakota. River Basin Survey Papers, No. 37. BUREAU OF AMERICAN ETHNOLOGY BULLETIN 189, Smithsonian Institution. Washington, D. C.

- 1967 Atlatl Weights from Certain Sites on the Northern and Central Plains. AMERICAN ANTIQUITY 32(1): 36-53.

- 1975 The Sonota Complex and Associated Sites on the Northern Great Plains. PUBLICATIONS IN ANTHROPOLOGY 6, Nebraska State Historical Society. Lincoln.

Nicollett, J. N.

- 1843 Report Intended to Illustrate a Map of the Hydrographical Basin of the Upper Mississippi River. SERIAL SET 380, Senate Document 237, 26th Congress, 2nd Session.

- 1976 JOSEPH N. NICOLLET ON THE PLAINS AND PRAIRIES; THE EXPEDITIONS OF 1838-39. WITH JOURNALS, LETTERS, AND NOTES ON THE DAKOTA INDIANS. E. C. Bray and M. C. Bray, translators and editors. Minnesota Historical Society.

- Nowak, T. J.
 1980 MISSOURI NATIONAL RECREATIONAL RIVER PRE-IMPLEMENTATION STUDIES: CULTURAL RESOURCES INVESTIGATIONS OF SIX SELECTED AREAS. U. S. Army Corps of Engineers.
- O'Brien, P. J.
 1971 Valley Focus Mortuary Practices. PLAINS ANTHROPOLOGIST 16 (53): 165-182.
 1979 Preliminary Archaeological Literature Search: Western Portion of the Kansas River and Tributaries Bank Stabilization Study, Kansas. Report for the U. S. Army Corps of Engineers, Kansas City District.
- Odum, H. T.
 1957 Biogeochemical Deposition of Strontium. INSTITUTE OF MARINE SCIENCES, PUBLICATIONS 4: 39-106.
- Oglesby, R. E.
 1963 MANUEL LISA AND THE OPENING OF THE MISSOURI FUR TRADE. University of Oklahoma Press: Norman.
- Olsson, I.
 1970 Radiocarbon Variations and Absolute Chronology: PROCEEDINGS OF THE 12th NOBEL SYMPOSIUM. Almquist and Wiksell: Stockholm.
- Ordway, J.
 1916 The Journals of Captain Meriwether Lewis and Sergeant John Ordway. Edited by M. M. Quaife. WISCONSIN HISTORICAL SOCIETY COLLECTIONS 22.
- Orr, E.
 1963 Iowa Archaeological Reports 1934-1939; Ten Volumes with an Evaluation and Index by Marshall McKusick. ARCHIVES OF ARCHEOLOGY 20.
- Osborn, J.
 1971 A Relationship Between the Striae of Retzius and Prism Directions in the Transverse Plane of the Human Tooth. ARCHAEOLOGICAL ORAL BIOLOGY 16: 1961-1970.
 1973 Variations in Structure and Development of Enamel. ORAL SCIENCE REVIEW 3: 3-83.
- O'Shea, J. M.
 1979 Models for the Emergence of Ethnic Groupings on the Central Plains. Paper read at the 37th Plains Conference, Kansas City.
 1981 Coping with Scarcity: Exchange and Social Storage. In: A. Sheridan and G. Bailey (eds.) Economic Anthropology: Towards an Integration of Ecological and Social Approaches, BRITISH ARCHAEOLOGICAL REPORTS, Vol. 96: 167-183.
- O'Shea, J. M. and J. Ludwickson
 in press Ton Won Tonga, the Big Village on Omaha Creek: A Study in Historic Omaha Archeology and Ethnohistory. PUBLICATIONS IN ANTHROPOLOGY, Nebraska State Historical Society.

Over, W. H.

- 1973 The Archeological Field Notes of W. H. Over. RESEARCH BULLETIN 1. Edited by J. S. and J. K. Sigstad. Office of the South Dakota State Archeologist.

Over, W. H. and E. E. Meleen

- 1941 A Report on an Investigation of the Brandon Village Site and the Split Rock Creek Mounds. ARCHEOLOGICAL STUDIES, CIRCULAR III. University of South Dakota Museum.

Owsley, D. and W. Bass

- 1979 A Demographic Analysis of Skeletons from the Larson Site (39WW2). Walworth County, South Dakota: Vital Statistics. AMERICAN JOURNAL OF PHYSICAL ANTHROPOLOGY 51: 145-154.

Owsley, D., D. Morey and W. Turner

- 1980 Inferring History from Crania: Biological Distance Comparisons of Mill Creek and Early Middle Missouri Tradition Crania with Mandan and Arikara Population Samples. Paper presented at the 38th Plains Conference, Iowa City.

Owsley, D., G. Slutzky, M. Guagliardo and L. Deitrick

- in press Interpopulation Relationships of Four Post-Contact Coalescent Sites from South Dakota. PLAINS ANTHROPOLOGIST, MEMOIR SERIES.

Palkovich, A.

- 1978 Tuberculosis Epidemiology in Two Skeletal Samples: A Study of Disease Impact. Paper presented at annual meeting of American Association of Physical Anthropologists, Toronto.

Palliser, J.

- 1856 THE SOLITARY HUNTER; OR, SPORTING ADVENTURES IN THE PRAIRIES. G. Routledge & Co., London.

Parker, S.

- 1936 The Journal of Samuel Parker. MARCUS WHITMAN, CRUSADER; PART ONE, 1802 TO 1839. Edited by A. and D. Hulbert. Overland to the Pacific, Vol. 6.

Parks, D. R.

- 1979a The Northern Caddoan Languages: Their Subgrouping and Time Depths. NEBRASKA HISTORY 60(2): 197-213.

- 1979b Bands and Villages of the Arikara and Pawnee. NEBRASKA HISTORY 60(2): 214-239.

Pearson, G.

- 1980 High Precision Radiocarbon Dating by Liquid Scintillation Counting Applied to Radiocarbon Time-Scale Calibration. RADIOCARBON 22(2): 337-345.

- Perino, G.
 1966 A Preliminary Report on the Peisker Site Part I: The Early Woodland Occupation. CENTRAL STATES ARCHEOLOGICAL JOURNAL 13(2): 47-51.
- "Perry Winkle"
 1858 Perry Winkle's Adventures on the Prairies. FRANK LESLIES ILLUSTRATED WEEKLY NEWSPAPER.
- Perzigian, A.
 1975 The Dentition of the Indian Knoll Skeletal Population: Odontometrics and Cusp Number. AMERICAN JOURNAL OF PHYSICAL ANTHROPOLOGY 44: 113-122.
 1977 Fluctuating Dental Asymmetry: Variation Among Skeletal Populations. AMERICAN JOURNAL OF PHYSICAL ANTHROPOLOGY 47: 81-88.
- Peterson, D. A., Sr.
 1967 A First Report on the Excavation of a Great Oasis Site 13PM25. NORTH WEST CHAPTER OF THE IOWA ARCHEOLOGICAL SOCIETY NEWSLETTER 15(4): 3-6. Cherokee.
- Phenice, T.
 1969 A Newly Developed Visual Method of Sexing the Os Pubis. AMERICAN JOURNAL OF PHYSICAL ANTHROPOLOGY 30: 297-302.
- Plank, P.
 1907- The Iowa, Sac and Fox Indian Mission and its Missionaries,
 1908 Rev. Samuel M. Irvin and Wife. TRANSACTIONS OF THE KANSAS STATE HISTORICAL SOCIETY 10: 312-325
- Pond, S.
 1908 The Dakotas or Sioux in Minnesota as They Were in 1834. COLLECTIONS OF THE MINNESOTA HISTORICAL SOCIETY 12: 319-501.
- Price, R. S.
 1956 Early Ceramic Period Sites in Northeastern Nebraska. M. A. Thesis, University of Nebraska-Lincoln.
- Ralph, E., H. Michael and M. Han
 1973 Radiocarbon Dates and Reality. MASCA NEWSLETTER 9(1): 1-20.
- Raynolds, W. F.
 1868 REPORT ON THE EXPLORATION OF THE YELLOWSTONE RIVER.
- Redfield, A.
 1970 A New Aid to Aging Immature Skeletons: Development of Occipital Bone. AMERICAN JOURNAL OF PHYSICAL ANTHROPOLOGY 33: 207-220

Redfield, A. H.

1857 Letter from A. H. Redfield to John Haverty, September 9, 1857. REPORT OF THE COMMISSIONER OF INDIAN AFFAIRS 1857: 123-135.

1860 Letter from A. H. Redfield to H. M. Robinson, Yankton Agency, Greenwood Dacotah Territory, October 17, 1860. REPORT OF THE COMMISSIONER OF INDIAN AFFAIRS 1860, Document 31: 310-315, U. S. SERIAL SET 1078.

Reed, E. C., V. H. Dreezen, C. K. Bayne and C. B. Schultz

1965 The Pleistocene in Nebraska and Northern Kansas. THE QUATERNARY OF THE UNITED STATES: 187-203. Edited by H. E. Wright and D. G. Frye.

Reeves, B. O. K.

1973 The Concept of an Altithermal Culture Hiatus in Northern Plains Prehistory. AMERICAN ANTHROPOLOGIST 75(5): 1221-1253.

Reid, R. and C. Gannon (Editors)

1929 Journal of Atkinson-O'Fallon Expedition. NORTH DAKOTA HISTORICAL QUARTERLY 4(1): 5-56. Bismarck.

Riggs, S. R.

1890 A Dakota English Dictionary. CONTRIBUTIONS TO NORTH AMERICAN ETHNOLOGY VII. Edited by J. O. Dorsey. U. S. Geographical and Geological Survey of the Rocky Mountain Region. Washington.

1893 Dakota Grammar, Texts and Ethnography. Edited by J. O. Dorsey. CONTRIBUTIONS TO NORTH AMERICAN ETHNOLOGY 9.

Roberts, F. H. H., Jr.

1935 A Folsom Complex: A Preliminary Report on Investigations at the Lindenmeier Site in Northern Colorado. SMITHSONIAN MISCELLANEOUS COLLECTIONS 94: 1-35.

Roberts, R. L.

1978 The Archaeology of the Kansas Monument Site: A Study in Historical Archeology on the Great Plains. M. A. Thesis. University of Kansas. Lawrence.

Robinson, D.

1904 A History of the Dakota or Sioux Indians. COLLECTIONS OF THE SOUTH DAKOTA HISTORICAL SOCIETY 2: 1-523.

1925 DOANE ROBINSON'S ENCYCLOPEDIA OF SOUTH DAKOTA. Published privately by the author.

Roedl, D. and J. Howard

1957 Archaeological Investigations at the Renner Site. MISSOURI ARCHAEOLOGIST 18: 52-96.

- Rose, J.
 1977 Defective Enamel Histology of Prehistoric Teeth from Illinois. AMERICAN JOURNAL OF PHYSICAL ANTHROPOLOGY 42: 439-446.
- 1979 Morphological Variations of Enamel Prisms within Abnormal Striae of Retzius. HUMAN BIOLOGY 51: 139-151.
- Rose, J., G. Armelagos and J. Lallo
 1978 Histological Enamel Indicator of Childhood Stress in Prehistoric Skeletal Samples. AMERICAN JOURNAL OF PHYSICAL ANTHROPOLOGY 49: 511-516.
- Rothrock, E. P.
 1943 A Geology of South Dakota-The Surface. BULLETIN 13, South Dakota State Geological Survey.
- Ruppe, R.
 1955 Archaeological Investigations of the Mill Creek Culture in Northwest Iowa. AMERICAN PHILOSOPHICAL SOCIETY YEARBOOK, 335-338.
- Ryan, A. and C. Posner
 1975 Metric Variation in the Dentition of American Indian Populations. AMERICAN JOURNAL OF PHYSICAL ANTHROPOLOGY 42: 326-327.
- Schmits, L. J.
 1978 The Coffey Site: Environment and Cultural Adaptation at a Prairie Plains Archaic Site. MIDCONTINENTAL JOURNAL OF ARCHAEOLOGY, Special Paper 1. 3(1): 69-185.
- Schoeninger, M.
 1979 Diet and Status at Chalcatzingo: Some Empirical and Technical Aspects of Strontium Analysis. AMERICAN JOURNAL OF PHYSICAL ANTHROPOLOGY 51: 295-309.
- Schoolcraft, H. R.
 1851- HISTORICAL AND STATISTICAL INFORMATION RESPECTING THE HISTORY,
 1857 CONDITION AND PRESPECTS OF THE INDIANS OF THE UNITED STATES.
 6 Vols. Lippincott, Grambo, and Co. Philadelphia.
- Scott, D. H.
 1970 Analysis of the Avifauna from the Broken Kettle West (13PM25). Ms. ditto on file, office of the State Archaeologist, Iowa City, Iowa.
- 1979 Analysis of Avifauna from Five Sites in Northwestern Iowa. JOURNAL OF THE IOWA ARCHEOLOGICAL SOCIETY 26: 45-79.
- Scott, E.
 1974 Dental Variation in Pre-Columbian Coastal Peru. Ph.D. Dissertation, University of Missouri.

- Shaw, R. D.
 1974 The Houston Site (25BT1): A Nebraska Phase Site from Burt County, Nebraska. M. A. Thesis, Department of Anthropology, Washington State University.
- Shay, C. T.
 1971. The Itasca Bison Kill Site: An Ecological Analysis. Minnesota Historical Society.
- Sheldon, Addison (editor)
 1932 Prehistoric Man in Nebraska and the Great Plains Region. NEBRASKA HISTORY MAGAZINE 13(3): 160-165.
- Shryock, H. and J. Siegel
 1971 THE METHODS AND MATERIALS OF DEMOGRAPHY, Vol. 2, U. S. Government Printing Office, Washington.
- Shutler, R. and D. C. Anderson et al
 1974 The Cherokee Sewer Site (13CK405): A Preliminary Report of a Stratified Paleo-Indian Archaic Site in Northwestern Iowa. JOURNAL OF THE IOWA ARCHEOLOGICAL SOCIETY Vol. 21.
 1978 The Cherokee Sewer Site (13CK405): A Summary and Assessment. PLAINS ANTHROPOLOGIST 23(82) Pt. 2: 132-139.
- Siegel, S.
 1956 NON-PARAMETRIC STATISTICS. McGraw-Hill: New York.
- Simpson, H. E.
 1960 Geology of the Yankton Area, South Dakota and Nebraska. U. S. GEOLOGICAL SURVEY PROFESSIONAL PAPER 328.
- Skinner, A.
 1926 Ethnology of the Ioway Indians. BULLETIN OF THE PUBLIC MUSEUM OF THE CITY OF MILWAUKEE 5(4): 181-354.
- Slama, N. L. and D. E. Kerl
 1978 SOIL SURVEY OF DIXON COUNTY, NEBRASKA. U. S. Department of Agriculture, Soil Conservation Service and University of Nebraska Conservation and Survey Division. Lincoln.
- Smith, C.
 1963 Time Perspective within the Coalescent Tradition in South Dakota. AMERICAN ANTIQUITY 28(4): 489-495.
 1977 The Talking Crow Site. UNIVERSITY OF KANSAS PUBLICATIONS IN ANTHROPOLOGY 9. Lawrence.
- Smith, G. H.
 1972 Like-A-Fishhook Village and Fort Berhold, Garrison Reservoir, North Dakota. ANTHROPOLOGICAL PAPERS 2, National Park Service.

- Smith, G. H. (continued)
 1973 Notes on Omaha Ethnohistory, 1763-1820. PLAINS ANTHROPOLOGIST 18-62, Pts. 1-2: 257-270.
- 1974 ETHNOHISTORICAL REPORT ON THE OMAHA PEOPLE. Garland Publishing Inc.: New York.
- Soil Conservation Service
 1976 SOIL SURVEY OF HARRISON COUNTY, IOWA.
- Sontag, L. and G. Comstock
 1938 Striae in the Bones of a Set of Monozygotic Triplets. AMERICAN JOURNAL OF DISEASES OF CHILDREN 56: 301-308.
- Spaulding, A. C.
 1941 Archeological Field Notes on File, University Of Nebraska, Department of Anthropology.
- 1956 The Arzberger Site. OCCASIONAL CONTRIBUTIONS FROM THE MUSEUM OF ANTHROPOLOGY, UNIVERSITY OF MICHIGAN 16.
- Sperry, J. E.
 1965 Cultural Relationships of the Miller and Rush Creek Sites on the Lower Republican River of Kansas. M. A. Thesis, University of Nebraska.
- Stanford, D.
 1974 Preliminary Report of the Excavation of the Jones-Miller Hell Gap Site, Yuma County, Colorado. SOUTHWESTERN LORE 40 (384): 30-36.
- Steece, F. V. and M. J. Tipton
 1965 Introduction to Pleistocene of the Big Sioux River Basin in South Dakota. INQUA FIELD CONFERENCE C, SOUTH DAKOTA: 11-29.
- Steinacher, T. L.
 1976 The Smoky Hill Phase and Its Role in the Central Plains Tradition. M. A. Thesis, University of Nebraska.
- Sterns, F. H.
 1915 The Archaeology of Eastern Nebraska, with Special Reference to the Culture of the Rectangular Earth Lodges. Ph.D. Dissertation. Harvard University.
- Stewart, F.
 1974 Mandan and Hidatsa Villages in the Eighteenth and Nineteenth Centuries. PLAINS ANTHROPOLOGY 19(66) Part I: 287-302.
- Stewart, T.
 1968 Identification by the Skeletal Structures. In: GRADWOHL'S LEGAL MEDICINE. Edited by F. E. Camps. William and Wilkins Co.: Baltimore.

- Stewart, T. (Editor)
 1970 PERSONAL IDENTIFICATION IN MASS DISASTERS. National Museum of Natural History, Smithsonian Institution. Washington, D.C.
- Stipe, C.
 1971 Eastern Dakota Clans: The Solution of a Problem. AMERICAN ANTHROPOLOGIST 73: 1031-1035.
- Strong, W. D.
 1935 An Introduction to Nebraska Archeology. SMITHSONIAN MISCELLANEOUS COLLECTIONS 93(10).
 1940 From History to Prehistory in the Northern Great Plains. SMITHSONIAN MISCELLANEOUS COLLECTIONS 100: 353-394.
- Struever, S.
 1968 Woodland Subsistence-Settlement Systems in the Lower Illinois Valley. In: NEW PERSPECTIVES IN ARCHEOLOGY: 285-312.
- Stuiver, M.
 1978 Radiocarbon Timescale Tested against Magnetic and Other Dating Methods. NATURE 272: 271-274.
- Stuiver, M. and P. D. Quay
 1980 Changes in Atmospheric Carbon-14 Attributed to a Variable Sun. SCIENCE, 207: 11-19.
- Stuiver, M. and R. Kra (Editors)
 1980 Proceedings of the 10th International Radiocarbon Conference, Bern-Heidelberg. RADIOCARBON 22 (2-3).
- Suchey, J., D. Wisely, and T. Noguchi
 1979 Age Changes in the Female Os Pubis. Presented to the American Academy of Forensic Sciences, Atlanta.
- Suess, H.
 1980 The Radiocarbon Record in Tree Rings of the Last 8000 Years. RADIOCARBON 22(2): 200-209.
- Sumner, D. R., Jr.
 1975 Soils and Mill Creek Settlement Pattern. M. A. Thesis, University of Iowa, Iowa City.
- Tabeau, P. A.
 1939 TABEAU'S NARRATIVE OF LOISEL'S EXPEDITION TO THE UPPER MISSOURI. Edited by A. H. Abel, University of Oklahoma Press: Norman.
- Thomas, A. B.
 1935 AFTER CORONADO. University of Oklahoma Press: Norman.
- Thomas, Dr.
 1964 Journey to the Mandans, 1809; the Lost Narrative of Dr. Thomas. Edited by Donald Jackson. MISSOURI HISTORICAL SOCIETY BULLETIN 20(3): 179-182.

- Thomas, D. and K. Ronnefeldt (Editors)
 1976 PEOPLE OF THE FIRST MAN. Dutton: New York.
- Thompson, D. M. and E. A. Bettis
 1980 Archeology and Holocene Landscape Evolution in the Missouri Drainage of Iowa. JOURNAL OF THE IOWA ARCHEOLOGICAL SOCIETY 27: 1-60.
- Thwaites, R. G. (Editor)
 1890 JESUIT RELATIONS AND ALLIED DOCUMENTS, TRAVELS AND EXPLORATIONS OF THE JESUIT MISSIONARIES IN NEW FRANCE, 1610-1791 (Vol. 60). The Burrows Brothers: Cleveland.
 1905 THE ORIGINAL JOURNALS OF THE LEWIS AND CLARK EXPEDITION (7 Vols.) Mead, Dodd and Co.: New York.
- Tiffany, J. A.
 1977 Artifacts from the Sharp's Site: A Sterns Creek Component in Southwestern Iowa. JOURNAL OF THE IOWA ARCHEOLOGICAL SOCIETY 24: 84-124.
 - 1978a Middle Woodland Pottery Typology from Southwest Iowa. PLAINS ANTHROPOLOGIST 23(81): 169-182.
 1978b A Model of Changing Settlement Patterns for the Mill Creek Culture of Northwest Iowa: An Analysis from the Chan-Ya-Ta Site (13BV1), Buena Vista County, Iowa. Ph.D. Dissertation, University of Wisconsin-Madison.
- Tohill, L. A.
 1928- Robert Dickson, British Fur Trader on the Upper Mississippi.
 1929 NORTH DAKOTA HISTORICAL QUARTERLY 3: 5-49, 83-128, 182-203.
- Toots, H. and M. Voorhies
 1965 Strontium in Fossil Bones and the Reconstruction of Food Chains. SCIENCE, Vol. 149: 854-855.
- Tratebas, A.
 1981 Current Status of Research on the McKean Complex in South Dakota. In: SPECIAL PUBLICATIONS 2, South Dakota Archeological Society.
- Troiike, R. C.
 1964 A Pawnee Visit to San Antonio in 1795. ETHNOHISTORY, II: 380-393.
- Tucker, S. J.
 1942 Indian Villages of the Illinois Country. ILLINOIS STATE MUSEUM SCIENTIFIC PAPERS 2, Part 1 (Atlas). Springfield.

Ubelaker, D.

1974 Reconstructions of Demographic Profiles from Ossuary Skeletal Samples: A Case Study from the Tidewater Potomac. SMITHSONIAN CONTRIBUTIONS TO ANTHROPOLOGY 18.

1976 Paleodemography of Virginia Indians: A Critique. JOURNAL OF THE ARCHAEOLOGICAL SOCIETY OF VIRGINIA, Vol. 30: 167-168.

1981 The Ayalan Cemetery: A Late Integration Period Burial Site on the South Coast of Ecuador. SMITHSONIAN CONTRIBUTIONS TO ANTHROPOLOGY. No. 29.

Ubelaker, D. and P. Willey

1978 Complexity in Arikara Mortuary Practice. PLAINS ANTHROPOLOGIST 23(79): 69-74.

United States Court of Claims

1916 THE OMAHA TRIBE OF INDIANS V. THE UNITED STATES. Docket No. 31002: 1-483.

Van Sina, J.

1965 ORAL TRADITION; A STUDY IN HISTORICAL METHODOLOGY. Aldine Publishing Co.: Chicago.

1978 THE CHILDREN OF WOOT; A HISTORY OF THE KUBA PEOPLES. University of Wisconsin Press: Madison.

Van Voorhis, F. L.

1978 Mill Creek Prehistoric Indian Culture. Edited by D. Anderson and J. Tiffany. JOURNAL OF THE IOWA ARCHEOLOGICAL SOCIETY 25: 8-48.

Vaughn, A.

1855 Letter from Alfred Vaughn to A. Cumming, September 12, 1855. ANNUAL REPORT OF THE COMMISSIONER OF INDIAN AFFAIRS 1855: 79-89.

Villiers du Terrage M. de

1925 LA DECOUVERTE DU MISSOURI ET L'HISTOIRE DU FORT D'ORLEANS (1673-1728).

Vis, R. B. and D. R. Henning

1969 A Local Sequence from Mill Creek Sites in the Little Sioux River Valley. PLAINS ANTHROPOLOGIST 14(46): 253-271.

Wada, M. and I. Inoue

1966 Relations between the Carbon-14 Production Rate and the Geo-Magnetic Moment. JOURNAL OF GEOMAGNETISM AND GEOELECTRICITY, 18: 485-488.

- Warren, G. K.
 1856 Explorations in the Dakota Country in the Year 1855. U. S. SERIAL SET 822, Document 76.
- Washburn, S.
 1948 Sex Differences in the Pubic Bone. AMERICAN JOURNAL OF PHYSICAL ANTHROPOLOGY 6: 199-207.
- Weakly, H.
 1962 Dendrochronology and Archaeology in Nebraska. PLAINS ANTHROPOLOGIST, Vol. 7, No. 16: 138-146.
- Weakly, W. F.
 1971 Tree-Ring Dating and Archeology in South Dakota. PLAINS ANTHROPOLOGIST 16(54) Pt. 2, MEMOIR 8.
- Weaver, J. E.
 1965 NATIVE VEGETATION OF NEBRASKA. University of Nebraska Press: Lincoln.
- Wedel, M. M.
 1938 The Relation of Historic Indian Tribes to Archaeological Manifestations in Iowa. IOWA JOURNAL OF HISTORY AND POLITICS 36(3): 227-314.
- 1959 Oneota Sites on the Upper Iowa River. THE MISSOURI ARCHAEOLOGIST, Vol. 21, Nos. 2-4.
- 1963 Note on Oneota Classification. THE WISCONSIN ARCHAEOLOGIST, Vol. 44: 118-122.
- 1974 LeSueur and the Dakota Sioux. MINNESOTA PREHISTORIC ARCHEOLOGY SERIES 11: 157-171. Minnesota Historical Society. St. Paul.
- 1976 Ethnohistory: Its Payoffs and Pitfalls for Iowa Archeologists. JOURNAL OF THE IOWA ARCHEOLOGICAL SOCIETY 23: 1-44.
- 1978 A Synonymy of Names for the Ioway Indians. JOURNAL OF THE IOWA ARCHEOLOGICAL SOCIETY 25: 49-77.
- Wedel, W. R.
 1934 Preliminary Notes on the Archaeology of the Medicine Creek Valley in Southwestern Nebraska. NEBRASKA HISTORY MAGAZINE 14(3): 144-166.
- 1935a Contributions to the Archeology of the Upper Republican Valley. NEBRASKA HISTORY MAGAZINE 15(3): 133-209.
- 1935b Minneapolis I, A Prehistoric Village Site in Ottawa County, Kansas. NEBRASKA HISTORY MAGAZINE 15(3): 210-237.

Wedel, W. R. (continued)

- 1936 An Introduction to Pawnee Archaeology. BUREAU OF AMERICAN ETHNOLOGY BULLETIN 112.
- 1946 The Kansa Indians. TRANSACTIONS OF THE KANSAS ACADEMY OF SCIENCE, 49(1): 1-35.
- 1955 Archeological Materials from the Vicinity of Mobridge, South Dakota. BUREAU OF AMERICAN ETHNOLOGY BULLETIN 157 (Anthropological Paper 45): 69-188.
- 1959 An Introduction to Kansas Archaeology. BUREAU OF AMERICAN ETHNOLOGY BULLETIN 174.
- 1961 PREHISTORIC MAN ON THE GREAT PLAINS. University of Oklahoma Press: Norman.
- 1970 Some Observations on "Two House Sites in the Central Plains: an Experiment in Archaeology." NEBRASKA HISTORY MAGAZINE 51(2): 225-252.
- 1978 The Prehistoric Plains. In: ANCIENT NATIVE AMERICANS. Edited by J. D. Jennings.
- 1981 Toward a History of Plains Archaeology. GREAT PLAINS QUARTERLY (1): 16-38. Lincoln.

Wedel, W. R., W. Husted and J. Moss

- 1968 Mummy Cave: Prehistoric Record from the Rocky Mountains of Wyoming. SCIENCE 160: 184-186.

Weltfish, G.

- 1965 THE LOST UNIVERSE. Basic Books: New York.

Wendland, W.

- 1971 Dating the Temporal Limits of Climatic Episodes during the Holocene. Ph.D. Dissertation, Geography Department, University of Wisconsin. Madison.
- 1978 Holocene Man in North America: The Ecological Setting and Climate Background. PLAINS ANTHROPOLOGIST 23(82), Pt. 1: 273-287.

Wendland, W. and R. Bryson

- 1974 Dating Climatic Episodes of the Holocene. QUATERNARY RESEARCH, 4: 9-24.

Western Publishing Company

- 1882 HISTORY OF WESTERN IOWA, ITS SETTLEMENTS AND GROWTH. Western Publishing Co.

- Wheat, C. I.
 1958 MAPPING THE TRANSMISSISSIPPI WEST; VOLUME TWO: LEWIS AND CLARK TO FREMONT 1804-1845.
- Wheat, J. B.
 1972 The Olsen-Chubbuck Site, A Paleo-Indian Bison Kill. SOCIETY FOR AMERICAN ARCHAEOLOGY, MEMOIR 26.
- White, T. E.
 1953 A Method of Calculating the Dietary Percentage of Various Food Animals Utilized by Aboriginal Peoples. AMERICAN ANTIQUITY, Vol. 17, No. 4: 396-398.
- Whiteford, G. L.
 1937 PREHISTORIC INDIAN EXCAVATIONS IN SALINE COUNTY, KANSAS. Salina, Kansas.
 1941 INDIAN ARCHAEOLOGY IN SALINE COUNTY, KANSAS. Salina, Kansas.
- Wied-Neuwied, Maximilian Prince of
 1906 TRAVELS IN THE INTERIOR OF NORTH AMERICA. In: EARLY WESTERN TRAVELS, Vols. 22-24. Edited by R. G. Thwaites.
- Wilford, L. A.
 1945 Three Village Sites of the Mississippi Pattern in Minnesota. AMERICAN ANTIQUITY 11: 32-40.
 1955 A Revised Classification of the Prehistoric Culture of Minnesota. AMERICAN ANTIQUITY 21(2): 130-142.
 1960 A Sickle from the Great Oasis Site in Minnesota. PLAINS ANTHROPOLOGIST 5(9): 28-29.
 n.d.a The Great Oasis Village Site. Unpublished Manuscript, Minnesota State Historical Society.
 n.d.b The Low Village Site 1950. Unpublished manuscript, Minnesota State Historical Society.
- Will, G. F.
 1946 Tree Ring Studies in North Dakota. Agricultural Experiment Station, North Dakota Agricultural College, BULLETIN 338.
- Will, G. F. and G. E. Hyde
 1917 CORN AMONG THE INDIANS OF THE UPPER MISSOURI. University of Nebraska Press.
- Will, G. F. and H. J. Spinden
 1906 The Mandans. PEABODY MUSEUM PAPERS 3: 81-219.
- Willey, G. R. and P. Phillips
 1958 METHOD AND THEORY IN AMERICAN ARCHAEOLOGY. University of Chicago Press.

Williams, P. M.

- 1973 The Herzer Site (13PM49): A Surface Inventory. NORTHWEST CHAPTER OF THE IOWA ARCHEOLOGICAL SOCIETY NEWSLETTER 21(4): 4-6.
- 1974 The Beals Site (13CK62): An In-Depth Inventory. NORTHWEST CHAPTER OF THE IOWA ARCHEOLOGICAL SOCIETY NEWSLETTER 22(4): 3-5.
- 1975a The Jones Site, (13CK1), 1974 Test. NORTHWEST CHAPTER OF THE IOWA ARCHEOLOGICAL SOCIETY NEWSLETTER 23(4): 3-9.
- 1975b The Sunken Lake Site (13DK22). NORTHWEST CHAPTER OF THE IOWA ARCHEOLOGICAL SOCIETY NEWSLETTER 13(5): 3-6. Cherokee.
- 1975c The Williams Site (13PM50): A Great Oasis Component in Northwest Iowa. JOURNAL OF THE IOWA ARCHEOLOGICAL SOCIETY 22: 1-30.

Wilmsen, E. N. and F. H. H. Roberts Jr.

- 1978 Lindenmeier, 1934-1974. Concluding Report of Investigations. SMITHSONIAN CONTRIBUTIONS TO ANTHROPOLOGY 24.

Wilson, G. L.

- 1934 The Hidatsa Earthlodge. Edited by B. Weitzner. ANTHROPOLOGICAL PAPERS OF THE AMERICAN MUSEUM OF NATURAL HISTORY. 33(5).

Wishart, D.

- 1979 The Dispossession of the Pawnee. ANNALS OF THE ASSOCIATION OF AMERICAN GEOGRAPHERS 69(3): 382-401.

Witty, T. A., Jr.

- 1962a The Anoka Focus. M. A. Thesis, Department of Anthropology, University of Nebraska.

1962b Archaeological Investigations of the Hell Creek Valley in the Wilson Reservoir, Russell and Lincoln Counties, Kansas. KANSAS STATE HISTORICAL SOCIETY, ANTHROPOLOGICAL SERIES 1. Topeka.

1963 The Woods, Avery and Streeter Archaeological Sites, Milford Reservoir, Kansas. KANSAS STATE HISTORICAL SOCIETY, ANTHROPOLOGICAL SERIES 2. Topeka.

1974 K.A.A. Dig, 1973, The Minneapolis Site, One More Time. KANSAS ANTHROPOLOGICAL ASSOCIATION NEWSLETTER 19(5): 1-4.

Wolpoff, M.

- 1971 Metric Trends in Hominid Dental Evolution. CASE WESTERN RESERVE UNIVERSITY STUDIES IN ANTHROPOLOGY, No. 2. Cleveland.

Wood, W. R.

- 1955 Historical and Archeological Evidence for Arikara Visits to the Central Plains. PLAINS ANTHROPOLOGIST 4: 27-31.
- 1956 The Redbird Focus. M. A. Thesis, University of Nebraska-Lincoln.
- 1959 Notes on Ponca Ethnohistory, 1785-1804. ETHNOHISTORY 6(1): 1-27.
- 1960 Nañza: The Ponca Fort. ARCHIVES OF ARCHEOLOGY 3.
- 1962 A Stylistic and Historical Analysis of Shoulder Patterns on Plains Indian Pottery. AMERICAN ANTIQUITY 28: 25-40.
- 1965 The Redbird Focus and the Problem of Ponca Prehistory. PLAINS ANTHROPOLOGIST 10(28), MEMOIR 2: 79-145.
- 1967 An Interpretation of Mandan Culture History. BUREAU OF AMERICAN ETHNOLOGY BULLETIN 198. River Basin Surveys Paper 39.
- 1971a Biesterfeldt: A Post-Contact Coalescent Site on the Northeastern Plains. SMITHSONIAN CONTRIBUTIONS TO ANTHROPOLOGY 15.
- 1971b Pottery Sites near Limon, Colorado. SOUTHWESTERN LORE 37: 53-85.
- 1974 Northern Plains Village Cultures: Internal Stability and External Relationships. JOURNAL OF ANTHROPOLOGICAL RESEARCH 30(1): 1-16.
- 1978 Theodore H. Lewis and His Northeastern Nebraska "Forts." PLAINS ANTHROPOLOGIST 23(79): 75-81.
- 1981 The John Evans 1796-1797 Map of the Missouri River. Paper delivered at the 37th Plains Conference, Kansas City, Missouri, November 3, 1979. GREAT PLAINS QUARTERLY 1(1): 39-53.

Wood, W. R. (Editor)

- 1969 Two House Sites in the Central Plains: An Experiment in Archaeology. PLAINS ANTHROPOLOGIST 14(44) Pt. 2. MEMOIR 6.
- 1976 Fay Tolton and the Initial Middle Missouri Variant. MISSOURI ARCHEOLOGICAL RESEARCH SERIES 13.
- 1981 Papers in Northern Plains Prehistory and Ethnohistory. ANTHROPOLOGICAL PAPERS 3. U. S. National Park Service.

- Wood, W. R. and R. B. McMillan
1976 PREHISTORIC MAN AND HIS ENVIRONMENTS: A CASE STUDY IN THE
OZARK HIGHLAND. Academic Press.
- Woolworth, A. R.
1974 ETHNOHISTORICAL REPORT ON THE YANKTON SIOUX. Garland Press:
New York.
- Wozniak, J. S.
1978 CONTACT, NEGOTIATION AND CONFLICT: AN ETHNOHISTORY OF THE
EASTERN DAKOTA, 1819-1839. University Press of America.
Washington, D. C.
- Zimmerman, L. J.
1977 Prehistoric Locational Behavior: A Computer Simulation.
OFFICE OF THE IOWA STATE ARCHAEOLOGIST REPORT 10. Iowa City.
- Zimmerman, L. J. and J. Buechler
1976 A Cultural Resources Reconnaissance of the Vermillion River
Chute Area, South Dakota, and the Broken Bottom Road Area,
Nebraska. CONTRACT COMPLETION STUDIES 16. University of
South Dakota Archaeological Laboratory, Vermillion.
- Zimmerman, L. J. and P. Burns
1977 A Cultural Resources Reconnaissance of Five Missouri River
Bank Sites near Vermillion, South Dakota. CONTRACT COMPLETION
STUDIES 27. University of South Dakota Archeological Labora-
tory, Vermillion.
- Zimmerman, L. J. et al
1981 The Crow Creek Site (39BF11) Massacre. Report to the U. S.
Army Corps of Engineers, Omaha District.