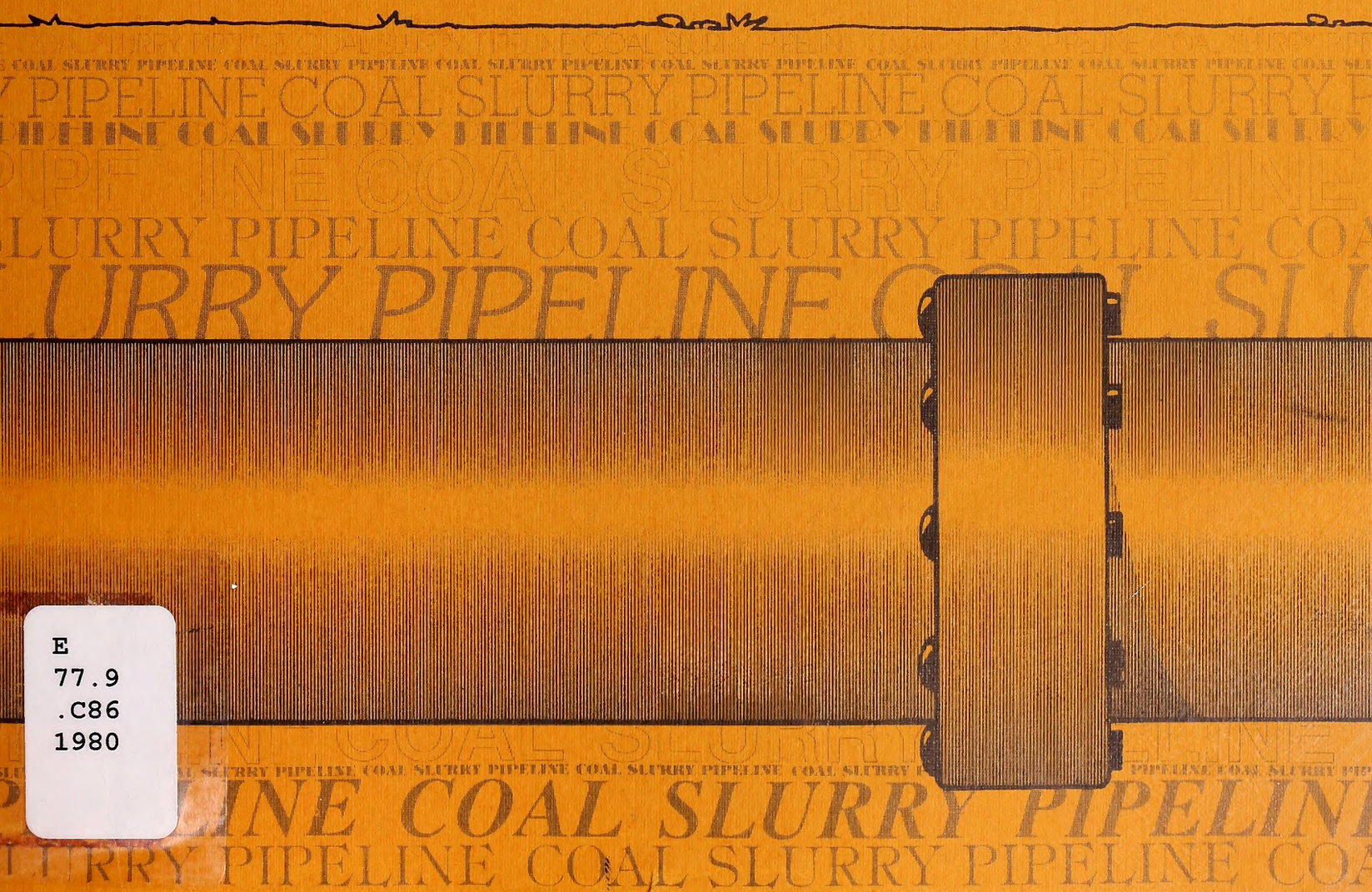
Technical Report

Cultural Resources

Prepared for
Bureau of Land Management
November 1980

Woodward-Clyde Consultants



CULTURAL RESOURCES

TECHNICAL REPORT

For the

ETSI Coal Slurry Pipeline Project

November 7, 1980

Prepared for

The Bureau of Land Management

by

Woodward-Clyde Consultants

This report was prepared by the following individuals:

PREHISTORY AND ETHNOLOGY

Heartfield, Price, and Greene, Inc.

301 Bres, Suite C

Monroe, LA 71201

Tony Dieste	Data Gathering and Compilation Agency Liaison
Edward L. Beene and Gary Stringer	Environmental Background
Robert W. Neuman	The Plains Synthesis
Jay Sperber	The Ozarks Synthesis
G.R. Dennis Price and Ellen Blue	The Lower Mississippi Valley Synthesis
Jay Sperber	Caddoan Archeological Area Synthesis
Roger Moore	Plains Ethnology
Jay Sperber	Ozarks Ethnology
Ellen Blue	Lower Mississippi Valley Ethnology
Jay Sperber	Caddo Ethnology
Roger Moore	Man and the Environment

HISTORY

Robert Murray

Western Interpretive Services

PO Box 6467

Sheridan, WY 82801

Paul Smith

Woodward-Clyde Consultants

3 Embarcadero Center

Suite 700

San Francisco, CA 94111

PREHISTORY AND ETHNOLOGY

Abstract

This report has collected and synthesized environmental, archeological, and ethnographic data regarding the existing cultural resources located within or near the proposed and alternate routes. Literature surveys, archival research, interviews and other sources have provided information necessary to define and summarize the important substantive archeological and ethnographic themes of the Project area. Past, present, and future research orientations have been defined and specific research goals for future work in the region have been recommended. An overall cultural resource management plan implemented by a Memorandum of Agreement is additionally recommended.

TABLE OF CONTENTS

LIST OF FIGURES

List of Figures (Cont.)

1. INTRODUCTION

1.1. Desciption of the Study

Heartfield, Price and Greene, Inc. of Monroe, Louisiana, was contracted by Woodward-Clyde Consultants of San Franciso, California, to prepare a Cultural Resource Synthesis following the procedures outlined in BLM Manual 8 111. The study pertains to lands adjacent to the proposed and alternate routes of a proposed coal slurry pipeline system to be constructed by Energy Transport Systems, Inc. This volume provides a synthesis of current archeological and ethnological knowledge of the Project area and is intended to provide a context for evaluating cultural resources potentially impacted by the proposed and alternate actions.

This study is the first step in placing the project in compliance with both Federal and State stipulations regarding cultural resources. The study should provide a base from which to develop subsequent studies that will provide for the cost-effective and timely acquisition of all necessary permits and clearances for construction of the Project.

1.2. Project Route Description

One may refer to the Project Environmental Assessment for a formal description of the proposed action and alternate routes. However, it is appropriate in this introduction to informally describe the project routes and note the relationship between routes and culture areas (Figure 1-1).

1.2.1. Proposed Action

The proposed action route begins in Gillette, Wyoming, and traverses portions of six states: Wyoming, Nebraska, Kansas, Oklahoma, Arkansas, and Louisiana. While within the states of Wyoming, Nebraska, Kansas, and Oklahoma the route passes through the Plains Culture Area. In Arkansas, the route traverses portions of the Ozarks, Caddo, and Lower Mississippi Valley Culture Areas, while in Louisiana the route passes along the boundary between the Caddo and Lower Mississippi Valley Culture Areas, then into the Lower Mississippi Valley Culture area, proper.

A breakdown of counties passed through by the proposed action route and ancillary facilities is as follows:

Wyoming
Cambell
Niobrara
Weston
Goshen
Crook

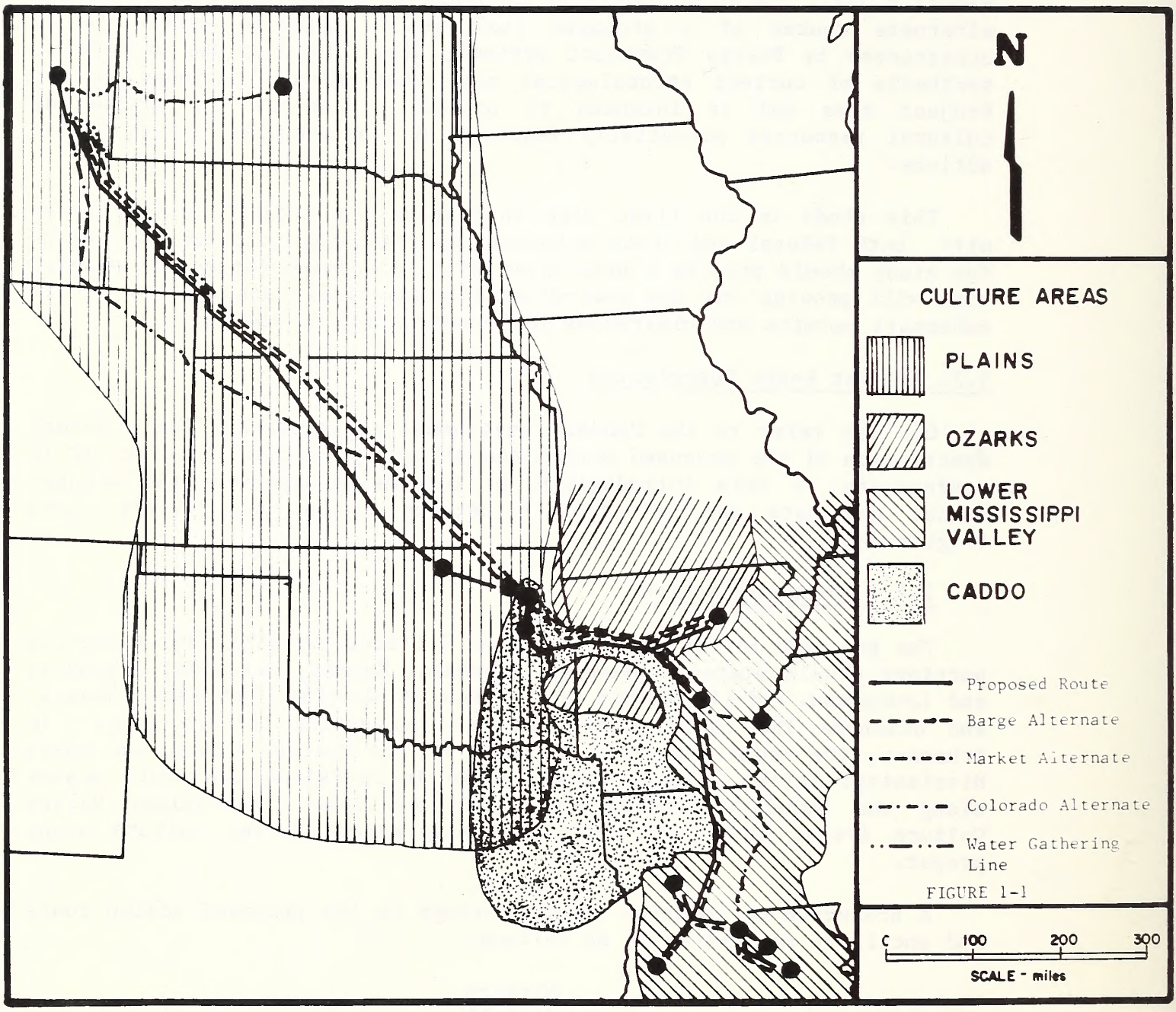

N
CULTURE AREAS
PLAINS
OZARKS
LOWER MISSISSIPPI VALLEY
CADDO
Proposed Route
Barge Alternate
Market Alternate
Colorado Alternate
Water Gathering Line
0
100
200
300
SCALE - miles

FIGURE 1-1

Nebraska

Sioux
Box Butte
Morril
Garden
Duel
Kieth
Perkins
Chase
Hayes
Hitchcock
Red Willow

Kansas

Decatur
Norton
Trego
Ellis
Rush
Barton
Graham
Stafford
Reno
Kingman
Harper
Sumner

Oklahoma

Grant
Kay
Noble
Pawnee
Osage
Washington
Rogers
Wagoner
Muskogee
Sequoyah

Arkansas

Crawford
Franklin
Johnson
Pope
Conway
Perry
Pulaski
Saline
Jefferson
Cleveland
Bradley
Ashley
Van Buren
Cleburne
Independence

Louisiana

Morehouse
Ouachita
Caldwell
La Salle
Rapides
Evangeline
Allen
Jefferson Davis
Calcasieu
Avoyelles
Pointe Coupee
West Baton Rouge
Iberville
St. James

1.2.2. Alternate Actions

Several alternate routes and ancillary facilities have been proposed for this project. The areas to be affected by these alternate actions are described below.

1.2.2.1. Market Alternate

The Market Alternate differs in the exclusion of the Ponca City and Muskogee Delivery Terminals. The route therefore differs within the states of Kansas and Oklahoma. Despite these changes, the route remains within the Plains Culture Area within those states. Counties lying within the Market Alternate Route within Kansas and Oklahoma include:

Kansas

Decatur
Norton
Phillips
Rooks
Osborne
Russell
Ellsworth
Rice
McPherson
Harvey
Sedjwick
Butler
Cowley
Chautauqua

Oklahoma

Osage
Washington

Oklahoma (cont.)
Rogers
Mayes
Cherokee
Adair
Sequayah

1.2.2.2. Barge Alternate

The Barge Alternate Route is identical to the Market Alternate from Gillette, Wyoming, to Jefferson County, Arkansas. There it turns eastward and passes through Lincoln and Desha Counties to the Mississippi River.

1.2.2.3. Colorado Alternate

The Colorado Alternate Route runs from Wyoming to Kansas through northeastern Colorado, by passing the state of Nebraska. The Colorado Alternate Route could terminate either by joining the Proposed Route in Ellis County, Kansas, or the Market/Barge Alternates in Rice County, Kansas. The entire alternate route remains within the Plains Cultural Area. Counties traversed by the Colorado Alternate include:

Wyoming
Cambell
Converse
Niobrara
Weston
Goshen
Laramie

Colorado
Weld
Logan
Washingto
Yuma

Kansas
Rice
McPherson
Harvey
Sedgewick
Butler
Cowley
Chautauqua
Cheyenne
Sherman
Thomas
Sheraton
Gove

1.2.2.4. Oahe Alternate Water Supply System

This water supply alternate is the only of both the Proposed Action and Alternate Actions water supplies which traverses counties not already listed under the Proposed Action. The Oahe Alternate begins in Pierre, South Dakota, and terminates in Gillette, Wyoming. While this route lies entirely within the Plains Culture Area, it encompasses territory occupies by semi-sedentary farmers of the Middle Missouri subarea in addition to the nomadic hunters of the High Plains (Figure 7-1). Counties traversed include:

Wyoming
Crook
Campbell

South Dakota
Lawrence
Mende
Pennington
Haakon
Stanley

1.3. Study Parameters

1.3.1. Utility of the Cultural Resources Synthesis

This Cultural Resource Synthesis is designed to provide the information necessary to make effective decisions in the cultural resource management process. In addition, it is intended to provide both the private sector and concerned citizens with a sufficient understanding of the cultural history of the Project area to make the decisions of the cultural resource managing agencies comprehensible.

The primary objective of the synthesis is to provide a framework for cost effective and time efficient project management throughout subsequent cultural resource compliance procedures. The synthesis provides a consistent body of data that spans the entire length of the proposed and alternate routes. This facilitates development of a comprehensive and programatic cultural resources management plan. It should also obviate the need for preparation of various regionally specific overviews. These are often conflicting and/or overlapping and difficult if not impossible to use for comparative purposes.

The synthesis will provide useful data that can be applied to:

1) definition and determination of the significance of cultural resource sites along the proposed and alternate routes;

2) interpret the meaning of those cultural resources identified within the corridors impacted by the Proposed and Alternate Actions;

3) identification and determination of the kinds and extent of impact of the proposed construction on significant cultural resources;

4) provide background data on prehistoric periods and ethnographic peoples (interpretive schemes) that will be useful in fulfilling subsequent compliance procedures;

5) in determining where "gaps" in our knowledge of a particular people, time period, or activity exist, in order to select impacted sites for mitigation or conservation which might shed light on these poorly-known areas.

To the layman, the synthesis can provide an impression of the diversity, through both time and space, of Project area cultural resources. The report emphasizes different degrees of mobility and subsistence systems of the Native American inhabitants of the Project area in prehistoric and historic time, factors which point to the necessity of studying the full range of sites associated with prehistoric cultures. Further the value of preserving information about the prehistoric past is discussed in Chapter 12.

We might illustrate this process this process with a hypothetical example from the Middle Missouri region of the Plains Culture Area. Chapter 3 (p. 3-16) points out that little is known about Early Woodland campsites in the Middle Missouri region. Let us suppose that the Oahe Water Supply Alternate would impact a number of such sites in South Dakota. To the non-archeologist, these small temporary camps might seem unimportant. Thus, he may have difficulty understanding why the cultural resource managers insist that a number of these sites be mitigted (extensively excavated prior to their destruction) or conserved. This study, however, points to our inadequate knowledge concerning sites of this type and has stressed repeatedly the vital necessity of examining the entire range of human activities in a particular region at specific points in time. We have little hope of truly understanding the way of life of a prehistoric people and how and why it changed if we do not investigate (or save for future investigators with more sophisticated techniques, since no excavation can recover all of the information in a site) the small, temporary, unglamorous, the-beaten-path sites as well as spectacullar mound complexes or village sites. This study is designed to provide both the professional archeologist and the layman with sufficient elementary information of this vareity to recognize and comprehend some of the problems to which Project area cultural resources might be relevant in the academic, regulatory, and managerial spheres.

1.3.2. Outline of Study Contents

The contents of the balance of this report may be briefly summarized by chapters as follows:

Chapter 2, Environmental Background: This chapter defines the broad geographical regions encompassed by the study area, outlining the physiography and geology of each region. In addition, brief overviews of the soils, hydrology, flora, and fauna of each region are outlined.

Chapters 3 through 6 synthesize the prehistoric record of the four culture areas traversed by the proposed action and alternate routes:

Chapter 3, Plains Culture Area: Prehistoric Synthesis: Chapter 3 summarizes previous archeological investigations in the Plains Culture Area and Symmarizes each of the major periods in the Plains chronological sequence.

Chapter 4, Ozarks Culture Area: Prehistoric Synthesis: Chapter 4 summarizes previous archeological investigations in the Ozarks Culture Area and outlines the Ozarks chronological sequence.

Chapter 5, The Lower Mississippi Valley Culture Area: Prehistoric Synthesis: This chapter reports previous archeological investigations in the Lower Mississippi Valley Culture Area and synthesizes the complex cultural sequence of the area.

Chapter 6, The Caddo Culture Area: Prehistoric Synthesis: Again, Chapter 6 summarizes the previous archeological investigations in the Caddo Area, as well as providing an outline of the Caddo chronological sequence.

Similarly, chapters 7 through 10 summarize the cultures of the various historic Native American groups occupying the four areas:

Chapter 7, Plains Ethnology: Chapter 7 summarizes the linguistic and tribal groupings of the Plains Culture Area. The chapter describes the subsistence and settlement systems, social organization, and historic affiliations of both the nomadic hunters and the semi-sedentary farmers of the historic Plains.

Chapter 8, Ozarks Ethnology: This chapter outlines the history, material and economic culture, and social organization of the Osage tribe, the predominant historic occupants of the Ozark region.

Chapter 9, Lower Mississipi Valley Ethnology: This chapter discusses early European contacts with the numerous Native American groups occupying the Lower Mississippi Valley and provides brief historical descriptions of each tribal grouping.

The chapter then offers generalized syntheses of the languages, housing, subsistence, social organization, and religious beliefs of the Lower Mississippi Valley.

Chapter 10, Caddo Ethnology: Chapter 10 outlines the linguistic affiliations, history, religion, social organization, economy, material culture, and warfare practices of the various groups identified with the Caddo confederacies.

Chapter 11, Man and Environment: This chapter examines various, increasingly sophisticated explanations of the relationship between human groups and their environment, illustrating these explanations with examples of previous research within the Project area. The chapter then lists some specific categories of information required to understand the prehistoric man/land relationship.

Chapter 12, Summary and Interpretations: Chapter 12 defines the scientific and human interest value of Project area cultural resources, briefly discusses previous research orientations within the Project area, and details a number of current research problems for each of the culture areas, as well as research problems for the Project area as a whole.

Chapter 13, Recommendations: Chapter 13 provides recommendations for the coordination (at both the State and Federal levels) of the management of cultural resources potentially impacted by the Proposed and Alternate Actions.

Appendix: Sensitive areas (defined on the basis of known significant cultural resource sites) are described in this portion of the report.

1.4. Study Methodology

This study has provided an extensively researched and clearly synthesized general summary of current knowledge regarding both prehistoric and historic Native American habitation of the culture areas to be traversed by the proposed and alternate routes. Information used in preparing this report was gathered through intensive literature surveys for each of the areas synthesized, as well as by reference to appropriate literature addressing the general orbjectives posed in Chapters 11 and 12.

Basic environmental data was assembled and synthesized, with the archeological and ethnological intent of the study clearly stated and emphasized.

A temporal sequence for each culture area was developed. Regional variations were identified, and a comprehensive synthesis which is consistent in format and can be used for comparison between the four regions was prepared.

Archeological and ethnological research designs applied within each region were identified, and major researchers and their works discussed. A historical perspective was provided with emphasis placed upon current research. Problems and areas of concern to both the cultural resources and academic communities were provided. Information pertaining to each region was presented in a consistent manner and comparisons made when possible.

The above information was used to develop narrative models that describe the dynamics of culture change; specifically, population variation, settlement and land use patterns, economic/exploitation systems, and the social parameters that can be identified.

2. ENVIRONMENTAL BACKGROUND

The environmental background of the area traversed by the proposed and alternate routes is most easily described among broad geographic regions. Thus, in the following chapter the geographic setting is provided first followed by brief overviews of the soils, hydrology, flora and fauna; each related to specific regions. The relationship of the environment to man; its limiting factors and opportunities are briefly discussed in Chapter 11.

2.1. Geographic Setting

There are three clearly definable geographic regions traversed ty the Project; the Plains, the Ozarks and the Lower Mississippi Valley. Each of these exhibits distinct physiography, biota and cultural adaptations. Thus, the geographic regions provide the constants within which environmental and cultural categories are described in most sections of this report.

2.1.1. The Plains Region

2.1.1.1. Physiography. The Plains Region through which the proposed and alternate routes pass includes the eastern part of Wyoming, the northeastern part of Colorado, Kansas, and northeastern Oklahoma. The Plains Region as defined in this report is located in the Great Plains Province (Thornbury 1965). This physiographic province is extensive, extending without interruption from the Pecos and Rio Grande Rivers on the south to the latitude of Great Bear Lake in Canada. As a whole this province may be described as plateau-like, although local mountainous uplifts as well as lowland areas are included in it. The western boundary of the Great Plains Province is very distinct. The Rocky Mountains form a prominent boundary almost the entire length of the province. In the northern Great Plains, numerous outliers of Rocky Mountain geology and geomorphology are detached from the mountain mass and included in the Great Plains Province. The surface of the Great Plains descends from elevations of 5000 or 6000 feet at the west to an average elevation of about 1500 on the east. The regional slope to the east averages about 10 feet per mile. Although flatness and monotony of topography characterize many thousands of square miles of the Great Plains, areas do exist where the relief is considerable. These are: 1) deeply dissected tracts adjacent to major entrenched streams, 2) areas along cuesta scarps, particularly at the eastern margin of the Great Plains, and 3) structurally high areas such as the numerous mountain tracts associated with Tertiary intrusives. Moderate to slight relief is to be found in 1) the Sand Hills of Nebraska and other dunal tracts, 2) the glacial moraines in the northern and northeastern part of the province, 3) some of the deeper depressions on the plains surface, and 4) along some stream terraces (Thornbury 1965).

The proposed and alternate routes in Wyoming lie in a relatively flat area. Bear Lodge Mountain to the north of the route has elevations in excess of 6300 feet above mean sea level. In the Laramie Range to the southwest of the route, elevations rise as high as 10,000 feet above mean sea level, but these elevations are rare for the Great Plains province. The Goshen Hole Lowland is located along the Wyoming-Nebraska border. This is the name given to a pronounced widening of the North Platte Valley in western Nebraska and eastern Wyoming. The lowland is as much as 50 miles wide at its maximum and has been formed by north and south recession of its rim and ensuing rapid erosion of the exposed Oligocene Brule Clay (Thornbury 1965). The topography of northeastern Colorado is similar to southeastern Wyoming with elevations around 5000 feet above mean sea level. The Colorado Piedmont is located just west of the proposed route. An extension of the Sand Hills of Nebraska is found along the Colorado-Nebraska boundary.

The route in western Nebraska passes south of the Pierre Hills and Pine Ridge. The route passes through the Box Butte Tablelands and the North Platte Valley. In this area, the route encounters the Sand Hills of Nebraska. The Sand Hills region of Nebraska is the most extensive area of stablized sand dunes in the United States. Thorp and Smith (1952) recognized an older generation of transverse dune ridges (some as much as 300 feet in height) and a second generation of dunes and formation, mostly in the form of longitudinal dunes. Thornbury (1965) describes the topography as consisting of a maze of dunal mounds and ridges separated by interdunal basins.

The route passes from northwest Kansas diagonally across Kansas to southeast Kansas. Elevations are relatively flat in the northwestern portion of the state ranging from 2500 feet to 3000 feet above mean sea level. This area is referred to as the Blue Hills Upland. Elevations rise slightly in the Smoky Hills area. However, the elevations drop below 2000 feet above mean sea level in the central part of Kansas. This area is extremely flat and is known as the Wichita Prairies. Elevations around Wichita average around 1300 feet above mean sea level. Elevations rise slightly again in the southeastern part of Kansas. This area is known as the Flint Hills and the Iola Escarpment.

As the proposed and alternate routes pass into northeastern Oklahoma, elevations are almost all below 1000 feet above mean sea level. The route passes through the Enid Prairies and the Cherokee Plains. These areas are characterized by elevations of less than 1000 feet and relatively flat topography.

2.1.1.2. Geology. Geologically, the Great Plains differ notably from the Central Lowlands to the east of them despite the fact that the topographic boundary cuts across geologic boundaries. The rocks of the Great Plains province are mainly Mesozoic or Cenozoic in age.

The eastern part of Wyoming through which the route passes is basically Cretaceous and Tertiary. The Cretaceous consists primarily of the

Lance, Lewis, and Pierre Formations. The Tertiary is mainly Paleocene and Eocene terrestrial sediments. These formations are the Fort Union, Wasatch, and Wind River. Along the boundary of southeastern Wyoming and Nebraska, Oligcene and Miocene formations are exposed. This area is unique geologically in that the late Tertiary sediments still lie against the Rocky Mountains. The continuity of erosional and depositional surfaces has been preserved (Clark and Stearn 1968).

The portion of the proposed and alternate routes that extends from Gillette, Wyoming northward to near the border of Wyoming-Montana is very similar geologically to the route in the other parts of Wyoming. The sediments are primarily Tertiary with smaller amounts of Quaternary and Cretaceous deposits. The Tertiary deposits consists mainly of Palescene and Eocene terrestrial sediments. Major formations include the Fort Union, Wasatch, and Wind River. Small amounts of Quaternary alluvium are located around the Little Powder River and the Little Missouri River. Cretaceous deposits are located in the northernmost portion of the proposed and alternate routes.

The geology of northeastern Colorado is very similar to the geology of southeastern Wyoming. It has Cretaceous exposures, mainly the Lance, Pierre, Fox Hills, and Laramie Formations, located north and northeast of Denver. These formations consist mainly of shales and sandstones. Oligocene (White River Formation) and Miocene (Arikaree Formation) formations are exposed in the extreme northeastern corner of Colorado. The most prominent geologic exposure in this part of the route is the Pliocene Ogallala Formation. The Ogallala Formation consists mainly of sandy alluvium. Its thickness varies from a few feet to several hundred feet, depending upon the configuation of the surface on which it was deposited. Although alluvial sands dominate, within the Ogallala Formation are beds of gravels, silt, lacustrine clays, and even freshwater limestone (Thornbury 1965). The gravels within the Ogallala could have been utilized by early inhabitants.

The geology in the western most part of Nebraska is similar to the geology of southeastern Wyoming and northeastern Colorado. However, the geology of the majority of Nebraska is dominated by Pleistocene deposits. All of the four glacial stages (Nebraskan, Kansan, Illinoian, and Wisconsinan) are recognized in the Upper Mississippi River Valley region. However, according to Reed and Dreeszen (1965), each of the glacial stages is represented by more than one advance and "retreat" of the ice.

Reed and Dreeszen (1965) present an excellent generalized Pleistocene map of Nebraska. Utilizing this map, the proposed and alternate routes pass through Wisconsinan terrace deposits which are loess-mantled, Wisconsinan dunesand, Illinoian terrace deposits which are loess-mantled, Kansan (Sappa, Walnut Creek, and Red Cloud Formations) and Nebraskan (Fullerton and Seward Formations).

The Sand Hills region of Nebraska is one of the more interesting geologic features of this area, but it represents one of the least understood parts of the state. The 22,000 square miles of Sand Hill

area is located principally in north-central Nebraska. As mentioned earlier, the Sand Hills also extend southwest into Colorado (Reed and Dreeszen 1965). Lugn (1935) recognized the Sand Hills region as an important source of loess during Wisconsinan time. Lugn suggested that the area probably had a complex pre-dunesand Pleistocene history with a hill and valley topography eroded into the underlying Pliocene bedrock of the Ogallala Formation. Reed and Dreeszen (1965) recognize an older and younger dunesand in the Sand Hills region. They correlate the older with Peoria Loess of medial Wisconsinan age and correlate the younger with the Bignell Loess of Late Wisconsinan age.

The deposits of Pleistocene age in the Sand Hills region which underlie the Peoria Dunesand seen to be generally coarser textured than their equivalents southeastward. This is probably due to these deposits being closer to the headwaters of the Early and Middle Pleistocene drainages and the fact that there is an abundant source of clastics in the Ogallala Formation (Reed and Dreeszen 1965). Gravels that are often found in the basal sections of the Sand Hills deposits would have served as excellent tool-making material for Native Americans.

The geology of northwestern Kansas is a continuation of the Pliocene Ogallala Formation found in northeastern Colorado and southern Nebraska. One feature of the Ogallala that should be noted is the zone of massive carbonate concentration in the upper part of the formation. This area known as caprock is from 10 to 30 feet thick and represents a zone of irregular accumulation of caliche. This resistant caprock is responsible for the development of escarpments in Texas and to a lesser degree in Kansas (Thornbury 1965). The lower parts of the Ogallala consist of sands, silts, clays, and gravels.

The Smoky Hills of Kansas consist mainly of Cretaceous deposits. The youngest Cretaceous deposits are located along the western margin and become progressively older eastward. The youngest Cretaceous sediments are represented by the Niobrara and the Carlile which consist of limestones and limey shales. Older Cretaceous formations include the Greenhorn, Graneros, Kiowa, and Cheyenne. These formations are also limestones and shales with the exception of the sandstone of the Cheyenne.

With the exception of widespread Quaternary (Recent) deposits around Hutchinson, Kansas, the remainder of the proposed and alternate routes in Kansas and northern Oklahoma is located in Paleozoic sediments. Just east of Wichita, Kansas, a 50 mile-wide, north-south trending belt of Permian exposures is found. These Permian sediments consist of Wolfcampian and Leonardian age rocks (A.A.P.G. 1966). The rocks consist of a variety of sediments ranging from small amounts of sandstone to shale to limestone. Dolomites and cherts are also widespread in areas.

Just east of the Permian deposits, three narrow bands of Pennsylvanian rocks are exposed. These north-south trending bands are narrow (each band being less than 50 miles wide). The youngest band is located to the west, subsequent bands becoming progressively older to the east as they approach the Ozark Region. The youngest exposures con-

sist of Virgillian-age (Pennsylvanian) sediments. These sediments consist of limestones, shales, and localized areas of coal. The next band of exposures consists of Missourian-age (Pennsylvanian) sediments. The bulk of these sediments are alternating shales and limestones. The final band of Pennsylvanian sediments is Desmoinesian in age. The rocks are mainly sandstones, shales, and limestones. Coal is abundant in much of the Desmoinesian sediments (A.A.P.G. 1966).

2.1.2. The Ozarks Region

2.1.2.1. Physiography. The Ozark Region for the purposes of this report includes northern and western Arkansas and eastern Oklahoma. The Ozark Region equates approximately with the Interior Highlands, one of the major physiographic divisions of the southeastern United states. The Interior Highlands in Arkansas and eastern Oklahoma are divided into three physiographic subdivisions. These are the Ozark Plateaus, the Arkansas Valley, and the Ouachita Province (Williams 1959).

The Ozark Plateaus are located in the northernmost counties of Arkansas and northeastern Oklahoma. According to Williams (1959), the Ozark Plateaus form an uplift more or less oval in shape with the longer axis trending northeast-southwest. The Ozark Plateaus cover an area of approximately 40,000 square miles.

The Ozark Plateaus are subdivided into three groups: the Salem Plateau, the Springfield Plateau, and the Boston Mountains. The Salem Plateau is located in northeastern Oklahoma and the extreme north-central portion of Arkansas. The Salem Plateau is bordered by the Gulf Coastal Plain to the east and by the Springfield Plateau to the south and west. The Salem Plateau is the largest of the Ozark Plateaus as it extends up and includes much of Missouri. Elevations average about 1250 feet above mean sea level. (Williams 1959). The Salem is a rough to rolling country with relief rarely as much as 100 feet. However, around the White River, relief may be as great as 500 feet. Deep dissection is characteristic of the southern side of the Salem Plateau (Thornbury 1965). Cuestaform topography is developed in varying degrees in the Salem Plateau. Beckman and Hinchey (1944) found that 12 of the 69 large springs in the United States are found in the Salem Plateau.

The Springfield Plateau of the Ozark Plateaus is located north of the Boston Mountains and is rather narrow except in the northwest part of Arkansas (Williams 1959). Most of the Springfield Plateau is gently rolling and has elevations in most areas of 1250 to 1700 feet above mean sea level. Much of the Springfield Plateau consists of the flat interfluve areas called "prairies" which are separated by valleys cut 200 to 300 feet below the upland surface. Locally, outliers of Pennsylvanian age sediments stand a few hundred feet above the plateau surface, much of which ranges between 1000 and 1500 in altitude (Thornbury 1965).

The final subdivision of the Ozark Plateaus is the Boston Mountains. The Boston Mountains are an east-west belt of rugged topography in

northern Arkansas and Oklahoma. It is the southernmost subdivision of the Ozark Plateaus. The Boston Mountains attain altitudes in excess of 2200 feet. According to Williams (1959), most of the mountain tops stand at about the same level and form a greatly eroded tableland. Dissection of the major valleys attains depths of 500 to 1000 feet. The Boston Mountains include the highest elevations and the most rugged terrain of the Ozark Plateaus in Arkansas.

The Arkansas Valley lies between the Ozark Plateaus on the north and the Ouachita Province to the south. The Arkansas Valley trends east-west in the central part of Arkansas. It extends from the Arkansas-Oklahoma border eastward where it is buried beneath the Tertiary and Quaternary sediments of the Mississippi Embayment. It is a gently undulating plain, most of which stands between 300 and 600 feet above mean sea level. However, many long, sharp ridges and mountains rise above this plain. Some of the mountains rise as high as 2,800 feet above mean sea level (Croneis 1930). The valley varies in width from 24 to 34 miles and is approximately 168 miles in length. The topography of the area consists of prominent resistant sandstone ridges and valleys of shale, which together produce a trellis drainage system. The topography is the result of erosion of the Arkansas Valley synclinorium (a broad, regional syncline on which minor folds are superimposed). Although the Arkansas Valley is lower than the highland regions to the north and south, it has several high mountain peaks (Kucsma 1978). The highest point in Arkansas, Magazine Mountain, is found in the Arkansas Valley.

The Ouachita Province is an east-west trending area roughly 225 miles long and 100 miles wide. The Ouachita Province lies south and parallel to the Boston Mountains (Thornbury 1965). The Ouachita Province lies north of the Gulf Coastal Plain and is divided into three subprovinces (Williams 1959). These subprovinces are the Fourche Mountains to the north, the Novaculite Uplift in the center, and the Athens Piedmont Plateau on the south.

The Fourche Mountains occupy a belt about 25 miles in width extending from near Little Rock westward into eastern Oklahoma. Most of the mountains in the western part of the subprovince are rugged and rise 1000 feet or more above the valleys. These mountains decrease in height eastward toward Little Rock. Pinnacle Mountain and Shinall Mountain near Little Rock lie in this subprovince (Williams 1959).

The second subprovince of the Ouachita Province is the Novaculite Uplift. The Novaculite Uplift is a spindle-shaped area extending from near Little Rock westward to southern Polk County in Arkansas. The proposed route runs to the north and just to the east of the Novaculite Uplift. The Novaculite Uplift is named for the fine-grained siliceous sedimentary rock which composes much of the strata in the area (Shreveport Geological Society 1953). The Uplift consists of a series of broad basins with gently rolling topography almost completely encircled by high ridges of novaculite (Williams 1959).

The third and southernmost of the subprovinces of the Ouachita Province is the Athens Piedmont Plateau. The Athens Piedmont Plateau is

narrow in width (8 to 18 miles) and extends from near the Ouachita River in Hot Spring County westward into Oklahoma. Its surface slopes from an elevation of about 1100 feet near the novaculite ridges in northern Howard and Pike Counties to 400 feet along its southeastern border. Williams (1959) notes that several eastward-trending parallel sandstone ridges project 150 to 250 feet above the adjacent valleys.

A very small portion of the proposed and alternate routes enters the Gulf Coastal province in northeastern Arkansas. The final segment of the route to Independence, Arkansas is in the Gulf Coastal physiographic province. This province is more fully described in the Lower Mississippi Valley section of this report.

2.1.2.2. Geology. Geologically, the Ozark Plateaus lies athwart a structural uplift known as the Ozark Dome and is bounded by topographic lowlands on all sides. The crest of the Ozark Dome actually lies in the St. Francois Mountains in Missouri (King 1951). Limestones and dolomites of Paleozoic age predominate in the Ozark Plateaus. According to Howe and Koenig (1961), the sedimentary rocks of the Ozark Plateau range in age from Cambrian to Pennsylvanian. One area that is a notable exception to the widespread carbonates of the Ozark Plateau is the Boston Mountain area. Rocks of the Boston Mountains are predominately sandstones and shales. Most of the clastic rocks composing the Boston Mountain section are Early and Middle Pennsylvanian in age. The predominant sandstone in the Boston Mountains is the Atoka Formation. Faulting is also more conspicuous in the Boston Mountains than in other sections of the Ozark Plateaus (Thornbury 1965). Faults are especially conspicuous in Cherokee and Adair Counties in Oklahoma.

One notable geological occurrence in the Ozark Plateaus that has an improtant archeological aspect is the widespread occurrence of chert. Thornbury (1965) states that this area may have more chert than any other comparable area in the United States. Chert is so abundant in many areas that it mantles the topography, chokes the streams, and all but obscures the soil. The chert is mainly from the Mississippian Boone Formation. This widespread chert was readily available to aboriginal inhabitants for tool and weapon flaking. Its conchoidial fracture pattern and huge supply offered aborigines an excellent source rock.

The Arkansas Valley is a broad synclinorium with a structural axis trending eastward. Sheppard (1978) describes the region as a large crumpled rug in which the most intense folding occurred near the area of greatest stress, the Ouachita Mountains. Most of the surface rocks in the Arkansas Valley are Pennsylvanian and Mississippian in age. The rocks and sediments consist primarily of sandstone, siltstone, and shale, with minor amounts of coal and limestone. Alluvial deposits are found along major streams. Colluvium, weathered debris, is found along the steep slopes of many hills and mountains.

Major formations in the Arkansas Valley include the Atoka Formation, the Hartshorne Sandstone, the McAlester Formation, the Savanna

Formation, the Stanley Formation, and the Jackfork Formation. Kucsma (1978) notes the occurrence of Quaternary terrace deposits in the Arkansas Valley. These deposits consist of locally derived clay, silt, and sand. Large gravel and small boulders of sandstone are also found in the terrace sediments. Terraces seldomly exceed 20 to 30 feet in thickness. Recent alluvial material is also present in many of the streams of the study area. The gravels and small boulders of sandstone were probably utilized by prehistoric occupants in the Arkansas Valley.

Closed folding with an east-west trend characterizes the Arkansas Valley. Croneis (1930) described 76 anticlines, 62 synclines, and 19 faults in the Arkansas Valley. The folded structure is most evident topographically in the southern part of the Arkansas Valley, where steep anticlinal ridges and broad, flat-topped synclinal mountains are conspicuously present.

The Ouachita Province extends from Little Rock, Arkansas to Atoka, Oklahoma. As a result of its anticlinorial structure, rocks of pre-Carboniferous age are exposed in the Ouachita Province. Rocks range in age from Ordovician (possibly Cambrian) to Pennsylvanian. The rocks are predominantly clastics (sandstones, siltstones, and shales), but unique to this area is the novaculite of Mississippian-Devonian age (Thornbury

The Fourche Mountains subprovince takes its name from the Fourche Range in Arkansas and the Kiamichi Range in Oklahoma. The rocks are all Carboniferous in age and belong to the Atoka, Jackfork, and Stanley Groups. The Jackfork sandstones are the major ridge markers. However, some of the lower ridges are sandstones in the Atoka and Stanley Groups. Most of the ridges display parallel arrangement, but not all (Thornbury 1965).

One of the unique geologic features of the Ouachita Province is the Novaculite Uplift. The Novaculite Uplift, so called because of the abundance of ridges of novaculite, consists of a series of mountains and basins (Croneis 1930). Uplift was greatest in this part of the Ouachita Province, and as a consequence, the exposed rocks are largely pre-Carboniferous in age. Ridges form mainly on the novaculite, but some also form on the Ordovician Crystal Mountain Sandstone and the Hot Springs Sandstone. These three formations were important to aborigines and warrant additional discussion.

Novaculite is a hard, fire-grained sedimentary rock consisting almost entirely of silica. It breaks with a smooth shell-like fracture. It is this feature that makes novaculite so valuable for prehistoric tool making. The novaculite is widespread and was readily available to prehistoric inhabitants. In the southernmost outcrops, it exceeds 900 feet in thickness. The novaculite is usually white with a bluish tint, but it may be red, green, gray, yellow, black, and brown. (Shreveport Geological Society 1953). A conglomerate also appears in the middle part of the novaculite deposits. This conglomerate consists of small rounded and subangular pebbles of novaculite in a sandy and dense flinty matrix.

The Ordovician Crystal Mountain Sandstone was probably also a valuable source of material for aborigines. The formation is composed of coarse-grained massive gray to brown sandstone. However, at the base, there is a conglomerate with limestone and chert pebbles. The Hot Springs Sandstone is composed of a gray, hard quartzitic sandstone. This formation also has a basal conglomerate. This conglomerate has novaculite pebbles up to 6 inches in diameter in it. The novaculite pebbles provide excellent material for flaking and tool making.

Another important geologic formation for prehistoric utilization is the Boone Formation. The Boone Formation is found along and near the route to Independence in Arkansas (Croneis 1930). The Boone Formation is commonly referred to as the "Boone Chert" because of the tremendous amount of chert found in the formation. The chert may be nodular, but the chert is usually evenbedded and massive. The rust-brown to cream-colored chert exhibits conchoidal fracture patterning and has excellent flaking properties. The "Boone Chert" is extremely resistant to weathering and has been known to "drop down" on other eroded formations. It is widespread throughout northeast Arkansas and is commonly found in streams, rivers, and talus deposits. With its physical characteristics and availability, the "Boone Chert" was utilized frequently by prehistoric inhabitants in northeast Arkansas.

2.1.3. Lower Mississippi Valley

The physiography and corresponding geology of the Lower Mississippi Valley varies greatly from the Ozark Region to the north. The Ozark Region is characterized by a complexity of physiographic subprovinces and complex geologic exposures. The Lower Mississippi Valley is relatively simple physiographically and geologically.

2.1.3.1. Physiography. The Lower Mississippi Valley is part of the Gulf Coastal province. Murray (1960) describes the Gulf Coastal province as that portion of the coastal element between the Rio Grande and the Atlantic Ocean. It includes all or parts of the states of Texas, Louisiana, Oklahoma, Arkansas, Missouri, Illinois, Kentucky, Tennessee, Mississippi, Alabama, Georgia, and Florida.

The alluvial Valley of the Mississippi River begins near Cape Girardeau, Missouri, and extends southward as far as the head of the Atchafalaya River in Louisiana, where the deltaic plain begins. The alluvial valley varies in width from 25 miles near Natchez, Mississippi, to 125 miles near Helena, Arkansas. The alluvial Valley is bounded by prominent valley walls which in places rise as much as 200 feet above the valley floor. In general, the valley walls decrease in height southward. A thick veneer of loess overlies the bedrock of the valley walls (Thornbury 1965). West of the alluvial valley, Cretaceous and Tertiary sediments occur.

Elevations in the Lower Mississippi Valley along the proposed and alternate routes in southern Arkansas and Louisiana almost all fall

below 600 feet above mean sea level. Physiographic features include Grand Prairie southeast of Little Rock, the Tensas Basin in northern Louisiana, the Atchafalaya Basin around Baton Rouge, and the Pine Flats in southern Louisiana.

Thornbury (1965) reports several ridges that break the continuity of the alluvial valley floor. The northernmost and longest of these ridges is Crowley's Ridge. This ridge extends for about 200 miles, from near Commerce, Missouri, to Helena, Arkansas. Crowley's Ridge rises as much as 200 feet above the valley floor. South of Crowley's Ridge, there are three upland remnants in the alluvial valley -- Macon Ridge, the Bastrop Hills, and Sicily Island. Macon Ridge extends from Eudora, Arkansas to Sicily Island, Louisiana -- about 100 miles. The Bastrop Hills, to the west of Macon Ridge, consist of Pleistocene sediments. Sicily Island, just to the south of the southern tip of Macon Ridge, is composed of rocks of Tertiary age and is mantled with Pleistocene loess.

A line drawn between Donaldsville and Franklin, Louisiana, has traditionally been the best approximation of the indefinite boundary between the alluvial valley and the deltaic plain of the Mississippi River (Fisk 1944). The deltaic plain is composed of at least five discernable subdeltas or delta complexes, each of which has several recognizable lobes or distributary networks. Each lobe and in a more complex way, each subdelta represents a predictable cycle of sedimentation and landscape development (Saucier 1974). Most of this area is south of the proposed and alternate routes.

2.1.3.2. Geology. The Lower Mississippi Valley, as part of the Gulf Coastal province, is a structural and stratigraphic entity of Mesozoic and Cenozoic age superimposed upon Paleozoic and Precambrian rocks. The over-all, regional form and shape of the element is controlled by Paleozoic and Precambrian structures and alignments (Murray 1960).

The predominantly shallow water and regressive Mesozoic and Cenozoic sediments attain a maximum thickness of 50,000 feet and constitute a great coastal geosyncline extending, in general, from the Gulfian (Cretaceous) outcrop to the edge of the continental slope.

The oldest exposed rocks in the Lower Mississippi River along or near the proposed and alternate routes are Cretaceous in age. These Cretaceous deposits are located in a narrow band south of Hot Springs, Arkansas. According to Dane (1929), the Cretaceous formations of southwestern Arkansas consist largely of unconsolidated sand, clay, and marl but include some beds of limestone, sandstone, and chalk. They rest on the truncated edges of the intensely folded and faulted Paleozoic rocks, which crop out in the Ouachita Mountains to the north.

The remainder of the sediments along the proposed and alternate routes are Tertiary and Quaternary in age. One of the most widespread geologic exposures in southeastern Arkansas is the Jackson Group. The Jacksonian deposits in southeastern Arkansas include both marine and

nonmarine strata. The sediments vary from thin-bedded lignitic silts to dark gray argillaceous sand to calcareous glauconitic clay (Wilbert 1953). Other Eocene groups in southeastern Arkansas include the Claiborne Group, the Wilcox Group, and the Midway Group.

The geological exposures in northern Louisiana are very similar to those in southeastern Arkansas and consist of Tertiary and Quaternary sediments. The oldest sediments in Louisiana are Paleocene except for the restricted Cretaceous outcrops over salt piercement domes. The major Paleocene group is the Midway. Eocene sediments are widespread throughout Louisiana and consist of the Wilcox, Caliborne, and Jackson groups. Oligocene exposures in Louisiana are not nearly as widespeard as Eocene exposures. However, the proposed route does pass through Oligocene sediments in southern Caldwell Parish and northern LaSalle Parish, Louisiana. The Oligocene sediments belong to the Vicksburg Group and consist mainly of clays and silts. Miocene exposures are also restricted in Louisiana. Several small, scattered Miocene exposures are found near the pipeline route in sourthern LaSalle Parish, Louisiana. Most Tertiary exposures in Louisiana are sands, shales, and clays. Limestones and marls also are found but are not as widespread.

Probably the most significant geological exposures for prehistoric lithic resource utilization are the Pleistocene terrace deposits. These terraces are named Prairie (youngest), Montgomery, Bentley, and Williana (oldest). Pleistocene terrace deposits are found in southern Arkansas and throughout Louisiana (Fisk 1944). The Williana and Bentley Terraces consist of well-oxidized, cross-bedded, fluvial coarse sands with extensive irregular zones or layers of chert gravels (Saucier 1974). Williana and Bentley are found mainly in central and southwestern Louisiana.

The principal occurrence of the Montgomery Terrace is in the form of a coastwise terrace of fluvial and possibly deltaic origin located in southeastern and southwestern Louisiana. Saucier (1974) questions the occurrences of Montgomery Terrace deposits in Arkansas. In its 10 to 15-mile outcrop belt, the coastwise terrace is composed of well-oxidized brightly colored, silty to sandy clays which grade downward into sands and gravels.

The youngest of the Pleistocene terrace deposits is the Prairie Terrace (Fisk 1938). Next to the Holocene and the deltaic plain of the Mississippi River, the Prairie Terrace comprises the largest area of Quaternary deposits of essentially one age. Saucier (1974) reports that the distinctive topographic ridge located north and west of Lake Charles, Louisiana is composed of Prairie Terrace sands. The ridge, which is prominent on an otherwise featureless Prairie Terrace surface, is believed to be a relict barrier island complex.

Another unique geological feature of the Prairie Terrace is the occurrence of hundreds of thousands of low, circular mounds several tens of feet in diameter in Arkansas and southwestern Louisiana. These mounds are referred to as pimple mounds, mima mounds, and prairie mounds. Many theories have been offered for their origin, but none of them can be accepted totally.

Another terrace deposit that warrants description is the Deweyville Terrace. This terrace occurs mainly along the Ouachita and Arkansas Rivers in Louisiana and Arkansas. Silty and sandy clays prevail in the upper few feet. Clean sands are present below a depth of about 20 feet and sands with large gravels should occur below a depth of 40 feet. Total terrace formation thickness averages 60 to 70 feet along the Ouachita River and 80 to 100 feet along the Arkansas River. The gravels of this terrace and the other Pleistocene terraces may reach sizes up to 6 to 10 inches. The conchoidal fracture and the abundance of these gravels made them a primary source for prehistoric inhabitants of Louisiana and Arkansas.

2.2. Soils

Soils constituted a major environmental factor affecting prehistoric inhabitants. Whether man is a hunter, gatherer, or a grower, he is dependent upon the types and fertility of the soils. The edapic or soil history along the proposed and alternate routes is extremely complex. Not only do the proposed and alternate routes transverse an extremely large area, but the geology and the climate which controlled soil development are extremely varied and complicated. The soils in the proposed pipeline route are the result of the parent material, landform, time, climate, and biological activity. Soil surveys rarely agree on the types or associations of soil from county to county within a state. To determine the specific soil associations for the proposed pipeline route would be a monumental task. However, it is possible to make accurate generalizations on the soil types and their relationships to prehistoric inhabitants.

2.2.1. Major Soil Groups

Most authorities divide the United States into two major groups of soils: the pedalfers and the pedocals. The pedalfers show pronounced leaching and occur mainly in the eastern United States. These soils occur mainly in climates where precipitation is more than 25 inches annually and more moderate temperatures exist. These regions are generally characterized by forested areas of coniferous evergreens or deciduous hardwoods (Laporte 1975). Within the proposed and alternate routes, pedalfer soils occur mainly in Louisiana, Arkansas, the eastern part of Oklahoma, and the extreme eastern part of Kansas.

The other major class of soils is the pedocals. The pedocals have an excess of calcium carbonate and occur mainly in the western United States. Pedocal soils occur mainly in climates where annual precipitation is less than 25 inches and temperatures are moderate to high. These regions are generally characterized by prairie, grassland, scrub, or desert vegetation (Laporte 1975). Within the proposed and alternate routes, pedocal soils occur mainly in western Kansas, Nebraska, Colorado, and Wyoming.

In addition to the two major groups of soils, many soil scientists subdivide soils into three orders: zonal, intrazonal, and azonal (Strahler 1973). The zonal soils are the most widespread and important. The zonal soils are formed under conditions of good soil drainage through the prolonged action of climate and vegetation. Intrazonal soils are those formed under conditions of very poor drainage. Azonal soils have no well developed profile characteristics due either to insufficient development time or steep slopes that prevent soil development.

The majority of the soils traversed by the proposed and alternate routes are zonal soils.

2.2.3. Soil Associations

Generalized soil associations (and their descriptions) along the proposed route from the area around Gillette, Wyoming to Baton Rouge and Lake Charles, Louisiana follow.

2.2.3.1. Brown Soils. A small area of the extreme western portion of the proposed and alternate routes consists of the brown soil association. The brown soils are zonal soils also referred to as aridic boroll (Soil Conservation Service 1967). The brown soils are generally found in more arid regions and contain less humus than the chestnut or chernozem soils. The brown soils are a lighter color than the chestnut soils due mainly to less humus content (Strahler 1973). Brown soils are typical of middle-latitude steppes and support a light growth of grasses. Present-day farming on brown soils must utilize irrigation. Farming or growing on brown soils in the past by early inhabitants without irrigation would have been futile.

2.2.3.2. Chestnut Soils. Through most of eastern Wyoming and western Nebraska the Project traverses chestnut soils. Chestnut soils are zonal soils similar to brown soils, but contain more humus than brown soils. The chestnut soils or typic boroll are darker than brown soils but not as dark as chernozem soils (Soil Conservation Service 1967). A unique feature of the chestnut soils is the prismatic structure found in the B horizon (zone of accumulation or of illuviation). Chestnut soils or typic boroll are widespread in the semi-arid middle-latitude steppe lands of the United States (Strahler 1973). The chestnut soils are fertile only under conditions of adequate rainfall or irrigation.

The route from Gillette, Wyoming northward to near the Wyoming-Montana border is characterized primarily by two zonal soils (Soil Conservation Service 1967). The soils near Gillette are mainly brown soils (aridic boroll). The remainder and majority of the route north of Gillette is characterized by chestnut soils (typic boroll). These two zonal soils are described more fully in the sections of this report covering brown soils and chestnut soils.

2.2.3.3. Chernozem Soils. The majority of north-central Kansas through which the proposed and alternate routes pass consists of chernozem soils or black earths. The chernozem soil or udic boroll is one of the most distinctive and widely distributed types of zonal soils in a semi-arid climate (Soil Conservation Service 1967). According to Strahler (1973), a typical chernozem profile appears to consist essentially of two layers. Immediately beneath a grass sod is a black layer, the A horizon, two to three feet thick in humus. The A horizon grades downward into a B horizon of brown or yellowish-brown color, then with a sharp line of demarcation, into a light-colored C Horizon. Chernozem soils are rich in calcium, which appears in excess as calcium carbonate precipitated in the lower B horizon or just beneath the B horizon.

The development of chernozem soils has long been related to climate (Young 1975). Drought periods with strong evaporation dry out the soil, and forests cannot exist. Instead, grasses, which can withstand drought readily and which are tolerant to soils with excesses of mineral salts, flourish on chernozem soils. Steppe grasslands and prairies are the natural vegetation of the middle-latitude chernozem soils (Strahler 1973). The chernozem soils were the grazing lands for many animals that were exploited by prehistoric peoples.

2.2.3.4. Planosols and Prairie Soils. In the central part of Kansas, the proposed and alternate routes encounter intrazonal soils known as planosols. These strongly leached soils develop on flat or gently sloping, elevated surfaces. The soil horizons are abnormally thick because of slow removal by erosion. Planosols have a dense, cemented horizon (Strahler 1973).

Soils along the proposed and alternate routes in the southern part of Kansas and the extreme northern part of Oklahoma consist basically of prairie or brunizem soil and reddish prairie soil. Reddish prairie soils are essentially like prairie soils except for the reddish brown color. The prairie soils are similar to the chernozems in general profile and appearance, but differ in that the prairie soils lack the excess of calcium carbonate of the chernozems (Soil Conservation Service 1967). The prairie soil is actually a transitional type between the major soil divisions: pedocal and pedalfer. The prairie soils become almost completely dry between summer rains down to a depth of a foot or so as a result of the dryness and heat of summer air masses. Although the prairie grasses can survive these conditions, deciduous forest, which border the prairies on the east, cannot (Strahler 1973). During earlier times, these prairie grasses supplied the major food supply for many of the larger animals, such as buffalo.

The eastern portion of Oklahoma through which the proposed and alternate routes passes consists mainly of two types of soils. One type of soil found in eastern Oklahoma is the planosol type. This intrazonal type is a strongly leached soil that develops on flat or gently sloping elevated surfaces.

2.2.3.5. Podzolic Soils. The other type of soil found in eastern Oklahoma is the red-yellow podzolic or udult soils (Soil Classification 1967). The red-yellow podzolic soils are zonal soils. They show the same characteristic leaching of the A horizon. Humus content is usually low. The typical red and yellow colors are a staining in the form of hydroxides of iron (Strahler 1973). Deciduous forest was the natural vegetation of this soil type. Aborigines exploited both the forest products and the great abundance of wildlife found in the forests.

Western and central Arkansas consists mainly of red-yellow podzolic udult soils as in eastern Oklahoma. However, in some parts of central Arkansas, alluvial soils develop around major tributaries. The route to Independence, Arkansas is dominated by two soil groups. These are the alluvial soils associated with the Mississippi River system and the red-yellow podzolic (udult) soils (Soil Conservation Service 1967).

Most of the soil in the proposed and alternate routes in Louisiana consists of red-yellow podzolic or udult soils (Soil Conservation Service 1967). The red-yellow podzolic soils of Louisiana are similar to the ones in Arkansas. The hot summers and mild winters favor bacterial action. Humus content is variable, but is usually low. The yellow soils are the more strongly leached of the red-yellow podzolic soils. This is related to the greater rate of precipitation. The yellow soils are widely distributed in sandy coastal plain belts as in Louisiana. These soils characteristically support thick forests with abundant fauna and flora which would have been exploitable by prehistoric peoples (Strahler 1973).

In the extreme southern portion of Louisiana, two intrazonal soils develop. These are groundwater podzol or half bog soils and the bog soils. Drainage in the groundwater podzol is somewhat better than in the bog soils, but is nevertheless poor. A thick, humus-rich layer is developed, overlying a sticky gley horizon. This type of soil is also referred to as humic glei soil (Soil Conservation Service 1967). Grasses grow rapidly and densely in groundwater podzol (Strahler 1973).

The bog soils are another type of intrazonal soils found in extreme southern Louisiana. These soils are associated with swamps, bogs and marshes. Drainage is extremely poor. These soils support abundant marsh and aquatic wildlife that could have been hunted and trapped by aborigines. The proposed land route to Baton Rouge would encounter some red-yellow podzolic soils. However, most of this route would encounter alluvial soils.

2.3. Hyrdrology

Although the type of soil, geology, vegetation, and climate was immensely important to the aborigines, the amount of water in the form of groundwater and surface water was also of extreme importance. Although rivers and lakes are obvious water resources, Hidore (1974) refers to groundwater and soil moisture as the most widely used water

resourses. Plant life is dependent upon soil moisture for sustenance. However, the quanity of water stored as soil moisture at any specified time is small. Continual renewal of the soil moisture supply is necessary to sustain plant growth. Some soil moisture is never available to plants because the bonds holding it to the soil particles are so strong that osmosis cannot remove it.

Groundwater storage in the United States is far greater than surface water storage. Groundwater storage is equal to about ten years of precipitation or thirty-five years of runoff (Hidore 1974). Therefore, groundwater plays an extremely important role in the hydrologic cycle.

Groundwater along the proposed and alternate routes occurs in a great variety of individual aquifers. The amount and quality of groundwater available at any location along the proposed and alternate routes would depend on the local geologic, climatic, and geographic conditions. However, generalized groundwater provinces have been established for the United States (Meinzer 1923). Each of the groundwater provinces is distinguished by the similarity of the occurrence of groundwater within it. Local conditions cause variations within each province, but in general, the boundaries of a province enclose an area of similar groundwater conditions. The groundwater provinces of the proposed and alternate routes are described below. The major surface waters such as rivers, lakes and creeks are given for each province.

2.3.1. Montana Eocene-Cretaceous and Black Hills Cretaceous Provinces

The proposed and alternate routes in eastern Wyoming are located in the Montana Eocene-Cretaceous groundwater province and in the Black Hills Cretaceous groundwater province (Meinzer 1923). In these two provinces, large amounts of water are found in the permeable sandstones of Cretaceous age. The water is generally high in mineral matter, but it is still usable. Artesian wells occur in both provinces, but are most frequent in the Montana Eocene-Cretaceous province. In the Black Hills Cretaceous province, water comes from Precambrian crystalline rocks as well as from younger sedimentary strata. Shallow wells in these provinces usually produce only meager amounts of water. This is due to the surface rock being composed of largely impermeable shale that must be pierced before a well reaches the deeper sandstone aquifers (Leet and Judson 1971).

In the eastern part of Wyoming, the proposed and alternate routes encounter no major surface water area. Keyhole reservoir to the north of the route is man-made and has no relationship to prehistoric inhabitants. Rivers and streams in this area that could have been utilized by aborigines include Belle Fourche, Dry Fork Creek, and Lightning Creek.

2.3.2. Great Plains Pliocene-Cretaceous Province

The proposed and alternate routes in Nebraska and the western part of Kansas are located in the Great Plains Pliocene-Cretaceous groundwater province (Meinzer 1923). The Great Plains Pliocene-Cretaceous province is similar to the Montana Eocene-Cretaceous province and the Black Hills Cretaceous province. Large amounts of water are found in the permeable sandstone of Cretaceous age. Much of the water is high in mineral matter. Artesian wells occur but not as frequently as in the Black Hills Cretaceous province. In some areas of the Great Plains Pliocene-Cretaceous province, water is obtained from Tertiary sediments that were eroded from the Rocky Mountains. Quaternary sands and gravels yield water in some of the larger valleys (Leet and Judson 1971).

In Nebraska, the proposed and alternate routes cross several major surface areas. In southwest Nebraska, the route crosses both the North Platte and South Platte. Lake McConaughy, a large man-made reservoir on the North Platte, of course, was not available to prehistoric inhabitants. Except for smaller rivers and streams (Stinking Creek and Republican), the North and South Platte represent the major surface water in the area. Both of these rivers could have been exploited for fish and associated wildlife by native Americans.

2.3.3. Great Plains Pliocene-Paleozoic Province

In southern Kansas, the proposed and alternate routes would be in the Great Plains Pliocene-Paleozoic groundwater province for a short distance (Meinzer 1923). This province is widely veneered with Tertiary sediments worn from the Rocky Mountains as they rose toward their present elevation. Large supplies of good water are obtained from wells in these deposits. Also in this province, the Triassic and Permian rocks bear water (Leet and Judson 1971).

In Kansas, the proposed and alternate routes cross numerous streams and rivers. These include Beaver, South Fork Sappa, Prairie Dog, North Fork Soloman, Bow Creek, South Fork Solomon, Saline, Big Creek, Smoky, Walnut, Arkansas River, Rattlesnake, and North Fork Ninnescah. The Arkansas River is the largest and most important of these surface waters.

2.3.4. South-Central Paleozoic Province

The proposed and alternate routes in the southernmost part of Kansas, in all of Oklahoma, and in western and central Arkansas are located in the South-Central Paleozoic groundwater province (Meinzer 1923). The province is underlain by relatively flat-lying sedimentary rocks of Paleozoic age. The shales produce virtually no water, but shallow wells tap good and often abundant water in the sandstones and limestone beds. Water in deep wells tends to have a high mineral content and is generally unfit for use. Water occurs in the Paleozoic rocks under artesian conditions in many places. (Leet and Judson 1971).

Along the proposed and alternate routes in Oklahoma and western and central Arkansas, the major surface water is the Arkansas River. Other smaller areas of surface water include Bird, Caney, Verdigris, Neosho, Spring, and Illinois. The White River and its tributaries represent major surface water in northeastern Arkansas available for Native American use. Also, there is a large amount of surface water in the Lake of the Cherokees and Lake Fort Gibson. However, this lake system is partly controlled and has been expanded by man-made structures. The Arkansas River complex in northern Oklahoma and western and central Arkansas played an important role in aboriginal life. The Arkansas River complex supplied ample surface water as well as providing hunting and fishing for prehistoric inhabitants (McGimsey 1969). Rock shelters in which Archaic Period inhabitants lived are found along the Arkansas River in the northwestern part of that state.

2.3.5. Atlantic Coastal Province

The proposed and alternate routes in southern Arkansas and all of Louisiana is located in the Atlantic Coastal groundwater province of Meinzer (1923). This province ranges from the coastal areas of New York to Texas. Its landward margin marks the present known limit of deposits laid down by the Cretaceous seas. Along the proposed and alternate routes in southern Arkansas and Louisiana, the sedimentary strata dip gently seaward. Water is found in the sandstone and porous limestone beds between more shaly layers. Due to downdip from the intake area of these beds, artesian pressure may be built up (Leet and Judson 1971). Groundwater is also abundant in the Pleistocene stream and terrace deposits along the route in southern Arkansas and Louisiana.

Major areas of surface water along the proposed and alternate routes in southern Arkansas and Louisiana include the Arkansas River, Saline Bayou, Bartholomew Bayou, Boeuf River, Bayou Macon, Bayou Desiard, Ouachita River, Catahoula Lake, Little River, Calcasieu River, Tensas River, Black River, and Red River. McGimsey (1969) mentions several of these rivers and bayous as known sites of prehistoric habitation. Game and fish were abundant in and around these areas. Abundant vegetation supplied edible plants, nuts, and berries. Middens containing freshwater mollusk shells and various types of fish remains such as vertebrae, scales and otoliths are found along many of these rivers and bayous in Arkansas and Louisiana (McGimsey 1969).

2.4. Flora

A comprehensive overview of the vegetation utilized by Paleo-Indian and Native American groups is provided by discussing the vegetation of two time periods. The first time period (post-glaciation) includes the succession of Pleistocene flora to Holocene flora. It begins in the late Wisconsin glaciation stage and extends to the late Pleistocene era. The second time period (Holocene) beings with the start of the Holocene era and continues to the present.

2.4.1. Vegetative Successions

In his treatment of plant migrations, Harshberger (1958) indicated that two vegetational centers were involved in the formation of post-glacial flora in the vicinity of the Project area. These include the Prairie center (centrally located in the Project area), and the Deciduous center (located east of the study area). The Prairie center established the Plains vegetation while the Deciduous center provided the proto-vegetation of the Ozark and the Lower Mississippi Valley areas.

2.4.1.1. Succession of Prairie Flora. The origin of the Prairie flora, both Mixed and True, began during the Eocene with the uplifting of the Rocky Mountains (Gleason 1923; Weaver 1954; and Weaver and Albertson 1956). As the Rocky Mountains were uplifted, they intercepted the moisture being carried from the Pacific which created a drier climate to the east (Gleason 1923; Weaver 1954; and Weaver and Albertson 1956). This resulted in a grassland prairie in the Miocene which, by the Pleistocene, evolved into the forerunner of the modern prairie (Weaver and Albertson 1956). Gleason (1923) wrote that the "present climatic center of the Prairie Province in western Kansas and Nebraska and eastern Colorado has been occupied by this vegetation [prairie] continually since its origin...." Harshberger (1958) corroborated this statement when he wrote, "it is a noteworthy fact that all the plants of the Pleistocene flora were such as are now represented in the same localities...."

After the initial retreat of the Wisconsin ice front, the Mid-West experienced a change in flora from tundra to boreal conifers which infers that there was still a cool climate (Wells 1970). As the glaciation continued to retreat, the climate became warmer allowing invasion by pine. This may indicate a warmer, drier climate (Ibid). According to Wells (Ibid), after the completion of the glacial retreat, the climate became warmer and more humid, allowing immigration of mesophytes such as beech, hemlock and elm. Wells (Ibid) further states that the following climatic period was warmer but considerably drier. These conditions were favorable to the advance of the grasslands. As the climate became more humid, the grasslands retreated into the limits exhibited prior to white settlement (Ibid).

During the Mid-Western succession of plant associations, the land through which the northern portion (Wyoming, Colorado, South Dakota, Nebraska, Kansas and portions of eastern Oklahoma) of the proposed and alternate routes will pass maintained a prairie association (Weaver 1954 and Weaver and Albertson 1956). The major climatic factor that may have affected the extent of the prairie was precipitation. Studies by Weaver (1954) of the present prairie association during the drought of the 1930's may give insight into events occurring simultaneously with those of the Mid-West.

Weaver (1954) stated that as precipitation increased within the Prairie associations, the True Prairie may have advanced into the eastern portion of the Mixed Prairie while deciduous forest advanced into

the eastern True Prairie. As conditions became drier, the situation reversed with Mixed Prairie advancing into the western border of the True Prairie which in turn advanced into the western border of the deciduous forest (Weaver 1954; Weaver and Albertson 1957).

Since the end of Wisconsin glaciation, it may be assumed that the prairie regions were fairly well established and that there have been periods in which precipitation has deviated from the recent (last 200 years) average. But, if the Prairie association response to these extremes is constant, it may be anticipated that the flora of the Mixed and True Prairies was essentially the same when the first white settler arrived as they were when the first Paleo-Indians entered the prairie region.

2.4.1.2. Succession of the Deciduous Forests. Harshberger (1958) referred to MacMillan's work in Minnesota, Bessey's work in Nebraska, Mason's work in Kansas and Bray's work in Texas to form his hypothesis of deciduous coniferous forest migration. Harshberger suggests that a center of deciduous/coniferous forests (located in Pennsylvania, Maryland, West Virginia, Kentucky, Tennessee, North Carolina, Virginia, Georgia, Alabama and Mississippi), which were remnants of a large Miocene forest, migrated westward as the climate became warmer. As these forests migrated west they encountered the xeric area bordering the Prairies. At this point, the broad-leafed forests migrated along the ravines and drainage systems located in the Prairies.

2.4.2. Holocene Vegetation

The Holocene flora represents the recent vegetation boundaries following the post-glacial period. It was during the early portion of this time frame that the Plains, Ozark and Lower Mississippi Valley vegetation evolved into the ecoysystems represented today by relic and undisturbed populations. These populations serve as the basis for the description of the flora during Paleo-Indian, Indian and Euro-American settlement times.

2.4.2.1. The Plains Holocene Vegetation. The Plains vegetation is characterized by two types of Prairie: the Mixed Prairie and True Prairie. Weaver and Albertson (1956) stated that the "Mixed Prairie is located in the xeric expanse located between the Rocky Mountains and the True Prairie, east to west, and between the Rio Grande and MacKenzie Rivers, north to south". Mixed Prairie is found along the alignment in eastern Wyoming, eastern Colorado, South Dakota, Nebraska, and Kansas.

According to Weaver (1954), the True Prairie extends from Manitoba to Wisconsin, through Illinois and Indiana, south to Missouri, eastern Oklahoma, and central Texas then to north Minnesota. It is bordered to the east by deciduous forest and to the west by the Mixed Prairie (Weaver 1954). It is intercepted by the proposed and alternate routes in eastern Kansas and eastern Oklahoma.

Eastern deciduous forest vegetation may be found associated with the larger streams and rivers in the Plains. This type vegetation will be discussed in the following section.

2.4.2.1.1. Mixed Prairie. Weaver and Alberston (1956) did extensive studies on Mixed Prairie between the 1920's and 1950's. They stated that "Although the vegetation is not uniform over its vast expanse, many of the more abundant grasses occur throughout. This leaves no doubt about its unity...." The "more abundant" grasses include six mid and seven short grasses. Abundant forbs number approximately 18.

The more abundant mid-grasses include needle and thread (*Stipa comata*), sand dropseed (*Sporobolus cryptandrus*), western wheatgrass (*Agropyron smithii*), Buffalo grass (*Buchloe dactyloides*), side-oats grama (*Bouteloua curtipendula*) and green needlegrass (*Stipa viridula*) (Weaver and Albertson 1956). The abundant short grasses include June grass (*Koeleria cristata*), blue grama (*Bouteloua gracilis*), thread-leaf sedge (*Carex filifolia*), needle-leaf sedge (*Carex eleocharis*), red three-awn (*Aristida longiseta*), purple three-awn (*Aristida purpurea*) and galleta (*Hilaria jamesii*) (Weaver and Albertson 1956). Since the dominant grass communities vary, a description of the Mixed Prairie within each state traversed by the proposed and alternate routes will be given.

Mixed Prairie in Wyoming. Two major mixed prairie types occur in Wyoming (Weaver and Albertson 1956). In northeastern Wyoming, the needle-and-thread-wheatgrass-buffalo grass is predominant (Weaver and Albertson 1956). Blue grama-buffalo grass Mixed Prairie is predominant in southeastern Wyoming. Additional grasses, western wheatgrass and six-weeks fescue (*Festuca octoflora*), are found in varying degrees associated with both types of Mixed Prairie (Weaver and Albertson 1956). Forbs and shrubs associated with the blue grama - buffalo grass Mixed Prairie include Pursh's plantain, red false mallow, pepper grass, prickly pear, big sage, fringed sage, silver sage, broom snake weed and winterfat (Weaver and Albertson 1956).

Due to overgrazing, a disclimax of blue grama, prickly pear and big sage occurs in eastern Wyoming (Weaver and Albertson 1956). It is assumed that pre-settlement vegetation probably consisted of a greater abundance of mid-grass (buffalo grass) and a lesser abundance of prickly pear and sages.

Blue grama and buffalo grass would have been and are preferred forage of herbivores. It is theorized that with natural grazing of the extinct megafauna and extant species, such as elk, antelope and bison, the blue grama - buffalo grass prairie flourished (Weaver and Albertson 1956).

Mixed Prairie in Eastern Colorado. According to Weaver and Albertson (1956), there are two major divisions of prairie in Eastern Colorado. These are the piedmont/mesa vegetation and High Plains vegetation.

The piedmont/mesa vegetation is dominated by blue grama. Ringgrass (Muhlenbergia torreyi), hairy grama (Bouteloua hirsuta) and red three-awn comprise the remainder of the dominant grasses. Weaver and Albertson (1956) stated that little and big bluestems were found in areas of high gravel content. Additional grasses include squirrel tail (Sitanion hystrix), tumblegrass (Schedonnardus paniculatus), junegrass, needle-and-thread and western wheatgrass. Buffalo grass was found to be extremely sparse (Weaver and Albertson 1956).

The bunch-grass community (little bluestem, June-grass, big bluestem, Indian grass, mountain muhly and side-oats grama) showed a preference for high mesas, moist slopes and small depressions containing a constant water supply (Weaver and Albertson 1956).

The remaining eastern portion the High Plains of the state is dominated by the blue grama-buffalo grass prairie (Weaver and Albertson 1956). Within this prairie type are two minor prairie types: the bunch-grass type and the wire-grass type (Weaver and Albertson 1956).

The bluegrama-buffalo grass type was described by Weaver and Albertson (1956) as "uniform and velvet-like." Additional grasses include squirreltail, red three-awn, tumblegrass and western wheatgrass. Forbs include fetid marigold (Dysodia popposa), Russian thistle (Salsola kali), horseweed (Conyza canadensis), lamb's quarters (Chenopodium album), prickly-pear, hedgehog cactus, bull cactus, red false mallow, gumweed, ground plum, brown-plumed ptiloria, scarlet gaura, flea bane, crazy weed, woolly loco, western wallflower, fringed sage, broom snakewood, few-flowered psoralea, cut-leaved goldenweed, hairy golden aster, umbrella plant and blazing star (Weaver and Albertson 1956).

The bunch-grass plant community is found principally on sandy soil and is dominated by little bluestem (Weaver Albertson 1956). Additional grasses include sand bluestem (Andropogon hallii), sand reed (Calamovilfa longifolia), switchgrass, red three-awn, blue grama and hairy grama. Important forbs include few-flowered psoralea, sand sage, bush morning glory, red false mallow, prairie coneflower, fine-leaf hymenopappus, cut-leaved goldenweed, hedgehog cactus, blazing star, greenthread, umbrella plant, hairy golden aster and rusty lupine (Weaver and Albertson 1956).

The wire-grass plant community is found on sand loam soils and indicates a relatively deep water source. As the name implies, wire-grass is the dominant plant of this community type (Weaver and Albertson 1956). Weaver and Albertson (1956) listed the additional grasses and forbs few-flowered psoralea, needle-and-thread, sand dropseed, needle-leaf sedge, tumblegrass and six-weeks fescue, as occuring as well as those grasses listed in the blue grama-buffalo grass and bunch-grass community types. Important forbs include bush morning-glory, red false mallow, prairie coneflower, fine-leaf hymenopappus, cut-leaved goldenweed, hedgehog cactus, blazing star, greenthread, umbrella plant, hairy golden aster and rusty lupine.

All of the grasses and many of the forbs are edible forage for grazing herbivores (Weaver and Albertson 1956).

Mixed Prairie in South Dakota. Prairie in South Dakota can be divided into three areas. According to Weaver and Albertson (1956), these are: 1) The Black Hills area; 2) Buffalo grass/western wheatgrass-blue grama area; and 3) Badlands area.

The Black Hills is located in southwestern South Dakota and grass communities consisting of junegrass, needle-and-thread, western wheatgrass and bluebunch wheatgrass and junegrass are dominant (Weaver and Albertson 1956). Short grasses include buffalo grass, blue grama, needle-leaf sedge and thread-leaf sedge with buffalo grass and blue grama being co-dominant (Weaver and Albertson 1956). Other grasses include big bluestem, sand reed, little bluestem, red three-awn, purple three-awn and squirrel tail (Weaver and Albertson 1956). Forbs and shrubs listed as important by Weaver and Albertson (1956) include big sage, sand sage, silver sage, fringed sage, rabbit brush and broom snakeweed.

The buffalo grass/western wheatgrass-blue grama area is located east and south of the Black Hills and extends to the Missouri River (Weaver and Albertson 1956) area. There are few additional grasses or forbs encountered in this area.

The Badlands area is located southeast of the Black Hills. Undisturbed areas were studied in 1942 by Larson and Whitman (mesas) and in 1954 by Albertson and Tomanek (uplands) (Weaver and Albertson 1956). These studies showed that short grasses comprised approximately 60% while mid and tall grasses comprised approximately 40%. Forbs and shrubs exhibited little or no significant populations. Grasses in the mesa included western wheatgrass and blue grama (codominants), needle-leaf sedge, penn sedge, thread-leaf sedge, needle-and-thread, side-oats grama, green needlegrass, red three-awn, little blue-stem and big blue-stem. Grasses in the uplands included needle-and-thread, Buffalo grass, blue grama (all co-dominants), western wheat grass, green needlegrass and thread-leaf sedge (Weaver and Albertson 1956).

Mixed Prairie in Eastern Nebraska. Mixed Prairie in eastern Nebraska is divided by four topographic areas which include the sands hill area, the lake and wet meadow area, the loess plains area and the pine ridge escampment area.

The sand hills area of Nebraska may divided into 31 phases of vegetational dominance. This is due to the fact that the sand hills are an everchanging environment ranging from bare sand to a typical mixed prairie coverage (Weaver and Albertson 1956).

The initial dominant vegetation on a sand hill is termed the "blow-out community." (Weaver and Albertson 1956). According to Weaver and Albertson (1956), this community type is characterized by a dominance of blowout grass (*Redfieldia flexuosa*) and lance-leaved psoralea (*Psoralea lanceolata*). Scattered individuals of Indian ricegrass (*Oryzopsis hymenoides*), sand lovegrass (*Eragrostis trichodes*), needle-and-thread (*Stipa comata*), sand reed (*Calamovilfa longifola*), spider-wort

(Tradescantia virginiana), umbrella plant (Eriogonum annuum), toothed-leaved primrose (Oenothera serrulata), showy peavine (Lathyrus onnatus flavescens), rattlepod (Phaca longifolia), white-flowered spurge (Euphorbia petaliodea) and woolly yellow hymenopappus (Hymenoppapus filifolius) may be encountered (Weaver and Albertson 1956). As the blowout community stabilizes the sand hill, other grasses and forbs are able to compete and eventually replace the blowout community. The first of these is the sand hill muhly community.

The sandhill muhly community is dominated by sandhill muhly (Muhlenbergia pungens) and may contain hairy grama, small soapwood, lance-leaved psoralea and sand cherry (Prunus besseyi). As this community further stabalizes the sand hill, annual grasses of the bunch grass community become established and eventually replace the sand hill muhly community.

The bunch grass community, according to Weaver and Alberton (1958), is the "prevailing and most characteristic of the sandhill region...." Little bluestem (Andropogon scoparius) is the dominant grass type of this community. It is usually accompanied by sand bluestem (A. hallii), sand reed (Calamovilfa longifola), needle-and-thread (Stipa comata) sand lovegrass (Eragrostis trichodes), sand dropseed (Sporobolus cryptandrus) and little soapweed (Yucca glauca) (Weaver and Alberton 1956). The more important forbs and shrubs include bush morning-glory (Ipomoea leptophylla), flea bane (Erigeron bellidiastom), annual gilia (Gilia longiflora), sand milk weed (Asclepias arenaria), sand sage (Artemisia filifolia), umbrella plant (Eriogonum microthecum), Canada sage (Artemisia canadensis), redroot (Ceanothus ovatus), sand cherry (Prunus besseyi), prairie rose (Rose suffulta) and lead plant (Amorpha canescens).

There are usually two sedges associated with this community. These are Cyperus sedge (Cyperus shweinitzii) and sun sedge (Carex heliophila) (Weaver and Albertson 1956).

The lakes and accompanying meadows in the sand hills are surrounded by three zones of vegetation (Weaver and Albertson 1956). These are the lower, middle and upper zones (Weaver and Albertson 1956). According to Weaver and Alberton (1956), the lower zone usually contains "bluejoint" (Calamagrostis canadensis), numerous species of sedges, and certain tall forbs such as water hemlock (Circuta maculata) and swamp milkweed (Ascelepias incarnata). The middle zone is usually characterized by big blue stem, Indian grass, switch grass, slender wheatgrass and slough grass. True prairie components of the short grass community comprise the upper zone. Beyond the upper zone, the bunch grass community is dominant (Weaver and Albertson 1956).

The remaining areas of Mixed Prairie in Nebraska include the loess plains, short-grass and the Pine Ridge Escarpment areas (Weaver and Albertson 1956).

The loess community is characterized by being divided into three topographic floral community types. The blue grama/buffalo grass com-

munity previously discussed, is located on hill tops and dry slopes (Weaver and Albertson 1956). Tall and mid-grass true prairies are located in the lower portions such as "ravines, low terraces and lower slopes" (Weaver and Albertson 1956). Along hillsides, the junction of these two communities form a third community type which consists of mixed short, mid and tall grasses.

The short grass community covers the area south and west of the Sand Hills and the Cheyenne and Perkins table lands (Weaver and Albertson 1956). It is co-dominated (an average 80%) by the short grasses blue grama and buffalo grass. Additional grasses include false buffalo grass (Munroa squarrosa), penn sedge (Carex pennsylvanica), hairy grama (Bouteloua hirsuta), sun sedge (C. heliophila), side-oats grama (B. curtipendula), red three-awn (Aristida longiseta), purple three-awn (A. purpurea), little bluestem (Andropogon scoparius) and squirreltail (Sitanion hystrix) (Weaver and Albertson 1956). Western wheatgrass (Agropyron smithii), sand dropseed (Sporobolus cryptandrus) and June grass (Koelaria cristata) are prevalent during periods of drought (Weaver and Albertson 1956). Big bluestem (Andropogon gerardi) is found in the more humid soils of ravines and hill bottoms. Dessert saltgrass (Distichlis stricata), alkali sacaton (Sporobolus airoides) and foxtail barley (Hordeum jubatum) may be found in saline soils (Weaver and Albertson 1956).

The important forbs listed by Weaver and Albertson (1956) as occuring in the short grass community include cut-leaved golden weed (Haplopappus spinulosus), broom snakeweed (Gutierrezia sarothrae), velvety goldenrod (Solidago mollis), false boneset (Kuhnia eupatorioides), blazing star (Liatris punctata), many flowered aster (Aster ericoides), smooth golden rod (Solidago missouriensis), gumweed (Grindelia squarrosa), wavy-leaved thistle (Cirsium undulatum) and few-flowered psoralea (Psoralea tennuiflora). Weaver and Albertson (1956) also lists additional perennials of abundance in the short grass community. These include greenthread (Thelesperma sp), scarlet gaura (Gaura coccinea), prairie coneflower (Ratibida columnifera), silky sophora (Sophora sericea), tooth-leaved primrose (Oenothera serrulata), puccoon (Lithospermun incisum), western ragweed (Ambrosia psilostachya), Missouri mild vetch (Astragalus missouriensis) and woolly loco (Astralagus mollissimus).

The four abundant annuals of the short grass community listed by Weaver and Alberton (1956), include six-week fescue (Festuca octoflora), little barley (Hordeum pusillum), Pursh's plantain (Plantago purshii) and spinulose plantain (Plantago spinulosa).

The "numerous rosette and mat-forming plants" (Weaver and Albertson 1956) include prairie cat's foot (Antennaria neglecta), yellow sheep sorrel (Oxalis stricta), heath aster (Aster arenosus), rough penny royal (Hedeona hispida), Carolina anemone (Anemone caroliniana), Short's vetch (Astralagus shortianus), ground plum (Astralagus crassicarpus) and red false mallow (Sphaeralcea coccinea).

The Pine Ridge Escarpment flora as described by Weaver and Albertson (1956), consists of rolling hill grasses and ponderosa pines. Needle-and-thread (Stipa comata) is described as the dominant grass. Weaver and Albertson (1956) quoted Poual and Clements concerning the original flora as stating:

> The [grass] carpet is to be found thin and patchy, while, on the sandy plains, the cover is seldom sufficiently dense to hide the sand. June grass and wheat grasses were other important mid-grasses, and blue grama and buffalo grass were in the understory. Abundant and conspicuous legumes were Astragalus mollissimus [woolly loco], A. adsurgens [vetch], Lupinus plattensis, Oxytropis lambertii, Psoralea argophylla [Silver-leaf psoralea], P. tenuiflora [few-flowered psoralea], and P. esculenta [Prairie turnip]. Erysimum asperum, Thelesperma trifidum and Pentstemon albidus were common along with many forbs well distributed over the great Plains."

Weaver and Albertson (1956) included Tolstead's 1939 study of relic areas of the Pine Ridge Escarpment flora. In this study, Tolstead cited needle-and-thread (Stipa comata) as by far the most abundant. Thread-leaf sedge (Larex filifola) was the second most abundant. the scant understory consisted of blue grama and buffalo grass. Sparse patches of wheatgrass were noted (Weaver and Albertson 1956).

Mixed Prairie in Western Kansas. Mixed Prairie in western Kansas is divided by Weaver and Albertson (1956) into three floral communities: short grass, tall grass and little bluestem. The short grass community occurs in the level uplands. The tall grass community occurs in the ravines and along the lower slopes and little bluestem communities occurs on "rocky hillsides and steep protected slopes" (Weaver and Albertson 1956). Kuchler (1974) identifies four floral communities in the area traversed by the proposed and alternate routes. These are the mixed prairie (north-central Kansas), the short grass prairie (Western Kansas), sand prairie (in south-central Kansas) and tall grass prairie. The sand prairie is not considered abundant in Weaver and Albertson (1956) because it represents a very small section of the state. The mixed prairie designation is to the east of the area studied by Weaver and Albertson (1956). All of the above communities have been described earlier in this report.

2.4.2.1.2 True Prairie. True Prairie is characterized by nearly pure stands of tall, mid- or short-grasses, depending upon the physiography of the land (Weaver 1954). Grasses of a heighth of 5-8 feet or more are indicative of areas of high moisture content, such as ravines and lowlands, and are termed tall grasses (Weaver 1954). Weaver (1954) describes mid grasses as grasses attaining a heighth of 2-4 feet. These grasses are indicative of a somewhat drier niche than that asso-

ciated with tall grasses. Short grasses, 0.5-1.5 feet tall, are indicative of areas of low moisture content such as ridges and hill crests (Weaver 1954). These three grass types constitute a majority of the individuals found in the two topographic regions of the True Prairie: lowlands and uplands (Weaver 1954).

Lowlands. The lowlands association may be divided into the Big Bluestem, Sloughgrass and Switchgrass-Canada Wild-Rye communities (Weaver 1954). Weaver (1954) states that the big bluestem community is one of great importance and large area. It is found most often along well drained lowlands and lower slopes of hills. This community type is composed of big bluestem (Andropogon gerardi), Indiangrass (Sorghastrum nutans) and Kentucky bluegrass. Big bluestem generally comprises the majority of the biomass with Indiangrass and Kentucky bluegrass comprising much less of the biomass (Weaver 1954).

Sloughgrass (Spartina pectinata) is the only grass constituent of the sloughgrass community type. It is found in bottomlands and along sluggish streams and ponds (Weaver 1954). It is usually bordered by hydric vegetation such as sedges, rushes and marsh grasses and by xeric vegetation of the Switchgrass-Wild-Rye community (Weaver 1954).

The Switchgrass-Canada Wild-Rye community is usually found separating the Big Bluestem and Sloughgrass communities. It is composed of switchgrass (Panicum virgatum), redtop (Agrostis alba), and Canada wild-rye (Elymus canadensis) (Weaver 1954). Weaver noted that switchgrass is dominant in the southern portions of the True Prairie while wild rye increases in dominance to the north.

Other Vegetation. There are twelve grasses that, although not dominant, are of importance to the lowland communities (Weaver 1954). These are eastern gamagrass (Tripsacum dactyloides), northern reedgrass (Calamagrotis inexpansa), reed canary grass (Phalaris arundinacea), saltgrass (Distichlis stricata), western wheatgrass (Agropyron smithii), Virginia wild-rye (Elymus virginicus), stout wood reed (Cinna arundinacea), American sloughgrass (Beckmannia syzigachne), fowl mannagrass (Glyceria striata), rice cutgrass (Leersia oryzoides), and whitegrass (L. virginica) (Weaver 1954).

According to Weaver (1954), there are 17 forbes of populational importance in the lowlands association. These include stiff marsh bedstraw (Galium tinctorium), scarlet strawberry (Fragaria virginiana), fringed loosestrife (Steironema ciliatum), willow aster (Aster praealtus), Canada anemone (Anemone canadensis), tall goldenrod (Solidago altissima), compassplant (Silphium laciniatum) entire-leafed rosinwood (Silphium integrifolium), cup plant (Silphium perfoliatum), saw-tooth sunflower (Helianthus grosseserattus), Jerusalem artichoke (Helianthus tuberosus), prairie phlox (Phlox pilosa), prairie button snakeroot (Liatris pycnostachya), golden meadow parsnip (Zizia aurea), American germander (Teucrium canadense), Culver's root (Veronicastrum virginicum) and water hemlock (Cicuta maculata).

Uplands. The uplands association may be divided into the Little Bluestem, Needlegrass and Prairie Dropseed communities (Weaver 1954).

The Little Bluestem community, along with the Big Bluestem community, comprises nearly 80% of the True Prairie flora (Weaver 1954). The dominant plant is the little bluestem (Andropogon scoparius) (Weaver 1954). Other grasses found in this community include prairie dropseed, switchgrass and needlegrass (Stipa spartea) (Weaver 1954). Weaver (1954) noted that this community is the dominant community in the eastern, southern and western portions of the True Prairie.

Weaver (1954) noted that the needlegrass community is dominant in the northern portions of the True Prairie located in the Dakotas. In these areas it may provide over 50% of the available plant cover. Big and little bluestems, Junegrass (Koeleria christata) and side-oats grama (Bouteloua curtipendula) are often found in association with needlegrass communities (Weaver 1954).

The Prairie Dropseed community dominates areas exhibiting low moisture content (Weaver 1954). The major constituent of this community is prairie dropseed. Minor constituents include the bluestems, needlegrass, junegrass and Indian grass (Weaver 1954).

Additional Vegetation. Nine other grasses occur in the uplands in numbers sufficient to include them in this report. These include Scribner's panic grass (Panicum scribnerianum), Wilcox' panic grass (Panicum wilcoxianum), tall dropseed (Sporobolus asper), penn sedge (Carex pennsylvanica), western wheatgrass (Agropyron smithii), purple lovegrass (Eragrostis spectabilis), blue grama (Bouteloua gracilis) and buffalo grass (Buchloe dactyloides).

Twenty-two of the most numerous uplands forbs include the lead plant (Amorpha canescens), silver-leaf psoralea (Psoralea argophylla), many-flowered psoralea (Psoralea tenuiflora), prairie turnip (Psoralea esclenta), prairie clovers (Petalostemum candidum and P. purpurenum), ground plum (Astragalus crassicarpus), wild indigo (Baptisia leucophaea), button snakeroots (Liatris punctata and L. scariosa), prairie mugwort (Artemisia ludoviciana), stiff sunflower (Helianthus laetiflorus), many-flowered aster (Aster ericoides), prairie cat's-foot (Antennaria neglecta), daisy fleabane (Erigeron strigosus), smooth goldenrod (Solidago missouriensis), stiff goldenrod (Solidago ridida), flowering spurge (Euphorbia corollata), pale purple coneflower (Echinacea pallida), prairie rose (Rosa suffulta), false boneset (Kuhnia eupatorioides), white larkspur (Delphinium viresecns), prairie violet (Viola pedatifida), tick trefoil (Desmodium illinoense).

2.4.2.2. The Ozark Holocene Vegetation. The Ozark region encompasses the eastern Oklahoma and western Arkansas portions of the proposed and alternate routes. This region is characterized by hardwood and/or coniferous forests. Prairie associations are found in scattered patches (Bruner 1931; Allred and Mitchell 1955).

Ozark Region of Oklahoma. Flora of the Ozark region in Oklahoma include two deciduous forests types: oak-hickory association and oak-hickory savannah.

Oak-Hickory Association. The oak-hickory association is located in the northeastern corner of Oklahoma and is dominated by members of the oaks (Quercus) and hickories (Carya), with oaks being the predominant of the two. Oak species include red oak (Quercus rubra), water oak (Q. nigra), black oak (Q. velutina), blackjack oak (Q. marylandrica) and post oak (Q. stellata). The Hickory species include the shag-bark oak (Carya avata), shell bark hickory (C. laciniosa), the bitternut hickory (C. cordiformis) and hickory (C. buckleyi) (Bruner 1931).

According to Bruner (1931), the moist soils are occupied by red oak, black oak, shag bark hickory, shellbark hickory and bitternut hickory. The red oak, according to Bruner (1931), commonly is found in pure stands. Blackjack oak and post oak are found in association with dry hills and uplands (Bruner 1931).

Subdominant trees listed by Bruner (1931) include the short leaf pine (Pinus echinata), maple (Acer saccharinum), persimmon (Diospyros virginiana), sassafrass (Sassafras sassafras), red gum (Liquidambar styraciflua) wild cherry (Prunus serotina), black walnut (Juglars nigra), black locust (Robinia pseudoacacia), black gum (Nyssa sylvatica), ironwood (Ostrya virginiana), linden (Tilia americana), willow oak (Q. phellus), bur oak (Q. macrocarpa), chestnut oak (Q. muhlenbergii), pecan (H. pecan), overcup oak (Q. lyrata), and white oak (Q. alba).

Shrubs, or the smaller woody plants, may be classified according to moisture requirements. These classifications include xeric (requiring little moisture), mesic (requiring moderate moisture) and moist mesic (requiring more than moderate moisture) (Brumer 1931). Some common xeric forms include huckleberry (Batodendron arboreum), American snake tree (Cotinus americanus), elastic gum (Bumelia lanuginosa), chinquapin (Castanea pumila) and New Jersey tea (Ceanothus americanus). The hawthorns (Crategus sp), dogwoods (Cornus sp), plums (Prunus sp), strawberry bush (Euonymus americanus), wahoo (E. atropurpureus), the coral berries (Rhus sp) and the sumacs (Schmaltzia sp) are the more common species of the mesic classification (Bruner 1931). The smooth alder (Alnus rugosa), papaw (Asimina triloba), spice-bush (Benzoin aestivale), hollys (Ilex sp), blackberry (Rubus frondosus) and raspberry (Rubus occidentalis) are the more common forms of the moist xeric habitat (Bruner 1931).

The lianas (vines) include the more abundant ampelopsis (Ampelopsis cordata), rattan vine (Berchmia scandens), bittersweet (Celastrus scandens), Virginia creeper (Parthenocissus quinquefolia), smilax (Smilax sp.) and vitis (Vitis sp.) (Bruner 1931).

Oak-Hickory Savannah. The oak-hickory savannah extends into eastern Oklahoma between the two areas of oak-hickory association. It continues westward a short distance and expands north and south (Bruner

1931). The north-south expansion separates the two True Prairie types of eastern Oklahoma. It is characterized in the portion transected by the proposed and alternate routes by scrubby growths of oaks and hickories alternating with grasslands (Bruner 1931).

The dominant trees of this area are the blackjack oak (Q. marylandrica), post oak (Q. stellata) and hickory (Carya buckleyi). Cedar (Juniperus virginiana) may be found in abundance on the steep, exposed slopes (Bruner 1931). Bruner (1931) found that blackjack oak is indicative of "poor, dry sterile soils." Post oak is not restricted to this type of soil although it occurs with blackjack oak. Hickory, according to Bruner (1931), is normally found on soils with more clay or water-holding capacity.

The remainder of the vegetation of this area consists of herbs, grasses, etc. These can be divided into two types, the woodlands and the grasslands (Bruner 1931). The grasslands represent portions of the True Prairie, which was discussed earlier in this report.

The herbs, grasses, etc., of the woodlands are usually divided into one of four categories, based upon the time of year in which the plant matures. The categories include prevernal, vernal, estival, and serotinal.

The prevernal and vernal vegetation includes vegetation found in the winter and spring in sheltered, slightly sheltered and exposed areas. The vegetation found in sheltered areas include Scutellaria cordifolia, S. parvula, Clinopodium glabrum, Sanicula canadensis, Galium latifolium, G. circaezans, Xanthoxalis stricta, Selenia aurea, Pedicularis canadensis and Ranunculus hispidus (Bruner 1931). In slightly exposed areas the vegetation includes Lithospermum carolinense, Myosotis virginca, Pentstemon hirsutus, Erigeron philadelphicus, Ionoxalis violacca, Ruellia parviflora, R. strepens and Tradescantia reflexa (Bruner 1931). Exposed areas are characterized by Cardamine parviflora, Plantago virginica and Lesquerella globosa (Bruner 1931).

The estival (summer) vegetation is represented by the members of the genus Acalypha, Anychia polygonoides, Mullugo verticillata, Polgala verticillata, Strophostyles helvola and Stylosanthes biglora in the moderately protected areas. Open areas are dominated by Meibomia paniculata, M. sessilifolia, Cracca virginiana, Crotalaria rotundifolia, Hypericum punctatum, Clitoria mariana, Galactia volubilis, Portulaca pilosa, Chrysopsis pilosa, Gnaphalium purpureum, and Croton glandulosus (Bruner 1931). The protected areas contain Sabbatia angularis, Buchnera americnan and Coreopsis palmata (Bruner 1931).

The serotinal (fall) societies are represented in areas of moderate coverage by Dasystoma grandiflora, Lespedeza repens and Lespedeza procumbens. (Bruner 1931). Bruner (1931) listed Phaethusa occidentalis, Aster patens, Solidago tortifolia, Solidago boottii, Solidago ulmifolia, Lespedza stuvei, Lespedza frutescens, Piodia teres, Lechea villosa and Lechiea tenuiflora as vegetation in exposed areas. Elephantopus carolinianus is the only species listed by Bruner (1931) as occurring in

covered areas. Bruner (1931) also lists several grasses, including the genera Andropogon, Aristida, Eragrostis, Muhlenbergia, Panicum and Sporobolus.

Ozark Region of Arkansas. The Ozark region of Arkansas includes two major types of vegetation. These are the oak-hickory savannah and shortleaf pine (Allred and Mitchell 1955). Remnants of prairie occur sporadically throughout the area.

The oak-hickory savannah was described in the Ozark region of Oklahoma.

The prairie plant types have been discussed earlier in this report.

The shortleaf pine vegetation type extends through central Arkansas in a southeastern-northwestern direction. The major vegetation consists of shortleaf pine (Pinus echinata). Sub-dominant trees include red oak, black oak, blackjack oak, post oak and hickory.

2.4.2.3. The Lower Mississippi Valley Holocene Vegetation. The area addressed in this report as the Lower Mississippi Valley includes eastern Arkansas and all of Louisiana. Within this region, four vegetative types may be encountered. This includes bottomland hardwoods, mixed pine-hardwoods, longleaf pine and tall grass prairie. The tall grass prairie has been discussed earlier in this report.

The Lower Mississippi Valley Region of Arkansas. The Lower Mississippi Valley vegetation of Arkansas is of two types: bottomland hardwoods and mixed pine-hardwood forests (Delcourt 1976; Allred and Mitchell 1955). The bottomland hardwoods are located in the alluvial valley of the Mississippi River in eastern Arkansas. There are two subtypes of bottomland vegetation. These are the cypress swamps and the tributary bottomland hardwoods (Harshberger 1958).

The cypress swamps are located in areas subjected to frequent flooding with slow run-off or drainage. The dominant plant species is southern cypress (Taxodium distichum). Planera aquatica, Leitneria floridana and Polygonum densiflorum are sub-dominant cover flora (Harshberger 1958). Azolla caroliniana, Lemma minor and Ricciocarpus natans, according to Harshberger (1958), may occur on the suface of the water. Lizard tail (Saururus cernuus) and Sium cicutaefolium occur near the shore line (Harshberger 1958). Cephalanthus occidentalis and Nyssa uniflora occur in the bank community (Harshberger 1958).

According to Allred and Mitchell (1955), bottomland vegetation varies with the degree of wetness of the soils with the lighter soils occurring in the better drained locales. Alluvial backswamps occur in the wetter, darker soils while tributary bottomlands occur in the lighter, better drained soils. Alluvial backswamps are dominated by white oak (Quercus alba) with red oak (Q. rubra), southern cypress (Taxodium distichum), water oak (Q. aquaticus), hickory (Carya sp) and sweetgum, reflecting the sub-dominant hardwood community (Delcourt

1976). Ash, beech, black gum, black oak, boxelder, chinquapin, holly, hornbeam, maple, persimon, sassafras, sycamore, tupelo gum, water birch, water elm, water thorn, whitewood, honey locust, bitter pecan and overcup oak are found throughout the alluvial backswamp, but rarely in abundance (Delcourt 1976; Allred and Mitchell 1955).

The lianas community is comprised of members of the genera Vitis, Ampelopsis, Crematis, and Smilax (Harshberger 1958).

The herbaceous genera include Camex, Muhlenbergia, Dioclea, Amorpha, Aster, Solidago, Dianthera, Hygrophila, Trepocarpus, Cynoscyadium, Asclepias, Trachelospermum and Cratiola (Harshberger 1958).

According to Delcourt (1976), the tributary hardwoods community is dominated by four species: ironwood, white oak, hickory and sweetgum. Sub-dominant plants include beech, bay, holly, maple, and sassafrass (Delcourt 1976). Ash, black gum, black oak, chinquapin, cypress, dogwood, hornbeam, persimon, pine, poplar, post oak, red oak, sourwood, tupelo gum, water oak and witch hazel are distributed throughout the community and are rarely in abundance.

It is assumed that the same lianas are present in the tributary hardwoods community as are present in the alluvial bottomlands.

The mixed pine-oak forests are co-dominated by pine (Pinus sp), white oak (Quercus alba) and red oak (Q. rubra) (Delcourt 1976). Allred and Mitchell (1955) stated that loblolly (Pinus taeda) and short-leaf pine (Pinus echinata) are the predominant pines. Delcourt (1976) and Allred and Mitchell (1955) include blackjack oak, dogwood, sweetgum, post oak, black gum and black oak as sub-dominant components. Minor components include beech, hickory, holly, ironwood, lightwood, locust, maple, poplar, red elm and sassafras (Delcourt 1976).

Harshberger (1958) lists Vaccinium, Kalmia, Persea and Smilax as the dominant understory.

The Lower Mississippi Valley of Louisiana. Vegetative community types intersected by the proposed and alternate routes in Louisiana include the bottomlands, mixed pine-hardwood forests, longleaf pine forest and tall grass prairie (Delcourt 1976; Allred and Mitchell 1955). Tall grass prairie are discussed earlier in this report.

The longleaf pine forest is dominated by the longleaf pine (Pinus palustris). Allred and Mitchell (1955) state that pine forest are characterized by "shallow, poorly drained soils or deep coarse sands." Harshberger (1958) commented that in pure stands of longleaf pine understory deciduous trees are absent or widely scattered. Two genera of deciduous trees are occasionally encountered. These include Quercus and Carya (Harshberger 1958). The ground cover consists of various grasses, sedges and legumes (Delcourt 1976; Harshberger 1958).

The tributary bottomlands encountered in Louisiana differ from those of Arkansas in that giant cane (Arundo gigantea) occurs above those areas of constant flooding (Delcourt 1976).

The mixed pine-hardwood forest encountered in Louisiana differ from those of Arkansas in that giant cane (Arundo gigantea) is encountered in the uplands and the dominant pines are loblolly (Pinus taeda) and longleaf (Pinus palustris) (Delcourt 1976).

The Lower Mississippi Valley of Mississippi. Vegetative cover traversed by the proposed and alternate routes in Mississippi are almost exactly identical to those described earlier in the section of the Lower Mississippi Valley of Arkansas.

2.5. Fauna

The fauna that may occur along the proposed and alternate routes can be divided into two types: prairie and deciduous forest. The prairie type associated with the proposed and alternate routes is found in eastern Wyoming, southern South Dakota, eastern Colorado, western Nebraska, western and central Kansas and portions of eastern Oklahoma. The deciduous forest type associated with the proposed and alternate routes is found in extreme eastern Oklahoma, western and central Arkansas and Louisiana.

2.5.1. Prairie Fauna

The prairies support, and have supported, a wide assemblage of faunal species. The more notable species include the bison, wapiti, mule deer, antelope, timber wolf, black and grizzly bears and the mountain lion. The herbivores of this area are typically larger than those of surrounding areas. Since the prairie affords little cover for fauna of any significant size, most of the larger herbivores are either gregarious or long-limbed. Fauna in the prairie are adapted to survive years of drought which result in little forage or water. Fauna in the northern portion of the prairie must migrate south during the winter to protected basins to survive sub-zero temperatures and large amounts of snowfall.

During the late Pleistocene and early Holocene, the predominant large herbivores included proboscids, edentates, artiodactylids (even-hoofed herbivores) and perissodactylids (odd-hoofed herbivores). The dominant proboscid was the mammoth (Mammuthus sp.) (Frison 1978; Osborn 1909; Haynes 1966; Domning 1969; Stephens 1960). Martin (1975) stated that there are indications that four genera of edentates were present in the prairie. The most common genera was Nothrotheriop while the largest was the Megatherium. Osborn (1909) and Domning also recorded several edentates from the prairie. Frison (1978), Osborn (1909), Domning (1969) and Mossiman and Martin (1975) noted several artiodactylids from the prairie. These include mule deer, antelope, mountain sheeps and goats, bison, musk-ox, moose and wapiti. Perissodactylids recorded by Osborn (1909), Domning (1969), Simpson (1945), Brown (1938) and Lewis (1970) include tapirs, camels, and horses.

After the extinction of the megafauna following the beginning of the Holocene, bison, mule deer, antelope, wapiti and moose became the dominant herbivores.

The extinction of the megafauna resulted in the demise and eventual extinction of several predators. Those known to have occurred in the regions encompassing the proposed and alternate routes but now extinct include Machaerodontidaae (Saber-tooth tigers), dire wolf (Canis dirus) and the giant jaguar (Felis atrox) (Downing 1969; Simpson 1941).

Individuals of Ursidae (bears), Felidae (cats) and Canidae (dogs, wolves and coyotes) were able to effectively compete. These include the present species Ursus americanus (black bear), Ursus horribilis (Grizzly bear), Lynx rufus (bobcat), Felis concolor (Puma), Canis lupus (Gray wolf), Canis latrus (Coyote) and the foxes Urocyon cinereoargenteus (gray fox) and Vulpes fulva (red fox).

The smaller forms, such as Lagomorpha (hares and rabbits), Cricetidae (mice, rats, lemmings and voles), etc., as well as the Teleosts (bony fishes), amphibians and reptiles have remained fairly stable since the Pleistocene. Avian species, although not well-documented, are also assumed to have maintained stability. Families that may have been utilized by prehistoric inhabitants include the families Columbidae (doves), Anatidae (Ducks, geese and swans), Icteridae (Meadowlarks, blackbirds and orioles) and Meleagriidae (turkeys).

2.5.2. Deciduous Forest Fauna

Fauna in the deciduous forest is generally smaller and not well adapted for periods of low rainfall. It is thought that because there is more available cover, there are very few gregarious species. The most abundant late Pleistocene and early Holocene herbivores were the Proboscids, Artiodactylids and Perissodactylids. The dominant proboscids, mammoth (Mammuthus) and mastodon (Elaphas) have been noted from deciduous forests by Haynes (1966) and Struever (1979). White-tail deer were probably the most abundant artiodactylid. Camels and tapirs were the most numerous perissodactylids and have been noted by Osborn (1909); Domning (1969); Simpson (1971) and Brown (1938).

Present day herbivore fauna is dominanted by the white-tailed deer.

The same predators that existed in the prairies during the late Pleistocene and early Holocene existed in the deciduous forest. Modern predators of the prairies have also been known to occur in deciduous forests with the exception of the grizzly bear.

The smaller forms mentioned as occurring in the prairies also occur in the deciduous forest although individual species may vary.

3. THE PLAINS CULTURE AREA: PREHISTORIC SYNTHESIS

3.1. Introduction

The region (Figure 3-1) encompassed by archeological synthesis encompasses much of the northern Great Plains in the states of Wyoming, South Dakota, Colorado, Nebraska and Kansas. More specifically it transects the high plains region of eastern Wyoming and Colorado and the western sectors of South Dakota, Nebraska and Kansas, continuing on into southeast Kansas. In addition, one other arm of the proposed and alternate routes extends from the vicinity of Gillette, Wyoming, directly eastward to the Missouri River in central South Dakota.

The High Plains region is characterized by relatively flat uplands which are dissected by small, deeply eroded stream courses, many of which carry surface water only intermittently. Two quite distinctive physiographic features of the study area are the Laramie Range, where the mountains reach an altitude of 9,000 feet, and the Black Hills, which rise in elevation to 7,200 feet. Abundant wind and sunshine and warm summers and cold winters characterize the area; there are profound seasonal variations of temperature and precipitation. Annual average precipitation ranges from 12 inches in the western sector to 20 inches in the eastern sector of central South Dakota. About one-half of the total precipitation falls during May, June and July.

The native peoples who inhabited the Plains Culture Area at the time of European exploration can be divided into two general groups, the nomadic bison hunters of the short grass plains and the village agriculturalists along the drainages of the Missouri, Platte, Republican and Arkansas Rivers. The former would include the tribes of the Crow, Arapaho, Cheyenne, Sioux and the Plains Apache, the latter being the Mandan, Hidastsa, Arikara, Ponca, Omaha, Oto, Kansa, Pawnee, and the Wichita (Lowie 1954; Powers 1971, 1973; Meyer 1977). As we shall see, this not altogether exclusive dichotomy of nomads and village dwellers has its genesis in the prehistoric, pre-horse era.

3.2. Previous Investigations

Exceedingly interesting are the observations of Waldo R. Wedel (1961a) that as late as the first quarter of the present century some prominent anthropologists thought that human occupation in the Plains region was largely negligible prior to the acquisition of the horse. Ironically, however, as George C. Frison (1973) points out, the Plains region more than anywhere else, because of its past and present climatic and geomorphic characteristics, was destined to reveal archeological remains in contexts which validated without further question the contemporaneity of man and Pleistocene megafauna in North America (Wormington 1957). At the same time that much attention was being directed toward the finds at Paleo-Indian or Early Man sites, a number of investigators were sporadically describing other archeological phenomena in the plains, e.g., mounds, earthworks, stone mosaics, earthlodge and pueblo ruins, stone quarries, petroglyphs, pictographs, human burials and arti-

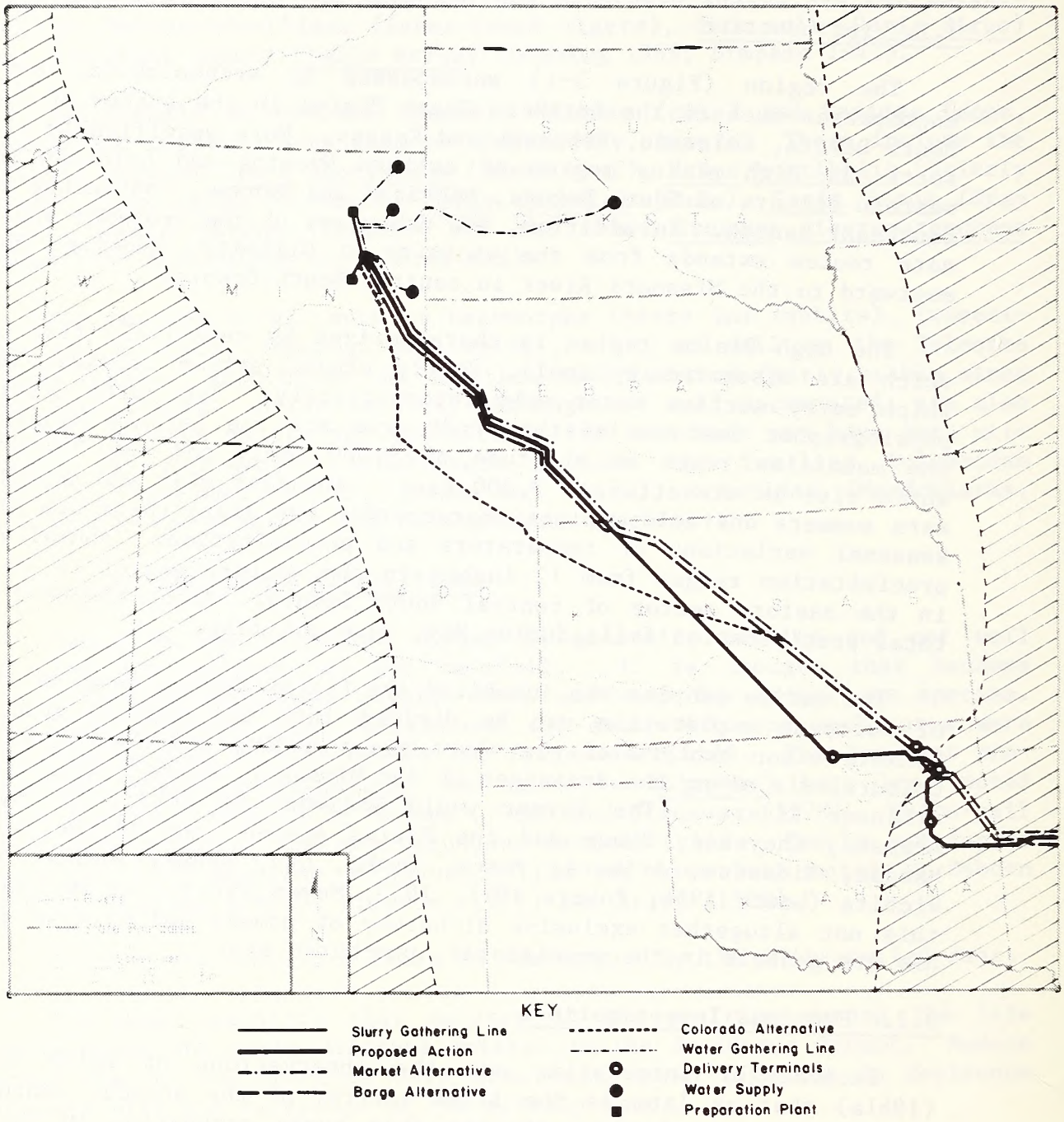


Figure 3-1. Plains Culture Area.

facts (Neuman 1962; 1968). However, beyond the fact of their existence, their cultural relationships and chronological assignments were often quite arbitrarily determined.

In the High Plains area of the present study, it was not until the late 1920's and early 1930's that professionally trained archeologists conducted excavations. By the end of the 1930's, the sequence of prehistoric human occupation of the plains had become intelligible, albeit on a very general level. Frank H. H. Roberts of the Smithsonian Institution had directed extensive excavations at the Lindenmeier Site in northeastern Colorado. Here were exposed the associated remains of Paleo-Indians and Pleistocene megafauna dating back to 10,000 BC (Roberts 1940; Wilmsen 1965). In 1935, William D. Strong of the Smithsonian Institution published Introduction to Nebraska Archeology; that volume contained much of the cultural continuum for the study region (from about 2000 BC to the historic period), based upon the stratified deposits he exposed at the Signal Butte Site near Scottsbluff, Nebraska (Strong 1935; Forbis, Strong and Kirkby n.d.).

On the central plains of Nebraska and Kansas, but also in eastern Wyoming and along the Missouri River in the Dakotas, federal aid programs funded extensive excavations and surveys. Most of this work was directed toward ceramic period burial mounds, earthlodge villages and camp sites dating from about AD 500 to the historic period (Wedel 1961a). An enormous inventory of specimens, photographs, maps and field notes had been amassed by the end of the 1930's; impromtu meetings and the organization of the annual Plains Conference provided an atmosphere for the formularization of these data. This developmental period of plains archeology was interrupted by the advent of World War II.

After the war large scale federal water-control projects were initiated throughout the United States. It was realized immediately that the proposed dams would create reservoirs which would flood the very stream valleys where most of the prehistoric and early historic settlements were situated. In order to procure as much archeological data as possible before the sites were destroyed, a salvage program was established which involved federal, state and local agencies (Roberts 1952; Lehmer 1971). In the present study area, almost every section of the Great Plains was investigated and its diverse local environments (e.g. major and minor stream valleys, dry basins and mountain lakes and parks) are well represented. A bibliography of archeological publications relative to the salvage program nation-wide was authored by Jerome E. Petsche (1968) and the number of and substantive information provided by articles concerned with the plains region is most impressive.

By 1969, most of the water-control projects had been completed and the reservoirs were flooded, but in the last decade or so the implementation and enforcement of the Environmental Protection Agency guidelines have occasioned many archeological programs. As a direct consequence of this environmental protection legislation, more funds than ever before are being provided to investigate more sites in differing Plains environmental locales (Keel 1979).

3.3.1. Cultural Sequence

This section will be an endeavor to outline the cultural chronologies as they have been presented in the literature of the plains region. Although many of the specifics are yet to be explained and the archeological theories substantiated, the general cultural sequence of the study area is validly established. This fact is facilitated to a large degree by the development of the radiocarbon method; since 1951 a most impressive number of prehistoric Indian occupations have been radiocarbon dated (Neuman 1967; Breternitz 1969; Thiessen 1976; Frison 1978). Before and during this interim, several useful chronologies were suggested to formulate the cultural sequences in the study area, such as those of Mulloy (1958) and Frison (1978) for the northwestern plains; Lehmer (1971) for the Middle Missouri area of the Dakotas; and Wedel (1940; 1961) for the central plains of Nebraska and Kansas. For the purposes of the present outline, the cultural chronology may best be presented from early to late in the following periods: Paleo-Indian; Archaic, Early Ceramic; and Late Ceramic (Figure 3-2). The accepted validity of the radiocarbon assays from the various archeological deposits assigned to the above periods is dependent upon their degree of association with particular diagnostic artifacts and/or site features.

3.3.2. Paleo-Indian Period. Exactly when the first people arrived into the plains region is still a matter of debate, but a time during the immediate pre-Holocene is certainly suggested by the published data on hand. Radiocarbon assays from several sites indicate that human occupations date back as far as 10,000 BC.

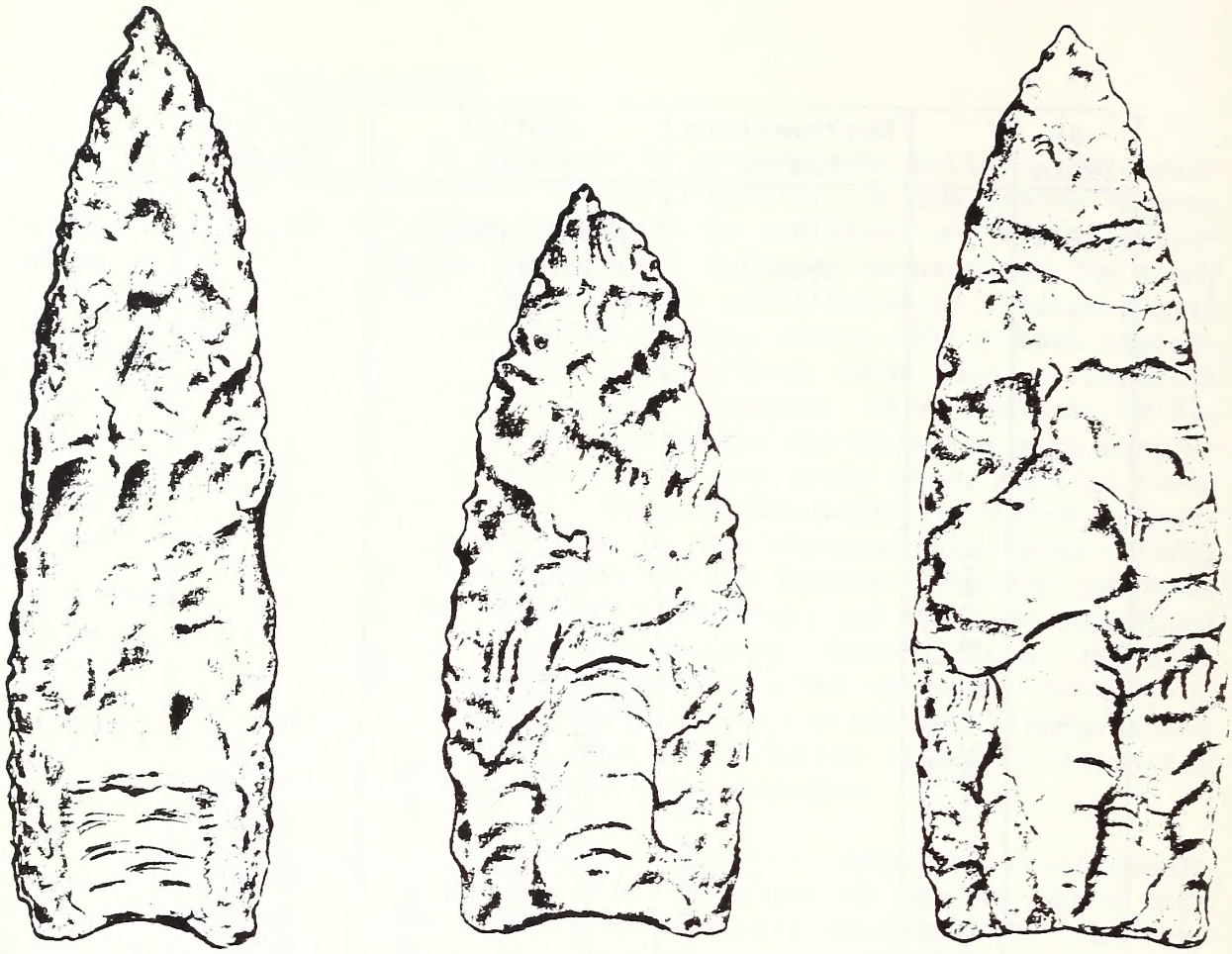
Diagnostic artifacts for this period are stone points (Wormington 1957; Figure 3-3, Figure 3-4, a-c). From early to late the stone points of the Paleo-Indian Period include the following named types: Clovis, Folsom, Agate Basin, Hell Gap, Angostura, Plainview, Scottsbluff, Milnesand and Simmonsen. All of these types have been found in association with the butchered bone remains of Pleistocene megafauna including the mammoth or the bison and the camel.

The earliest Paleo-Indian sites include the Dent Site in eastern Colorado (Wormington 1957), the Union Pacific Mammoth Site in south central Wyoming (McGrew 1961; Frison et al 1974), and the Colby Site in north central Wyoming (Frison 1978). Each of these sites has yielded Clovis or Clovis-like points in association with mammoth (*Mammuthus sp.*) bones, representing as many as twelve animals. It is true that a fragment of a mammoth radius was exposed next to a hearth at the Bentzen-Kaufman cave site near Sheridan, Wyoming, but no diagnostic artifacts were associated with these remains (Grey 1962).

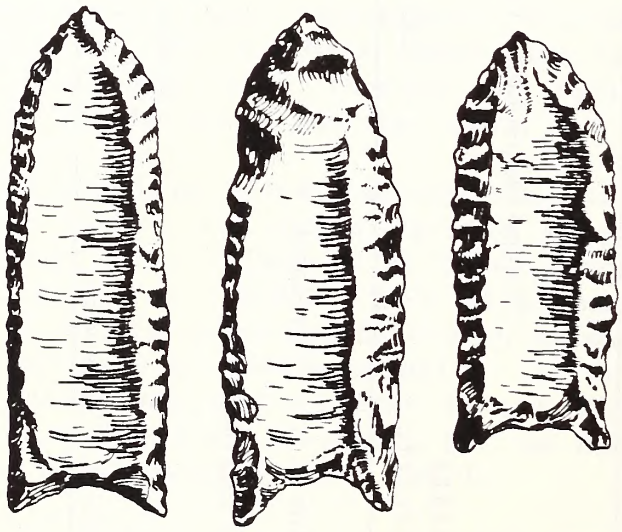
Only the Colby Site deposits were extensively excavated and reported in detail (Frison 1978). Exposed in the excavations were two stacks of bones, representing the butchered remains of at least six mammoths. In association with the bones were four Clovis-like points, two bone tools, and two possibly-related stone artifacts (a chopper and an abrader). Two radiocarbon assays from the Colby Site are 9250 BC and 8598 BC.

AD Date		Northwestern Plains	Central Plains	Southern Plains	Middle Missouri	
1850		Crow	Dakota, Pawnee Cheyenne, Omaha etc.	Kiowa	Mandan Arikara	Late Village
				Apache	Terminal Middle Missouri	Early Village Cultures
					Extended Coalescent	
1500	Nomadic Bison Hunters (Western Plains) Plains Village Pattern (Eastern Plains)	Prehistoric	Upper Republican Dismal River Lower Loup White River Smoky Hill Great Bend Red Bird Oneota Nebraska	Antelope Creek Neosho Washita River Henrietta	Initial Coalescent	
					Extended Middle Missouri	
1000		Late Pictograph-Ghost Caves	Sterns Creek		Initial Middle Missouri	
	Hunters and Gatherers	Middle Prehistoric	Woodland Plains Ash Hollow Cave K. C. Hopewell		Plains Woodland	
AD 1						

Figure 3-2. Plains Cultural Sequence (Modified from Jennings 1974).



Typical Clovis Fluted points. Actual size.



Folsom Fluted points. Approximately actual size.

Figure 3-3. Paleo-Indian Point Types. (From Prehistory of North America, by Jesse D. Jennings, McGraw-Hill, 1974. Used by permission.)

Another pertinent site, the Selby-Dulton Site in eastern Colorado, is currently being excavated by Dennis Stanford of the Smithsonian Institution. Here mammoth remains and bones of other Pleistocene megafauna have been found in association with Clovis points. Furthermore, at the same site, archeological deposits purportedly dating into pre-Clovis times have been exposed.

Clovis deposits are also currently being excavated at the Sherman Site in eastern Wyoming (Shaw and Frison 1979).

There is considerably more documentation on those Paleo-Indian sites characterized by the presence of Folsom points. Folsom sites do not contain mammoth bones; instead, they are characterized by the bones of the Pleistocene bison (Bison taylori, Bison aentiquus and Bison occidentalis). Evidently the mammoth had become extinct by this time (ca. 9000 BC to 8000 BC). The transition from mammoth to bison and from Clovis to Folsom was not totally abrupt; this is exemplified by finds of Goshen Complex material at the Hell Gap Site in eastern Wyoming. Artifactual material from this complex at Hell Gap was found in a stratigraphic context which "...indicates a pre-Folsom, post-Clovis placement, about 9000 BC" (Irwin-Williams et al 1973:46).

Surface finds of stone points in the Big Horn Mountains include specimens that are difficult to differentiate between Clovis and Folsom types; these probably also represent transitional forms (Frison 1978). It is worth noting here that at the Clovis Site itself, in New Mexico, Folsom points were found stratigraphically above the Clovis deposits (Sellards 1952). Evidence from the Folsom type sites, also in New Mexico, and the Lipscomb Site in Texas indicates that bison were herded and trapped in bogs or driven into low depressions and then killed. Unfortunately, the function of the Folsom occupation at the Johnson Site in Larimer County, eastern Colorado, cannot be determined from the published account (Galloway and Agogina 1961).

To date, the most detailed information about the Folsom Complex comes from excavations at an encampment, not a kill site, north of Fort Collins, Colorado (Roberts 1935; 1936; Wormington 1957; Wilmsen 1974). Extensive investigations at this site, the Lindenmeier Site, revealed soil lenses containing stone and bone refuse. In addition to Folsom points, a large number and a wide variety of chipped and ground stone implements and ornaments, bone implements and gaming pieces, and red and yellow pigments were present. Bone of Pleistocene megafauna represented included bison and camel; bones of the deer, antelope, wolf, fox and smaller animals were also present.

Folsom points were also excavated at the multicomponent Agate Basin Site in eastern Wyoming (Agogino and Frankforter 1960), but the details of those investigations have not been published.

Typologically, Clovis and Folsom points are fluted; that is, during an intermediate stage of manufacture, flutes were struck from one or both faces of the preform. At about 8000 BC this diagnostic practice of fluting stone points declined, and a new tradition developed which pro-

duced unfluted stone points whose basic style was lanceolate in outline. Points of this new tradition have been recovered in association with Pleistocene bison, but generally they are found with bones of Holocene fauna. This stone point tradition lasted until about 6000 BC and produced types such as Agate Basin, Hell Gap, Angostura, Plainview, Scottsbluff, Milnesand and Simmonsen.

The Agate Basin component at the Agate Basin Site was a bison kill manifestation with modern fauna (Roberts 1951; 1961; Bass 1970). Frison (1978) synopsizes the events which probably took place there during the Agate Basin occupation and provides a description of the lithic remains in that deposit. At the Hell Gap Site in eastern Wyoming, the Agate Basin component revealed the remains of three circular structures. These are probably the earliest prehistoric structural remains reported in the Project area (Irwin-Williams et al 1973). Numerous surface finds of Agate Basin points have been seen in private collections, and it appears that this point type distribution is concentrated in the High Plains region (Husted 1965).

The Hell Gap point type was established from specimens excavated at the type site in eastern Wyoming (Agogino 1963; Irwin-Williams et al 1973). The site is notable for the sequence of cultures exposed there, although little was learned about site function. The Sister's Hill Site, also in eastern Wyoming, is a single component deposit with Hell Gap points (Agogino and Galloway 1965; Haynes and Grey 1965; Haynes 1965). This site is distinctive in that the excavations yielded no bison bones. Instead, only the deer, antelope and small animals are represented.

At all other Hell Gap occupations bison bones are the predominant faunal remains. At the Jones-Miller Site in eastern Colorado, the remains of several hundred bison were excavated (Stanford 1974; Frison 1978). The Hell Gap component at the Casper Site (Frison 1974), near Casper, Wyoming, revealed that about one hundred bison were driven into a natural trap, formed by a parabolic sand dune, and then slain. They have been identified as Pleistocene bison.

It should be noted that although it is generally agreed that the Hell Gap Complex post-dates the Agate Basin Complex (Agogino and Galloway 1965; Irwin-Williams et al 1973), there are strong indications that the former may precede the latter in time (Frison et al 1974) or, at least, the two complexes may have existed in part concurrently. Surface finds of Hell Gap points have their greatest concentration in the High Plains portion of the present study area.

The Angostura Point was first described from excavations in the Angostura Reservoir area in western South Dakota (Hughes 1949); at that time, it was called the Long Point. Additional work slightly to the west in Wyoming, yielded more examples of these points. In a subsequent publication their name was changed to Angostura, and they are known best under this title (Wheeler 1954; Wormington 1957; Roberts 1961). It has been noted that they resemble and bear a close relationship to the Agate Basin Point. However, radiocarbon determinations indicate that the

Angostura deposits date later than the remains from Agate Basin occupations (Wheeler n.d.).

The most recent statement regarding the chronological placement of Angostura points suggests that they, along with other parallel-oblique flaked points "...may be local or regional variants of the terminal Paleo-Indian manifestations for the Northwestern Plains" (Frison 1978:37). One of these other parallel-oblique flaked types is the Jiminy Allen Point. Its original assemblage is from a Pleistocene bison kill site near Laramie, Wyoming (Mulloy 1959). Another similar type is the Frederick Point found at Hell Gap (Irwin-Williams et al 1973). Associated with the Frederick occupation was "...a circle of small boulders similar to those used by historic tribes to hold down the hide coverings of tipi-like structures" (Irwin-Williams 1973:51). Frederick points are also reported from the Walth Bay Site in Walworth County, South Dakota (Ahler et al 1974); from the Clary Ranch Site in western Nebraska; and possibly from the Sutter Site in northeastern Kansas (Katz 1973; Myers 1979). An Angostura point was also identified from a site in southeastern Nebraska (Neuman, Kendle, and Witt 1964).

The investigations at the Angostura sites in South Dakota and Wyoming have not been published, but it is known that the occupational remains consist of chipped and ground stone tools, such as mealing stones, and simple hearths. No bone was preserved at the sites. With the present data, little can be said about the lifeways of the Angostura Complex, except that the people hunted the Pleistocene bison as part of their subsistence pattern, and at times, lived in structures comparable to the historic tipis.

The Plainview Point was named from excavations at a Pleistocene bison kill site in northwest Texas (Sellards, Evans and Meade 1947). Since that time, this point type has been identified over much of the plains region and from Canada to Mexico (Wormington 1957). In the present study area, they have been found to occur in the Upper Republican drainage of south-central Nebraska at the Red Smoke Site (Davis 1953), at the Allen Site (Holder and Wike 1949), and at the Lime Creek Site (Schultz et al 1948; Davis 1962; Figure 3-4). Plainview points are also reported at the Olsen-Chubbuck Site, a single occupation, Pleistocene bison kill site in eastern Colorado (Davis 1959; Wheat 1972); in association with Pleistocene bison at the Colorado City Site in Texas (Wedel 1961); and possibly at the Medicine Lodge Creek Site in the Big Horn Mountain region of Wyoming (Frison 1978).

Found in association with Plainview points at several sites excavated in the study area are two other Paleo-Indian type points, Scottsbluff and Milnesand. There can be little doubt that all three of these point types had at least partial contemporaneity during their time spans.

The Scottsbluff type was established from specimens found in association with Pleistocene bison remains at the Scottsbluff Quarry Site in western Nebraska (Barbour and Schultz 1932; Schultz and Eiseley 1935). Since that time other excavated examples have been reported from the

Figure 3-4. Artifacts from the Lime Creek Site. a) Plainview point; b) Milnesand point; c) Scottsbluff point; d) flake scraper; e) grooved abrader; f) end scrapers; g) uniface core chopper; h) five Lime Creek knives. (From Prehistory of North America, by Jesse D. Jennings, McGraw-Hill, 1974. Used by permission.)

previously cited Lime Creek Site (Davis 1962). Significantly enough they occur along with Milnesand points at the single occupation Olsen-Chubbuck Site in Colorado (Davis 1959; Wheat 1972). Elsewhere in Colorado, they are found at the Claypool Site (Dick and Mountain 1960); at the Jurgens Site (Wheat 1979); the Caribou Lake Site (Benedict 1974); and Lamb Spring Site (Wedel 1963). Scottsbluff points have been found in Wyoming at the Finley Site (Wormington 1957), the Homer Site (Wormington 1957), at Hell Gap (Irwin-Williams et al 1973); and the Carter-Kerr McGee Site (Frison 1978); a cache of Scottsbluff points was found at the Larson Site (Frison 1978).

The Milnesand Point was established from examples found at the type site, a Pleistocene bison kill site in New Mexico (Sellards 1955). In the study area, Milnesand points have been found in association with Plainview and Scottsbluff points (Davis 1962; Wheat 1972).

A quite different manifestation in the plains region is the Logan Creek or Simonsen Complex. The diagnostic points of this complex are not lanceolate; they are triangular with side notches and a concave base. They were first found at the stratified Logan Creek Site in eastern Nebraska (Kivett 1949). Other specimens were excavated in association with the remains of twenty-five Pleistocene bison at the Simonsen Site in western Iowa (Frankforter 1959; Frankforter and Agogino 1960; McKusick 1964). Simonsen points, as they have come to be called, have been found elsewhere in the Middle Missouri region of South Dakota (Neuman 1964; 1967) and at the Bentzen-Kaufman Cave in eastern Wyoming (Grey 1962). At the Simonsen Site, they have a maximum date to 6480 BC and a minimum date of 4950 BC.

In respect to Paleo-Indian remains from Kansas, Wedel (1959; 1961a) summarized the data, and little of a substantive nature has been published since then. He reported that during the late 19th Century at the Twelve Mile Creek Site in Logan County, a stone point of no known type was found in association with Pleistocene bison at a depth of 25 feet below the surface. Bone from Twelve Mile Creek has recently been radiocarbon dated at about 8050 BC (Rogers and Martin 1979).

At a slightly later date, the human skeletal elements of two individuals were exposed in eastern Kansas. They received much notoriety under the name "Lancing Man". Because they occurred 20 feet beneath the surface, they were thought to date back to the Pleistocene period; however, more recent analysis of the bones and radiocarbon assays place the burials within the Archaic period, at about 3579 BC (Bass 1973). As elsewhere in the study area, Paleo-Indian points have been surface collected in Kansas.

A Paleo-Indian manifestation occurs at the Gordon Creek Burial, in northwestern Colorado (Anderson 1966; Breternitz, Swedlund and Anderson 1971). In a burial pit exposed along the bank of a stream were the bones of a primary flexed interment, representing an adult human female. The bones were coated with hematite. In the slump below the pit, along with some of the skeletal elements, were several stone and bone artifacts thought to have eroded from the burial pit. Although none of the

artifacts are diagnostic of the Paleo-Indian period, a collagen fraction radiocarbon date of 7750 BC was obtained from the human bone. If this date is valid, and there does not appear any evidence to the contrary, the Gordon Creek Burial represents one of the earliest human interments reported in North America.

3.3.3. Archaic Period. Much of what is known about this period (ca. 6000 BC to about the time of Christ) is related to a climatic episode most generally referred to as Altithermal (Antevs 1955; Bryson, Baerreis and Wendland 1970; Reeves 1973). The Altithermal, an interval of time from ca. 5000 BC to 2000 BC, was characterized by one or two warm, dry optimums following the last retreat of the glaciers in North America (Benedict 1978). Exactly how this drought affected the human occupancy of the Plains area has been to a large degree a speculative matter for the regional scientists. Some believe that the people abandoned the area and retreated west to higher altitudes in the mountain ranges and eastward to where more moist conditions persisted. Notwithstanding, Wedel (1963) has demonstrated conclusively that human occupancy of the High Plains need not have terminated during the Altithermal, and his data are applicable to the Middle Missouri and the Central Plains region as well.

As indicated previously, the post-Pleistocene, preceramic cultural sequence in the High Plains was demonstrated by the stratified deposits at Signal Butte (Strong 1935, Forbis et al n.d.) in western Nebraska; at Pictograph Cave in central Montana (Mulloy 1958); at the McKean Site in eastern Wyoming (Mulloy 1954); and by explorations in eastern Wyoming and western South Dakota (Hughes 1949).

Diagnostic stone point types of this period consist of the McKean Lanceolate (Mulloy 1954), Mount Albion (Benedict 1978), Mallory (Forbis et al n.d.), Duncan and Hanna (Wheeler 1954), Yonkee (Frison et al 1974) and Besant (Wettlaufer 1955). These specimens contrast sharply with the earlier Paleo-Indian forms. Even though the McKean type is lanceolate with a concave base, its size and its mode of manufacture differ markedly. The other points are stemmed and side-notched and later corner-notched.

Most of the reported sites during the early Archaic are not on the open plains. They are remains from bison traps and rockshelters in the mountains, foothills and areas of rough topographical relief. Therefore, most of the sites are located considerable distances from the study area. Nevertheless, diagnostic specimens, comparable to those from the distant excavated deposits, have been surface collected from the more open plains areas and typological relationships are evident.

Important excavated sites in Wyoming include Mummy Cave, (Wedel et al 1968) near Yellowstone Park; Wedding of the Waters Cave (Frison 1962) in the Big Horn Mountain area; Laddie Creek; Southsider Cave; Point Rock V; Leigh Cave (Frison and Huseas 1968); Rice Cave; Carter Cave; Lookingbill Cave; Spanish Point Quarry; the Shoreline Site (Frison 1978); and the Bentzen-Kaufmann Cave (Grey 1962). Most of the above are in the region of the Big Horn Mountains, and their occupations have been radiocarbon dated.

In the western area of the Black Hills, near Sundance, Wyoming, is the Hawken Site, an early Archaic bison trap (Frison et al 1976). In contrast to the other regional sites of this period which are characterized by the remains of modern bison, the bison at the Hawken Site are identifed as Bison bison occidentalis, a Pleistocene variant.

Radiocarbon dates from Hawken and the nearby Hawken III Site range from 4550 BC to 4050 BC. Further south in the Colorado Front Range, important deposits of the early Archaic would include the Albion Boardinghouse Site and the Fourth of July Valley Site (Benedict 1978; Morris and Kainer 1978).

Several of the early Archaic sites not only produced a wide variety of chipped and ground stone tools and information about communal hunting patterns, but they also provided valuable inventories of worked bone, wood and other vegetal items including implements, clothing and food remains. These helped fill in the cultural scenario of the region.

The middle Archaic is slightly more pertinent to the present study if only because more of the reported sites exist in a closer proximity. It follows that a number of these sites are in more open areas than those reported for the early Archaic. They are not always characterized by large quantities of bison bones; instead, the faunal remains include a variety of hearths. Some are simple, while others are lined with stones and/or filled with stones used in cooking. Frison (1978) would also have us believe that it was during the middle Archaic that the ubiquitous stone rings made their appearance in the Plains region. Depending upon their shape, size and complexity, they undoubtedly functioned as "tipi rings" or interacted in ritualistic activities (Hoffman 1953; Kehoe 1960: Malouf 1961; Neuman 1962; Grey 1963; Frison 1967).

Components of the middle Archaic would include deposits at several sites in eastern Wyoming, namely the McKean Site (Mulloy 1954), the Hawken II Site (Frison 1978), the Belle and Mule Creek rockshelters (Wheeler n.d.), and the human burial near Laramie (Agogino 1961). In South Dakota, examples include the Gant Site in the Black HIlls (Gant and Hurt 1965) and several sites in the Middle Missouri area (Coogan and Irving 1959; Neuman 1964; Ahler 1978). For Nebraska, the principal source of information continues to be Signal Butte (Strong 1935; Forbis et al n.d.), and in eastern Colorado are the stratified Bayou Gulch (Grant 1979), Magic Mountain (Irwin-Williams and Irwin 1966), Wilbur Thomas (Breternitz 1971) and Dipper Gap (Metcalf 1973) sites. Again, there is a dearth of information from western Kansas for archeological remains that can be definitely attributed to the other regional materials of the time under consideration. In east central Kansas, however, the stratified lithic deposits at the Williamson and Young Sites have Archaic materials with relationships attributable to contemporary sites farther east in Kansas and in Oklahoma (Neuman 1967; Schmits 1978). Finally, middle Archaic manifestations continue in the extreme western section of the present study area in the Big Horn Mountains and Powder River Basin of northern Wyoming and southern Montana. Interestingly, it is from these cave, rockshelter, and bison trap sites that some of the earliest radiocarbon dates for middle Archaic deposits are recorded (Frison 1978).

The next group of sites on the high plains are late Archaic deposits whose earliest dates fall at about 1000 BC. The latest radiocarbon determinations extend to AD 700. The Altithermal optimum has passed, and cooler, more moist conditions pervaded, much as the present-day climate. Once again, natural (faunal and floral) adjustments took place which influenced the cultural development in the study area.

Late Archaic deposits on the High Plains are characterized by the introduction of corner-notched stone points. These are open campsites, butte-top sites, and bison pound and butchering sites. In addition, a large structure with an ovoid floor pattern outlined by postholes that is suspected of being a ceremonial manifestation is associated with the bison pound at the Ruby Site in eastern Wyoming (Frison 1971). Other late Archaic components in eastern Wyoming include those at the McKean (Mulloy 1954), Fulton (Frison 1978), Muddy Creek (Frison 1978), Lance Creek (Haynes 1968), Patten Creek (Haynes et al 1966), and North Platte River (Mulloy 1965; Mulloy and Steege 1967) Sites. Components in eastern Colorado include Magic Mountain (Irwin-Williams and Irwin 1966), Willowbrook (Leach 1966), LoDaiska (Irwin and Irwin 1959), Bayou Gulch (Grant 1979), Witkin Burial (Swedlund and Goodman 1966), Uhl (Wood 1967), Happy Hollow (Steege 1967) and the Medina Rock Shelter (Campbell 1969). There is also a late Archaic component at Signal Butte (Forbis, Strong and Kirkby n.d.) and possibly in several western Nebraska rockshelters (Bell and Cape 1936), but none are specifically reported in western Kansas (Bowman 1960). This paucity of pertinent data for western Nebraska and Kansas is not to be construed as an indication that such sites are absent. Rather, it is a result of the lack of concertive field investigations and/or report publication in this region. In eastern Kansas, Nebo Hill-related materials are evident from surface collections and excavations (Shippee 1948; 1962; Johnson, Yaple and Bradley 1972; Blakeslee 1979). Late Archaic deposits were also excavated from the Bean Hollow Site (Neuman 1967), the Koelliker Site (Fries 1971), the Kelley Site (Katz 1969), the Snyder Site (Grosser 1973) and the Williamson Site (Schmits 1978), all in eastern Kansas.

3.3.4. Early Ceramic Period. By the end of late Archaic times in the High Plains region, ca. AD 700, there had already begun in the central plains of Kansas and Nebraska a cultural development under the title "Plains Woodland". The earliest radiocarbon date for a Woodland component is 1880 BC from the Massacre Canyon Site in southwest Nebraska (Kivett 1952; Neuman 1967). Although this date has been viewed with suspicion because it was obtained from freshwater shell, several other rather early dates have been obtained from Woodland components along the Missouri River in South Dakota, i.e., 710 BC (Howard and Gant 1965) and 430 BC (Neuman 1964). Other Woodland manifestations have been dated as late as AD 1050 (Neuman 1967). Hill and Kivett (1941) and Kivett (1952) detailed the findings in Nebraska.

Wedel (1959) detailed the Woodland components in Kansas, and then he (1961a) summarized the Woodland data from the entire Plains region. More recently Reynolds (1979) has introduced new site data from Kansas and synthesized it into the body of previously reported Woodland manifestations in Kansas.

It is most important to realize that the introduction of Woodland sites in the Plains region is marked by the inception of three traits: pottery, burial mounds and horticulture, the latter manifested by the Meso-American triumvirate of maize, beans and squash. It should also be realized that Woodland burial mounds and cemeteries are the earliest sites in the study area from which large quantities of human skeletal remains have been excavated and analyzed with physical anthropological techniques (Stewart 1943; Bass and Grubbs 1966; Bass, McWilliams and Jones 1968; Phenice 1969; Klepinger and Bass 1971; Bass and Phenice 1975; Finnegan and Witty 1977; Gill and Lewis 1977; Finnegan 1978).

In western Missouri and eastern Kansas there are Hopewellian, or Middle Woodland, occupations comprised of campsites, small villages and burial mounds (Wedel 1943; 1959; Smith 1949; Johnson 1977). These are characterized by diagnostic decorated pottery, middens, cache pits and postmolds outlining structures having an ovoid floor pattern. Chipped, ground and polished stone artifacts include points, knives, scrapers, drills, gravers, mealing stones, celts and gorgets. Animal bone specimens include awls, needles, beamers, tubes and pendants. There are also antler objects and specimens of worked human bone. The bone refuse is comprised mostly of the remains of deer, small mammals and some avian fauna; bison is not at all well represented.

Another Plains Woodland manifestation is the Sterns Creek Culture in eastern Nebraska. At the stratified Walker Gilmore Site, deposits of ash, hearths, postmolds and midden remains are exposed in the creek bank at 27 feet beneath the surface. In one section of the creek bank, thatch and postmolds were exposed and thought to represent the remains of a structure (Strong 1935). Pottery here consists of small, conoidal, grit tempered vessels with plain outer surfaces and rims decorated by scalloping. Strong (Ibid) suggests that the pottery was manufactured by the coiling method. If this is correct, it is a most unusual feature in the Plains region. Other artifacts include a small, tubular clay pipe; a small quantity of ground and chipped stone hammerstones and a celt; points; and refuse. In contrast, bone specimens were abundant, and they include needles, awls, a worked bison scapula, several beads, a gaming piece and a worked antler. In addition to twigs and the thatch, wooden specimens consist of a section of an arrow shaft and a peg. Food remains include seeds of the bottle gourd and squash, in addition to nut shells. In keeping with general Plains Woodland scenario, deer and small mammal bone predominate in the refuse deposits, whereas bison remains are rare. The Sterns Creek Culture has been radiocarbon dated to AD 920 (Neuman 1967).

Farther west in the Central Plains of Nebraska and Kansas, in western South Dakota and the adjoining regions of Colorado and Wyoming are other Plains Woodland sites, both open camps and camps in rockshelters and caves. They are characterized by cord-roughened, conoidal vessels. Stone and bone tools represent items used in hunting and gathering activities. These sites generally do not have burial mounds; instead the inhabitants cremated their dead and/or buried the deceased in pits or ossuaries (Kivett 1949; 1952; 1953; Wedel 1959). Often there were burial accompaniments of stone and bone tools, shell and bone

beads, and pendants. Plains Woodland components in Kansas include the Bean Hollow and Two Dog Sites (Neuman 1967), Snyder (Grosser 1973), Coal-Oil Canyon (Bowman 1960), and the Taylor Mound (O'Brien 1971). Others in Nebraska are the Mousel, Lucas, Elm Creek Eleven and Shadley Sites (Philips 1963), Bisterfeldt (Mattes 1965; Breternitz and Wood 1965). Other sites are located in rockshelters and caves in the western sector of the state, e.g. Ash Hollow Cave (Champe 1946; Bell and Cape 1936). Eastern Colorado also has a number of reported Plains Woodland components, such as Van Bibber Creek (Rubin and Alexander 1960), Hazeltine Heights (Buckles et al 1963), Lo Daiska (Irwin and Irwin 1961), Helmer Ranch (Rubin and Suess 1954), the Michaud Sites A and B (Wood 1971), Happy Hollow Rockshelter (Steege 1967), Uhl (Wood 1967), Willowbrook I (Leach 1966), Hutcheson (Wade 1966) and the Hall-Woodland Cave (Nelson 1967). In eastern Wyoming reported Plains Woodland components are rare, but they do include the Greysrock Site and the Mule Creek Rockshelter (Frison 1978).

Plains Woodland sites in the Middle Missouri region of the Dakotas are best known from excavations into small, domed, earthen tumuli (Cooper 1949; Hewes 1949; Neuman 1960a; 1960b; 1961; 1975; Wood 1960; Henning 1965). Most of the tumuli contain a small amount of pottery which is characteristically cord-roughened and conoidal in shape; however, vessels with plain or smoothed outer surfaces have been recorded, as well as others with simple stamped exteriors. The human interments are manifested in a variety of patterns. There are single primary burials in individual submound pits; grouped primary burials in a common pit; grouped secondary burials in common logcovered pits; single secondary burials in individual pits and in the mound fill. Almost without exception the burials are accompanied with funerary offerings; however, some of the secondary burials are found without direct artifactual accompaniments. In addition to pottery, the artifact inventories from the tumuli include stone points, knives, drills, gravers, mauls, atlatl weights, bone needles, awls, pins, flakers, pendants, beads and tubes. Furthermore, there are worked human long bones, mandibles and maxillae, shell beads, discs, cups and pendants of olivilla, conch and dentalium, red, green, black and white pigments, fragments of vegetal matting, and bison offerings manifested by entire or partially entire articulated bison skeletons on the mound floor.

In the Middle Missouri region, Plains Woodland campsites have not received much attention. They yield typical inventories of utilitarian pottery, stone, bone and antler tools in association with shallow pits, hearths, scattered postmolds and middens (Hurt 1952; Wood 1956b; Sheans 1962; Neuman 1964; 1975; Howard and Gant 1965; Brown 1968). Only one site in the Dakotas has provided definite evidence of a Plains Woodland habitation. At the LaRoche Site, Hoffman (1963) exposed an ovoid pattern of postmolds indicative of a structure 20 feet long and open at one end. Within the postmold outline was a central firepit and a small amount of cultural debris.

Whereas most of the Plains Woodland sites in the Middle Missouri region have artifactual resemblances with sites in the Central Plains, a number of the mounds and several campsites near the South Dakota-North

Dakota boundary line clearly have relationships with Hopewell manifestations to the east and Besant sites to the west (Neuman 1975).

3.3.5. Late Ceramic Period. Following the Plains Woodland, or Early Ceramic period, in the Central Plains of Nebraska and Kansas at about AD 900 are the Nebraska, Upper Republican and Smoky Hill cultures of the Central Plains Tradition (Strong 1935; Wedel 1940; 1947; 1959; Bell and Gilmore 1936; Brown 1966). These were the first semi-sedentary cultures in the study area, the first agricultural societies to produce food surpluses by growing maize and other vegetable crops and supplementing this subsistence pattern by hunting, fishing and gathering. They are the first culture to construct substantial dwellings, and most likely they are the earliest people in the area under consideration to utilize the bow and arrow. Settlements consisted of small villages or hamlets near stream bottoms with available alluvial soils (Gradwohl 1969; Johnson 1973).

The habitations were square to rectangular in floor pattern with an extended entryway. Inside each structure is a central firepit, and perhaps several secondary firepits and cache pits (Heavin 1970). The structure was supported by central upright posts, ridge poles, and wall posts, and then covered with thatch and sod. These are most commonly known as earthlodges. In the eastern area of the Central Plains the floor of the earthlodge may be from two to six feet below the occupation surface. To the west the semi-subterranean house floors were shallower or non-existent (Kivett 1949). Out of 122 house floors measured, Wedel (1979) found that 84 were less than 900 square feet in their dimensions. Detailed data from excavations at two house sites is provided by Wood (1969).

Pottery is still cord-roughened on the exterior, but now vessel shapes are globular with constricted necks and recurved and decorated rims. Stone arrow points are smaller than those of the preceding Plains Woodland people, and four-sided "Harahey" knives make their introduction. New bone tools include the fishhook and the toggle-headed harpoon. Other new features are curved clay pipes and anthropomorphic and zoomorphic clay effigy heads. Generally burials are comprised of secondary interments without a great deal of artifactual accompaniments. An exception to this pattern, however, is the Whiteford Site in Kansas, where most of the interments were of a primary nature and in flexed positions (Wedel 1959; Figure 3-5).

Definite evidence of Central Plains Tradition earthlodges does not seem to extend farther west than about the 101° meridian, perhaps at the Pottorff Site in Kansas or in Chase County, Nebraska (Wedel 1959). Nevertheless, pottery attributed to that tradition has been reported from sites in eastern Colorado, i.e., Agate Bluff (Irwin and Irwin 1957); Happy Hollow (Steege 1967); Chubbuck-Oman (Tipton 1967); Peavy Rockshelter, Biggs, Kasper and Site 5LO6 (Wood 1967). Other such components are said to be scattered along the drainages of the North and South Platte Rivers in eastern Colorado and in southeast Wyoming (Wood 1978). Exactly what terminated the existence of these Central Plains farmers is not known, but speculation is that drought during the late

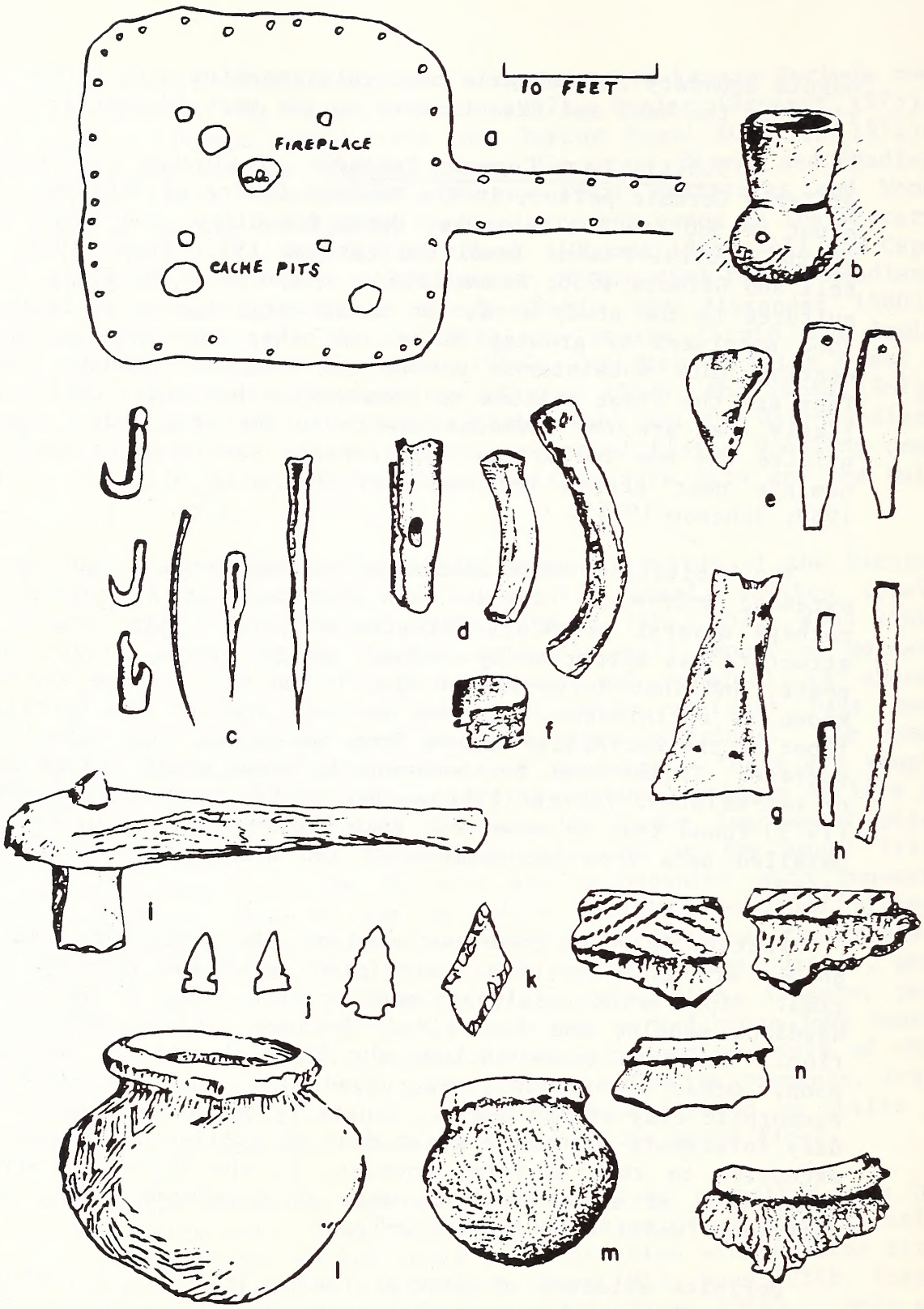


Figure 3-5. The Upper Republican Culture. a) lodge plan showing post holes and fireplace; b) bone fish-hooks and awls; d) antler handles; e) shell ornaments; f) bracelet; g)bone hoe; h) bone tubes; i) celt or ungroved axe; wooden handle; j) projectile point outlines; k) beveled knive; l-m) typical vessel shapes, random cord and paddle decoration; n) rim details. (From Prehistory of North America, by Jesse D. Jennings, McGraw-Hill, 1974. Used by permission.)

15th Century and incursions by Plains Apaches from the west may well have forced the people to abandon their western settlements and to move eastward into eastern Nebraska where they evolved into the Lower Loup Culture and eventually became the historic Pawnee.

Farther to the south of central Kansas along the Arkansas River drainage is another archeological complex known as the Great Bend Aspect (Wedel 1959). The remains here consist of middens and refuse spread over areas of as much as 40 acres. There are no earthlodges or definite habitation remains other than thatch, but cache pits and hearths are abundant. Another distinctive feature is the presence of small, earthen, arched eminences called "council circles" and thought to represent community ritual centers. Refuse from the cache pits indicates that the people were agriculturalists and that they also hunted the bison and smaller animals.

Pottery is plentiful at the sites. Vessels are jar-shaped with a flat base or constricted neck and recurved rims. Tempering is grit or shell, and the vessel exteriors are simple stamped or smoothed. Some of the vessels are painted red.

Except for their noticeable abundance, the bone and stone inventories do not differ greatly from other contemporary regional cultures. There is one important exception, however, and that is the presence of obviously foreign trade goods at several of the Great Bend Aspect sites. These consist of painted pottery sherds known to have originated at sites along the upper Rio Grande during the 16th and 17th centuries. Other items include an iron awl and axe, chain mail, tubular copper beads and glass trade beads. These European objects and their cross-dating at other sites suggest that the Great Bend Aspect sites were very likely occupied by bands of the historic, grasslodge Wichita who came into contact with exploring Spaniards in central Kansas in 1541 (Wedel 1942; 1961).

Somewhat contemporaneous with the Great Bend Aspect sites are those of the Lower Loup Focus and the historic Pawnee in central Kansas and north central Kansas (Strong 1935; 1940; Dunlevy 1936; Wedel 1936; 1938; 1959; 1961a; Smith 1949; Witty 1967; Grange 1968). The latter are also large villages of agriculturalists who supplemented their subsistence by hunting the bison. They differ markedly from the Great Bend settlements, however, in that the Lower Loup and Pawnee villages were characterized by large, circular earthlodges and some of the settlements are said to have been fortified by ditches and stockades. The settlements may range in area up to 100 acres.

Lower Loup and Pawnee ceramics are quite varied, distinctive and decorative. Vessels include grit or shell tempered globular containers with a constricted neck and braced, thickened, s-shaped, collared or straight rims. Bowls and bowl lids are present, but rare. The exterior surfaces are plain, simple stamped and rarely cord-roughened. Handles, two or four to a vessel, are common and variable (Figure 3-6).

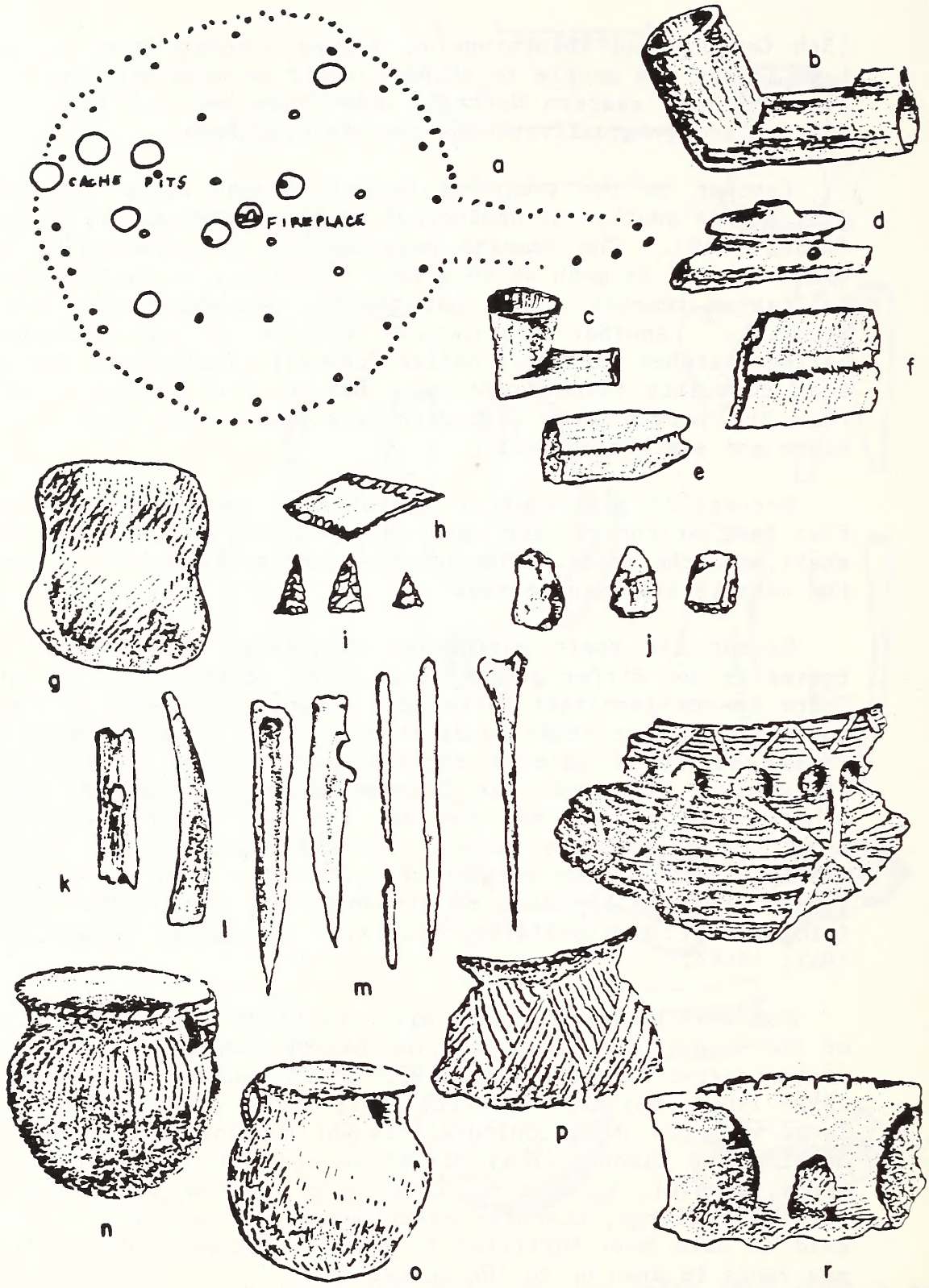


Figure 3-6. Lower Loup Culture. a) house pattern; b-d) pipes; e-f) abraders; g) maul; h) knife; i) points; j) scrapers; k) perforated rib; l) antler punch; m) awls; n-o) vessel shapes; p-r) pottery details. (From The Native Americans, by R. F. Spencer, J. D. Jennings, et. al., Harper and Row, 1965. Used by permission.)

As at Great Bend sites, these settlements have yielded an abundant and variable inventory of worked stone and bone artifacts, as well as maize, beans and squash remains from middens, cache pits and the general occupation levels. Finally, it is important to realize that some of the few dendrochronological dates, obtained from archeological specimens in the plains region, were determined from wood samples excavated at Pawnee sites (Weakley 1961).

Still another Late Ceramic period complex is the White Rock Aspect, consisting of a number of areally extensive sites in north central Kansas and the adjacent region of Nebraska. These somewhat resemble those villages of the Great Bend Aspect in that the White Rock occupations are characterized by refuse, hearths, middens and cache pits, but no definite habitational remains. Pottery is globular with a constricted neck and straight or everted, decorated rims. Grit and shell tempered sherds are present, though grit temper predominates. Exteriors are plain or simple stamped; cord-roughening is rare.

The non-ceramic inventory follows the same general traits as the other late prehistoric complexes discussed above. Several sites of the White Rock Aspect have yielded a few historic artifacts of copper and glass, and it is quite probable that the sites of this aspect represent prehistoric and protohistoric Kansa Indian occupations (Wedel 1959; Rusco 1960; Neuman 1962).

Four excavated circular earthlodge villages and twelve campsites in northeast Nebraska have been assigned to the Redbird Focus, another prehistoric and protohistoric manifestation in the study area. The distinctive pottery is globular with a constricted neck and recurved, collared or straight, decorated rims. Temper is shell or grit, and the vessel exteriors are simple stamped or smoothed. A minority are check stamped or cord-roughened.

Nothing in the general nonceramic artifact inventory distinguishes it from other contemporary sites in the area (Wood 1956a; 1959; 1965b). Only one of the excavated earthlodge sites yielded European trade materials.

The geographical location of the villages and their adjudged time of occupation, in addition to their relatively small size, correspond well with ethnohistoric data to indicate that these Redbird Focus sites are prehistoric and protohistoric villages and campsites of the Ponca Indians. A late 18th Century Ponca village is situated near one of the Redbird Focus sites and although it is not included in the focus, its location and certain of its manifestations correlate well with and strenghten the hypothesis that the Redbird sites are of Ponca origin (Wood 1965a).

The last complex of sites that will be dealt with on the Central Plains is grouped under the title of the Dismal River Aspect. Actually, as will be apparent, sites of this aspect extend out onto the High Plains of Colorado. Known best from excavations in western Nebraska and Kansas, the remains were manifested as temporary campsites or as small,

semipermanent hamlets with up to twelve light-poled, circular structures having central firepits and walls of thatch and/or grass. In the settlement area were bell-shaped cooking and storage pits. At times, these pits were used for human interments and as refuse pits.

Dismal River pottery is described as ollas with a slightly flared rim and subconical to round bottoms. There are also hemispherical bowls and at leat one flat-bottomed vessel. Tempering consists of grit or mica, the latter being a Southwestern trait. Vessel exteriors are smoothed or simple stamped. Decoration is most commonly limited to the lip of the vessel rim. Once again, nonceramic artifacts, though less abundant, could be duplicated at other protohistoric villages in the Central Plain, with the exception of southwestern trade items found at Dismal River sites (Figure 3-7).

One Dismal River site, dated at about AD 1540, is represented as a settlement surrounding the remains of a stone walled pueblo in western Kansas. Archeological remains suggest that as the Dismal River people moved eastward, they developed a less nomadic, semi-sedentary way of life. Furthermore, the evidence suggests that the Dismal River Aspect represents the physical remains of the nomadic Plains Apache who in the 16th Century came into contact with Southwestern pueblos and eventually adopted some of their sedentary traits such as horticulture and pottery-making. In time, they moved or expanded into southwest Nebraska and central Kansas. It is also suggested that these Plains Apache were to become the Padouca peoples whom the French encountered in northern Kansas in 1724 (Wedel 1947; Champe 1949; Metcalf 1949; Gunnerson 1956; 1960; 1969; 1968).

Sherds identified as Dismal River ware have been reported from Weld County, Colorado; the Glendo Reservoir, Wyoming; and the Angostura Reservoir, South Dakota (Gunnerson 1968).

On the High Plains of eastern Wyoming and Colorado, the Late Prehistoric period is comparable in time to the Later Ceramic period on the Central Plains. Diagnostic artifacts include small side-notched and corner-notched stone arrow points, and flat-bottomed, flower pot-shaped steatite and pottery vessels with smoothed exteriors. Also present are limited finds of pottery representing globular vessels with a constricted neck and everted rims. They are grit tempered and simple stamped or smoothed on their exterior surface. This ware is comparable to ceramics from Mandan villages in the Dakotas, but the finds in eastern Wyoming and western South Dakota are attributed to occupations by Crow peoples (Over 1936; Mulloy 1942; 1958; Wedel 1954; Frison 1976; Wood 1971).

Protohistoric sites are manifested by European metal and glass objects. These are generally of an ornamental nature and often associated with human burials. Also present are metal utensils such as knives, and points made from hammered iron.

Horse bones are found at some sites. It is also during this late period that communal bison hunting reached its zenith in the study area. Classic bison jump sites include Piney Creek (Frison 1967), Big Goose

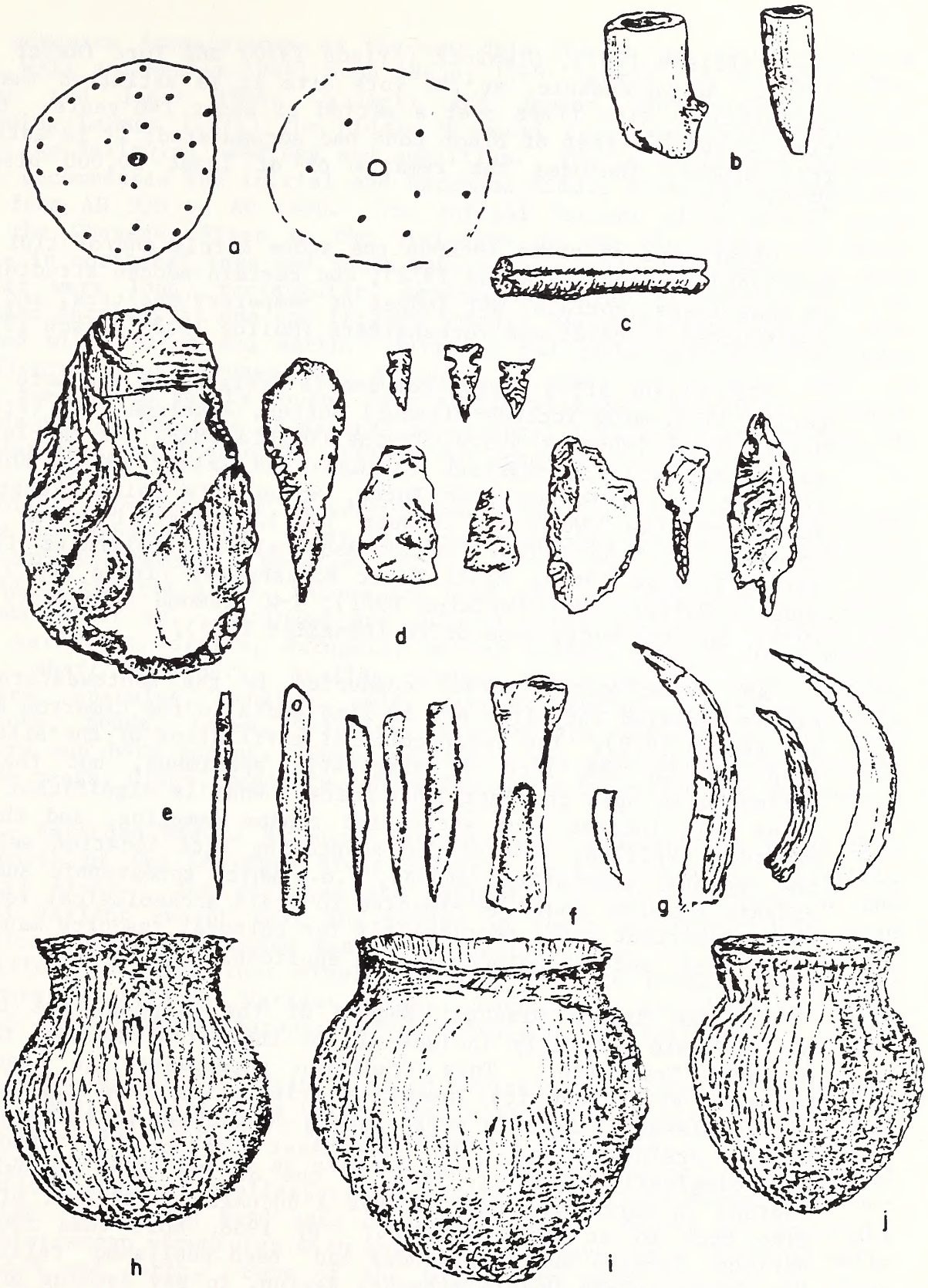


Figure 3-7. Dismal River Culture. a) lodge or house plans; b) pipes; grooved abrader; d) chipped flint; e) needles and awls; f) hide flesher; antler handles for scrapers; h-j) typical vessel shapes. (From The Native Americans by R. F. Spencer, J. D. Jennings, et. al., Harper and Row, 1965. Used by permission.)

Creek (Frison 1967), Glenrock (Frison 1970) and Vore (Reber and Frison n.d.). As an example, at the Vore Site it is estimated that the jump was utilized five times over a period of about 140 years. During this time period, 17 feet of bison bone had accumulated; it is estimated that this deposit includes the remains of at least 20,000 bison (Frison 1978).

Other type of sites include the stone circle and/or tipi ring sites mentioned previously (Kehoe 1972); and certain wooden structures erected as game traps, corrals, war lodges or temporary shelters; and structures constructed in caves and rockshelters (Mulloy 1958; Frison 1978).

High Plains sites having components assigned to the Late Prehistoric period in Wyoming include Missouri Buttes, Antelope Trap (Frison 1978), Miller Creek (Wheeler n.d.), Irvine (Duguid 1968), North Platte (Mulloy and Steege 1967), Greysrock (Zeimens and Walker 1977), Shirley Basin (Zeimens 1975), Gurney Peak Butte, Seven Mile Point (Reher 1971) and near Newcastle (Wood and Downer 1977). Farther south in eastern Colorado are the Wilbur Thomas Rockshelter (Breternitz 1971), Happy Hollow (Steege 1967), Agate Bluff Rockshelter (Irwin and Irwin 1957), Roberts Buffalo Jump (Witkind 1971), T-W Diamond (Flayharty and Morris 1974), and the Murry Game Drive (Benedict 1975).

An archeological survey conducted in the southwestern corner of Kansas revealed 158 sites and 18 find spots in the Cimarron River drainage (Brown 1979). The exact cultural affiliation of the sites is uncertain due to the lack of diagnostic specimens, but the sites are estimated to span the last 2000 years. What is significant is that the sites were located from stratified random sampling, and that the data provided empirical information respecting site location selectivity by the regional prehistoric groups, i.e., which topographic and/or physiographic features could be expected to yield archeological remains. This is an important work, particularly for cultural resource managers in the study area, and the methodology is applicable elsewhere.

In the Middle Missouri Region of the Dakotas, the Late Ceramic period would generally include all of the sites assigned to the Middle Missouri Tradition. This tradition encompasses an area along the Missouri River and its immediate tributaries from the mouth of the Little Missouri River in North Dakota downstream to the Sioux and James River drainages in the southeast corner of South Dakota. Archeologically speaking, this is one of the most intensively worked regions in North America. It has a documented cultural history extending back to at least 9000 BC. By 1968, more than 500 reports of various lengths and magnitudes had been published relative to the archeology in the Middle Missouri Region, to say nothing of unpublished manuscripts (Petsche 1968). Today that number would be increased appreciably. It would be superfluous, in the present synthesis, to attempt a detailed description of the archeological data from the region, but outlines of pertinent cultural developments will be offered.

Formulations of the archeological occurrences have been provided, reappraised, submitted again, and then abandoned, only to be replaced by

more adequate formulations as the new data change the picture (Strong 1940; Will and Hecker 1944; Wood 1965a; 1969; Lehmer and Caldwell 1966; Lehmer and Jones 1968, Caldwell and Jensen 1969; Lehmer 1971). Following Lehmer (1971) the Middle Missouri complexes may be outlined under the following headings and subtitles. The Early Village Cultures which encompasses the Initial and Extended Middle Missouri variants and date from AD 900 to AD 1400. The Initial Variant sites extend south from the Cheyenne River to the drainages of the Big Sioux and James Rivers in northwest Iowa and South Dakota, respectively. Houses of this variant were long, rectangular, semi-subterranean structures with an extended entryway at one end (Figure 3-8c). The walls and the roof were covered with thatch and earth. Firepits and cache pits were dug into the floors. Most houses were arranged in rows, and there may be from twelve to thirty houses in a single village. Defensive features include the utilization of natural topography, i.e. hills and bluffs, in addition to fortification of ditches and stockades.

Pottery consisted of globular vessels with a constricted neck and flared or s-shaped rims. Clay was grit tempered, and vessel exteriors were cord-roughened. Handles are rare, and decorative motifs are applied to the rim areas. Stone and bone artifacts are abundant, shell specimens less so. Included are chipped stone points of notched and plain varieties, drills, scrapers, worked flakes, ground stone mauls, celts, shaft smoothers, mealing stones, bone scapula hoes, picks, fleshers, spatulas, handles, awls, punches, knives, shaft wrenches, fishhooks, beads, tubes, whistles, game pieces, ornaments, elk horn scrapers and horn scoops. Shell artifacts are generally ornaments and include beads, discs, pendants, and effigies of Dentalium and Busycon.

The Extended Middle Missouri Variant has a geographical range from just north of the Cheyenne River upstream to the mouth of the Little Missouri River. The villages are basically similar to those of the Initial Variant except that the former in their southern range, have fortifications with rounded bastions. Pottery, too, is quite similar, one difference being that simple stamping is more popular and flared rims rarer at Extended Variant sites. Stone, bone and shell artifacts show no appreciable differences at this level of abstraction.

Between AD 1400 and AD 1675, other variants interacted in the Middle Missouri Region. They are called the Initial Coalescent, the Extended Coalescent, and Terminal Middle Missouri Variants. The Initial Coalescent is essentially an expression of Central Plains traits blended with Middle Missouri manifestations (Figure 3-9). This variant is concentrated in the Big Bend area of South Dakota. Houses are squarish, semisubterranean structures with extended entryways and a roof and walls of thatch and earth. Some of the houses are more circular in floor plan. The village pattern consists of widely scattered houses. Several sites are fortified with encircling ditches and bastions. Pottery is quite similar to that of the Late Ceramic period sites on the Central Plains except that simple stamping is more popular among the Big Bend sites. Stone, bone and shell artifacts expectedly exhibit a blend between the Big Bend sites and those in the Central Plains.

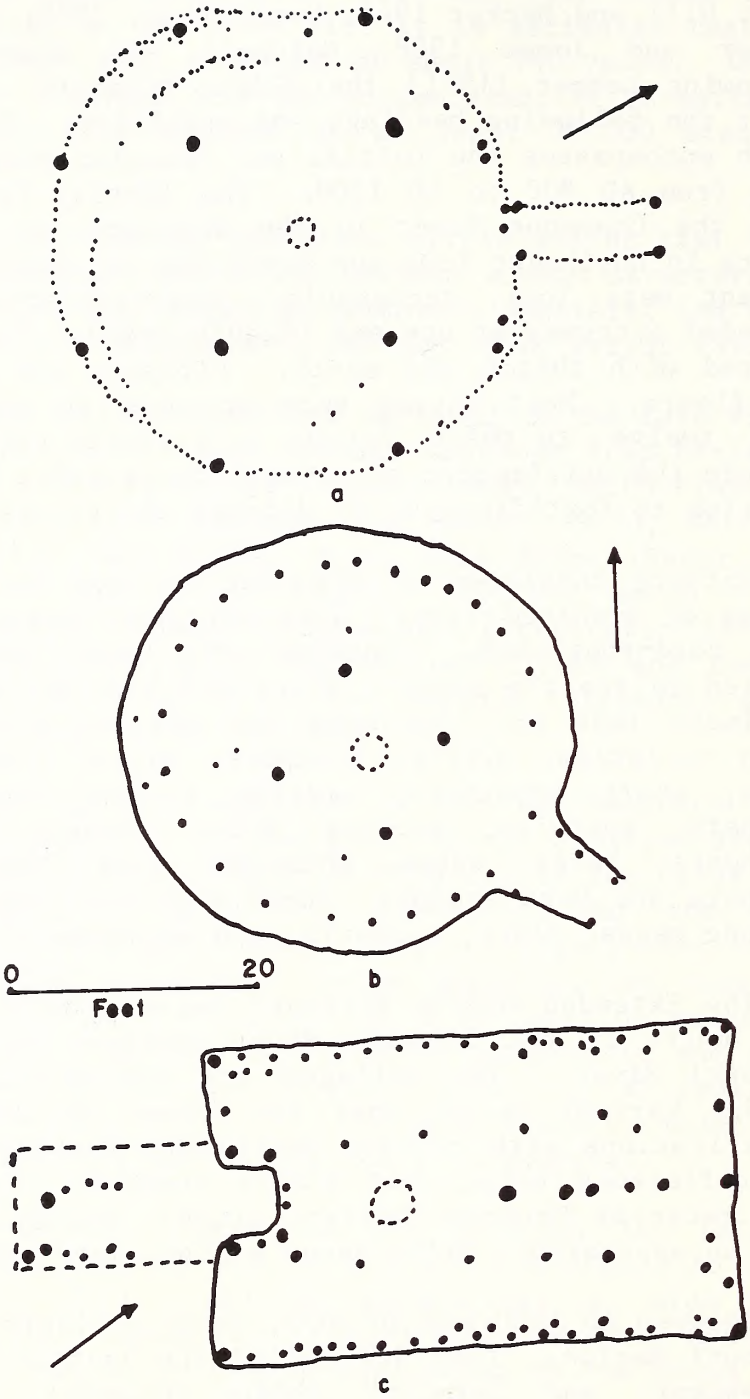


Figure 3-8. Middle Missouri House Floor Plans, Showing Characteristic Shapes and Posthole Patterns, but with Subfloor Cache Pits Omitted. a) Arikara, ca. 1700-1750; b) La Roche focus, ca. 1500-1650; Thomas Riggs focus, ca. 1200-1300. Arrows point north. (From Prehistoric Man on the Plains, by W. R. Wedel, University of Oklahoma Press, 1961. Used by permission.)

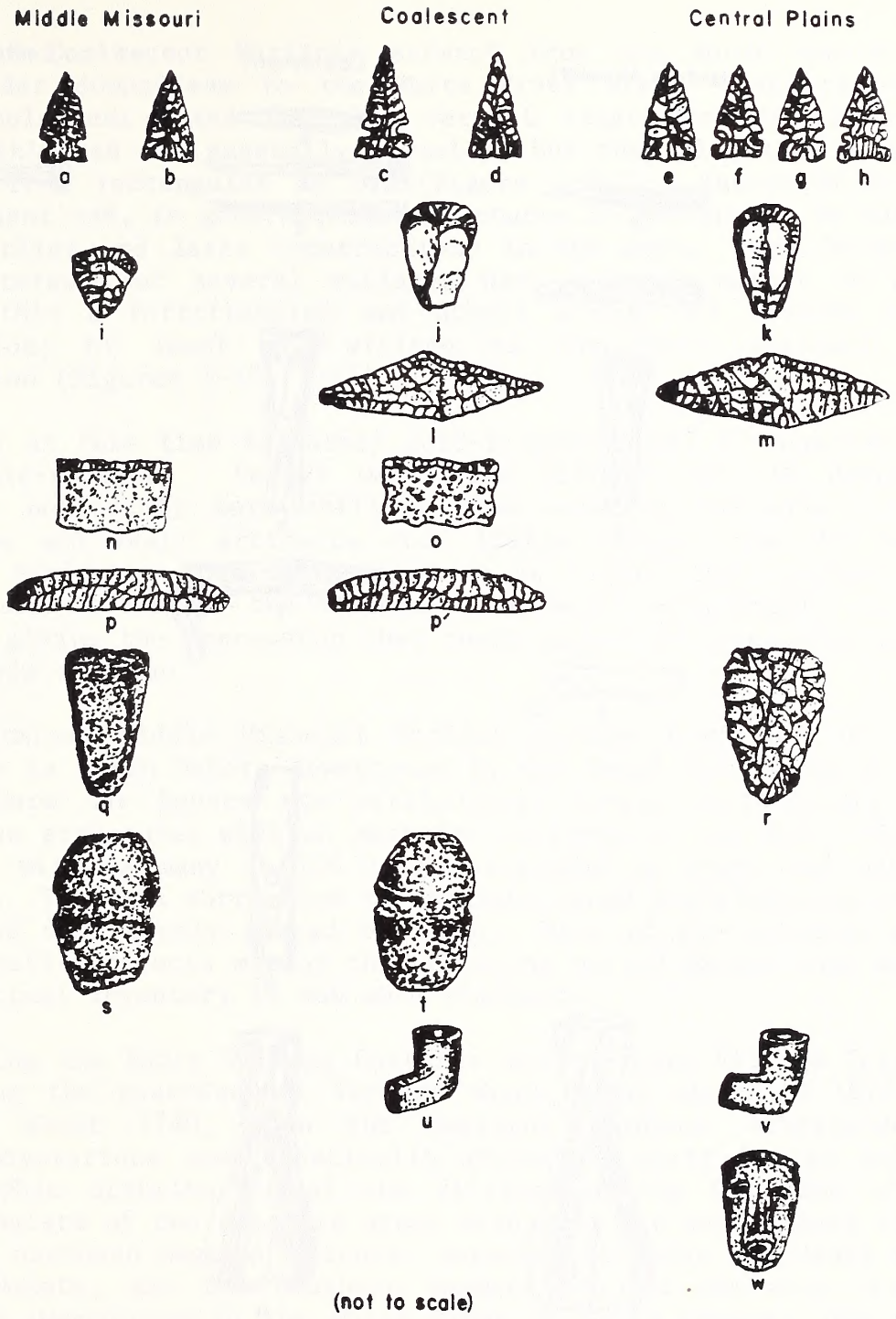


Figure 3-9A. The Blending of Middle Missouri and Central Plains Traits in the Coalescent Tradition: Lithic Artifacts. a-h) Arrow points; i-k) end scrapers; l-p,p') knives; q-r) celts; s-t) mauls; u-v) pipes; w) figurine. (After Lehmer 1954.)

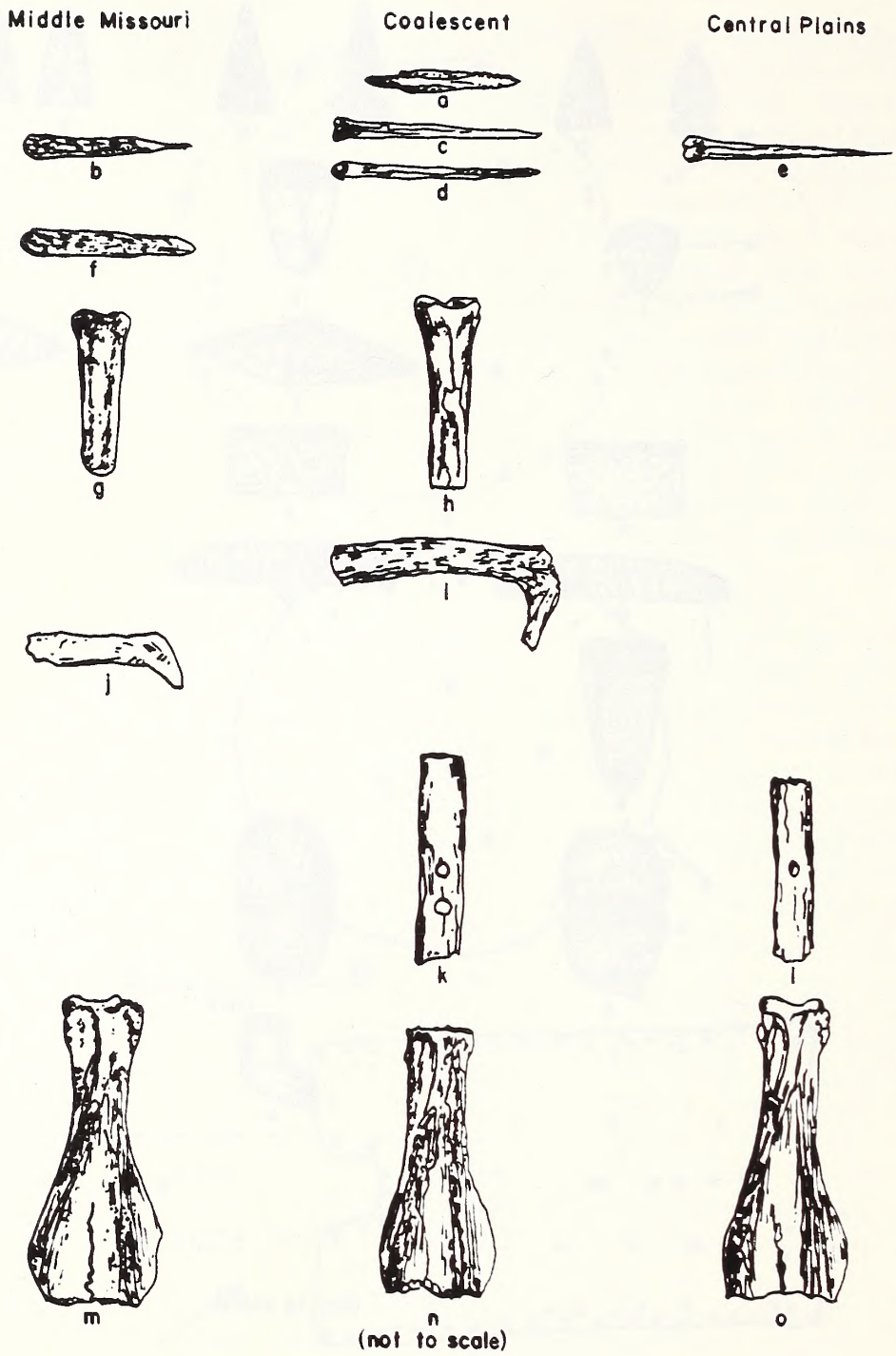


Figure 3-9B. The Blending of Middle Missouri and Central Plains Traits in the Coalescent Tradition. a) Tenoned bone point; b-e) awls; f) quill flattener; g-h) fleshers; i) elk antler scraper haft; j) scapula knife; k-l) shaft wrenches; m-o) scapula hoes. (After Lehmer 1954.)

Extended Coalescent Variants stretch from the North Dakota-South Dakota border downstream to the White River area. Radiocarbon and dendrochronological dates for this variant range from AD 1550 to AD 1675. Earthlodges are generally circular, but they also show a variety of shapes from rectangular to oval(Figure 3-8b). Entryways are not always evident and, in general, the structures do not appear as substantial as earlier and later constructions in the area. Most houses are still scattered, but several villages have a small number of houses clusted within a fortification and others strung out outside of the fortification; at least one village is completely enclosed by a fortification (Figures 3-10, 3-11).

Pottery at this time is rarely cord-roughened and is characteristically simple-stamped. Vessel walls are thinner and the decorative motifs are noticeably more skillful than seen in the area earlier. Stone, bone and shell artifacts show little change from the Initial Coalescent Variant. Notwithstanding, it is a fact that quantities of artifacts and refuse in the Extended Coalescent settlements are less plentiful, giving the impression that their period of occupation was for short periods of time.

The Terminal Middle Missouri Variant extends from just below the Knife River in North Dakota downstream to the Grand River area in South Dakota. Here the houses are particularly large, rectangular, semi-subterranean structures with an extended entryway at one end. Villages are large, with as many as 100 lodges arranged in rows, and one open plaza area. They are surrounded by straight-lined fortification ditches interspersed with evenly spaced bastions. Most of the pottery, stone, bone and shell artifacts mirror the preceding period except that much of the artifactual inventory is now more elaborate.

Following the Early Village Cultures are the Late Village Cultures, encompassing the post-Contact Variant which began about AD 1675. It terminated about 1780, when the smallpox epidemic devastated the regional populations and drastically disrupted their native culture. The geographic distribution of the villages during the time of this variant consists of two separate areas with very few settlements in between. The northern segment extended between the Knife and Heart Rivers in North Dakota, and the southern segment spanned the area from the Grand River downstream to the White River in South Dakota. The Mandan and Hidatsa were in the northern segment, and the Arikara were in the southern area.

Houses at this time were circular earthlodges described in numerous, standard, ethnohistoric documents, as well as in archeological reports. There were also ceremonial earthlodges, temporary winter lodges, eagle trapping lodges and perhaps some continuation of the long, rectangular lodge. Villages no longer have lodges arranged in rows and fortifications, where present, are circular and lack bastions. There are more fortified villages in the northern area than to the south where lodges are more scattered. Historic documentation indicates that the Mandan averaged about 90 lodges per village, while the Arikara settlements averaged only about 35 lodges.

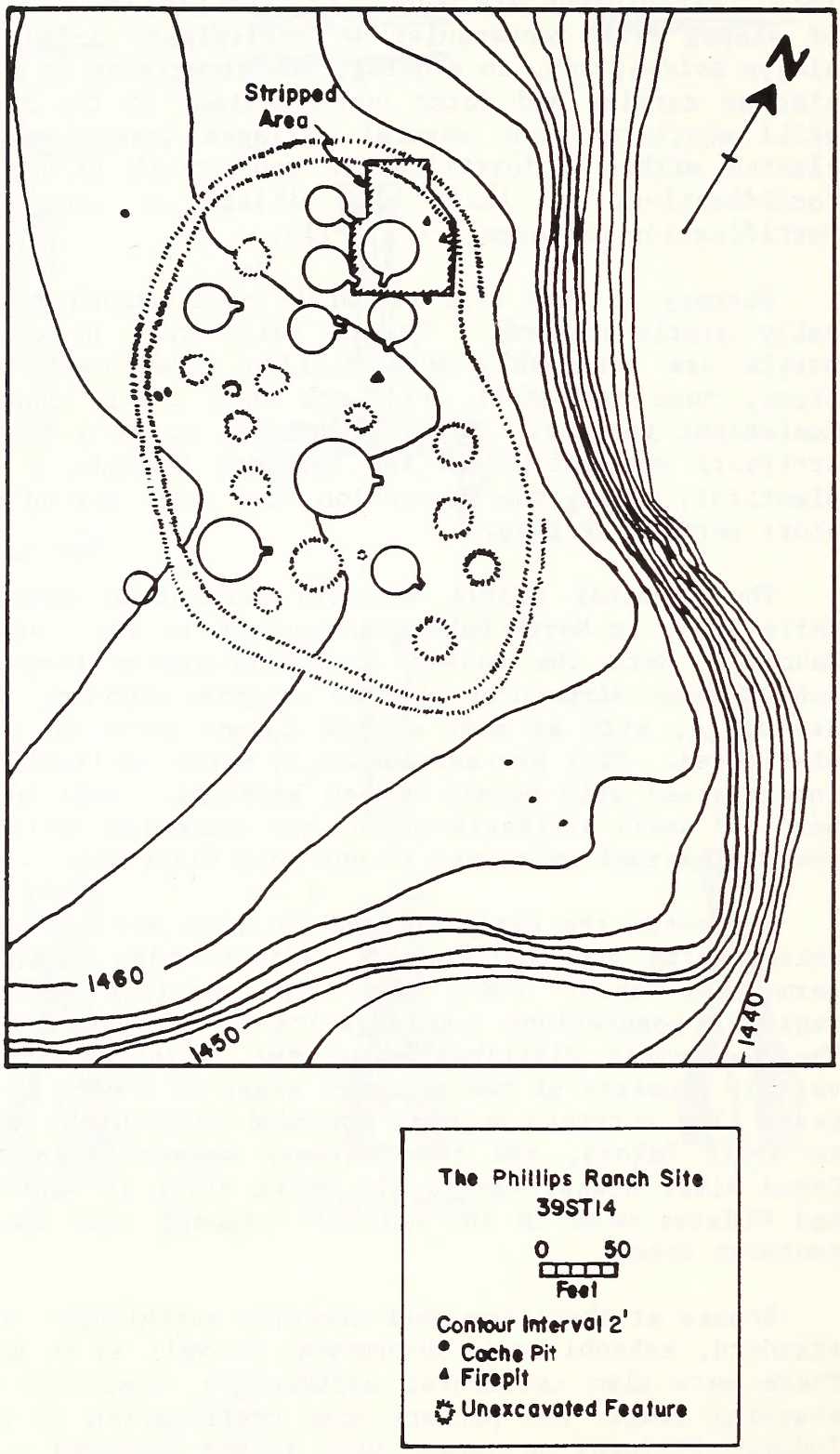


Figure 3-10. The Phillips Ranch Site, an Extended Coalescent Fortified Village. (After Lehmer, 1954.)

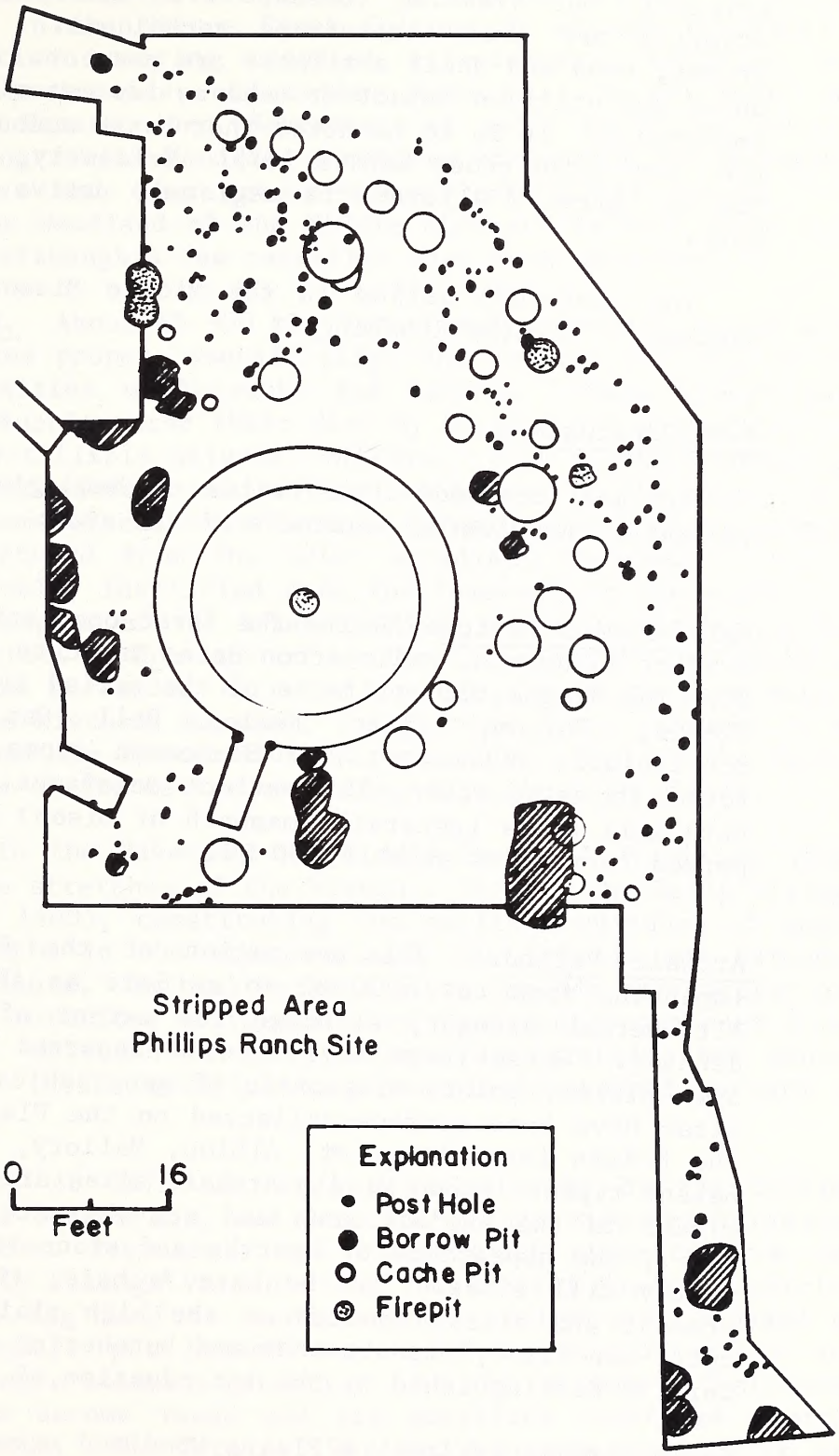


Figure 3-11. (After Lehmer 1954.)

Post-contact coalescent pottery is simple stamped or smoothed on the exterior, but brushing (perhaps with bark or grass brooms) and check stamping are newly introduced techniques. Rim styles change also. Stones, bone and shell artifacts are present. European items are introduced and utilized intact or used as raw material to fashion traditional implements. It is to be noted that horse accouterments are rare and so, too, are horse bones before 1675. Evidently, the impact of this animal had not greatly altered the regional, native culture until after that date.

The post-1695 period in the Middle Missouri region is covered in Chapter 7, "Plains Ethnology."

3.4. Conclusions

We may conclude the Plains Archeological Synthesis by briefly reviewing the diverse sequences of the area:

Paleo-Indian Period: While the first occupation of the Plains is still subject to debate, radiocarbon dates indicate a human presence by 10,000 BC. The diagnostic artifacts of the period are large projectile points: Clovis, Folsom, Agate Basin, Hell Gap, Angostura, Plainview, Scottsbluff, Milnesand, and Simmonsen types, all of which have been found in association with extinct megafauna. Excavated sites include both kill sites (generally mammoth or bison) and occupation sites. The period terminates about 6,000 BC.

Archaic Period. The occupation of the Plains during this period (spanning from ca. 6000 BC to as late as AD 700) was affected by the Altithermal drought, although the extent of the disturbance is still debated. While there have been no reported Early Archaic sites in the open plains, points diagnostic of geographically marginal Early Archaic sites have been surface-collected on the Plains proper. These include the McKean Lanceolate, Mt. Albion, Mallory, Duncan, Hanna, Youkee, and Besent types. Known Middle Archaic sites are located in more open acres closer to the project area and are characterized by greater diversity (i.e., the appearance of hearths and stone rings) than earlier predominantly kill sites. By the Late Archaic, the climate was that of the present and sites reported on the high plains include open campsites, butte-top sites, bison pounds and butchering sites. The artifact inventory is distinguished by the introduction of corner-notched points.

Early Ceramic Period: A Plains Woodland occupation began in the Central Plains prior to the end of the Archaic on the High Plains, with earliest dates for the introduction of Woodland traits dating to the 2nd millenium BC. These traits include introduction of ceramics, burial mounds, and horticulture. Skeletal material from these sites form an important body of data. Plains Woodland sites in eastern Kansas show an affiliation with the Hopewell complex and consist of camps, villages, and burial mounds. These sites may exhibit cache pits, midden deposits,

oval postmold patterns, and the exploitation of small mammal and deer to the almost complete exclusion of bison. A similar pattern of faunal remains is evident in the Sterns Creek Culture of eastern Nebraska, a Woodland manifestation boasting conodial grit-tempered ceramics, ash deposits, hearths, post-molds, and midden deposits. To the west, the Central Plains of Kansas, and Nebraska, as well as South Dakota, Colorado, and Wyoming reveal Woodland campsites of hunting and gathering groups. These cave and open ground sites lack burial mounds. In contrast, the Plains Woodland of the Middle Missouri is best known from mound excavations, although a few campsites have been excavated.

Late Ceramic Period. About AD 900 the first semi-sedentary groups move into the Project area proper, specifically, the various cultures of the Central Plains tradition of Nebraska and Kansas. These groups were horticulturalists, supplemented their diet by hunting and gathering, and occupied the easily-tillible alluvial valleys. They further introduced the bow and arrow and substantial rectangular houses to the area. Cord marked ceramics become globular in form an ceramic effigy heads appear. Upon retreating eastward from the 101st meridian, the Central Plains Tradition are eventually identified with the Pawnee. To the south, the Great Bend Aspect peoples of the Arkansas River built no pit houses but practiced horticulture. This group is identified with the Wichita. Other Central Plains gardening cultures include the White Rock Aspect (identified with the historic Kansas), the Redbird Focus (thought to be the Ponca tribe), and the Dismal River Aspect (identified as the Plains Apache), occupations of the latter extending into the high plains.

To the north, in the Dakotas, the Middle Missouri Tradition sites lie along the middle stretches of the Missouri River. The Early Village Cultures (900 - AD 1400), constituting the earliest evidence of semi-sedentary village life in the area includes the Initial and Extended Middle Missouri Variants. Initial Variant sites include rectangular pit houses grouped into fortified settlements and boast cord-roughened grit-tempered ceramics. Extended Variant villages are similar, but employ rounded bastions in their fortifications and simple-stamped pottery is more popular.

From AD 1400 to AD 1675 the area was dominated by the Initial Coalescent, Extended Coalescent, and Terminal Middle Missouri Variants. The Initial Coalescent represents the blending of elements from the Middle Missouri Early Village Variants and the Central Plains Tradition in the area of the Big Bend in South Dakota. Sites are composed of widely scattered square pit houses surrounded by fortifications and boast primarily simple-stamped pottery. In the Extended Coalescent Variant most houses become round and are sometimes clustered closely within defensive works. The Terminal Variant features rectangular pit houses arranged in rows around a plaza, with villages enclosed by straight-line bastioned fortifications.

4. THE OZARKS CULTURE AREA: PREHISTORIC SYNTHESIS

4.1 Introduction

For at least 10,000 years man has inhabited the Ozark region (Figure 4-1). The major sites which have been investigated and/or excavated have become known as the Ozark bluff-shelters. The shelters are composed of outcroppings of Boone Limestone with an underlying strata of Chattanooga Shale which has been rapidly removed by the erosive action of wind and/or water, leaving a Boone Limestone overhang (Cleland 1960).

Although many of the early excavations in the Ozark region produced a vast amount of material goods, one major problem greatly hindered the construction of chronological and cultural sequences. This problem, faced by both past and present archeologists who have excavated bluff-shelters, is the massive exfoliation of rock materials from the roofs of the bluff-shelters in prehistoric and present times. Exfoliation precludes the building up of continuous stratigraphic record upon which chronologies and cultural sequences are built. Also, exfoliated rock materials are one of the favored places for rodent burrowing; this activity tends to disturb whatever stratigraphic record may have remained.

4.2. Previous Investigations

The earliest work on archeological sites in the Ozark region occurred when Peabody (1903) investigated a rock-shelter in Benton County, Arkansas, for Phillips Academy of Andover, Massachusetts. The next investigation was by Bushnell, who in 1915 excavated Edens Bluff-Shelter. At the same time Moorehead (1931) initiated a survey of the Central and Upper Arkansas River Valley for the Peabody Museum at Andover, Massachusetts. However, as Hoffman (1977:4) has stated, "the publication contained little more than superficial generalization about the artifacts found; specific sites are only briefly discussed and possible artifact complexes not at all."

In 1922 and 1923 Harrington (1924; 1960) excavated twenty bluff-shelters in the White River Valley for the Heye Foundation of New York City. The major purpose of these excavations was to obtain perishable materials (such as plant fibers, wood, and animal hides) which typically are preserved within these caves. However, none of these artifacts can be confidently dated (Scholtz 1975). Harrington interpreted shelter deposits as representing a single uniform culture: the "Ozark Bluff-Dweller Culture". From the excavated materials he hypothesized that the inhabitants depended on hunting, gathering, agriculture, and fishing for their subsistence.

Harrington (1924; 1960) also postulated a post-bluff-dweller culture which he labeled the "Top-Level Culture". This was based on distinctive artifact types that were found only in the upper levels of the White River shelters in Benton and Carroll Counties, and in the upper levels of southwest Missouri shelters. They included shell-tempered pottery, arrow points that were often triangular grinders, mortars with cup-shaped cavities, and sandstone shaft-smoothers.

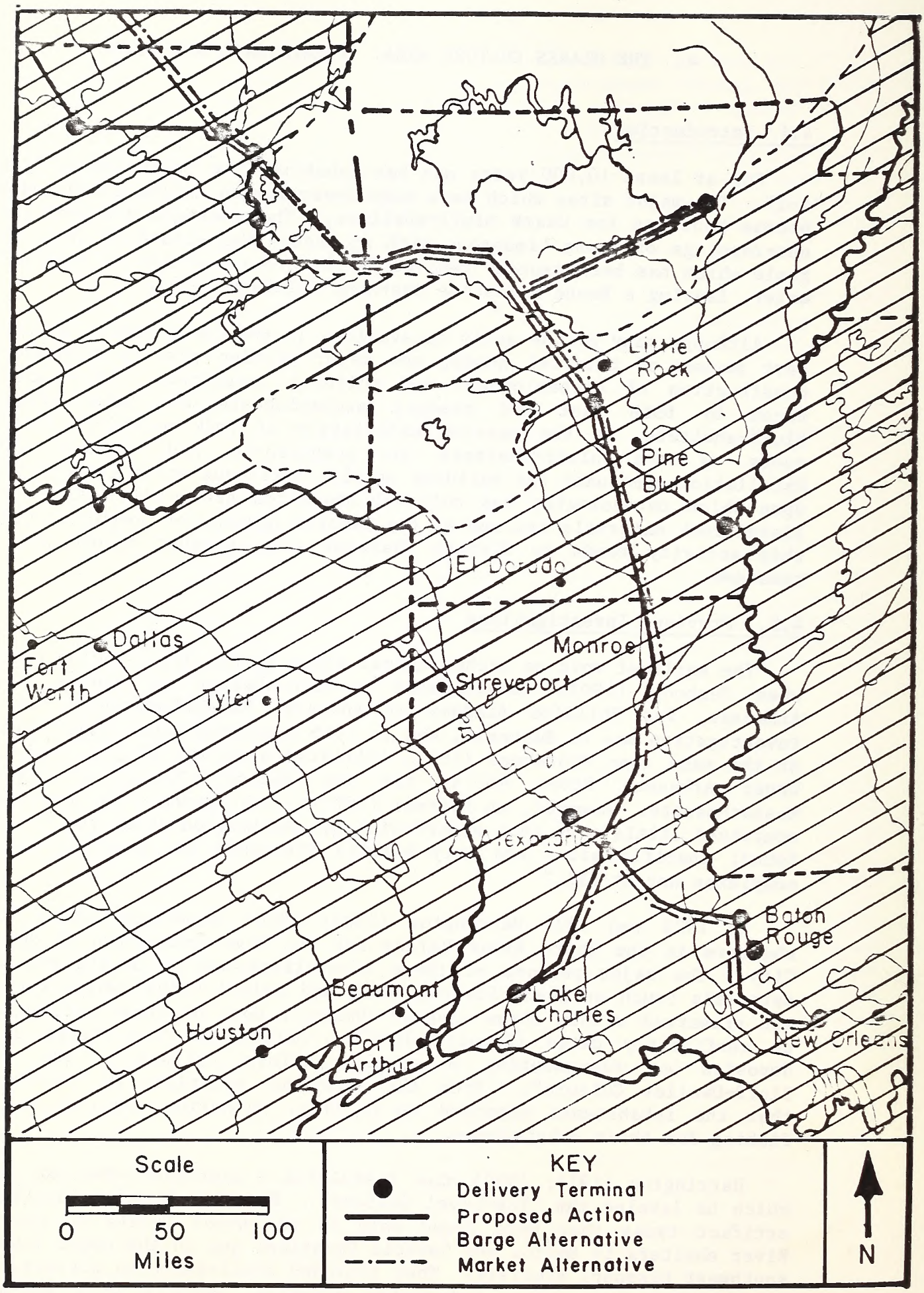


FIGURE 4-1. OZARKS CULTURE AREA

Wolfman (1979:26) has attributed Harrington's "Ozark Bluff-Dweller Culture" to the Early through the Late Archaic period, and the "Ozark Top-Layer Culture" to the Early through the Late Woodland and Mississippian periods.

In 1932, Winslow Walker (as referenced by Wolfman 1979) investigated a small cave on the Buffalo River. The report that he produced was innovative in that he was the first to illustrate the variety of projectile point styles as indicators of time changes.

Dellinger (1936; Dellinger and Dickson 1942) excavated seventy-two caves between 1928 and 1935 for the University of Arkansas Museum in order to obtain perishable materials. The majority of these sites were located on the White, Kings, Buffalo, and Arkansas Rivers. Also excavated were sites on Lee Creek and Frog Bayou in Arkansas. Along with the perishable materials, Dellinger recovered lithics, ceramics, floral and fauna materials, and human skeletal materials. Again, these artifacts cannot be assigned to discreet time periods. Although an archeological synthesis of the sites and excavated materials was never written, many excellent articles have been written about the material culture, including articles on ceramics (Dellinger and Dickson 1942), prehistoric baby cradles (Dellinger 1936), and what may be termed a "pioneer study" on the effect of disease and diet on the health of the prehistoric bluff-dwellers (Wakefield and Dellinger 1936; 1940; Wakefield, Dellinger and Camp 1937). Although Dellinger has come under criticism by current archeologists for methods used, collection bias, and the salvage mentality of the 1930's, he in fact was trying to save a vast amount of the prehistoric record which was being looted extensively by relic hunters.

Also during the 1930's, W.P.A. crews were excavating sites in the Oklahoma portion of the Ozark Plateau. Major excavations in the Oklahoma Ozark region include those at the Pohly Site in Mayes County (Israel 1979); and the Smullins I Shelter in Cherokee County (Hall 1954). Other shelters which have been reported in the Oklahoma Ozarks include 34MY79 in Mayes County (Kerr and Wycoff 1964), 34DL47 in Delaware County (Baerreis and Freeman 1961); and a site in Pontotoc County (Antle 1939).

Although few definitive works emerged during the 1950's, one study which stands out was conducted by Marshall (1958) in the Ozark Highlands at Table Rock Shelter. Based on surface collections from the Table Rock Lake area, he developed a typology for projectile points and defined the geographic range of point types. He also used the comparative method to ascertain the cultural complexes and cultural affiliations beyond the Table Rock Lake area. Although Marshall has come under recent criticism for his work at Table Rock, his report served until very recently as the only major projectile point sequence in the Arkansas Ozark region.

Cleland (1960), the first to draw notice to the importance of certain types of faunal remains as food for the prehistoric inhabitants of the Ozarks, analyzed remains from the bluff-shelters in the Arkansas Ozark region. He was also the first to note selective or differential butchering between the home base and the kill site. This study laid the foundation for future faunal studies (Medlock 1975; 1978) which have in-

involved the relationship between man and his exploitation of the environment during prehistoric times.

In the 1960's concern was shown over the loss of archeological resources due to increased reservoir construction (Dickson 1970; Bartlett 1963; Hoffman 1977).

General cultural sequences were set up for the Ozark region of Arkansas by McGimsey (1963) and Scholtz (1969). These follow the general outline others have proposed for the eastern United States. Both of these sequences have considered the Ozarks a "cultural backwater" which lagged behind in an Archaic stage of development (Phillips 1958:124-125) due to its marginal location and the rugged mountain terrain (Wolfman 1979; Scholtz 1969).

Struever and Vicker (1973) studied the beginnings of plant cultivation in the Midwest-riverine area of the United States. Their work in the Ozarks region was based on floral remains recovered by Harrington (1924; 1960).

Raab (1976) recently questioned whether the Arkansas Ozark region was actually a "cultural backwater" during its prehistory. This is presently leading to a reevaluation of Ozark prehistory. Current research by Don Dickson (1979: personal communication) on the Albertson Site (an Ozark bluff-shelter) by Ray (1979: personal communication) on the Heber Springs Site and by Fritz (1979) on civic and ceremonial centers in the Ozarks indicates that complex factors influenced prehistoric cultural change in the Ozark region.

The work of these researchers will provide the definition of: 1) cultural phases and sequence; 2) subsistence and settlement systems; and 3) prehistoric cultural change in the Ozark region employed in the current study.

4.3. Cultural Sequence

As in other cultural areas of the eastern United States, the prehistoric cultural sequence in the Ozark region can be divided into four general periods: Paleo-Indian, Archaic, Woodland and Mississippian (Figure 4-2).

4.3.1 The Paleo-Indian Period

The Paleo-Indian period, spanning from approximately 11,000 B.C. to 8,000 B.C., is characterized by small nomadic family bands who hunted now extinct Late Pleistocene megafauna such as mammoth, mastodon, and bison. Williams and Stoltman (1965) have documented this period as the earliest stage of human occupation in North America. The presence of fluted lanceolate projectile points like Clovis and Folsom are diagnostic of the period (Wormington 1957; Williams and Stoltman 1965; Gorman 1972).

Although the Paleo-Indian period is not well documented in the Arkansas Ozark region, fluted points have been reported from Baxter and

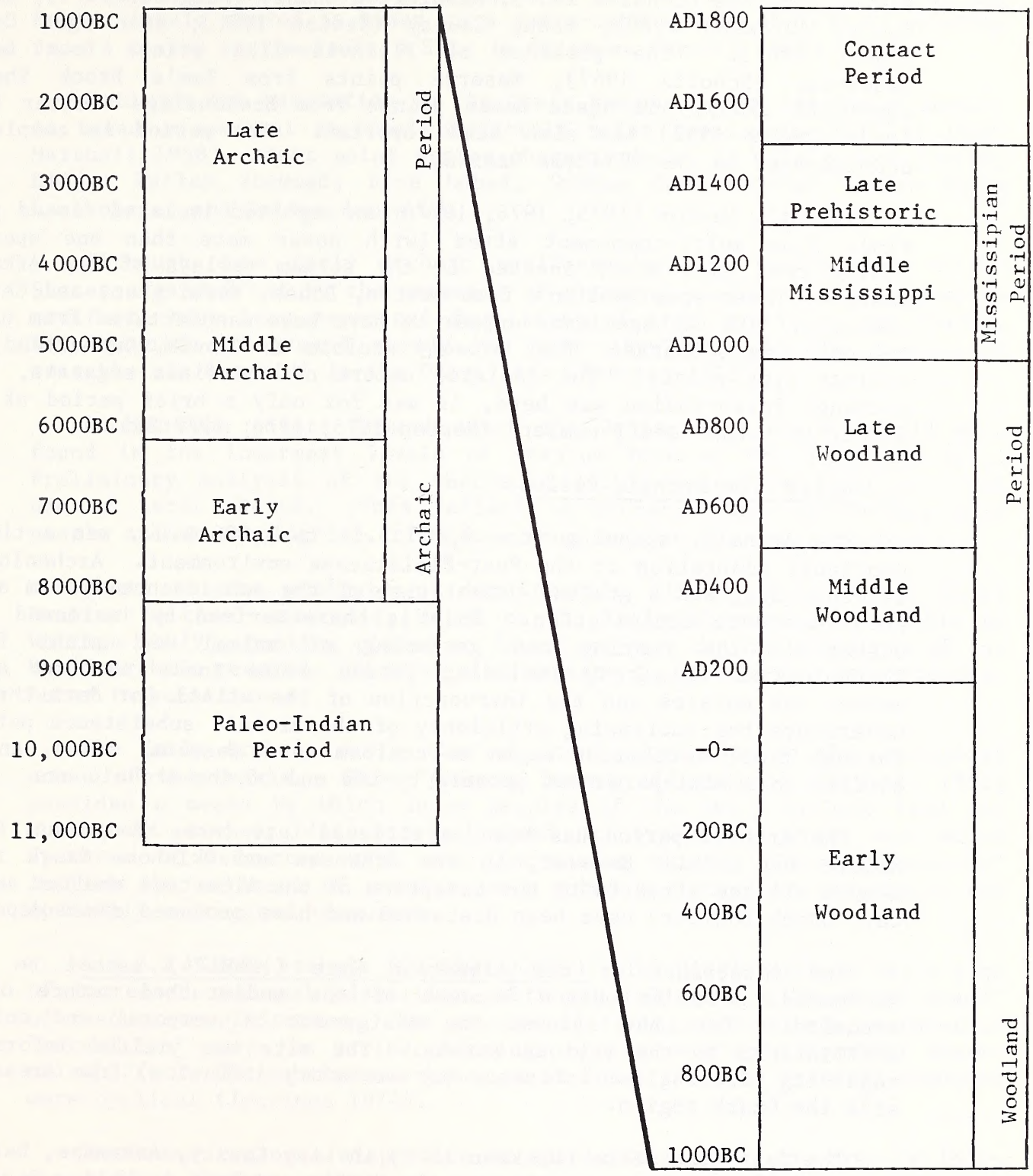


Figure 4-2. Ozarks Cultural Sequence.

Newton Counties (Scholtz 1969); Washington County (Ferguson 1973); Searcy County (Dickson 1970); Boone County (Newton 1971); and Logan County (Davis 1967). The presence of Plainview-like points from Beaver Reservoir (Scholtz 1967), Meserve points from Tom's Brook Shelter (Bartlett 1963), and Agate Basin points from Brekenridge Shelter (Wood 1963; Thomas 1962) has also been reported. The period is completely undocumented in the Oklahoma Ozarks.

Recently Newton (1975; 1976; 1977) has reported isolated fluted point finds from multi-component sites (with never more than one specimen coming from each site) located in the stream valleys of the Arkansas Ozarks. These specimens are from Newton, Boone, Washington, and Carroll Counties. All the specimens appear to have been manufactured from native Arkansas Ozark cherts. They closely conform to Clovis, Cumberland, and Pelican type points. The isolated nature of the finds suggests, "that although Paleo-Indian was here, it was for only a brief period of time and/or in rather small number" (Newton 1975; 1976; 1977:89).

4.3.2 The Archaic Period

The Archaic, spanning from 8,000 B.C. to 1,000 B.C., was a time of continual adaptation to the Post-Pleistocene environment. Archeological evidence suggests a gradual orientation of the subsistence system around local resource exploitation. This is characterized by increased efficiency in the hunting and gathering of animal and plant foods. Technological advances, including ground stone tools such as adzes, manos, and metates and the introduction of the atlatl (or dart thrower) underscore the increasing efficiency of the Archaic subsistence pattern. Through time, settlement began to conform to a seasonal round, and had evolved to a semi-permanent pattern by the end of the Archaic era.

The Archaic period has been partitioned into three divisions, Early, Middle and Late. However, in the Arkansas and Oklahoma Ozark region almost all the sites (with the exception of the Albertson shelter and the Calf Creek Shelter) have been disturbed and have produced mixed deposits.

The importance of the Albertson Site (13BE174) cannot be overestimated. It is unique because of the undisturbed nature of its deposits. This has allowed the assignment of temporal and cultural affiliations to the various strata. The site has yielded information regarding ideological influence (or secondary diffusion) from areas outside the Ozark region.

The Calf Creek Site (Dickson 1970) in Lacy County, Arkansas, has also produced important information on the Middle and Late Archaic. Pertinent information concerning these sites will be incorporated into the following discussion.

4.3.2.1 Early Archaic (8000BC-6000 BC). The Early Archaic was a time of climatic and environmental change at the end of the Pleistocene period. These changes led to an altered lifestyle, indicated by changes in dart point typology.

The earliest evidence of occupation in the Ozark region during the Early Archaic period is based on a radio-carbon date of 7450 BC obtained from a hearth at the Packard Site in Oklahoma (Wycoff 1964).

Evidence for habitation in the Ozark region during the Early Archaic is based on several regional projectile point typologies (Scholtz 1969, Marshall 1958). Dart point styles characteristic of this period include Hidden Valley Stemmed, Rice Lobed, Graham Cave Notched, Agate Basin Lanceolate, and Dalton Serrated.

Although some Early Archaic manifestations in the eastern United States are typified by the presence of grinding stones, few ground stone artifacts have been recovered from sites of this period in the Ozarks. This paucity of ground stones has been attributed to the absence of suitable raw material in the Ozark area (Scholtz 1975).

Dalton-type points (named after the Dalton Site in Missouri) were found in the lowermost levels of stratum five at the Albertson Site. Preliminary analysis of the recovered lithic materials indicates 100% use of local cherts. This reflects a probable lack of contact with people and/or ideological influences from outside the Ozark region.

Based on the analysis of Harrington's (1924; 1960) "Ozark Bluff Dweller Culture" materials, dated to the Early through Late Archaic by Wolfman (1979), hunting played an important part in the lifestyle of the Early Archaic peoples. Fishing also appears to have been a major contributor to subsistence.

The Early Archaic was a time of local adaptation to the ecological zones of the Ozarks. This "primary forest efficiency" (Caldwell 1958) provided a means by which these peoples of the Early Archaic (and all subsequent Archaic divisions) learned to exploit a wider and wider spectrum of resources with ever increasing skill. This "efficiency" implies the movement of peoples to a schedule fitted to seasonally and spatially segregated resources.

4.3.2.2 Middle Archaic (6000BC-4000BC). The Middle Archaic was a time of increased regional adaptation, with man following a "seasonal round" of resource exploitation. The pattern of living in complete, harmonious "parasitism" upon the varied offerings of the woodlands involved seasonal shifts in the subsistence base, or at least that the seasonal emphases were cyclical (Jennings 1974).

Increased regional adaptation or specialization in the area is indicated by a larger number of projectile point (dart) types and other lithic tools.

In the Ozarks, the Middle Archaic is marked by projectile points such as the Big Sandy Notched, Jakie Stemmed, Rice Lobed, and various basally notched types. Stemmed forms with generally expanding stems are typical of this period. Ground and polished stone artifacts are also more frequent during this time, indicating an increase in the importance of vegetal food processing.

At the Calf Creek Site (Dickson 1970) the Middle Archaic is represented by the Big Sandy I (named after the Big Sandy Site in Tennessee), Johnson (named after the Johnson site in Arkansas), Rice Lanceolate (Searcy) (named after the Rice Site in Missouri), and Smith Basal Notched (named after the Smith Site in Oklahoma).

At the Albertson Site, Rice Lobed (named after the Rice Site in Missouri), Hidden Valley Stemmed points (named after the Hidden Valley Site in Missouri), and Johnson-type dart points (named after the Johnson Site in Arkansas) were found. A preliminary analysis of the recovered lithic material indicates that 10% of the chert was being imported.

An increase in the number of sites containing Middle Archaic projectile point styles may argue for an expansion in population in the Ozark region (Scholtz 1979; Marshall 1958; Scholtz 1975).

Along with an increase in population, the presence of point styles typifying other regions of the eastern United States and the presence of imported chert indicates that the prehistoric people of the Ozark region were in contact with peoples and/or ideological influence (secondary diffusion) from Missiouri and Oklahoma.

Plant remains found by Harrington (1924) identified by Gilmore (1931) and reanalyzed by Struever and Vickey (1973) point to cultivation of indigenous North American plant species at the Albertson Site. In addition, floral remains indicate the processing of native wild plants such as honeylocust, persimmon, blackshell, hackberry, hickory nuts, acorns and chinquapin during the Middle Archaic.

The use of mullers (as found at the Albertson Site) in the processing of local plant materials also argues for a more settled existence in the Middle Archaic than in the previous Early Archaic (Scholtz 1975).

To summarize, based on the material excavated by Harrington (1924), it appears that hunting and fishing played an increasingly important part in the lives of the prehistoric inhabitants during the Middle Archaic. The information presented in this section points to an increase in population, as well as an increased contact with peoples and/or ideologies from outside the Ozark region. Plant remains indicate the existence of incipient horticulture. However, the gathering of wild plant species continued to play an important role in the subsistence strategy during this time.

4.3.2.3 Late Archaic (4000BC-1000BC)

The Late Archaic is seen as the culmination of regional adaptation. It is marked by the increased presence of ground stone, particularly manos and nutting stones, and by projectile points such as Gary, Bulverde, Ellis, Williams, and Langtry. The Late Archaic in the Ozark region is generally similar to the Middle Archaic except for changes in dart point types.

At the Calf Creek Site (rock shelter) the Late Archaic is represented by Langtry and Rice Contracting Stem dart point styles.

The Late Archaic is represented at the Albertson Shelter by the uppermost level of stratum four. Diagnostic projectile point types found at the site include Pandale (after the Pandal Site in Oklahoma), Williams (after the Williams Site in Texas), and Table Rock (named for the Table Rock Site in Missouri). A preliminary analysis of the lithic material from the Albertson Site indicates that 10% of the chert was being obtained from outside the immediate area.

Along with a probable increase in population suggested by the increase in the number of sites with Late Archaic projectile point types (Scholtz 1975), the presence of imported chert material and point styles which typify other regions of the eastern United States, indicate contact with peoples and/or ideological influences outside of the immediate area of the Ozarks.

By the close of the Late Archaic, man had succeeded in developing an increasingly efficient set of exploitative techniques. This efficiency implies new techniques of food preparation and exploitation of a broadened range of raw materials. What Archaic efficiency implies, then, is a technology utilizing many raw materials and resources never before exploited in a series of inventions or innovations (Jennings 1974). Technological advances, of course, led to an increase in man's ability to cope with the natural environment. Due to this increased ability to successfully exploit the natural environment, there was a general increase in population. The inevitable result was a more sedentary society and an increasingly complex social organization.

4.3.3. The Woodland Period

The Woodland Period, spanning from 1,000 BC to AD 1,000, is generally divided into three stages: Early, Middle and Late Woodland. However, as in the Archaic Period of the Arkansas and Oklahoma Ozark region, all the sites with the exception of the Albertson Shelter have been disturbed and have produced mixed deposits. Just as the Albertson Site is in the most reliable data for the Archaic Period in the Ozarks, it is also the most reliable for the Early, Middle, and Late Woodland.

4.3.3.1 Early Woodland (1000BC-AD 200): Little is known about the Early Woodland in the Ozarks. This period may be seen as an extension of the Late Archaic lifestyle. Although the introduction of agriculture (e.g., corn) has been found to mark this period in the Midwest, there is no evidence of this plant in the Ozarks during Early Woodland times. Analysis of plant remains from the Albertson Site indicates that native plant materials were used as a dietary supplement.

Cleland's (1965) analysis of faunal remains also suggests that deer, bison, elk, and bear were hunted extensively, along with raccoon, turkey, beaver, and woodchuck. The question had been raised as to whether the bluff shelters were inhabited year-round. Cleland documented the presence of deer skulls in all stages of antler growth, proving that hunting occurred at the sites in all seasons.

During the Early Woodland, changes occur in point style at sites such as Albertson, where Gary-type projectile points are represented in the lowermost level of stratum three. A dramatic increase in the amount of chert being imported (80%) may indicate a possible expansion of trade networks into the Ozark region; this was a foreshadowing of events within the Middle Woodland.

4.3.3.2 Middle Woodland (AD 200-500). Middle Woodland ceramic types have been reported for the Oklahoma Ozarks (Bell and Baerreis 1951); this is an indication that contacts and/or ideological influences from the Kansas City Hopewell area north of the Ozarks are being initiated (Scholtz 1975). These types include Classic Hopewell-type ceramics, Honeycreek Plain-type ceramics (named after the Honeycreek Site in Oklahoma), and the Cooper Zoned Dentate Stamped-type ceramic (named after the Cooper Site in Oklahoma).

It is also reported that Middle Woodland-type burial mounds have been observed in the Arkansas Ozark region (Phyllis Clancy, 1979: personal communication). If these mounds are indeed Middle Woodland in nature, then it may be postulated that impetus for this mound construction is also coming from the Kansas City area.

Although corn has been recovered from Middle Woodland sites in the Midwest, there is no definite evidence of corn being cultivated in the Ozarks during this period. Cleland (1965), however, speculates that corn materials found by Harrington (1924:1960) in his excavation of Ozark bluff shelters may date from this time period. He based this assertion on its possible association with ceramics. The analysis of plant materials from the Albertson Shelter indicates that gathering still played an important part in the everyday diet of the prehistoric peoples of this region. It can also be assured that hunting still plays an important part in supplementing the diet of the Ozark bluff-dweller since there was an abundance of animal remains found in the shelters.

4.3.3.3 Late Woodland (AD 500-1000). The Heber Springs Site is producing new and reliable data about the Late Woodland period. It consists of a low rise mound and shell midden in Cleburne County, Arkansas. Located on the southeastern fringe of the Ozark escarpment, it is in the area of the Little Red River Valley and the Lower White River Basin. A preliminary analysis of the excavated materials indicates the site was occupied during the Late Woodland. Therefore, evidence from this site will be employed in characterizing the late Woodland.

Decline of the Hopewellian influence in the Ozarks during Late Woodland is evidenced by the complete absence of Middle Woodland artifact complexes. Instead, sherds bearing cord-making and net impressions on clay-tempered polo were collected in the Greers Ferry Reservoir area (McGimsey 1959). These indicate that Baytown influence had reached the Ozarks from the Lower Mississippi Valley. At the Heber Springs Site the Baytown Period is represented by the presence of Larto Red ceramics.

There is also evidence of influence from the later Coles Creek culture of the Lower Mississippi Valley as identified by sherds from bluff shelters in the Ozarks (Dellinger and Dickinson 1942) and from the Greers Ferry area (McGimsey 1959).

The Late Woodland at the Albertson Site is represented by Rice Side-Notched projectile (named after the Rice Site in Missouri) in the upper level of stratum three, and cord marked straight rimmed ceramics. A preliminary analysis of lithic materials from the Albertson Site indicates 80% of the chert is being imported.

As far as subsistence activities are concerned, it can be assumed that hunting, gathering and fishing still played an important role.

Cultural influences were probably more centralized during this period, as traits seem to have diffused from areas which are nearer geographically.

4.3.4 Mississippian Period

The Mississippian Period dates from AD 1000 to 1541. Two stages of the period are generally recognized: the Middle Mississippian, and the Late Prehistoric. However, as in the Archaic and Woodland eras of the Arkansas and Oklahoma Ozark region, all the excavated sites with the exception of the Albertson Shelter have been disturbed. The mixed deposits make accurate interpretation difficult.

Diagnostic traits for the Mississippian Period include pottery tempered with crushed shell and truncated pyramid temple mounds (usually in association with large village sites). Increased socio-political organization in concordance with an increase in centralized socio-political control at the major civic-ceremonial centers (based on an agricultural mode of subsistence) marks the cultural floresence of this period. Social stratification is evident in mortuary practices. Some individuals were placed in mounds with many grave goods and some evidence of human sacrifice, but most of the population was buried in large cemetery areas. Religious ceremonialism was also highly developed during this time.

Since the Albertson Site has produced the most reliable data for the Mississippian Period, it will be used as an example in describing both the Middle Mississippi and Late Prehistoric periods.

4.3.4.1 Middle Mississippi (AD 1000-1300). The Middle Mississippi is generally marked in the archeological record by the introduction of shell-tempered pottery. The development of the Mississippian culture pattern was made possible by an efficient agriculture economy involving the intense cultivation of corn, beans, squash, gourds, pumpkins, and sunflowers. The improved subsistence base led to a dramatic population increase and led to the rise of a ranked society through which the critical resource, agricultural products, was controlled and redistributed.

In general, the Middle Mississippi is not well understood in the Ozark region, and until recently (Fritz 1979) has received little attention from the archeological community due in part to the absence of the elaborate complexes which mark this period in areas outside the Ozarks proper.

Analysis of the floral material from the Albertson Shelter indicates the continued utilization of a wide variety of native plant species. The importance of the agricultural mode of subsistence is evidenced by the presence of the tropical cultigens maize, beans, and squash.

The importance of the various trade networks in operation during this time can not be over emphasized. The presence of imported materials at the Albertson Site indicates a greater movement, and subsequent contact, between various cultures. This material includes projectile point types similar to some Oklahoma types, Anculosa shell from the Tennessee River area, and remains of the tropical cultigens (maize, beans, and squash). Other influences from outside the Ozark region include mound groups or complexes found in the Arkansas Ozark region.

It is unclear if the presence of these materials is the result of actual physical movement of peoples (primary diffusion) or the result of outside ideological influence (secondary diffusion). It is reasonable to assume, however, that both mechanisms were in operation.

The Benton County Mound group (3BE245) consists of an oval or subrectangular mound, two low rise mounds about 250 meters southeast of the mound, and two additional mounds located directly southwest of the large mound. The mounds range in height from one half to two meters. Cultural remains collected from the site indicate a generalized Woodland or Fourche Maline occupation. Evidence for this determination of cultural affiliation is provided by the presence of Gary and Williams projectile point types at the site.

The Washington County Mound group (3WA1) consists of four definite mounds and a possible fifth low mound on a terrace of the White River. These mounds are generally hemispherical in shape and range in height from 1 to 3 meters. The cultural remains that are identifiable point to a very Late Woodland to Late Prehistoric occupation as represented by Alba and Morris type points. The Madison County Mound group (3MA22) consists of 4 distinct mounds. Although test excavations have been conducted on this mound group no culturally diagnostic artifacts were located. Therefore confident temporal and cultural definitions will be contigent upon further investigations.

Fritz (1979) feels that although it is difficult to define the cultural units represented at the mound groups they may be assigned to either the Caddoan cultural tradition that existed to the west and south, or to the Mississippian tradition whch existed to the east. Fritz (1979:6) takes the opinion of Brown, Bell and Wycoff (1978:38) that Caddo is, "a regional manifestation of the Mississippian stage of cultural development . . .the mounds discussed can be thought of as a probable extension into the Arkansas Ozarks of the Arkansas Valley Caddoan settlement system or a closely related social development."

The presence of mound groups as an influence from the Caddoan area, Anculosa shell being traded in from long distances, the importing of chert materials, and the introduction of tropical cultigens argue for a highly complex series of possible trade networks and contact with peoples previously unrecognized in the Ozark region.

4.3.4.2 The Late Prehistoric (AD 1300-1541). The Late Prehistoric is represented by stratum one at the Albertson shelter. Neosho unnotched triangular projectile points (named after the Neosho Site in Missouri), Shetley type points (named after the Shetley site in Oklahoma), Woodward Plain (named after the Woodward site in Oklahoma), Neosho focus has been linked by some investigators to the Osage archeological assemblage which is discussed in greater detail in the next section. The introduction of Neosho focus type artifacts heralds an end to the cultural complexity of the Mississippi period. There is a basic return to the hunting and gathering patterns of the Late Archaic and Early Woodland period. Corn, however, still plays an important part in the subsistence pattern. It is postulated that shelter sites such as Albertson (Don Dickson 1979: personal communication) served as seasonal base camps during hunting and/foraging activities away from the main village sites.

4.3.5 The Contact Period

The first verfiable source of information which concerned a Native American population in the northwest Arkansas region dates to 1734. Trade was being conducted between the Arkansas Post and the Osage near the mouth of the Arkansas River which the Osage frequented on hunting, trading, and war expeditions (Chapman 1974:80). No earlier mention was made of the Native Americans of this region because trade routes taken by the early (1673-1723) French explorers avoided the area. These routes followed the Mississippi, Osage, and Missouri Rivers. Archeological sources must therefore be consulted to determine the probably geographic range of the early historic and late prehistoric Osage.

An attempt has been made to demonstrate that the Osage were the indigenous Native American population in the Ozark region during the late prehistoric and early historic periods. According to Chapman (1974:11), the Osage archeological assemblage is similar to the Neosho focus, the Ozark Top-Layer Culture, and the Marginal Mississippi assemblages. All of these assemblages possess similar cultural elements which strongly suggest that the late prehistoric cultures in southwest Missouri, northwest Arkansas, northeast Oklahoma and perhaps southeast Kansas "are units of a general culture pattern from which the Osage assemblage was derived". This combination of the areas occupied by the Neosho focus, the Ozark Top Layer Culture and the Marginal Mississippi assemblages would then coincide with the geographical territory of the Osage during the historic period (Figure 8-1).

Voget (1974:29) notes that "any determination of the range of the Osage and delimitation of lands they held to be their own must take the economy into serious consideration". The predominant mode of subsistence of the Osage was hunting and gathering, although horticulture was also practiced during the months of April (planting) and August

(harvesting). During the spring, summer, and autumn seasons the Osage obtained their principal food supply (bison, bear, deer, and antelope) from the Plains area (from western Oklahoma and portions of western Kansas and Texas) and the prairie area (eastern Oklahoma, southeast Kansas, and portions of Missouri north and south of the Missouri River). During the winter months, the Osage obtained their principal foodstuffs (bear, deer, walnuts, hazelnuts, pecans, acorns, grapes, plums, papaws, persimmons, hog potatoes and other types of roots) from the wooded plateau and upland areas which ranged from north of the Missouri River into northwest Arkansas and connecting with the Ouachita Mountains across the Arkansas River (Voget 1974).

The hypothetical historic range of the Osage is presented in Figure 8-1.

4.4. Conclusions

The Arkansas Ozark region represents a complex cultural system that, contrary to popular belief, was not a "cultural backwater" in spite of its marginal location and its rugged mountain terrain. The existence of bluff-shelter sites with influences from peoples and ideological systems from Missouri, Kansas, Oklahoma, Texas, Illinois, and Tennessee, the existence of sites which exhibit influences from the Mississippi Delta region of northeast and from south-central Arkansas, and the presence of civic-ceremonial centers with influences derived from south central Arkansas argue for complex changes in settlement and subsistence patterns in the Arkansas Ozarks from the Archaic through the Late Prehistoric.

The following summarizes briefly recapitulate the Ozark cultural sequence:

Paleo-Indian Period (11,000 - 8000 BC): The period of nomadic hunters of Pleistocene megafauna. Characteristic artifacts of the period are fluted lanceolate points (e.g., Clovis and Folsom points). A limited number of such points have been recovered in the Ozarks, suggesting a light occupation.

Early Archaic (8000 - 6000 BC): The period of intial adaptation to climatic changes at the end of the Pleistocene. This adaptation has been characterized as 'primary forest efficiency,' the development of a fine-tuned technology suited to the scheduled, regional exploitation of a broad range of smaller animals and plants. Ozark sites are defined as Early Archaic primarily on the presence of such diagnostic dart points as Dalton, Agate Basin, Hidden Valley Stemmed, Rice Lobed, and Graham Cave Notched point types.

Middle Archaic (6000 - 4000 BC): Further development of efficient multiple-resource adaptation is evidenced by the increasing complexity of the Middle Archaic tool kit. Dart points are generally of expanding-stemmed varieties and an increase in ground stone (e.g. mullers) reflects increasing plant food exploitation. Some evidence from Ozark Bluff Dweller sites may indicate incipient cultivation of several indigenous plant species. An increase in the number of sites over the prior

period may indicate a rising population, while the appearance of 'foreign' point types and imported charts may indicate increased extra-regional ties.

Late Archaic (4000 - 1000 BC): This period, defined essentially on the bais of changes in dart point styles, represents a culmination of the trend of regional forest adaptation. Manos and nutting stones indicate a continued reliance upon plant food resources. Site numbers continue to increase, possibly indicating increasing area population. Exotic point types and materials reflect continuing contacts outside the Ozark region.

Early Woodland (1000 BC - AD 200): Very little is known about this period in the Ozarks. Gary-type points become important in Albertson site deposits of this period and chart becomes overwhelmingly (80%) imported. No evidence of corn horticulture has yet been found for the Ozark Early Woodland.

Middle Woodland (AD 200 - AD 500): This period is marked by the appearance of classic Hopewell ceramic types indicating contact with the Kansas City Hopewell area. The presence of Oklahoma ceramic types and the probable existance of Middle Woodland burial mounds also indicate external contacts. There is still no conclusive proof of corn cultivation in the Ozark Middle Woodland, while ample evidence exists of the continued importance of hunting and gathering.

Late Woodland (500 - AD 1000): This period, as typified by the Heber Springs Site, exhibits the decline of Hopewell expressions in the Ozarks and their replacement by Lower Mississippi Valley ceramic types, (e.g., cord-marked and Larto Red wares diagnostic of the Baytown Period, as well as Coles Creek ceramics). Fully 80% of chert continues to be imported, and subsistence activities remain biased towards hunting and gathering.

Mississippian Period (1000 - AD 1541): The Mississippian Period (generally characterized by shell-tempered ceramics and truncated pyramid temple mounds) is poorly known in the Ozark's, with only one site (the Albertson site) yielding undisturbed deposits. Middle Mississippian (AD 1000 - AD 1300) remains at this site included evidence of corn, beans, and squash, as well as shellfish, chert, and point types obtained out of the Ozark region. There are no large, clearly Mississippian mound complexes in the Ozarks, although two small groups of oval mounds may relate partly to the period. The Late Prehistoric (AD 1300 - AD 1541) is represented at the Albertson site by the upper stratigraphic layer and is characterized by the triangular Neosho point associated with the historic Osage Indians.

5. THE LOWER MISSISSIPPI VALLEY CULTURE AREA: ARCHEOLOGICAL SYNTHESIS

5.1. Introduction

The Lower Mississippi Valley has archeologically conformed to the definition of the Mississippi Alluvial Valley defined by Fennemen (1938) and Fisk (1944).

For this study, the Lower Mississippi Valley Culture Area includes all of the alignment west of Little Rock within the Arkansas River Basin and all portions of the pipeline east and south of Little Rock (Figure 5-1). However, towards the end of the prehistoric sequence (roughly post-AD 1000), the Caddoan culture area extends into the Arkansas River Valley upstream from Little Rock and intrudes into the Ouachita River and Bayou Bartholomew on the western margins of the Mississippi Alluvial Valley in northeast Louisiana and southeastern Arkansas. Influences from this culture have also been noted near the mouths of the Arkansas River and the Red River. The Caddoan developments are described in Chapter 6, Caddo Culture area archeological synthesis.

5.2. Previous Investigations

An extensive bibliography of archeological investigations in the Lower Mississippi Valley has been prepared by Brain and Phillips (1979). Compiled as a document for the Avery Island Conference, the bibliography has been published by the Lower Mississippi Survey of the Peabody Museum, Harvard University.

Neuman and Simmons (1969) published a bibliography of literature about Native Americans in the State of Louisiana. A bibliography of the archeological investigations within Louisiana through 1977 has also been compiled by the State Archeologist's Office (Department of Culture, Recreation and Tourism, Division of Archeology and Historic Preservation.)

Arkansas's archeological investigations through 1967 were briefly summarized by Davis (1969).

Early archeological investigators travelled throughout wide areas of the Lower Mississippi Valley and described sites which dated to many temporal periods. These included Brackenridge (1814); Squier and Davis (1848); Thomas (1894); Beyer (1895; 1897); and Moore (1908; 1909; 1911; 1913).

Cultural sequences for this area have been defined by the Harvard based Lower Mississippi Survey (Phillips, Ford and Griffin 1951; Phillips 1970; Avery Island Conference 1978) on the basis of ceramics recovered from large-scale excavations. These have become the "classic" works on the cultural manifestations of the area, and their general outline has been followed for this synthesis.

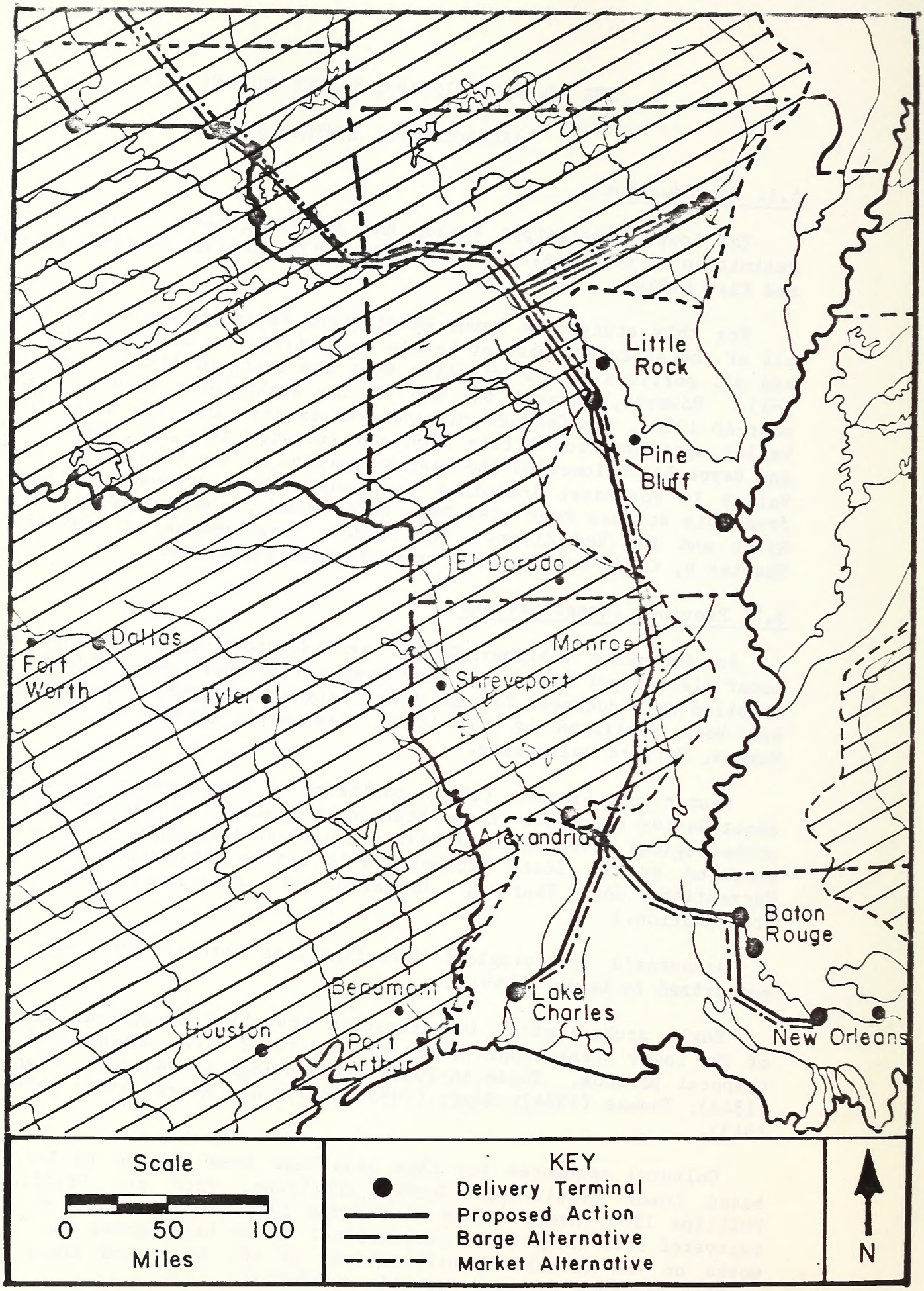


FIGURE 5-1. LOWER MISSISSIPPI VALLEY CULTURE AREA

Byrd and Neuman (1978) discussed prehistoric subsistence patterns in the Lower Mississippi Valley.

Regional variations of this sequence have also been proposed for several smaller areas within the valley. Schambach (1979) has recently proposed a cultural sequence for the Felsenthal region of Arkansas which places it within the Lower Mississippi Valley sequence, rather than within the Caddoan framework as had preivously been postulated (Schambach 1971; Rolingson 1976). Gibson (1976a; 1976b; 1978) has also suggested that several modifications might be appropriate for areas in southwestern Louisiana.

More specific works which comprise some of the major investigations on each temporal span are noted below.

Previous investigations at the Poverty Point Site include those by Haag and Webb (1953); Ford and Webb (1956); Gibson (1970; 1973; 1974a; 1974b); Kuttruff (1975); and Webb (1968; 1977). Gagliano and Saucier (1963) reported on Poverty Point sites in southeastern Louisiana. Reports on the Poverty Point culture as it was manifested in Mississippi include those of Ford, Phillips and Haag (1955) on the Jaketown Site.

Czajkowski (1934) performed some of the earliest work on Tchefuncte sites in Orleans Parish. The term "Tchefuncte" was coined by Ford and Willey (1940), who reported on excavations at the Crooks Mound (16LA3) The culture was first fully defined by Ford and Quimby (1945) on the basis of excavations at the Little Woods sites (16OR1, 16OR2, 16OR3, 16OR4 and 16OR5); Big Oak Island (16OR6); the Tchefuncte Site (16ST1); Lake Louis (16CT24); Lafayette (16SM17); and Coppell (16VM1023).

McIntire (1958) reported on Tchefuncte sites in Cameron and Iberville Parishes.

Gibson (1968) defined the Russell Landing Phase from the Russell Landing Site (16LA9) in north-central Louisiana. Phillips (1970) postulated several other phases in his regional evaluation of the culture.

In 1973, Rivet (1973) completed a reappraisal of Tchefuncte ceramic typology. Shenkel (1974; Shenkel and Holley 1975) has worked at Big Oak and Little Oak Island in Orleans Parish. Weinstein and Rivet (1978) have analyzed collections from the Beau Mire Site in Ascension Parish.

Toth (1977) has summarized the previous investigations of the Marksille culture. He (Ibid:26) remarks that "the entire literature pertaining to Marksville period archeology can be accomodated by a very modest bookshelf."

The Troyville Site at Jonesville was described by several early investigators, including Brackenridge (1818), Squier and Davis (1848) and Thomas (1894).

Peabody and Farabee (Peabody 1904) conducted the first controlled excavation of a Marksville component at the Oliver Site (LMS #16-N-6) in

Coahoma County, Mississippi. The site, which has been renamed the Dorr Site (LMS #16-N-22), yielded early Marksville materials (Toth 1977:27-28).

Moore (1908; 1909; 1912) was one of the first to visit many of the Marksville sites in the Lower Mississippi Valley. These include the Saline Point (LMS #28-H-7) and Mayer Place (LMS #28-H-32) sites in the Lower Red River region, and the Crooks Mound Site in LaSalle Parish, Louisiana.

Fowke (1927; 1928) was apparently the first to discover the Marksville Site (16AV1) in Avoyelles Parish, Louisiana. He spent three months excavating there in 1926 under the auspices of the Smithsonian Institution.

Setzler (1933a; 1933b; 1934) was the first to report on the similarities of Marksville artifacts to those of the Hopewellian culture of the Ohio Valley.

Ford conducted several of the most important early Marksville excavations. His (1935) report on work at the Peck Site in Catahoula Parish established the chronological relationship between the Marksville and Coles Creek cultures. He (1936) then compiled a synthesis of the ceramic complexes of the Marksville period.

Two important excavations were conducted in the 1930's under the auspices of the Works Progress Administration. Vescelius (1957) and Toth (1974a) have summarized the 1939 excavations at the Marksville Site itself by Stu Neitzel and Edwin Doran. Mulloy and King excavated at the Crooks Mound Site. Their work was reported by Ford and Willey (1940). Toth (1977:32) notes that this report "has remained for years the most complete description of a Marksville site, and the findings from Crooks have been used in a normative framework to stand for all early Marksville cultural activity in the Lower Mississippi Valley."

Phillips, Ford and Griffin (1951) illustrated Marksville ceramics found during their survey of the Lower Yazoo River Basin in Mississippi; their typology is still quite useful. Phillips' (1970) refinement of the earlier work presented more information on late Marksville components.

Ford (1963) has worked at Marksville sites in Arkansas. His excavations at the Helena Crossing Site strengthened the associations between Marksville culture and the Hopewellian manifestation.

Toth (1973; 1974a; 1974b; 1976) provided several reviews of the Marksville ceramic typology, and his doctoral dissertation (1977) is perhaps the definitive work on the culture.

Few investigations have been conducted on Troyville/Baytown sites. Investigations on the culture began when Walker (1936) postulated the existence of the period. His excavations at the Troyville Site in Catahoula Parish left him with an artifact assemblage which he could not place within any previously defined type, and he created the Troyville period.

Ford (1936) analyzed his collection from the Troyville Site, and placed it under the classification of Coles Creek. However, Ford and Willey (1941) later modified their typology, calling late Marksville material "Troyville".

Williams (1954) defined the Hoecake Phase of the Baytown period; however, Phillips (1970) believes that the materials were actually Marksville.

Phillips, Ford and Griffin (1951) described the Baytown type site, 3MO1, in Monroe County, Arkansas. The site has not been excavated, but McClurkan (1971) conducted limited testing at the site. Phillips (1970) later noted that much of the pottery from the site used to define the period actually dated to Coles Creek times. The site was revisited by Price and Madden (The Research Institute 1979).

The Gold Mine Site (16RI13) in Richland Parish is being excavated by amateur archeologists (Helfert et al 1979). Talley (1978) has analyzed skeletal material recovered there. Belmont (1979) has assigned this site to the Troyville period.

Coles Creek was first recognized as a period by Collins (1932). He defined the culture from his excavations at two sites near Deasonville, Mississippi.

Ford (1936) also analyzed Coles Creek materials from several sites in that area, and helped to clarify the ceramic typology.

He (1951) also conducted excavations at the Greenhouse Site, a Troyville-Coles Creek site in Avoyelles Parish. Belmont (1967) later reanalyzed much of this material.

The Lower Mississippi Survey (Phillips, Ford and Griffin 1951; Phillips 1970) also investigated several Coles Creek sites and defined many of the culture's phases.

Investigations at Plaquemine sites include excavations by Quimby (1951) at the Medora Sie in West Baton Rouge Parish, and at the Bayou Goula Site (Quimby 1957) in Iberville Parish.

Lower Mississippi Survey personnel (Phillips, Ford and Griffin 1951; Phillips 1970) worked on Plaquemine sites. Hally's (1972) dissertation has provided a complete discussion of the culture. A recent excavation of a Plaquemine burial on the Ouachita River was conducted by Price and Heartfield (1977).

Phillips (1970:925) refers to one phase of the Mississippian period, Cairo Lowland, as "the most profusely documented archeological phase in the Lower Mississippi Valley, if not the Southeast." The major work includes that of Phillips (Phillips, Ford and Griffin 1951; Phillips 1970), and Williams' (1954) dissertation on the period. Brain (1978) has discussed settlement patterning during the period in the Yazoo Basin.

5.3 Cultural Sequence

The Prehistoric sequence of the Lower Mississippi Valley is divided into three major eras: the Paleo-Indian era, the Archaic (or Meso-Indian era, and the post-Archaic (or Neo-Indian) era.

5.3.1. Paleo-Indian Era

Brain (1971:15-18) suggests that the earliest populations to reach the Lower Mississippi Alluvial Valley date between 9000 and 7500 BC. Haag (1971:5) speculates that remains may in time be found in parts of Louisiana that date to as early as 10,000 BC. However, as Neitzel and Perry (1978:91) have pointed out, the earliest Paleo-Indian remains are not likely to be found on the recent floodplain surfaces of the Mississippi, Ouachita and Red Rivers or their major tributaries "because of the obvious reasons of age and depositional history". It is thus possible that we may one day find evidence of sites more than 10,000 years of age on the older land surfaces of Arkansas and Louisiana, but it is more likely that we will simply broaden our understanding of those Paleo-Indians who ventured into the area after 10,000 BC.

Confirmed evidence of Paleo-Indian occupation of Louisiana and Arkansas consists mainly of finds of early dart point forms such as Plainview, Scottsbluff and Quad (Gagliano and Gregory 1965); these were located on Pleistocene or older land surfaces. Later in the Paleo-Indian period, these dart forms were replaced by San Patrice and Dalton types, which spanned the transition into Archaic times, and date between 7500 and 6500 BC (Brain 1971:15-18).

The population during early Paleo-Indian times is generally viewed as consisting of small groups of wide-ranging nomads, following herds of megafauna. They lived in temporary campsites, and left few traces of their occupation. It may, however, be a mistake to view the Paleo-Indian as merely a big game hunter. Byrd and Neuman (1978:10) note that in the Lower Mississippi Valley, no evidence has been found which has demonstrated a direct association between human remains and Pleistocene fauna. Despite the evidence available from other parts of the United States and the obvious adaptability of the Paleo-Indian's tool kit to the killing and butchering of game, they view it to be "unlikely that the Paleo-Indian was exclusively or even primarily a 'meat-eater'." They point out that given the fact that man is basically an omnivore and the fact that fruits, nuts, tubers and berries were available and easily gathered, "it seems reasonable to suppose that some vegetal foods were eaten" (Ibid:10). They suggest that Paleo-Indian in the Lower Mississippi Valley could have followed the pattern so prevalent in other ethnographic examples; that is, that the men were hunters, and the gathering of vegetal foods could have been an activity of women, young children and aged persons.

Later in Paleo-Indian times, as megafauna became extinct, an economic shift to dependence on local fauna and flora occurred. With localization came the first development of diverse cultural patterns and these are reflected in the late Paleo-Indian artifact assemblages.

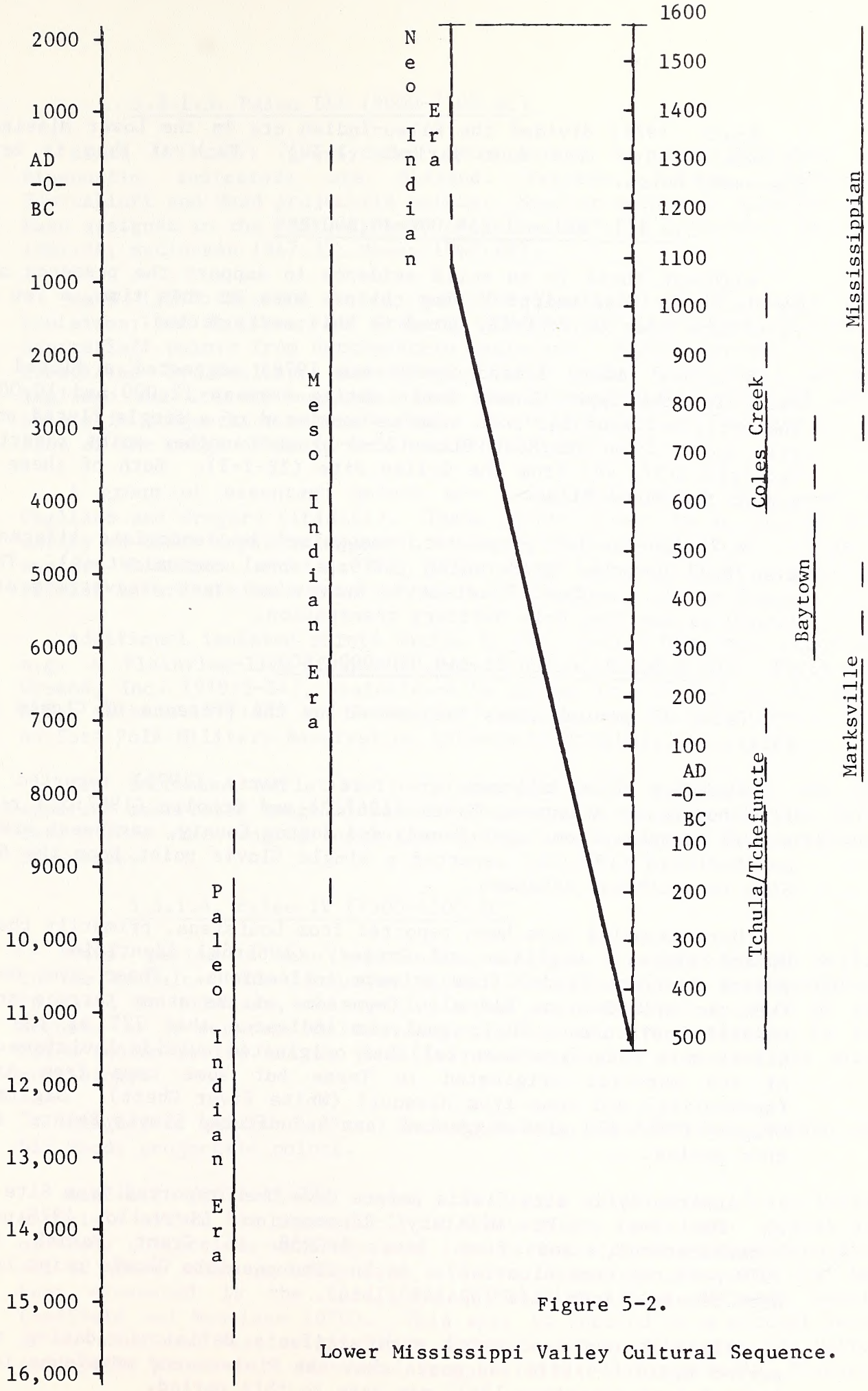


Figure 5-2.

Lower Mississippi Valley Cultural Sequence.

Brain (1971) divided the Paleo-Indian era in the Lower Mississippi Alluvial Valley into four periods (I-IV). Each of them is briefly discussed below.

5.3.1.1. Paleo I (16,000-10,000 BC)

Although there is no solid evidence to support the presence of man in the Lower Mississippi Valley culture area at this time, a few artifacts have been tentatively dated to this early period.

Williams (Avery Island Conference 1978) suggested a Fluted Point Phase for the Upper Tensas Basin dating between 12,000 and 10,000 BC. The early evidence for such a phase consisted of a single fluted projectile point from the Mott Site (23-J-1) and another point reported by Redfield (1971:44) from the Gilley Site (22-J-3). Both of these sites are on the Macon Ridge.

A "proto-Clovis" component, recognized by lanceolate bifaces, has also been proposed by Servello (1979:personal communication). This is based on the results of intensive survey and test excavations at Site 16SA50 on the Fort Polk Military reservation.

5.3.1.2. Paleo II (10,000-9000 BC)

Paleo II period sites are marked by the presence of Clovis points (Brain 1971:10).

Examples from Arkansas are rare. Morse (1975) reported a few from northeast Arkansas, Davis (1967:2) and Scholtz (1967:52) reported single examples from Logan County and Boston County, northwest Arkansas, and Redfield (1971:41) reported a single Clovis point from the Shelton Site in northeast Arkansas.

More examples have been reported from Louisiana, primarily the older upland areas. Gagliano and Gregory (1965:66) identified 18 Clovis points (surface finds) from private collections. These come not only from the upland areas but also from some of the other terrace areas of coastal Louisiana. Their analysis indicated that 77% of the Clovis points were made from material that originated outside Louisiana. Most of the material originated in Texas but some came from Arkansas (novaculite) and some from Missouri (White River Chert). Gagliano and Gregory (1965:69) also suggested that 8 "unfluted Clovis Points" date to this period.

Apparently in situ Clovis points have been reported from Site 16SA50 on the Fort Polk Military Reservation (Servello 1979:personal communication), and from Site 16GR58 in Grant Parish (Keller 1979:personal communication). An in situ possible Clovis point has also been reported from Site 16RA149 (Ibid).

Although not associated with artifacts definitely dating to this period Brain (1971:10) suggests that the Pleistocene megafauna found at Avery Island (Gagliano 1967) may date to this period.

5.3.1.3. Paleo III (9000-7500 BC)

Brain (1971:14) "guess-dated" this period to circa 9000-7500 BC. Diagnostic indicators are Midland, Pelican, Folsom, Plainview, Scottsbluff and Quad projectile points. Similar points in Arkansas have been assigned to the Proto-Archaic (Scholtz 1967:53) or Archaic (Hoffman 1967:38; McClurkan 1967:33; Morse 1967:18).

Webb (1948:227-230) noted some 59 Yuma-Scottsbluff points from Louisiana; and Gagliano and Gregory (1965:68-69) identified 16 typical Scottsbluff points from northwestern Louisiana. Eighty percent of those identified by Gagliano and Gregory were made from Texas cherts. Gagliano and Gregory suggested that the limited distribution of these points in conjunction with the Texas chert indicated an "eastern extension of the range of these more western hunters".

A group of seventeen points was tentatively named "Pelicans" by Gagliano and Gregory (Ibid:61). These points appear to be located primarily on older deposits adjacent to the Sabine and Red River valleys in western Louisiana and on the Macon Ridge in northeast Louisiana. Pelican points are made mainly from local cherts.

Additional isolated points dating to this period have been reported, e.g. a Plainview-like fragment from X16BI-I (Heartfield, Price and Greene, Inc. 1979:5-24), Plainview-like points from 16FR44 on the Macon Ridge (Gibson 1977:28) and Scottsbluff points from the Elton Smith Site on Fort Polk Military Reservation (Gibson 1978:26).

The increased variation in projectile point morphology and the apparent restricted range of some of these types has been taken to indicate a less wide ranging population making greater use of local regional resources.

5.3.1.4. Paleo IV (7500-6500 BC)

This period is seen as transitional from the Paleo-Indian period to the Archaic. Its inclusion within the Paleo-Indian is debateable. In fact, in Arkansas, this period would be considered as part of the Archaic or a separate Dalton stage. However, its inclusion in the Paleo-Indian period can be justified on the grounds of projectile point morphology.

Diagnostic period markers include Dalton, San Patrice, Hardin and Big Sandy projectile points.

Redfield (1971:26-77) noted 101 sites with late Paleo-Indian materials within his areas II-IV in Arkansas and Louisiana. Almost all of these collections were obtained from plow disturbed surface deposits. All of these sites probably date to Paleo IV period. One site that has been excavated is the Lace Site (3PO1/11-M-1) in Poinsett County (Redfield and Moselage 1970). This site is located on a natural levee of an abandoned Mississippi River channel. Apparently over 120 Dalton projectile points were recovered from the site. Unfortunately, however,

they all appear to have come from plow, or otherwise, disturbed deposits.

A cache including 18 Dalton points was found at Site 3LW89 in Lawrence County, northwestern Arkansas in 1970 (Morse 1971). In addition to the Dalton point, the cache included 11 preforms, 3 adzes, 3 utilized flakes, 2 grooved sanstone abraders, 1 chisel, 1 end scraper and 1 backed blade. It was concluded that the cache was a male's tool kit, possibly associated with a burial.

Excavation at the Brand Site (3PO17) in Poinsett County recovered over 300 Dalton points and associated artifacts (Goodyear 1974). Associated artifacts included hafted and unhafted end scrapers, spokeshaves, gravers, knives made from blades and flakes, hammers, chopper-hammers, pitted stones, grooved and flat sandstone abraders. Limonite and hematite, apparently brought into the site for use as pigment, was also recovered. The artifacts occurred in 5 major concentrations. Each of these concentrations apparently reflected an individual butchering area.

House et al (in Schiffer and House 1975:93) interpreted the Lace Site as a base camp occupied by a whole kin group and the Brand Site as a hunting/butchering camp occupied only by males. In order to test the hypothesis that Dalton period settlement pattern consisted of base sites, possibly occupied year round, and associated limited activity sites, they analyzed collections from 22 Dalton components in the Cache River Basin. Unfortunately, they were unable to define the base camps from the artifacts studied.

In Louisiana, Gagliano (1967) noted late Paleo-Indian material from the vicinity of DeVanie's Pond on Avery Island. Again, these materials appear to be largely disturbed deposits and definite association between lithic artifacts and other remains such as basketry and faunal remains is lacking.

An apparently in situ component with a San Patrice point has recently been identified at the Whatley Site, 16CA37, in LaSalle Parish (Thomas and Campbell 1978). As the component was stratigraphically discrete, other items of late Paleo lithic tool classes were identified. These included scrapers, spokeshaves, gravers, blades, and ground stone artifacts (Ibid:195-204). All of the artifacts appeared to be made from locally obtained cherts. The entire tool kit associated with the San Patrice point indicates that wood, bone, antler, and hide were being processed and utilized at the site. The ground stone may indicate the utilization of floral remains. Preservation conditions at the site were such that no non-lithic remains nor carbon for dating survived.

Another apparently in situ San Patrice component, at the John Pierce Site (Webb, Shiner and Roberts 1971), included artifacts similar to those found at the Whatley Site. Noticeably absent, however, were ground stone artifacts. Again the tools were made from locally obtained cherts.

A possible in situ San Patrice component may also exist at Site 16GR58 (Keller 1979:personal communication).

Surface finds of San Patrice point are fairly common throughout the older geological areas of Louisiana. Gagliano and Gregory (1965:73) note that this was the most numerous category of all the types with Paleo-Indian characteristics; some 72 specimens being analyzed. Webb, Shiner and Roberts (1971:42-47) list 26 sites with San Patrice points in Caddo Parish alone. Five sites with San Patrice components have been identified on the Fort Polk Military Reservation (Gibson 1978:25-26). A single San Patrice point was also found at Sites 16JA3 in Jackson Parish (Heartfield and Clendenen 1975). Additional points have also been reported from the Macon Ridge in northeast Louisiana and adjacent to Petticoat Bayou in Ouachita Parish (Hillman 1979:personal communication).

5.3.2. Archaic Era

The Archaic era spans the interval from about 6000 to about 2000 BC. Brain (1971:23) remarks that the Archaic period is the least known interval in the prehistory of the Lower Mississippi Valley. Haag (1971:10) points out that the Archaic era is, nonetheless, "of the utmost importance throughout the whole of North America, because of the fact that it formed the basis upon which a great many local or regional variations developed".

Byrd and Neuman (1978:10) connect the onset of the Archaic with the changes in hydrology and ecology which occurred in the Lower Mississippi Valley at the end of the Pleistocene. Sea level began to rise, flora and fauna began to change, and megafauna became extinct. Man was forced to find new sources of game, and one of the first he turned to was marine life, or shellfish. Haag (1971:7) notes that shellfish move slowly but require rapidly moving water for their habitat. They, therefore, accumulate in fresh-water streams, such as rivers. Large shell middens are testimony to the reliance that was placed on shellfish as a source of food. In fact, Brain (1971) has modified Caldwell's (1958; 1965) definition of "Primary Forest Efficiency" into the concept of "Maximum Riverine Efficiency" in order to describe exploitation of the Lower Mississippi Valley during Archaic times.

The appearance of the bone fishhook during this era is also suggestive of the increased reliance on fish (Byrd and Neuman 1978:10). Other innovations in hunting technology, such as the atlatl (or spear thrower) occurred at this time, no doubt arising from the need for increased dependence on animals such as the deer.

Most Archaic sites occur where a diversified, abundant resource base can be exploited by an intensive hunting, gathering, and fishing lifestyle (Neitzel and Perry 1978). The Tertiary and Quaternary uplands probably did not provide the range or abundance necessary for support of the Archaic lifestyle except for the upland-floodplain fringe and along perennial stream channels. They (Ibid:96) have speculated that there was "considerable" Archaic settlement on the floodplain meander belt

features of major rivers, on alluvial valleys streams and tributaries. Although much of the evidence has been buried, they feel that many streams and tributaries should still show Archaic remains on their banks.

They (Ibid:94-95) have divided the changes in subsistence and settlement patterns during the Archaic era into three stages:

1) The Transitional Paleo to Early Archaic stage, in which the change from nomadic hunting to more diversified resource utilization occurred;

2) the Late Early to Middle Archaic stage, in which semi-sedentary, intensified hunting and gathering gained importance; and

3) the Late Middle to Late Archaic stage, in which quasi-permanent settlements began to be established.

Brain (1971) has also divided the Archaic into the three periods, Periods I-III; as discussed below.

5.3.2.1. Period I (6000-5000 BC)

This period marks the shift to the warmer period of the Hypsithermal, which brought about the growth of woodland and an increased number of smaller faunal forms at the expense of the Pleistocene megafauna. As a result, the basic subsistence pattern of man changed and brought about a more settled way of life. Exploitation of the smaller faunal forms by bands (related families) followed a seasonal round (Brain 1971:25).

There are, according to Brain (Ibid:26-27), only a few diagnostic artifacts recognized for this period. Projectile points were present, those made in the Scottsbluff-Hardin tradition, local varieties of the Kirk point, and points which resemble earlier Paleo-Indian types. This period is also marked by a general deterioration of lithic technology as well as emphasis upon bifacial rather than unifacial tools.

Many Dalton and San Patrice components (discussed in the preceding Paleo-Indian IV section) may actually date to this early Archaic period.

5.3.2.2. Period II (5000-3000 BC)

This period is chronologically arbitary but Brain (1971:29) ties it to two major environmental events, the general trend to the warmer and drier climate of the Altithermal and the approach of modern standing sea level.

During this period, Brain hypothesizes "that a more localized adaptation occurred" and that this change was not dramatic but took place very slowly during the period. Local zones of exploitation basically remained the same, although these zones may have become more restricted.

Artifacts of this period demonstrate a certain continuity from previous forms. However, dart points are no longer fluted but are side and corner-notched, generally with expanding stems. Examples are: Big Sandy, Keithville, Yarborough, Evans, Bulverde, Carrolton, Morehouse. Because of the lack of stratified sites within the Lower Mississippi cultural area, and the pre-occupation with the later ceramic sites, most of the diagnostic point types used in the area are those which have been defined elsewhere. These generally appear to have long time spans and discrete dating within the Archaic is extremely difficult.

During this period, choppers, axes, adzes, and sharply bevelled side scrappers are introduced. These have been interpreted as indicating a greater reliance on, and utilization of, forest resources (Brain 1971:30). Other innovations during this period include the introduction of the axe (or spear thrower) (Ibid). Pecked and ground stone artifacts also apparently became more frequent.

Meso-Indian peoples became more effective in utilizing natural resources, and their lifestyle is characterized by a setting which Caldwell (1958; 1965) describes as "Primary Forest Efficiency". This was a way of life which Brain (1971:23) states was being developed in the eastern United States, although at the same time there was the adoption of a local emphasis in the Mississippi Valley.

5.3.2.3. Period II (3000-2000 BC)

The settling of the Mississippi-Ohio River system into a meandering pattern provided the environmental setting for this period. Brain (Ibid:34) notes a greater specialization or localized adaptation in the Valley which he terms "Maximum Riverine Efficiency". During this time man was utilizing the local natural resources which had the greatest potential to the fullest. This exploitation was concentrated in the Valley in its riverine zones, even though stable life was achieved away from these areas.

Shell middens, on both the rivers and local marshes, the atlatl with the pierced type of weight, and a large number of point types, generally with contracting stems such as Gary, Ellis, Pontchartrain, Kent, Carrollton, Marcos, and Marshall are diagnostic of this period. Other artifacts diagnostic of this period include bifacially chipped knives, scrapers, choppers, drills, ground stone mauls, grooved axes, adzes, bowls, pestles and mortars (Ibid:37-38). Fire-cracked gravels are also being recognized as indicators of Archaic sites.

This period is marked by the use of raw materials, clay cooking balls for the preparation of food, and by the production of luxury artifacts such as beads, plummets, and gorgets. These artifacts are typical diagnostic of the Poverty Point period which is treated in this report as post-Archaic.

Within the Lower Mississippi cultural area there is a dearth of well stratified, excavated Archaic sites. Although many Archaic sites have been reported, they generally consist of surface scatters and are often

identified on the absence of definite post-Archaic diagnostic such as ceramics or arrow points.

Apparently in situ Archaic components were present at the Whatley Site. However, it was not possible to isolate discrete Archaic component because the same general classes of artifacts occurred throughout the sequence. It was concluded that several temporary camps were probably represented. No other conclusions could be determined from the evidence.

5.3.3. Post-Archaic Era

Although the onset of the Neo-Indian era is often considered to be marked by the appearance of horticulture and the appearance of pottery, in most areas these traits did not appear simultaneously. In fact, Haag (1971:9) notes that in the east, agriculture was not important until "near the beginning of the Christian Era", while pottery was known as early as 2500 BC. It is significant that uplands and terrace areas were relatively stagnant culturally, and the Archaic lifestyle persisted there much longer than it did along the alluvial portions of the Mississippi Valley (Gagliano 1968:19).

5.3.3.1. Poverty Point

Knowledge of the Poverty Point culture has recently been fully excavated and summarized by Webb (1977). He believes that the culture was extant by 1700 BC, fully developed by 1000 BC, and declined by 500 BC.

Diagnostic artifacts of the Poverty Point period include baked clay objects (such as the Poverty Point cooking balls), steatite vessels, plummets, microlithic tools and distinctive dart point types such as Epps, Gary and Motley (Brain 1971:46). Brain (Ibid:47) notes that the presence of "finely wrought nonutilitarian ornaments" are indicative of a high level of socio-economic development. He speculates that some crude, fiber-tempered pottery did exist in the later stages of the Poverty Point culture, but never in "significant amounts" (Ibid:52).

Webb (1977:Figure 1) recognized five distinct clusters of sites in Louisiana and Arkansas. The first is around the type site, Poverty Point (16WC5), on the Macon Ridge and the floodplain east of the Tensas River (Figure 5-3). The others are adjacent to the Ouachita River in north Louisiana and south Arkansas, around Caney Island and Catahoula Lake, in central Louisiana; around Beau Rivage west of the Mississippi River Delta, and around Claiborne east of the Mississippi River Delta. Another major cluster of sites occurs around Jaketown in the Yazoo Basin in Mississippi. Individual Poverty Point sites have also been located adjacent to the Arkansas River, White River and St. Francis River in Arkansas.

Brain (1971:50) characterizes the Poverty Point culture as "a phenomenon of the bottomlands". He suggests that the lineal spread of the culture along a north-south axis was not accidental, but rather a response to the demand for exotic materials from distant sources along

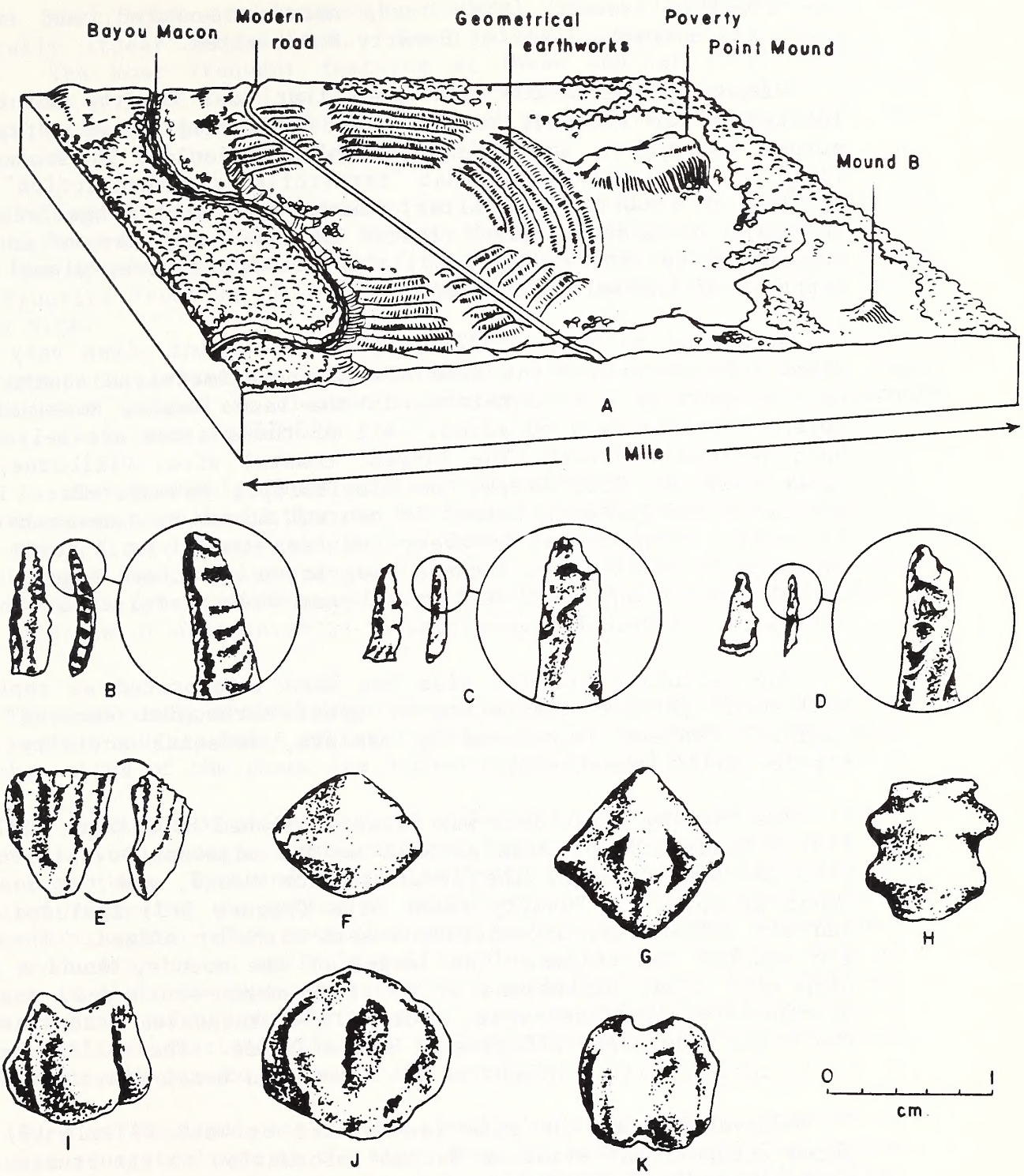


Figure 5-3. The Poverty Point Site and Associated Artifacts. a) relief map of the Poverty Point site; b) experimental "Perferator" made to use and compare with Poverty Point perferators (c,d); e) microflint core; f-k) commom types of baked clay cooking balls ("Poverty Point objects"). (From Prehistory of North America, by Jesse D. Jennings, McGraw-Hill, 1974. Used by permission.)

the riverine system. Wide trade networks existed, and exotic trade goods are characteristic of Poverty Point sites.

Gibson (1974a:19-20) has noted that most Poverty Point sites are located on an ecotone, on the boundary formed by an abrupt or semi-abrupt escarpment separating "upland and lowland environments". He (Ibid:20) also points out that "territorial circumscription" is characteristic of Poverty Point sites, meaning that most sites "are restricted to small or moderate-sized tracts of land that are often completely surrounded by natural barriers, such as wide rivers, dismal swamps, or expanses of inhospitable upland".

According to Webb (1977:110), Poverty Point sites vary greatly in size. The Poverty Point Site covers approximately a square mile. The next largest site is Jaketown, in the Yazoo Basin, Mississippi, which covers approximately 50 acres. All of these sites are believed to have been regional centers. The largest coastal site, Claiborne, and other sites such as Teoc Creek, in Mississippi, Neimayer-Dare in northern Louisiana and Picketts Island in central Louisiana, cover between 8 and 15 acres. Many sites, however, are less than 1 or 2 acres in extent. Examples of small sites include Deep Bayou and Lloyd Bayou in Arkansas; Terral Lewis, Copes and Ray Brake near Poverty Point; and most of the Catahoula and Beau Rivage sites.

The variation in site size has been interpreted as representing a settlement pattern consisting of great ceremonial centers and lesser regional centers surrounded by hamlets, seasonal activity camps, and single family homesteads.

The Poverty Point Site was first mentioned by Lockett (1873). Moore (1913) described the site as well as the adjacent Poverty Point period site of Motley Mound, the lower Jackson Mound, and the Jackson Place mound group. The Poverty Point Site (Figure 5-3) includes two mounds and six concentric, discontinuous semi-circular ridges. The two mounds are outside the ridges. The larger of the mounds, Mound A is 70 feet high with basal dimensions of 680 feet north-south and, including the platform 690 feet east-west. Ford (1954) suggested that this mound and the Motley Mound are effigies of seated birds. The smaller mound, Mound B, is conical with a height of 21.5 feet and basal diameter of 195 feet.

Excavations at the site (summarized by Webb 1977:16-19) have produced occupational evidence but no information on structures. The only evidence so far obtained for structures, other than isolated postmolds, comes from Jaketown, where an oval shaped arrangement of postmolds was interpreted as a house plan (Ford, Phillips and Haag 1955:34).

Charred bones from Mound B at Poverty Point constitute the only evidence for disposal of the dead, suggesting that cremation was standard (Webb 1977:14).

Other large Poverty Point period sites such as Claiborne, Cedarland, Teoc Creek, Jaketown and Savory, have arcuate planforms similar to Poverty Point. These sites, with the exception of Teoc Creek, include mounds.

Most sites are located on natural levees or terraces and have generally linear occupations. Small sites, however, are circular or oval. The most frequent features at these smaller sites consist of baked clay objects found in pits. Representative smaller sites include: Terral Lewis (Gregory et al 1970), Mound Bayou Site (Gibson 1975), Shoe Bayou and Old Saline Camp (Hunter 1970).

Although it might be expected to find long distance trade material at the largest sites such as Poverty Point, materials such as steatite from the Appalachians, hematite from Missouri and northern flint, slate and fluorite from the Ohio River Valley were also found at the Terral Lewis Site.

Webb characterizes the Catahoula Phase, the Poverty Point subdivision located in closest proximity to the proposed and alternate routes, as follows (1977:60):

> In the Catahoula Phase of central Louisiana, evidence of contact with or domination by the Poverty Point center is minimal. The culture seems simple and locally restricted, even at the larger Cancy Island regional center. Materials are local or imports from a distance within 60 miles, and evidence of ceremonialism or ornamentation is scarce.

The admittedly minimal involvement of the Catahoula Phase sites in the greater Poverty Point cultural system should not, however, be taken to that sites of the phase are archeologically insignificant.

The magnitude of the earthworks at Poverty Point and the other large ceremonial mound centers suggest that large populations were used to construct them. Byrd and Neuman (1978:11) remark on the disparity of opinion regarding the method of exploitation used to support such a large population. They note that some archeologists have argued that the production of an agricultural surplus of a crop such as corn or squash is the only explanation for the society; others feel that the domestication of native plants could have supported the groups; still others believe that the efficient exploitation of wild resources would have been adequate to maintain the population.

Byrd and Neuman do not reach a conclusion regarding the presence or absence of agriculture at the site; they do, however, note that squash had been introduced at other locations in North America much earlier than the Poverty Point timeframe. Haag (1971:13) remarks that the Poverty Point culture is "a radically new thing in contradistinction to the drab hunting and gathering culture that we called the Archaic".

5.3.3.2. Tchefuncte Period

Phillips (1970) has placed this period within the span of about 500 to 100 BC. Neuman (1977:15) dates the culture in coastal Louisiana to the span of 750 BC-AD 250. Haag (1971:16) estimates that perhaps five

or six centuries were required for the gradual change from the Archaic lifestyles to the Tchefuncte modifications which emphasize the exploitation of coastal resources to be completed.

The Tchefuncte Period is marked by the first widespread use of pottery. The first pottery was simple and not very well-made. Later during the Tchefuncte period, pottery became fairly abundant and is marked by a distinctive set of shapes and decorations (Ford and Quimby 1945:89). Diagnostic pottery features include tetrapodal supports; simple pot and bowl forms; rocker-stamped and punctated-incised decorations consisting mainly of straight lines; and pinched and fingernail-impressed decorations.

Other diagnostic artifacts include socketed antler points, harpoon heads, large socketed bone points, and antler atlatl hooks (Ibid: 44-45). Projectile forms continued to be mainly the large points held over from the Archaic era.

To the north, the culture is referred to as "Tchula". Diagnostic artifacts are much the same; Gibson (1968) reports that the pottery is clay tempered and includes stamped (rocker and simple), punctated (fingernail and tool), and incised (wide and narrow line, drag and jab) decorative techniques. Perhaps the most diagnostic characteristics of Tchula pottery are the contorted paste and finely cracked surface. Poverty Point baked clay objects and Epps, Gary, Macon and Motley dart points are also common.

Even though ceramic artifact assemblages are distinctive, the period is loosely defined because there are few sites and these are scattered over a broad area (Phillips 1970:876; Brain 1978:personal communication). As Haag (1971:15) has pointed out, our knowledge of the Tchefuncte period is confined mainly to information gathered from coastal shell middens. Gregory and Curry (1976:19) acknowledge this condition and suggest that sites of the Russell's Landing Phase (located in close proximity to the proposed and alternate route in the vicinity of LaSalle Parish) are substantially distinct from the Littoral Tchefuncte, as well as nearer Tchefuncte sites in southwest Louisiana.

The culture was first called "Tchefuncte" by Ford and Willey (1940), who excavated at the Crooks Mound Site (16LA3). This site is a Marksville mound site, and contained only a few Tchefuncte artifacts; five sherds of Tchefuncte Incised pottery were recovered. However, Ford and Willey (Ibid:138) noted a very close typological relationship between the Tchefuncte culture and some of the earlier Marksville remains. This led them to speculate that the site dated slightly earlier than the Marksville type site (16AV1).

Ford and Quimby (1945) excavated several Tchefuncte sites in south Louisiana, and provided the first description of the culture as the result. They worked at the Little Woods Sites (16OR1, 16OR2, 16OR3, 16OR4, and 16OR5), Big Oak Island (16OR6), the Tchefuncte Site (16ST1), Lake Louis (16CT24), Lafayette (16SM17), and the Coppell site on Pecan Island (16VM102).

They (Ibid:87) suggested that there are three "groupings or foci" which comprise the Tchefuncte culture. The first is represented by only one site, the Coppell Site on Pecan Island. Although the site lacked pottery, grave goods were included with burials. Gagliano (1968:12) suggests that this site actually pre-dates the Tchefuncte period.

The second group is represented by shell midden sites such as the Tchefuncte site, the Little Woods Site, and Big Oak Island. These sites are differentiated by the presence of shell middens, certain bone and chipped flint projectile points.

The third type is represented by mound sites such as the Lafayette and Lake Louis sites. Circular mounds and different styles of projectile points are characteristic of these sites.

Mound building began during the later part of the Tchefuncte period (Ford and Quimby 1945:88). Tchefuncte mounds contain well-preserved skeletal material. In coastal middens, burials were found in shallow pits. They were tightly flexed or in bundles. At the Little Woods, Copel and Tchefuncte sites, burials were grouped into burial areas or cemeteries. Human bones were also found mixed with refuse at all midden sites.

It is uncertain whether or not simple horticulture played a role in the subsistence of Tchefuncte peoples. It is clear that hunting and the exploitation of shellfish were economic activities of major importance. Byrd (1976) documented the presence of a possible native cultigen, knotweed, and of squash at the Morton Shell Mound, a Tchefuncte site in Iberia Parish. She (Ibid) also found evidence there of the use of several wild plants, including hickory nuts, walnuts, acorns, persimmons, and wild grapes.

Tchefuncte houses were apparently built of small poles. Oval floor patterns have been discovered (Neuman 1977:16).

In his regional summary of the culture, Phillips (1970:880-881) did not note any Tchefuncte period phases in Arkansas, but delineated five phases of the Tchefuncte period which are represented in Louisiana (Figure 5-4). These are apparently based more on geographic considerations than on temporal association. The Panther Lake Phase is represented in northeastern Louisiana at sites such as Panther Lake, Marsden, Montgomery and Mott. The Russell Landing Phase, a manifestation of central Louisiana, is found at sites such as Russell Landing (Gibson 1968) and Crooks Mound. Thomas and Campbell (1978) recently identified a central Louisiana Tchefuncte component at the Whatley Site, located in LaSalle Parish near the proposed and alternate routes. This occupation was interpreted as a small seasonal campsite. The Lafayette and Grand Lake Phases are located in south central Louisiana, while the Pontchartrain Phase is confined to the easternmost part of the state, near Lake Pontchartrain.

The period seems to represent a time of "fall back" between the Poverty Point culture and the arrival of Marksville traits from the

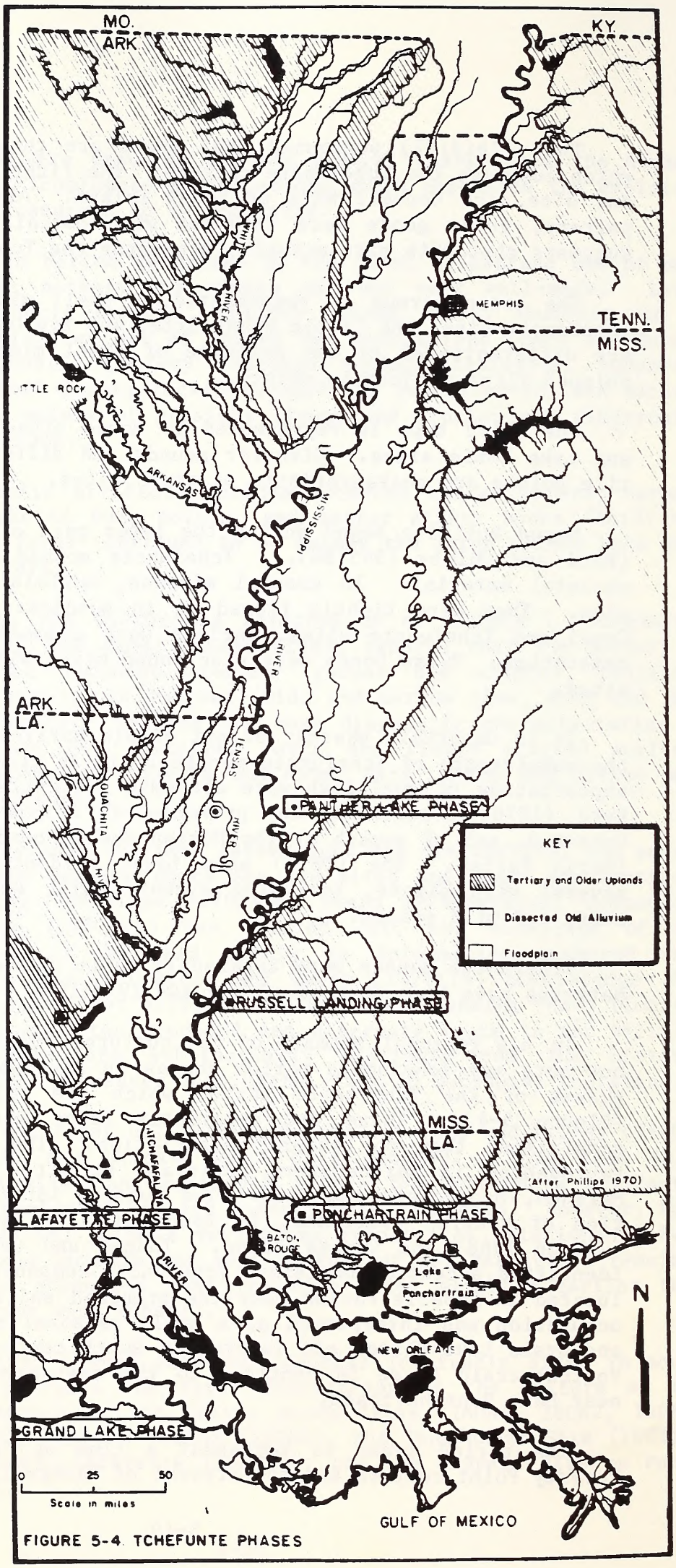


FIGURE 5-4. TCHEFUNTE PHASES

Illinois and Ohio Hopwellian centers to the north. As the Tchefuncte culture diffused northward, it seems to have blended with Marksville traits; this blend is reflected mainly in pottery types.

Haag (1971:16) considers the Tchefuncte culture to be a coastal outgrowth of the Archaic which gradually spread up the Mississippi River Valley and its tributaries. However, Toth (1977:48) notes that there is an almost total absence of Tchefuncte sites along the Mississippi River and its major tributaries (such as the Red and Atchafalaya Rivers in Louisiana). He (Ibid:50) hypothesizes that Tchefuncte is a culture manifested in "slack water environments", and notes that the distribution of sites is "remarkably coincident" with slow-moving secondary streams and lakes such as the Tensas River, Bayou Macon, Bayou Teche, Panther Lake, and Catahoula Lake. Toth feels that a possible reason for few Tchefuncte sites being located during normal surveys is the general tendency for surveyors to concentrate on higher alluvial ridges, and to conduct more cursory surveys in the wetter bottomlands. He feels that if surveys concentrated on bottomlands areas, "it can be predicted that such a research orientation would result in a significant increase in Tchefuncte sites."

He (Ibid:51) does note that such sites would have had to be abandoned each year during the time of high water; this leads to what he terms the second attribute of the Tchefuncte settlement pattern:a tendency for site location toward the edges of the alluvial valley away from the Mississippi River, and near uplands or elevated stretches of dissected older alluvium.

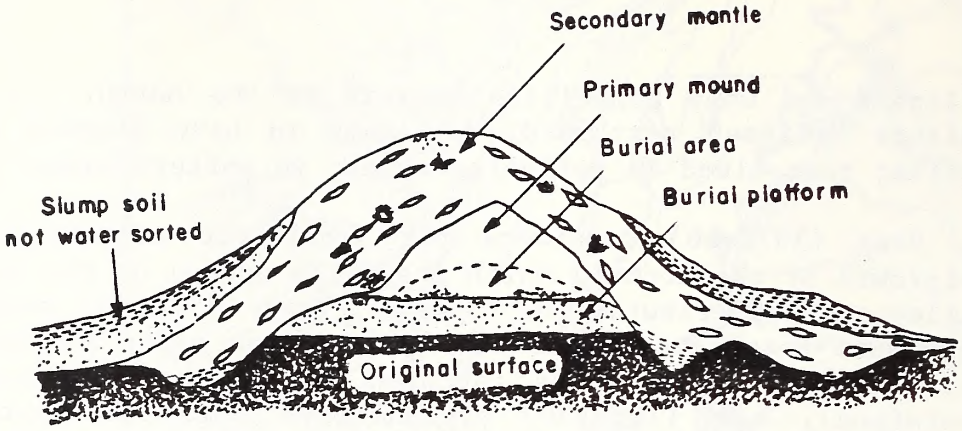
Schambach (1979:29) also sees Tchefuncte as a bottomland culture. Rolingson's (1972) excavations at the Coon Island Site (3BR10) revealed it to be what he terms "the northernmost real assemblage of Tchefuncte pottery we know of in the Ouachita Valley". Toth (1977:46) suggested that the latitude of Helena, Arkansas, may be the northermost boundary of the culture. Other Tchefuncte sites in the Lower Mississippi Valley area of Arkansas include 3UN52, 3UN63, 3UN75, and 3UN86 in Union County.

Weinstein and Rivet (1978:125) postulated a new late Tchefuncte phase, Beau Mire, from their analysis of collections from the Beau Mire Site (16AN17) in Ascension Parish. This site appears to have been located on a cut-off lake. They estimated that the phase is represented at at least eight sites in southeastern Louisiana.

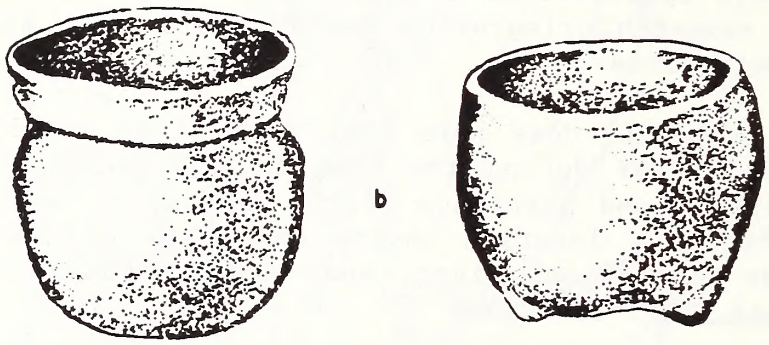
5.3.3.3. Marksville Period

The Marksville period spans the years between 100 BC and AD 300. However, Haag (1971:17) speculates that the Tchefuncte culture survived in coastal areas "long after the later Marksville culture was fully developed at the type site" and Neuman (1977:16) suggests a span of AD 250-AD 700 for the Louisiana coast.

Marksville is the regional manifestation of the Hopewellian culture as it diffused southward from Ohio and Illinois. Diagnostic artifacts often bear resemblance to those of the Hopewell culture. The period is

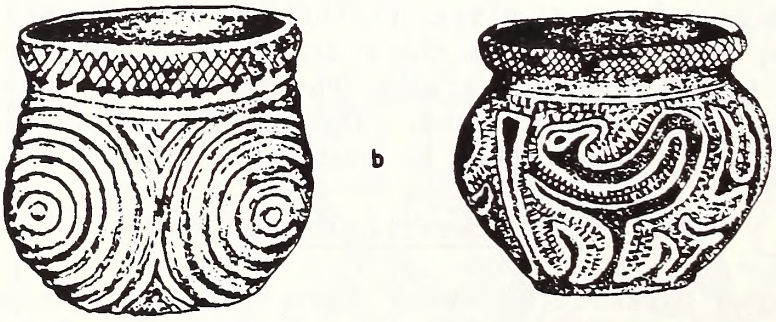


a



b

x½



b

x½

Figure 5-5. Marksville Complex. This Hopewell-related complex in the lower Mississippi Valley has many similarities to the Hopewell of Illinois and of Ohio. a) a Marksville burial mound; b) Marksville pottery. (From Prehistory of North America, by Jesse D. Jennings, McGraw-Hill, 1974. Used by permission.)

characterized by the introduction of "very fine pottery" and of "very fine flint artifacts--projectile points that appear to have been manufactured primarily for burial furniture" (Haag 1971:17). Diagnostic pottery types include Marksville Stamped, Marksville Incised, and Churupa Punctated. The cross-hatched rim is an important criterion in the recognition of Marksville pottery (Ibid:19). Boatstones, ornaments made in the forms of animals from slate and cannel coal, and "monitor pipes" which were made of stone and shaped like an animal, were introduced during this time (Ibid:19).

Gary and Ellis dart point forms continue to be common throughout the Marksville period. Lithic reduction techniques from the Poverty Point period, such as lamellar flaking, were also retained (Neitzel and Perry 1978).

Although large conical burial mounds were built during the Marksville period, their size is not comparable with the mounds of the Hopewellian and Adena cultures proper in Ohio (Figure 5-5). Indeed, Neitzel and Perry (1978:108) note that the size of burial mounds tends to decrease with distance from the Hopewellian center, with only a few notable exceptions. The construction of the burial mounds, along with the manufacture of elaborate burial furniture, would tend to typify the Marksville culture as a "death cult" (Haag 1971:18). They also are evidence of a socially stratified society.

Houses built during the Marksville period appear to have been circular, and were possibly earth covered. They were probably fairly permanent structures (Neitzel and Perry 1978:108).

Although hunting and fishing continued to be important ecomonic activities, true agriculture commenced during the Marksville period (Ibid:108). Both maize and squash remains were recovered from the type site of the period by Fowke in 1920 (Fowke 1927; Byrd and Neuman 1978:16). Neitzel and Perry (1978) suggest that the "profound and far-reaching effect" of the culture was due not only to the strength of the Hopwellian culture, but also to the local state of receptiveness to its traits.

Phillips (1970:Figure 444) identified eleven phases in the study area (Figure 5-6). These are:

a) Helena. This phase is based on artifacts recovered from Ford's excavations at Helena Crossing. Radiocarbon dates range from 150 $\pm$ 75 BC to AD 325 $\pm$ 75 (Ibid:887-889).

The Helena Crossing Site in Arkansas is generally considered to be the northern limit of the culture. Ford (1963) investigated the site, which contained five conical mounds. No village area seems to have been associated with the mounds. Morse (1969:20) notes that the social-political organization necessary for the construction of the mounds was probably dependent upon corn agriculture.

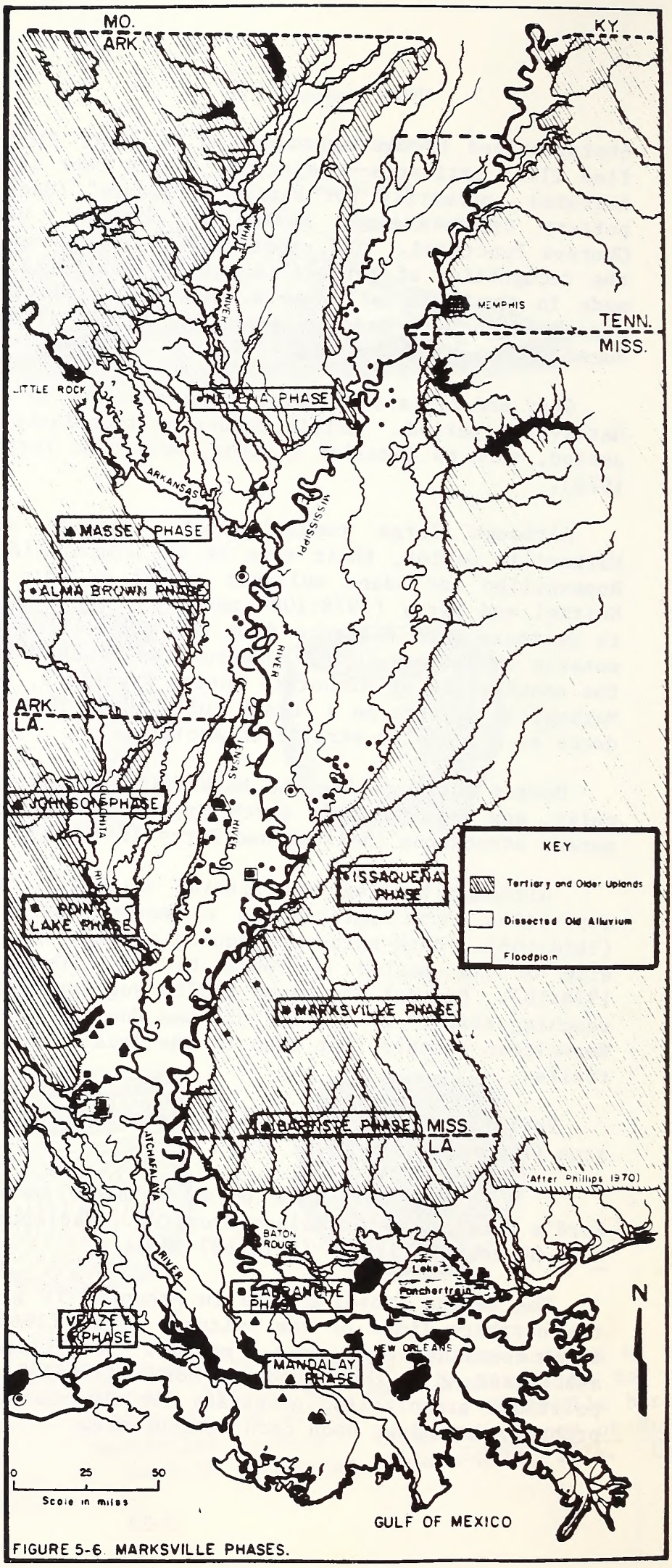


FIGURE 5-6. MARKSVILLE PHASES.

The site provides a look at one of the most classic Hopewellian manifestations at a Marksville site. Toth (1977:90) describes the site as providing "the strongest link with mortuary practices in the northern Mississippi Valley."

Helena Crossing is a multi-mound burial site. The conical mounds B and C contained central log tombs covered by a single earth mantle. Mound B's log tomb contained two extended burials; they were both young adult males. Two isolated skulls and a femur fragment were found within the mound, outside the log crypt.

Mound C was more complex; it consisted of a primary mound built over five log tombs. "Five scattered burial groups were laid to rest on the surface of the primary mound; and finally, the whole structure was covered by a secondary mantle (Ibid:91). Twenty-six burials were found in Mound C. Twenty were extended; three were bundled; three were isolated skulls. Infants, children, adolescents and adults were represented.

Toth (Ibid:91) remarks that the log tombs "have no known counterparts in the Lower Valley." He notes that the extended burials are in contrast to the flexed remains at the Marksville and Crooks Sites.

b) Massey. This geographical phase includes mounds in the vicinity of the confuence of the White River and the Arkansas River. The phase is named after the Massey Site (17-1-1) (Ibid:889).

c) Alma Brown. This geographical phase was based on 4 sites tempted to include them with the Massey phase, the ceramics were different. They were more akin to the Issaquena material from the Yazoo Basin.

Schambach (1969:29) states that it is quite difficult to differentiate between the Fourche Maline and Marksville cultures in southern Arkansas: "...we cannot take the mere presence of decorated Marksville types as an indication of Marksville culture at a site."

d) Johnson. This phase in the northern Tensas Basin was postulated as "a premature anticipation of a phase" (Ibid:895). At the Avery Island Conference (1978), a proposal by Williams and Phillips noted that definitive attributes were "enigmatic." A span of AD 50-150 was proposed.

e) Point Lake. This is an early manifestation of the Marksville period in the Tensas Basin (Phillips 1970:895-896). At the Avery Island Conference (1978) two time spans were suggested for this period. A span for the Tensas Basin of AD 1-200 was proposed by Toth, while a span of 200 BC-AD 50 was proposed for the Upper Tensas Basin by Toth and Williams.

f) Issaquena. This phase, defined in the Yazoo Valley, (Greengo 1964) is marked by large village sites. Dates proposed at the Avery Island Conference (1978) spanned the period AD 150-300.

g) Marksville. The diagnostic indicators for this phase on the Marksille Prairie are based on ceramics recovered from the Crooks Mound (Phillips 1970:896-897). Toth suggested a span for the period of AD 1-200 (Avery Island Conference 1978).

Ford and Willey (1940) reported on the 1938-39 excavations which Mulloy and King conducted under the auspices of the W.P.A. at the Crooks Mound Site in LaSalle Parish, Louisiana. The site consisted of a large conical burial mound, Mound A, and a smaller mound, Mound B.

The two mounds contained 1,175 human burials; 1,159 were in Mound A; 13 were interred in Mound B; and the provenience was lost on 3 (Ibid:35). Mound A was begun over only one burial. A flat-topped burial platform revealed 168 burials; they were not placed there until the structure was almost completed. A mass of 214 burials was located on top of the burial platform; all were interred at the same time (Ibid). Almost half of the burials, 503, were found in the secondary mantle of Mound A; most were placed on the south and east slopes, forming a crescent around the mound. Four small intrusive pits were found. Three contained a single burial, and one contained two burials. Three of the pits had been lined with cane matting (Ford and Willey 1940:36).

Flexed burials were the most common, but isolated skulls, indeterminate, bundle, semi-flexed, partially disarticulated and extended burials were also present. Burial offerings, mainly pottery and chipped stone artifacts, accompanied 169 of the burials (16.1%) (Ibid:44).

Both of the mounds were constructed entirely during the Marksville period. The site was probably occupied again for a very short time ca. 1700 BC (Ibid:47).

h) Baptiste. This phase was based on material from the Baptiste Site. Phillips (1970:897) notes that this is the only site with a good component of this phase. The phase post-dates the Marksville phase.

i) La Branche. The La Branche phase includes sites which are generally located east of the Mississippi River, around Lake Pontchartrain. However, Phillips notes one site, Smithfield, which is west of the Mississippi. Most of the sites of this phase include earlier Tchefuncte components (Ibid:898). The sites are, therefore, generally considered to date early in the Marksville period.

Springer (1973:36) states that little is known of the Marksville culture along the coast but that settlement seems to have been concentrated much the same areas as in the Tchefuncte period, namely around Grand Lake and Lake Pontchartrain.

Recent radicarbon dates from the Coquilles Site (16JE37) range between AD 115 and AD 225 (Beavers 1979).

j) Mandalay. This phase is located in the Atchafalaya-La Fourche area. These sites generally have minor quantities of Marksville ceramics (Ibid:899).

k) Veazy. This phase was postulatedd to included scattered sites on the western Gulf Coastal Plain, the Sabine River, and on Calcasieu, Grand and White Lakes.

Sites on the Marksville phase are located in closest proximity to the proposed and alternate routes of the phases described above. In addition, Gibson (1966) has identified a number of Marksville Period sites on the lower Ouachita River.

Phillips (Ibid:900) noted that these sites usually had earlier Tchefuncte components but not necessarily early Marksville components.

5.3.3.4. Baytown Period

The Baytown period is an indistinct period of transition "between the decline of the Hopewellian culture and the consolidation of Coles Creek culture in the southern half of the Lower Mississippi Valley (Phillips 1970:401) The Baytown period described by Phillips is essentially the same as Ford and Willey's Troyville (Ford and Willey 1940). Phillips (1970:Figure 450) suggests a time span of AD 300-700.

The Baytown period has been said to be characterized by an absence of distinctive traits. Williams (1963:297) referred to it as a "good gray culture". The Baytown period was proposed on the basis of undecorated grog tempered pottery found at, and in the vicinity of, the Baytown Site in the Lower White River. However, Phillips (1970:48) notes that the ceramics conforming to the type Baytown Plain, var. Baytown at the Baytown Site probably date to the Coles Creek period.

The contemporary Troyville period defined by Ford and based on material from the site of Troyville (Jonesville) also suffers from a lack of distinctive diagnostic artifacts. Haag (1971:22) notes that period as "a time of uncertainty and ill defined archeological history" and that Troyville "is nowhere found in a pure form on any single site, including the type site".

The Baytown/Troyville period spans the decline of the Hopewellian influence in the Lower Mississippi River, diagnostic ceramics of the early part of the period include late Marksville Incised varieties. Other diagnostic ceramics include Quafalorma, Mulberry Creek cord marked and Solomon brushed. Ceramics of the late period include early Coles Creek types such as French Fork Incised.

The burial mounds and earthworks of the Marksville period are lacking during the Baytown/Troyville period. However, a burial mound dating to the early Troyville period has recently been found in Richland Parish, Louisiana (see below).

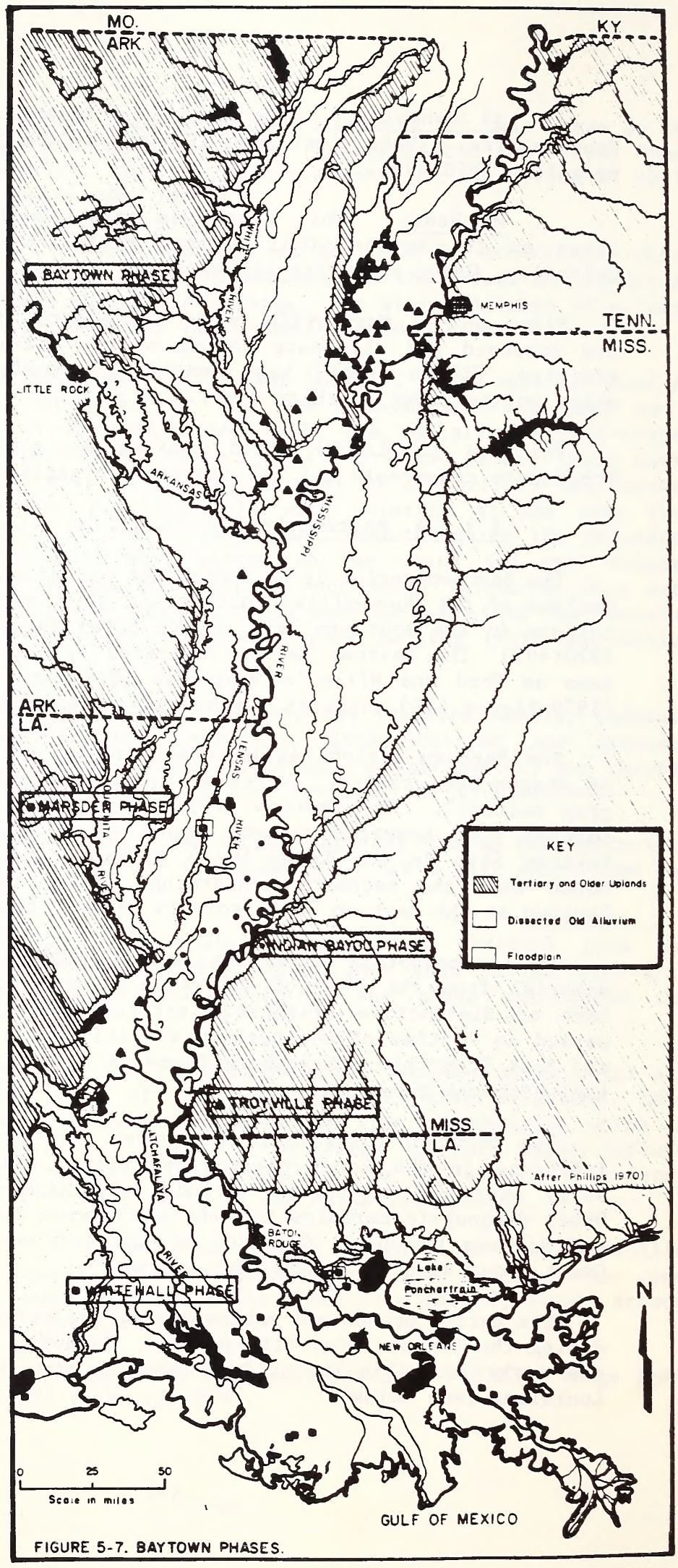


FIGURE 5-7. BAYTOWN PHASES.

Village sites are marked by oval or crescentic-shaped middens at either end of an oval plaza. Later in the period, flat-topped house mounds built over the middens made their appearances. Excavation of midden deposits has indicated that these were frequently sealed with thin layers of clean sterile clay, possibly as a sanitary measure (Neitzel and Perry 1978).

Human burials are generally extended and placed within the midden deposits. Dog burials also occur.

Although the Baytown/Troyville period is often interpreted as a period of decline, important advances did occur. Arrow points, occurring for the first time, indicate the introduction of the bow (replacing the atlatl). Maize cultivation also probably commenced in this period.

Phillips (1970:Figure 445) identified 5 phases in the study area (Figure 5-7). These are discussed below.

Baytown. This phase includes sites in the St. Francis Basin, the Lower White River Basin and the Arkansas Lowlands. Phillips (1970:904) notes that many of the Baytown sites in the St. Francis Basin include small conical mounds. These mounds do not appear to occur on sites in the White River or Arkansas River Lowlands.

Excavation at the Zebree Site in the St. Francis Basin suggested probable circular house patterns (Morse 1975:25). Houses were apparently small with diameters of approximately 3.5 meters.

Excavations at the Redactor Site (13DR96) on Bayou Bartholomew revealed four refuse pits (Wesalowksi 1974:32). No other cultural features were observed.

Indian Bayou. Phillips (1970:908) briefly noted the location of this phase in the Tensas Basin. At the Avery Island Conference (1978), Williams proposed a time span of AD 300-450 for the phase. He also noted that it was "an expression of Troyville in the Tensas Basin".

The Goldmine Site (16RI14) in Richland Parish has been dated to the phase by Belmont (1979). Diagnostic ceramics from the site include late Marksville Incised, Marksville Stamped types, Quafalorma, Alligator Incised and Mulberry Creek cord marked. The site consists of a single low conical mound built over a midden deposit. Both midden and mound date to the Indian Bayou phase. Up to 100 burials have been found in the mound fill. These are generally extended without grave goods. Single burials, small groups of 2 to 5 individuals and one large group have been found. Dog burials have also been discovered. The most remarkable artifacts recovered consist of 2 polychrome human effigy vessels (Figure). Belmont classified them as conforming to the type Quafalorma Red and White. He also notes that the only other such known effigy vessel comes from the Buck Mound, Fort Walton Beach, Florida, and is associated with the Weeden Island culture.

Marsden. Phillips (1970:908) had little information on the Marsden phase as it was a "recent development" of which he had little direct information. He thought it was a regional phase in the Upper Tensas Basin, equivalent to the Indian Bayou phase to the south. However, at the Avery Island Conference (1978) William's defined the phase as a Deasonville intrusion (from the Yazoo Basin) into the Upper Tensas. Characteristics of the sites include large village sites with heavy midden deposits. Diagnostic ceramics include Mulberry Creek cord marked, Solomon brushed and Woodville. Large fire pits with burned clay objects were also noted. The suggested time span of the phase is AD 450-600.

Troyville. Phillips (1970:908-910) described the problems of identification of the Troyville phase and sites dating to it. He did, however, use the phase name for a group of sites of the Marksville prairie in the Lower Red River. This phase has since been re-analyzed by Belmont (Avery Island Conference 1978) and subdivided into three phases: Black River I, Black River II, and Fort Adams.

The Black River phases have been dated to the time span of AD 350-500. Diagnostic ceramics include Marksville Incised, Churupa, Mulberry Creek cord marked, Quafalorma, Larto Red, and Alligator Incised. The later part of the phase does not include Quafalorma but does include French Fork Incised. Dated to the Black River phases are an oval ring of midden with mound like areas at Greenhouse and some earthworks at Troyville. Burial cisterns include secondary burials in midden.

The Fort Adams phase has been dated to the time span of AD 500-600. The diagnostic ceramics include French Fork Incised and minor quantities of types which occur in the succeeding Coles Creek period. Site characteristics include oval middens, extended human burials in middens. Dog burials and "bathtub shaped fire pits".

Whitehall. Phillips (1970:911-912) refers to this phase "as a collection of widely dispersed sites that have yielded a combination of pottery types assumed without proof to indicate occupation in a period called Troyville by Delta archeologists".

Gibson (1966) identified a number of sites of this period in the lower Ouachita River, while Gregory and Curry (1976) located several sites of the period in LaSalle and Catahoula Parishes. Further, Gibson (as cited in Thomas and Campbell 1978:233) has defined a late Baytown Atkins phase for the lower Ouachita River which Thomas and Campbell assert to be identical to Phillips' (1970) Troyville phase. Thomas and Campbell (1978) identified a minor and stratigraphically indistinct Baytown component at the Whatley site.

Although no Baytown/Troyville sites have been excavated on the coast, it appears that there was a shift in site distribution toward the center of the delta. The lake and swamp regions of the Atchafalaya Basin were also more intensively occupied (Springer 1973:34). The movement to new areas may have been the result of a population increase, as the earlier settled areas (the northern and western fringes of the delta) continued to be occupied about as heavily as before.

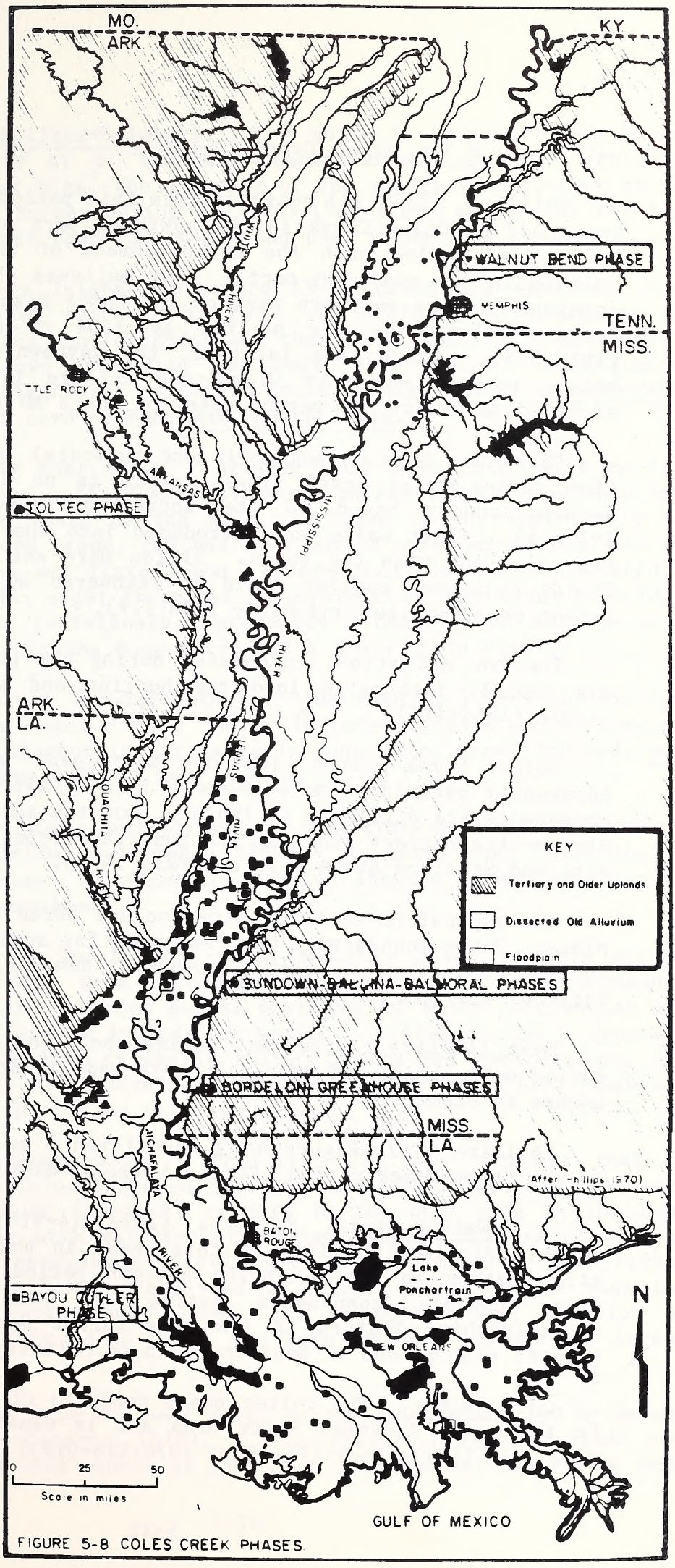


FIGURE 5-8 COLES CREEK PHASES

5.3.3.5. Coles Creek Period

Phillips (1970:18) characterizes this period as "beginning with the emergence of Coles Creek in the southern part of the Lower Mississippi Valley and ending with the establishment of full blown Mississippian culture in the northern part". He believes that Coles Creek culture developed in the southern part of the Lower Mississippi Valley and diffused northward as far as the latitude of Greenville, Mississippi (Ibid:923). Above this latitude, the Baytown culture persisted. It became perhaps the most widespread culture in Louisiana. Generally accepted dates for the period span the years AD 700-1000.

There was both a geographic and numerical expansion of the population during Coles Creek times. This is no doubt related to a more secure economy based on the increased production of maize (Haag 1975:26). Flint maize was introduced into the area from the east, and planted along with the beans. Fields were not abandoned so often, and fields abandoned earlier could be recovered by the planting of a different crop (Neitzel and Perry 1978:117).

The bow and arrow, introduced during the preceding Baytown period, was rapidly integrated into the hunting and warfare patterns of the people (Ibid:117).

Coles Creek sites include both oval and pyramidial mounds. Apparently pyramidial mounds are a late development. Pure Coles Creek components are difficult to isolate, but the earliest assemblage include distinctive pottery (incised and punctated types), Gary dart points, and Alba and Scallorn arrow points (Brain 1971).

The typical Coles Creek Site include three mounds arranged around a plaza. These mounds were used as bases for apparently ceremonial structures rather than as burial mounds. However, the mounds frequently include later burials.

Haag (1971:25) notes that houses constructed during the Coles Creek period were round, and the walls were made by erecting poles from 3 to 6 inches in diameter.

Phillips (1970:Figure 446) identified 5 geographical phases dating to the Coles Creek period (Figure 5-8), as discussed below.

Walnut Bend. Phillips (Ibid:914-916) notes that it is difficult to distinguish sites of this phase in the St. Francis Basin, from sites dating to the preceding Baytown period. In fact, many of the sites contain components dating to both periods. The main distinguishing feature is that the Walnut Bend phase components have greater proportions of Baytown Plain to Mulberry Creek cord marked.

Toltec. The Toltec phase consists of Coles Creek period sites in the Lower Arkansas River area and is named after the Toltec Mound Site near Little Rock (Phillips 1970:916-919).

Sundown-Ballina-Balmoral. This phase is located in the Tensas Basin and consists of a "striking concentration" of sites (Phillips 1970:918). At that time, the analysis of the materials collected by the Lower Mississippi Survey during the 1963-1964 field season had not been completed; but three temporal stages had been visualized.

Williams (Avery Island Conference 1978) dated the earliest stage Sundown to the time span AD 600-700. He believes that this is the earliest Coles Creek manifestation and that it is related to the Baytown phase of the Baytown period in the Lower Yazoo Basin. Sites include platform mounds. Diagnostic artifacts include Coles Creek, var. Sundown, and Mulberry Creek cord marked, var. Smith Creek.

It is possible that Stage F of the Mount Nebo Site dates to this period. Forty-four individuals (or parts thereof) were recovered from this stage of the mound at the site. Fifteen of the individuals had been buried extended prone, two had been buried extended supine, one was partly flexed, one was flexed, and 12 were bundles. Five consisted of skulls only, and for eight there was no information (Giardiano 1977:Table 1). One of these individuals, apparently a female, had an Alba arrow point embedded within the bone matrix of a tibia (Ibid:90-91).

The Ballina stage was dated to the time span AD 700-850 by Williams (Avery Island Conference 1978). Sites include platform mounds arranged around a plaza. Diagnostic artifacts include Coles Creek Incised, var. Coles Creek and French Fork, var. Larkin.

The Balmoral stage was dated to the time span AD 850-1050 by Williams (Avery Island Conference 1978). He noted that sites include platform mound groups. Diagnostic ceramics include Coles Creek Incised var. Mott, and Greenhouse.

Stage A of the Mount Nebo mound possibly dates to this period. Forty-one individuals were recovered from this stage. The commonest burial style was the extended supine position, of which 20 examples were recorded. Other styles include: 9 bundles, 2 flexed, and 1 partially flexed. Five consisted of skulls only. Styles for the remaining four burials could not be determined (Giardiano 1977:Table 1). Elaborate grave goods were not placed with the dead.

Bordelon-Greenhouse. (Phillips 1970:918) comments that the type site for all Coles Creek culture phases in the Lower Red River area has to be Greenhouse (28-11-2) as this is the only site in the Lower Mississippi Valley with satisfactory documentation of Coles Creek occupation. The WPA excavation of this site were reported by Ford (1951). The materials have been re-analyzed by Belmont, who defined four temporal stages. Fort Adams, Grand Lake or Grand Cote, Bordelon and Greehouse. The Fort Adams stage has been included within the Baytown period.

The Grand Cote Site has been dated to the span AD 600-700 by Belmont (Avery Island Conference 1978). Site characteristics include oval villages with platform mounds at each end, extended burials in the mound

summits and "bathtub pits". Diagnostic ceramics include Coles Creek Incised, vars. Wade, Chase, Sundown. Greenhouse, Stoner, and varieties of French Fork, Mazique and Chevalier. The stage is related to the Sundown stage in the Tensas Basin.

The Bordelon stage has been dated to the span AD 700-850 by Belmont (Avery Island Conference 1978). Site characteristics include circular houses on clay caps overlying middens. Neitzel and Perry (1978:104) call this the classic stage of the Coles Creek period marked by "typical three-mound plaza ceremonial center characterizd by mound capping". Diagnostic ceramics include: Coles Creek Incised, var. Coles Creek, Greenhouse, Stoner, and Chase; French Fork lugs; Mazique, var. Mazique, Chevalier, var. Chevalier; French Fork, var. French Fork; and quantities of "Sicily Island style"; Bayou Cutler Incised (early variety), Evansville, var. Rhinehart, and var. Evansville; Beldeau, var. unspec.; Avoyelles Punctated, var. Avoyelles (Belmont, Avery Island Conference 1978).

The Greenhouse stage has been dated to the span AD 850-950 by Belmont (Avery Island Conference 1978). This stage sees considerable changes from the preceding period. Mounds are now pyramidal,and oriented around a plaza. Houses are round, and occur on house mounds. Burials are extended and placed in midden deposits of the plaza. Diagnostic ceramics include: Coles Creek Incised, vars. Mott, Blakely, and (early in the phase) Greenhouse; Mazique Incised, var. Kings Point; French Fork, var. McNutt; Pontchartrain Check Stamped; Beldeau, var. Beldeau; Avoyelles, var. Kearny; Evansville, vars. Rhinehart and unspec.;and "Bayou Cutler Incised" (late variety). Some additional rare and early types are Carter Engraved, var. Shell Bluff; red filmed (cf. Old Town Red, var. Sharbrough; red and white.

Bayou Cutler. The term Bayou Cutler phase was first used by Kniffen (1936). Phillips (1970:920) views the Bayou Cutler phase as a phase "mostly if not entirely within the Coles Creek period." Diagnostic ceramics include: Pontchartrain Check Stamped, Coles Creek Incised, French Fork Incised, Mazique Incised, Rhinehart Punctated, Chase Incised, Chevalier Stamped, and Beldeau Incised. The geographical range of this phase includes most of south Louisiana. Phillips believes that it will eventually be regionally subdivided.

Along the coast, the Coles Creek settlement pattern is similar to that of the preceding Baytown/Troyville period, but the number of sites in the Lower Atchafalaya Basin increased (Springer 1973:35).

Coastal Coles Creek sites consist primarily of shell middens, shell ridges, and beach deposits. Only a few of these sites are accompanied by earth mounds and, with the exception of one, Bayou des Oies (34-P-20), all have later occupations to which the mounds may pertain. These coastal sites, therefore, appear to lack the "temple mounds" of the more northerly Coles Creek sites (Phillips 1975:922).

Springer (1974) identified a Coles Creek period occupation in the upper levels of Bruly St. Martin Site (16IV6). He identified a section

of wall trench and a number of pits. He also suggested that a rectangular mound north of the midden area was associated with the midden.

5.3.3.6. Mississippi Period

The Mississippi period commences with the emergence of the Mississippian culture in the northern part of the Lower Mississippi Valley and Plaquemine in the south. The generally accepted date is circa AD 1000. The culmination of the period coincides with European contact. Phillips (1970:19) remarks that as "the Spanish entradas left no discernible traces in the archeology of the Lower Mississippi Valley; one could hardly set the contact period before the last quarter of the seventeenth century." He also notes that the "ensuing collapse of native culture was so rapid that it seems hardly necessary to provide our sequence with an 'historic' period."

The Mississippi culture developed in the northern part of the valley and the Plaquemine culture developed in the south. Toward the latter part of the period, Mississippi influences moved southward and reached the vicinity of present-day Vicksburg. The valley south of this area retained the Plaquemine cultural manifestations, and during the final stages of the period, the Natchezan culture emerged and spanned the transition into historic times. The cultural picture during this period is further complicated by the development of the Caddoan culture which extends into the valley of the Arkansas River in the north of the present study area, and as far east as Bayou Bartholomew and the Ouachita River.

The Mississippian culture is recognized by large ceremonial centers surrounded by palisades. The mounds are extremely large and pyramidal. They served as building substructures.

Houses of the Mississippi period were rectangular and constructed by a technique which called for the digging of a trench about 12-18 inches wide, in which poles six inches or less in diameter were set. The trench was then filled with earth, and horizontal logs were laid to brace the upright poles. The whole dwelling was smeared over with mud or daub; this is known as "wattle and daub" construction. Houses had gabled roofs which were thatch-covered.

The period is also marked by a resurgence in burial ceremonialism. Haag (1971:31) refers to the period as "the rise of a new 'Cult of the Dead'." This ceremonialism is marked by artifacts placed with the dead. Artifacts include beaten copper, carved stone discs, and incised/engraved shell. Human bones and skulls, rattlesnakes, and feathered serpents are common motifs.

The size of the Mississippi sites indicates that intensive agriculture, particularly of maize, was an important part of the subsistence base. The size of the mounds argues for increased socio-political control.

The Plaquemine culture developed out of the preceding Coles Creek culture. Modifications include an increase in the size and number of mounds. Palisades and rectangular houses similar to the Mississippi culture also occur in Plaquemine times. Ceramics differ from the Mississippi culture in that they are not shell tempered until late in the period. They are, however, distinctive, having brushed decorations.

Phillips (1970:Figure 447) recognized twelve Mississippi period cultural phases (Figure 5-9), as discussed below, which may pertain to the present study.

a) Cherry Valley. The Cherry Valley phase of the Mississippian culture is with one exception located west of Crowley's Ridge. The type site, Cherry Valley, (11-M-1) has been reported by Perino (1967). Radiocarbon dates from the site are AD 700 ± 150; AD 920 ± 150; and AD 1100 ± 110. The first two dates are considered too early (Phillips 1970:929; Morse 1969:23).

Morse (Ibid) notes that Cherry Valley sites are generally located on bluff tops along Crowley's Ridge. He notes that many bundle burials occur in the mounds at Cherry Valley and that there is a large circular structure with a large entranceway. Ceramics from the site have been associated with the Trappist phases in the Illinois Valley.

b) Parkin. The Parkin phase of the Mississipian culture is centered on the St. Francis and Tyronza Rivers. Diagnostic ceramics include Mississippi Plain, var. Neeley's Ferry, Parkin Punctated, Barton Incised, vars. Barton, Kent, Togo and Old Town Red (Phillips 1970:932). Suggested time spans for the phase are AD 1400-1700 (Morse and Smith 1973:40); AD 1300-1650 (Jolly 1973:1).

The type site for the phase, Parkin Site (3CS29) has been describd by Davis (1966) and Klinger (1975-76-77).

Phillips (1970:932) describes typical settlements as large and densely packed with house sites and refuse.

c) Nodena. The Nodena phase of the Mississippian culture is located on the present meander belt between the Tyronza River/Little River and the Mississippi River (Morse 1973:Figure 40). Diagnostic ceramics are similar to those of the Parkin phase, though in different ratios (Phillips 1970:935).

Morse (1973:74) notes 3 classes of sites: 1) large sites with at least one major pyramidal mound and a large associated village area; 2) village sites without mounds ranging in size between 2-7 acres; and 3) house sites less than 0.25 acres in extent.

The Banks Village Site (Perino 1966) has been radiocarbon dated as early as AD 1075 (Perino 1967:78-85). However, this site is not typically Nodena. Morse (1973:83) believes that the Nodena phase commenced circa AD 1400 and lasted until about AD 1700.

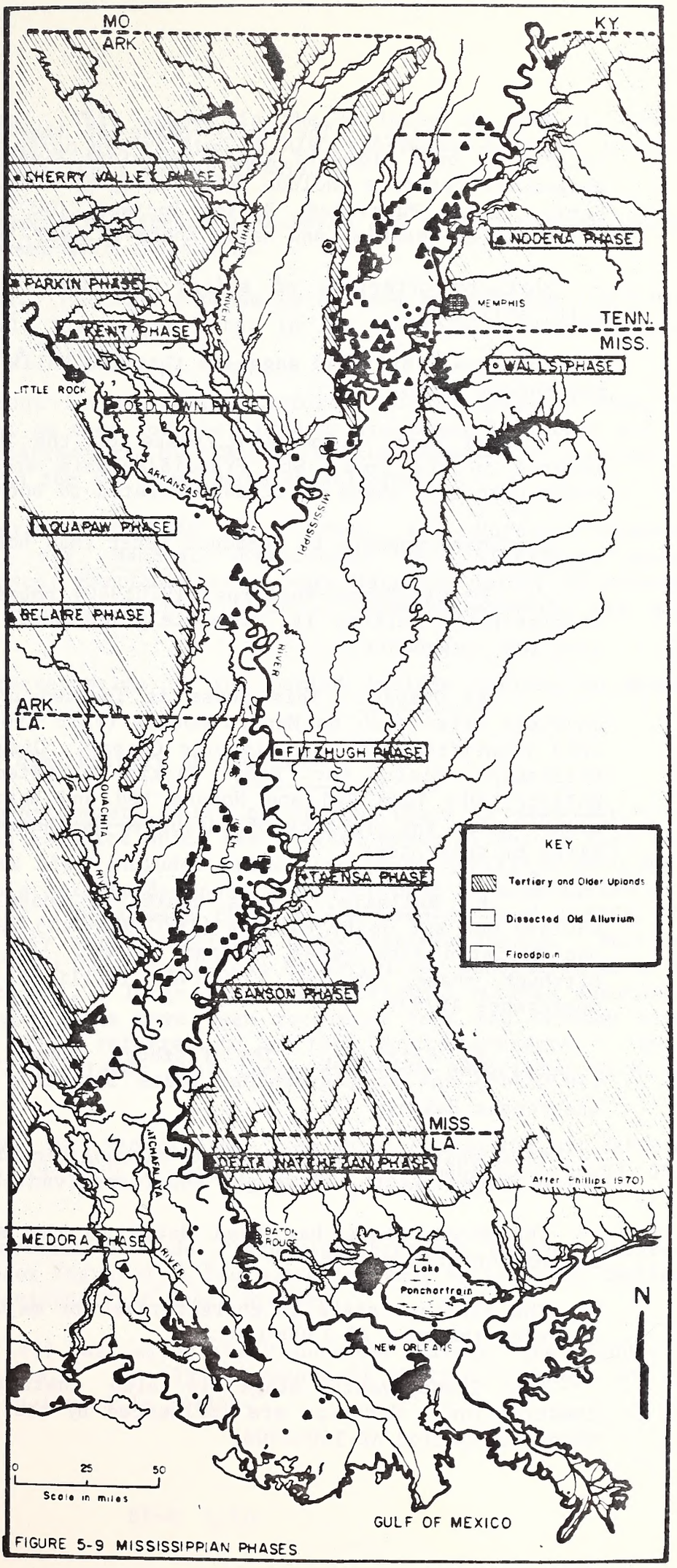


FIGURE 5-9 MISSISSIPPIAN PHASES

d) Walls. The Walls phase of the Mississippian culture is located on both sides of the Mississippi River, just south of Memphis. Diagnostic ceramics include Bell Plain; Mississippi Plain, var. Neeley's Ferry, Parkin Punctated, Barton Incised, Old Town Red, Nodena Red and White effigy vessels, and Walls Engraved, var. Walls (Phillips 1970:936).

Mortuary offerings of effigy figurines indicate strong "Southern Cult" affinities.

Phillips (Ibid:934) suggests that the Walls phase is a late phase of the Nodena phase.

e) Kent. The Kent phase of the Mississippian culture is located in the lower St. Francis/Memphis area. Phillips (1970:938) notes that this phase is closely related to both Parkin and Walls.

The phase appears to commence later than both Parkin and Walls.

f) Old Town. Phillips (1970:940) notes that this phase of the Mississippian culture is "completely dubious." It is based on only a very few components.

g) Quapaw. This phase is located on the Arkansas River and includes sites such as Menard Mounds (Ford 1961) that have ben positively identified with the historic Quapaw. Diagnostic ceramics include: Mississippi Plain, var. Nady; Parkin Punctated; Wallace Incised, var. Wallace, Old Town Red and Nodena Red and White. Phillips (1970:943) also notes the presence of intrusive Natchezan and Caddoan ceramics on sites of this phase.

h) Bellaire. This tentative phase in the Arkansas River Lowland was set up by Philips (1970:944-945) because the group of sites was isolated from other defined phases. It apparently dates to the Fitzhugh phase, ca. AD 1300-1400 (Williams and Halley:Avery Island Conference 1978).

i) Fitzhugh. The Fitzhugh phase as defined by Phillips (1970:945) was a geographical phase including all Plaquemine sites in the Tensas Basin.

This phase has been divided chronologically by Halley (1972) into three stages: Routh, Fitzhugh, and Transylvania.

The Routh stage has been dated to the span AD 1200-1300 (Avery Island Conference 1978).

The Fitzhugh stage is characterized by major mound construction and dates to the span AD 1300-1400.

The Transylvania stage is also characterized by large mound construction. Ceramics are influenced by the Nachez phase. The stage spans the period AD 140-1500.

j) Taensa. This phase, in the vicinity of Lake St. Joseph consists of sites which are related to historic Taensa villages recorded between 1682 and 1706 (Phillips 1970:945).

The ceramic assemblage includes Nachezan and shell-tempered sherds, indicative of contact with the north.

k) Sanson. The Sanson phase as defined by Phillips (1970:946-947) includes early Plaquemine sites in the vicinity of the Lower Red River and Catahoula Lake.

However, Belmont (Avery Island Conference 1978) proposed that the name Mayes Complex be used for the sites on the Lower Red River and the name Sanson be confined to the Catahoula Lake sites. No typological differences between the two areas were established.

Diagnostic ceramics include Coles Creek, var. Hardy; Plaquemine Brushed; Mazique, var. Manchac; Evansville, var. Wilkinson; Sanson Incised, var. Sanson; Harrison Bayou, var. Harrison Bayou; Hollyknowe, var. Patmos and Coleman Incised (Ibid). Caddoan elements are also included.

Specific characteristics of the period include burials in mounds with "killed" vessels.

The suggested time span is AD 1100-1200.

l) Delta-Natchezan. This "catch-all" phase is used for sites yielding Natchezan ceramics which are located south of Angola Farm (29-J-2); that site is also included within the phase (Phillips 1970:949). At Angola Farm, historic trade goods were recovered in association with aboriginal burials. These were first illustrated by Ford (1936), who postulated that they were associated with historic Tunica. Phillips (1970:949) doubts that the burials can be definitely associated with the Tunica. More recently, a large number of aboriginal burials associated with historic trade goods have been recovered from the Trudeau Site. These goods are often referred to as the "Tunica Treasure." Brain (1970; 1973; 1977) believes that these are also associated with the historic Tunica.

m) Medora. The Medora Site, from which Plaquemine was defined, was excavated in 1939-40; however, it was not published until 1951 (Quimby 1951).

Diagnostic ceramics include Plaquemine Brushed; Mazique Incised, var. Manchac; Maddox Engraved; L'Eau Noire Incised; Coles Creek Incised, var. Hardy; and Pontchartrain Check Stamped.

Quimby (1951:129) has called the Plaquemine culture "the product of agricultural peoples." He (1957) recovered charred corncobs at the Bayou Goula Site in Iberville Parish.

Plaquemine occupation on the coast is marked by a dramatic population increase (Springer 1973:35). Quimby (1951;1957) excavated two sites on the northern fringe of the delta. These were the Medora Site in West Baton Rouge Parish and the Bayou Goula Site in Iberville Parish.

The Medora Site consisted of a large truncated pyramidal mound, Mound A, and a smaller flat-topped mound, Mound B. Mound B was similar to Level II of Mound A; it was postulated (Quimby 1951:92) that Mound B remained as it had originally been constructed, while Mound A had been modified at a later date.

No aboriginal burials were found at the site; however, several intrusive Caucasoid skeletons were located in the top of Mound A.

n) Minor Phases. In addition to the foregoing phases defined by Phillips (with later modifications), a Plaquemine phase has been identified by Rolingson (1976) in the Bayou Bartholomew area. Gibson (1977), postulated Plaquemine phases on the Lower Ouachita River.

Brain (1978) has divided the Mississippi period in the Yazoo Basin into a series of temporal periods. It is to be expected that such temporal divisions may help clarify the Mississippian cultural stages west of the Mississippi River.

5.4. Conclusions

We may conclude by presenting Phillips' (1970:19-20) summary of the Lower Mississippi Valley cultural sequence:

> Poverty Point: An essentially preceramic period, the earliest we have or are likely to have in the geologically recent alluvial valley of the Mississippi River.
>
> Tchula: The period of initial pottery complexes, represented by the Tchefuncte culture in the south, Lake Cormorant and possibly other early ceramic cultures in the north.
>
> Marksville: The period of Hopewellian ascendancy in most if not all parts of the area.
>
> Baytown: The slightly murky interval between the decline of Hopewellian and the consolidation of Coles Creek culture in the south. A "gray" Baytown culture predominates in the north.
>
> Coles Creek: The period of Coles Creek ascendancy in the south. Baytown continuing in the north but under considerable Coles Creek influence in the zone of overlap between them.

Early Mississippi: The period of early Plaquemine culture in the south and ill-defined early Mississippian in the north.

Late Mississippi: The period of Mississisppian dominance throughout most of the area. Complicated by the possibility of a secondary diffusion via Alabama and the Gulf.

In still briefer terms: Following the Poverty Point Period, in which the cultural balance as between the northern and southern parts of the area seems to lie with the latter, comes the Tchula period in which the balance is not yet clear; then the Marksville period of northern (Hopewellian) dominance; followed by a Baytown period of apparent cultural recession (?) particularly in the north; next a period of renewed intensity with Coles Creek culture of mixed but preponderantly southern origins extending its influence northward until met in the early Mississippi period by a second radiation of northern (Mississippian) culture which, in the late Mississippian period, finally prevails.

Needless to add, this sequence is little more than a chain of interdependent hypotheses, none of which can now be adequately supported.

6. THE CADDOAN CULTURE AREA: PREHISTORIC SYNTHESIS

6.1. Introduction

Geographically, the Caddoan archeological area (Figure 6-1) encompasses southwestern Arkansas, eastern Oklahoma, northwestern Louisiana, and northeastern Texas. However, the Caddoan area might more accurately be defined as a cultural manifestation than as a geographic region.

The area was termed Caddoan due to the linguistic stock of the Native American tribes occupying the region during historic times (Orr 1952).

Archeological evidence indicates that the prehistoric peoples of this region began to hold a number of cultural traits in common from around 800 AD. Sites within the area which date before this period are assigned to other cultural areas, such as the Plains or the Ozarks region. The Caddoan area is generally considered transitional between the Plains and the Southeast (Kroeber 1953).

For the purposes of this synthesis, sites in Texas will not be discussed in great detail except for those which have contributed significantly to our knowledge of the Caddoan area.

6.2. Previous Investigations

The first decades of research in the Caddoan area (from the early 1900's to the close of the 1930's) were basically framed by a specimen-oriented approach, used for answering broadly based questions about past lifeways. The emphasis was on the excavation of large sites, and in particular of their associated cemetery areas. Provenience data were poorly recorded and non-artifactual remains were only sporadically collected. Although the early years of Caddoan research were marked by sampling bias and skimpy documentation, the pioneer efforts by early researchers should not be too harshly condemned. Their research efforts serve many times as the sole sources of information on sites that have subsequently been destroyed, and they salvaged a vast amount of prehistoric material that was already being extensively looted by relic hunters.

In the late 1930's it was recognized that the Caddoan area could not be explained as a single cultural manifestation. From this recognition the cultural-historical approach emerged as a major area of research during the 1940's and 1950's. This era was generally devoted to the formulation of artifact typologies and cultural taxonomies, and to the definition of chronological schemes.

During the 1960's, dissatisfaction arose with the taxonomic approach of the 1940's and 1950's because it did not explain why cultures changed. The approach of the 1960's became known as processual, scientific, or new archeology. However, few processual studies have been produced on the Caddoan area during recent years. The current research direction is taxonomic in nature, as it was in the 1940's and 1950's.

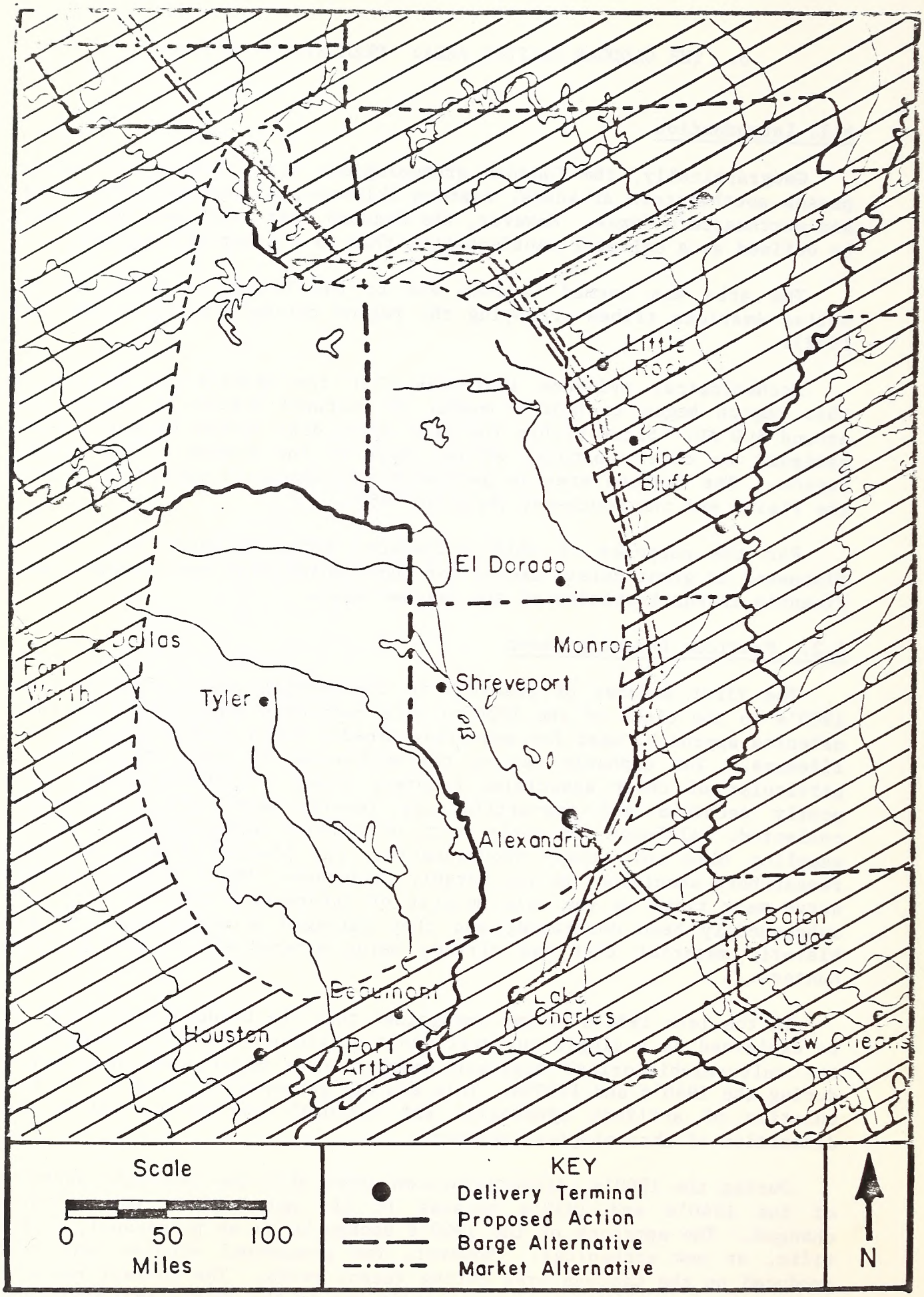


FIGURE 6-1. CADDO CULTURE AREA

This is largely because most of the sites excavated during the 1940's and 1950's are just now going through formal analysis.

6.2.1. Arkansas Previous Investigations

In 1911 and 1912 Moore (1912) traversed the Red River in Arkansas and investigated various sites. These include the Crenshaw and Haley sites in Miller County; and the Jones Site in Hempstead County. Moore concentrated on excavating the obvious mound structures and their associated cemetery areas. It is interesting to note that throughout his publication Moore makes constant references to the extensive destruction at sites caused by the relic hunters of the day.

In 1916 the Museum of the American Indian, Heye Foundation, was motivated by Moore's findings to send Harrington to southwest Arkansas to excavate various Caddo sites. Among others, these include the important Battle and Ozan sites in Hempstead County, and the Mineral Springs Site in Howard County (Harrington 1920).

In 1947 Kreiger directed work at the Battle Site in Lafayette County (Kreiger 1949). In 1966, under the auspices of the National Park Service, Bohannon excavated the Mineral Springs Site (Bohannon 1966;1973).

6.2.2. Oklahoma Previous Investigations

The upper reaches of the Arkansas River were not covered during the survey of Thomas (1894). The earliest record of an archeological investigation is simply an observation by Bryington (1912) who noted an Indian mound being destroyed by railroad construction in McCurtain County.

Mounds in the eastern Oklahoma region were first discussed by Moorehead (1931). Thornburn (1916) first discovered the Spiro Site in 1913-1914. In 1925, he (1926) also excavated the Reed Mound in Delaware County.

The Norman Site in Wagoner County was excavated by the University of Oklahoma in 1936, under the supervision of Finkelstein (1940). A mound group and village area were excavated.

A major Caddoan civic-ceremonial center, the Spiro Site in Le Flore County, was the object of research between 1936-1941. The Craig Mound was excavated with the assistance of the Work Projects Administration and the Oklahoma Historical Society under the direction of Clements (1945) from the University of Oklahoma.

The Huffaker Site, a major ceremonial center, was also excavated as part of the Work Projects Administration in Delaware County by Clements (Baerreis 1954, 1955). Under the auspices of the Work Projects Administration and the Univesity of Oklahoma, the village area and mound at the Brackett Site, located in the northern region of the Tenkiller Reservoir, Cherokee County, was excavated (Howard 1940;Baerreiss 1955).

In 1949, the Harlan Site was excavated by the University of Oklahoma (Bell 1972).

In 1951, Bell excavated the Vanderpool village site located in Wagoner County. During 1962, the Jugg Hill village site in Mayes County was excavated (Wycoff 1964).

6.2.3. Louisiana Previous Investigations

In the Red River region of Louisiana, Beyer (1896) visited mounds at Lake Larto in Catahoula Parish, the Henry Mound in Natchitoches Parish, and a linear mound in the Clear Lake area near Campti.

Clarence B. Moore (1912) of the Academy of Natural Sciences in Philidelphia navigated the Red River investigating burial sites and mound sites. Moore visited twenty mound sites and one dwelling site, and collected artifacts from Avoyelles, Rapides, Grant, Red River, Bossier, and Caddo Parishes.

Fowke (1927) investigated sites along the Red River near Shreveport to Marksville for the Bureau of American Ethnology, Washington, D.C.

In 1931, Winslow Walker (1932) of the Bureau of American Ethnology visited several sites in Natchitoches Parish and described ceramics from the Fish Hatchery Site. He attributed them to the Natchitoches Indians, and commented upon their resemblance to those from sites in northern Louisiana and Arkansas.

During the 1930's Dr. Clarence Webb worked extensively in the northwest section of Louisiana. In the 1930's Webb and Dodd (1959) excavated the Belcher Site in Caddo Parish, revealing a clearly stratified sequence of house patterns, human skeletal materials, and artifacts. It was concluded after analysis that these remains were southern Caddoan in nature.

Between 1934 and 1940, Webb and Dodd also investigated the Smithport Landing Site located in DeSoto Parish. From the materials discovered they (Webb 1963) attributed the site to the Alto Focus of the Gibson Aspect (an early Caddoan manifestation).

Salvage work conducted by Webb (1945) at the Lawton Site in Natchitoches Parish exposed human skeletal remains, ceramics, and European trade goods. Webb determined that the Lawton Site was Historic Caddoan, and that it was closely related to the Fish Hatchery Site (Walker 1934). He assigned both sites to the Glendora Focus (a late Caddoan manifestation).

6.2.4. Texas Previous Investigations

Although the proposed and alternate routes do not lie within Texas, two significant sites will be discussed. The first, the George C. Davis Site in Cherokee County, was excavated by Newell during 1939-1941

(Newell and Krieger 1949). The second, the Sam Kaufman Site in Red River Conty, was originally excavated by Harris (1953) of Southern Methodist University and members of the Dallas Archeological Society. In 1968 a major salvage project by Southern Methodist University took place at the Sam Kaufman Site (Skinner et al 1969).

6.3 Cultural Sequence

Initially Caddo cultural categories were broken into two separate divisions; the Gibson Aspect (early), and the Fulton Aspect (late). Each aspect included various foci or complexes which reflected spatial differences (Kreiger 1946; Orr 1952).

Another division has been presented which is more sensitive to the discussion of Caddoan development. This division, first espoused by Webb (1961), places Caddoan development into a five part sequence (Caddo I through V). Caddo I and II correspond to the Gibson Aspect, while Caddo III, IV and V correspond to the Fulton Aspect. A further discussion of this scheme is presented by Davis (1961) and Wycoff (1971). For this overview, the Caddo I-V sequence will be used (Figure 6-2).

6.3.1 Caddo I (AD 800-AD 1200)

The first Caddoan period commenced at some time between AD 800 and AD 1000.

Caddo I is characterized by a rise in ceremonialism and socio-political organization. This reflects both local elements and influences derived from Coles Creek cultures to the east. Coles Creek pottery occurs at several Alto Focus sites, but the relationship between the two cultures is still unclear.

Mounds Plantation, north of Shreveport on the Red River, is a site which reflects both Coles Creek and Caddoan occupations. The plaza-mound complex was initially designed and occupied during Coles Creek times (Webb and McKinney 1975). Although the primary component of the site is Alto, a smooth and rapid transition between the Coles Creek Culture and the Alto Complex occurred. This type of transition is also evident at the Crenshaw Site in Arkansas. There are also indications of the Coles Creek to Alto developmental sequence in parts of northwest Louisiana and southwest Arkansas.

Caddo I, the earlier part of the old Gibson aspect, is characterized by two regional manifestations, the Alto Focus and the Harlan Complex. (Wyckoff 1971). The Alto Focus is the earliest archaeological complex with a direct bearing on the Caddoan cultural tradition. It is represented by sites in northwest Louisiana, east Texas, and southwest Arkansas.

The George C. Davis Site, a mound center and associated village site in Cherokee County, Texas, is representative of the Alto Focus. The site contains three flat-toped truncated pyramidical mounds.

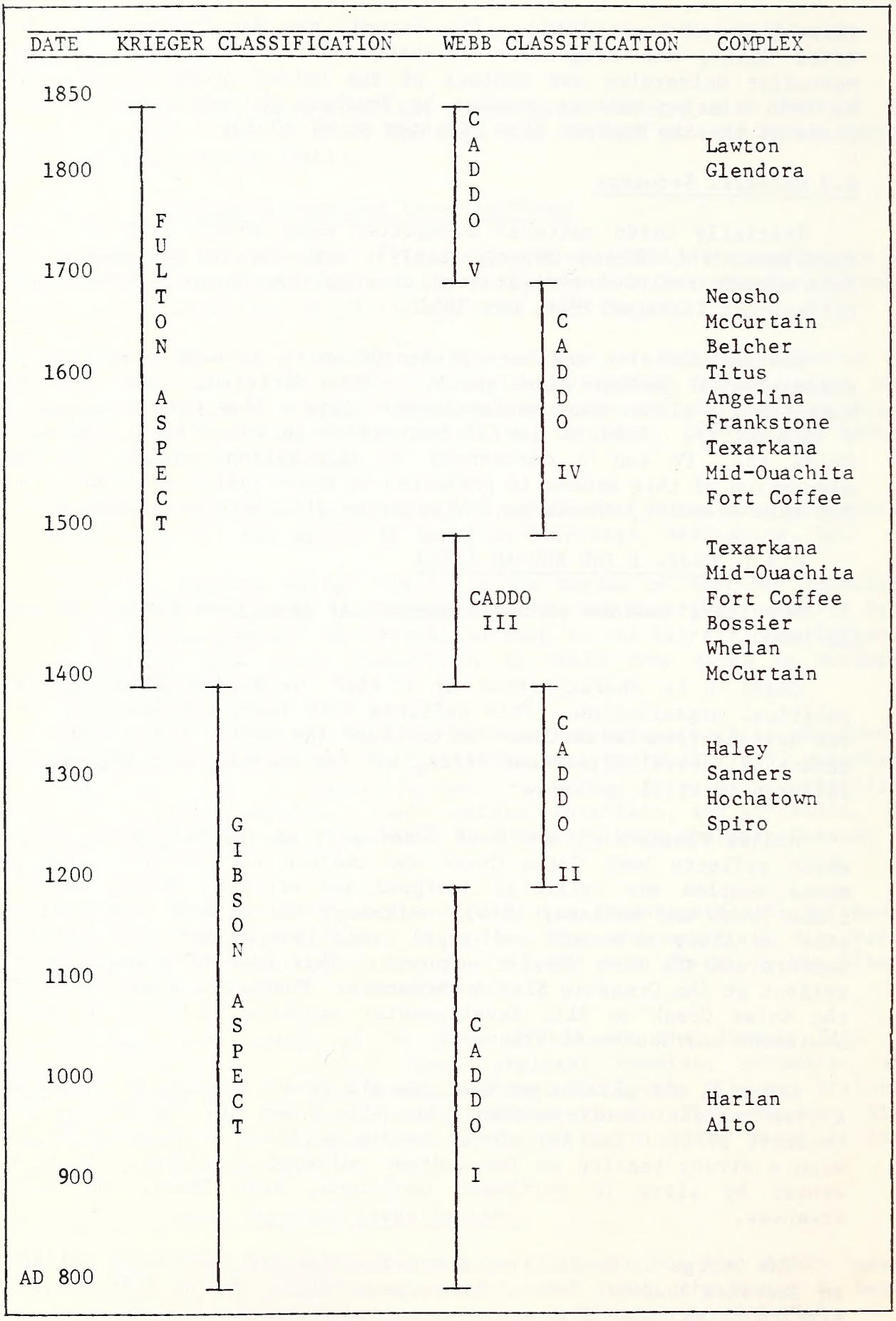


Figure 6-2. Caddo Cultural Sequence.

Mound C was used for the placement of multiple interments in large pits. The burials were primary and an extended, supine position. The pits are typically arranged with a row of individuals in the center; burial goods and other interments were placed at the edges.

Typical associated artifacts include human effigy pipes, petaloid celts, copper-covered ear spools, bone pins, undecorated conch shells, and cane matting.

Other typical artifacts include Gary, Marshall, Marcos, and Scallorn type points; double bitted axes; grinding stones; cup stones; hammerstones; and celts. Pottery includes clay tempered wares such as jars and globular bowls with thick flat bases.

Limited excavation at the village area indicates oval or circular house structures with a central support post and prepared floors with circular firepits. At present the setlement pattern of the Davis Site is not known.

Floral materials recovered at the site includes cane, oak, pine, acorns, and hickory nuts. Faunal materials include deer, bear, puma, beaver, turtle, rabbit, squirrel, and fresh water mussles.

The second manifestation of Caddo I times, the Harlan Complex, is primarily confined to the Arkansas River Basin of eastern Oklahoma. The Harlan site is located upstream from Spiro. It consists of several low mounds covered with prepared floors; a large burial mound; pyramid shaped mound; and a small residential village.

The settlement system of the Harlan complex is marked by scattered farmsteads, hamlets, and villages associated in geographic areas suitable for agriculture. Located separate from these settlements are mortuary areas with accretional burial mounds. Houses were square, centerposts holding the roof. They had extended entrances and fireplaces (Bell 1966).

Evidence for the participation of the Harlan site in a multi-regional trade network includes non-local goods such as copper, conch shells, galena pieces and long nosed god masks. Other artifacts recovered include Alba Barbed projectile points, large spearpoints, celts, metates, shell beads, and ground stone black beads (Orr 1946; 1952; Bell 1966). Pottery is granular clay-tempered. Types present included Coles Creek Incised and Williams Plain.

Socio-political organization at the site seems to have entailed a minor ranking of individuals; this is demostrated by the segregation of mortuary areas and by the different treatment of the 'elite' dead. The method of disposing of the dead involved storing the dead as cremations or partially articulated bodies in charnal houses. Bell (1972) demonstrated that the prepared floors beneath the mounds were probably mortuaries housing the dead before they were interred. The number of layers in the primary burial mound also correlates with the number of

layers in the low mounds; this correlation indicates phases in the disposal pattern of the dead during this period.

The Vanderpool Site in Cherokee County, Oklahoma is a non-mound habitation site. The presence of distinctive house patterns, clay tempered ceramics, and chipped stone hoes indicate that the site is an agriculturally oriented village. It may have been a satellite community of a mound center (Wycoff 1971).

The house patterns at Vanderpool are square in form, and several posts support the roofs. They have an extended entrance, with no evidence of prepared floors (Hardin and Robinson 1975).

The burial pattern at Vanderpool indicates single interments in a flexed position in a shallow burial pit. There is a lack of grave goods.

Other Harlan Complex sites include the Evans Component at the Spiro Site, LeFlore County, Oklahoma (Bell 1966) and the Jensen site in Mayes County, Oklahoma (Wycoff and Barr 1964).

6.3.2 Caddo II (AD 1200-AD 1400)

The latter foci of the Gibson Aspect (Spiro, Sanders, Haley) comprise Caddo II. Cultural manifestations such as the construction of mound centers and the presence of Southern Cult phenomena (a series of artifacts and stylistic motifs found in certain sites across the Southeast) mark the period.

Peebles and Kuss (1977:433) suggest that the socio-political organization changed to a more centralized structure between sites such as Harlan and Spiro as a response to climatic change. It is suggested that ca. AD 1200, the climate around Spiro became more harsh than at present (the Neo-Atlantic-Pacific I transition). Thus it appears that centralization and strengthening of socio-political power was a response to envirnmental stress that would endanger agricultural efficiency and productivity.

The Spiro Site lies in the major east-west corridor of travel along the Arkansas River, between the Mississippi Embayment province and the province of the Great Plains. This strategic pathway occupies a transition zone seperating the waterways and woodlands of the southeast from the grasslands of the plains.

The greater portion of the population at Spiro was dispersed in areas of subsistence security along the eastern edge of the vegetational zone. The mixed subsistence base emphasized hunting, gathering and agriculture. The principle cultigens were squash, corn, and beans

Increased complexity in disposal of high ranking dead is demonstrated by litter burials and box burials (Brown 1971). Items manufactured as grave goods for these elite individuals include gorgets of copper and shell, mask gorgets, discoidal stones, ceremonial

flints, effigy pipes, conch shell bowls, columnella pendants, embossed copper plates, sheet copper hair emblems, ear spools, and copper or stone ceremonial celts.

Brown (1975) has suggested that the exchange of exotic items between the elites of various societies was a method of creating obligations. Presumably, this would create a buffer designed to protect a society such as that of Spiro from ruin in times of food shortages. He further postulated that the burial of these objects with deceased members of the elite was a method of preventing inflation that might result from overproduction and accumulation of these items.

The basic house plan from Spiro type settlements consisted of a single rectangular room enclosing 200-600 square feet of floor space. Construction details included wood pole walls and a gabled roof held in place by two central posts (Phillips and Brown 1978).

The Huffaker site (Baerriss 1954;1955) in Delaware County, Oklahoma, is a non-mound habitation site. Houses, burials, and midden deposits are present. Typical pottery types include William Plain, Woodward Plain, LeFlore Plain, Spiro Engraved, Maxey Noded Redware, Pennington Punctate-Incised, Canton Incised, and Sanders Engraved. Scallorn, Morris, Keota, Alba, Reed and Gary points were recovered. Other stone tools include stone hoes, bitted axes, groundstone celts.

The burial pattern is interment of individuals in flexed or semi-flexed positions in shallow pits. Pottery vessels and ground stone earspools were found in association with burials. The presence of these items may argue for ranking of individuals living within the village site.

The Hochatown Complex, a regional focus, is apparently confined to McCurtain County, Oklahoma. It is best known from the Beaver Site (Wycoff 1968). This non-mound habitation site may represent a small farmstead.

The primary ceramic composition of this site is Sanders Plain, Sanders Engraved, Canton Incised, Davis Incised, Dunkin Incised, Kiam Incised, Crockett Curviliniar Incised, Hickory Fine Engraved, Wilkinsons Punctate, and Smithfort Plain. Lithics recovered include Alba, Bonham, Agee, Scallorn, Hayes, Reed, Ellis and Williams type arrow points. Other stone tools consist of bifacially flaked knives, gravers, chipped stone hoes, cupstones, grinding stones, and milling basins. House form indicates a double walled, rectangular structure with two centerposts, an interior firepit, and an extended entryway. The remains of deer, opossum, fish, mussels, and charred acorns have been recovered at the site.

Other sites from the Hochatown Complex include the Bell and Gregory sites (Wycoff 1968) and the Baldwin Site (Rohrbough 1968); all are in McCurtain County, Oklahoma.

The Sanders focus, defined from the Sam Kaufman Site in Red River County (Skinner, Harris and Anderson 1969), is primarily confined to Texas.

Few non-mound habitation sites from the Haley Focus are known, and most of the data concerning this period has come from its mound centers. There are at least a dozen mounds which have Haley Focus components. Most of these are in Arkansas (Neitzel and Perry 1978).

Although some Haley mound centers are in association with large village sites others show little indication of continuous or intensive occupation. Wyckoff (1971) has divided Haley Focus mound construction into four components: flat-topped substructure mounds, low mounds built over the usually burned locations of older structures, flat-topped mounds with shaft-pit burials, and rounded mounds with pit burials. In addition, the appearance of non-mound cemeteries is a new feature that was introduced at Haley Focus centers.

The Bell Site (Hoffman 1970) is one of the few good examples of non-mound habitation sites.

6.3.3 Caddo III (AD 1400-AD 1500)

During Caddo III times, religious complexity and Southern Cult resemblances began to fade, with socio-political organization becoming more egalitarian in nature. Although traits from the Southern Plains (including Puebloan influences) appear, they were not felt much at this stage in the southern Caddoan region (Neitzel and Perry 1978).

Two major components are accepted by most scholars: the Bossier Focus in Louisiana and the Whelkan Complex in Texas. Davis (1970) adds the Mountain Fork Complex, and Wyckoff (1974) adds the McCurtain, Texarkana, Mid-Ouachita and Fort Coffee Foci.

The Bossier Focus extends east from Texas into the tributaries of the Ouachita. There are quite a number of small Bossier habitation sites located on streams or lakes away from the major river valleys.

These habitation sites, such as Greer Place in Bienville Parish, Louisiana, (Webb 1948) contain diagnostic ceramic types such as Pease Brush-Incised, Sinner Linear Punctate, Maddox Engraved, Maddox Brushed, and Belcher Ridged. Point types present include Alba and Bassett. Other artifacts include pottery elbow pipes, perforated pottery dishes, pottery figures, rectangular celts, cupstones, grinding stones and melting basins.

Postholes relating to possible oval house patterns and cache pits have been found.

The Bossier Focus is not typified by mound construction. Less intensive utilization of the mound centers and the large river valleys is indicated. A few Bossier components associated with mound construction, these are the Belcher II, Werner, Thigpen, and Vanceville sites in Louisiana, and the Battle Site in Arkansas. The other Caddo III foci are beyond the geographical scope of this report.

6.3.4 Caddo IV (AD 1500-AD 1700)

Caddo IV is a time of renewed ceremonialism and mound construction. Foci which are applicable for this period including the Texarkana, McCurtain, Mid-Ouachita, and Fort Coffee foci (first manifested in period III) along with Titus, Angelina, Frankston, Neosho, Henrietta, and Belcher. The Belcher Focus of northwest Louisiana and southwest Arkansas is the most relevant to the present study.

Most identifiable Belcher Focus components come from mound sites in the Red River Valley. Although most sites have not been intensively investigated, Webb (1959) has recovered much information from the Belcher Mound site in Caddo Parish.

Webb (Ibid) describes Caddo IV period mound sites as community centers that are associated with dispersed sedentary agricultural villages and hamlets. Belcher Focus components reflect the ceremonial continuum begun in the Caddo I period. Existing mounds are added to; old houses are destroyed and new ones consructed.

Southern Cult-like burial goods are found at the Belcher site. Burials were primary and extended, consisting of both multiple and singular interments.

The transition between Caddo IV and Caddo V is marked by the arrival of European explorers. Post-contact times are assigned to the latter period.

6.3.5 Caddo V (AD 1700-AD 1850)

This period represents the historic interval of the Caddoan cultural sequence. Identification and linking of proto-historic archaeological sites with historic Indians tribes is possible in two parts of northern Louisiana. The Glendora Focus, comprised of the Glendora and Keno Sites on the Ouachita River north of Monroe, has yielded evidence of occupation by the Ouachita Caddo prior to their move to the Red River (Moore 1909; Swanton 1942). The Fish Hatchery and Allen's Plantation sites are among components of the Lawton Phase which bear a relationship to the Natchitoches Indians. Diagnostic artifacts include Natchitoches Engraved pottery and European trade goods (Neitzel and Perry 1978). Further information on the historic Caddo is available in Chapter 10, Caddo Ethnology.

6.3.6 The Contact Period

Documentary source materials for the Historic Caddo have been compiled by Swanton (1939; 1942), Neuman (1974) and Story (1978).

Although the Caddo were geographically widespread during the prehistoric period, at the time of historic contact they were concentrated in three geographic areas within the range illustrated in Figure 8-1. The Kadohadacho tribes were situated along the Ouachita River in Arkansas and along the Red River in Texas and Arkansas. The Hasinai

tribes were located above the fork of the Neches River in northeast Texas and west of Natchitoches in Louisiana. The tribes of the Natchitoches were found along the Red River in Louisiana and Arkansas and along the Sabine River in Louisiana and Texas (Neuman 1974).

The word "Caddo" may have been derived from the work "ka-ede" (chief) or may be a contracted form of "ka-dohada-cho" (real chiefs) (Story 1978). Although the name Caddo is applied as a term describing a single people, at the time of European contact the Caddo consisted of 25 tribes. These formed three confederate groups, the Kadohadacho, the Hasinai, and the Natchitoches (Swanton 1942).

At the time of contact, the Caddo were ariculturists living in dispersed hamlets. Hunting remained an important pursuit. The Caddo were involved in a well-developed trade network which operated from the Lower Mississippi Valley well into Texas and Oklahoma. Principal trade items included salt, bow wood, and pottery (Gregory 1973).

Neuman (1974) has listed the first historical references to the Caddoan Indians. The first of these is the narratives of the 1541 DeSoto expedition, when DeSoto's army was in central Arkansas (The Gentlemen of Elvas, Garcilaso de la Vega, and Luis Hernandez de Biedman as referenced by Swanton 1939; and Rodrigo Ranjel as referenced by Bourne 1904).

The journal of an expedition led by Hernando Martin and Diego del Castillo in 1650 makes [allusive] references to possible Caddoan tribes (the Tejas) in eastern Texas.

In 1686 and 1687, Robert Cavelier Sieur de LaSalle made an expedition to discover the mouth of the Mississippi. He recorded a visit to several Hasinai villages in Houston County, Texas (Swanton 1942). During the year 1690, Fray Francisco Casanas de Jesus Maria estabished a mission among the Nabedache (a tribe of the Hasinai Confederacy) on the banks of the Neches River east of San Francisco de los Tejas in Houston County, Texas. Casanas also reported on the Kadohadacho living to the northeast. In 1690 Henri de Tonti visited the Natchitoches and travelled up the Red River to villages occupied by the Kadohadacho.

6.4. Conclusions

We shall conclude the Caddo archeological synthesis by briefly summarizing Webb's (1961) Caddo cultural sequence:

Caddo I (800 - AD 1200): The first emergence of a recognizable 'Caddoan' culture area, as expressed in two regional manifestations: the Alto Focus of northwest Louisiana, east Texas, and southwest Arkansas; and the Harlan complex of the Arkansas River valley of east Oklahoma.

Caddo II (1200 - AD 1400): During Caddo II social structure is increasingly centralized and hierarchical, marked by such mound groupings as the Spiro site in eastern Oklahoma. Increasing connections between the Spiro elite and external areas is represented by exotic Southern Cult burial goods. The period encompasses the Spiro, Sanders, and Haley Foci.

Caddo III (1400 - AD 1500): This is a period of apparent decline in social stratification and external trade goods connections. Usage of mound centers and mound construction decreases. The period includes the Whelkum Complex of Texas and the Bossier Focus in Louisiana, the latter marked by numerous small habitation sites.

Caddo IV (1500 - AD 1700): This period is characterized by renewed ceremonialism and mound construction, both activities representing the revitalizatin of cultural traditions dating back to Caddo I. The span includes the Texarkana, Mid-Ouachita, Ft. Coffee, Titus, Angelina, Frankston, Neosho, Henrietta, and Belcher Foci. Caddo IV is terminated by significant European contact.

Caddo V (1700 - AD 1850): The historic period of the Caddo sequence, represented archeologically in northern Louisiana by the Glendora Focus (Ouachita River Caddo) and the Lawton Phase (Natchitoches Confederacy).

7. PLAINS ETHNOLOGY

7.1 Background

7.1.1. Geography

The geographical region embraced by this ethnographic overview has been adequately defined in the preceeding archeological summary (Figure 7-1). To reiterate briefly, however, the area encompasses portions of the states of Wyoming, South Dakota, Colorado, Nebraska, Kansas, and Oklahoma. The proposed and alternate routes traverse both the short grass plains roughly west of the 100th meridian and the subhumid tall grass prairies east of that line, as well as the variably forested bottomlands of the numerous streams and rivers (Wedel 1961b:451-452). Thus, the study area encompasses the primary domains of both the nomadic bison hunters and the semi-sedentary village farmers of historic times.

7.1.2. Linguistics

The historic Plains were peopled by groups of notably diverse linquistic and geographic origins. For example, Lowie (1954:4) and Driver (1969:45) identify six major language families as represented by one or more distinct lanquages within the Plains:

Family	Languages/Tribal Groupings	
Algonkian	Blackfoot	Plains Cree
	Cheyenne	Plains Ojibwa
	Arapaho-Grosventre	
Athabaskan	Sarsi	Kiowa-Apache
Caddoan	Pawnee-Arikara	Wichita
Kiowa-Tanoan	Kiowa	
Siouan	Mandan	Dakota-Assiniboin
	Crow	Iowa-Oto-Missouri
	Hidatsa	Omaha-Ponca-Osage-Kansa
Uto-Aztecan	Wind River Shoshone	Ute
	Comanche	

7.2 Plains Culture: Nomads

7.2.1. Introduction

Linguistic, archeological, and historical data indicate that the presence of the above groups represent the result of a complex series of population movements in late prehistoric and especially historic times. Many of these movements can be associated with the pressures and new opportunities created by the entrance of Europeans into North America (Ewers 1967; Jablow 1951). While some of these dynamics will be outlined below, we may begin by defining the key element which makes it

possible to speak meaningfully of a "Plains Culture Area": the spread of a lifeway based at least in part upon the employment of the horse in large game (especially bison) hunting. This dependence upon a large game hunting subsistence base may be near complete, as amoung the "true" Plains tribes (Oliver 1962:14; herein termed "Nomadic Plains" tribes) or partial, as in the case of the semi-sedentary village farmers of the tall-grass prairies. Of these two subdivisions, the following Plains groups have resided at some time within the area to be traversed by the proposed and alternate routes (Wissler 1950; Figure 7-1):

Nomadic Groups:	Semi-Sedentary Groups:
Arapaho	Arikara
Cheyenne	Hidatsa
Crow	Kansa
Kiowa	Mandan
Kiowa-Apache	Omaha
Teton Dakota	Oto
	Pawnee
	Ponca
	Wichita

7.2.2. Contact Relationships

The preceeding archeological synthesis of the Plains has demonstrated that, especially with regard to the semi-sedentary horticulturalists, most historically known tribes can be linked to their prehistoric and protohistoric antecedent cultures (Wedel 1964; Jennings 1974: Meyer 1977). While many of these specific archeological and historical connections will be reviewed and expanded on a tribe-by-tribe basis below, it is important to empasize that by earliest European contact times (ca. 1600) two groups were utilizing the resources of the Plains area (Wedel 1961):

1. The presence on the short-grass Plains of groups of pedestrian nomads employing "dog traction, skin tents and a host of other traits (suggesting) a mode of life like that of the later Plains hunting peoples," (Ibid: 455).

2. The simultaneous occupation of major stream valleys east of the 99th meridian by semi-sedentary horticultural groups.

With the coming of the Spanish to the Southwest and the French and English to the Great Lakes area, significant new factors began to affect the dynamics of the Plains region. The growth of the fur trade and the introduction of European trade goods (especially guns) to the Woodland tribes of the old Northwest began a series of population dislocations

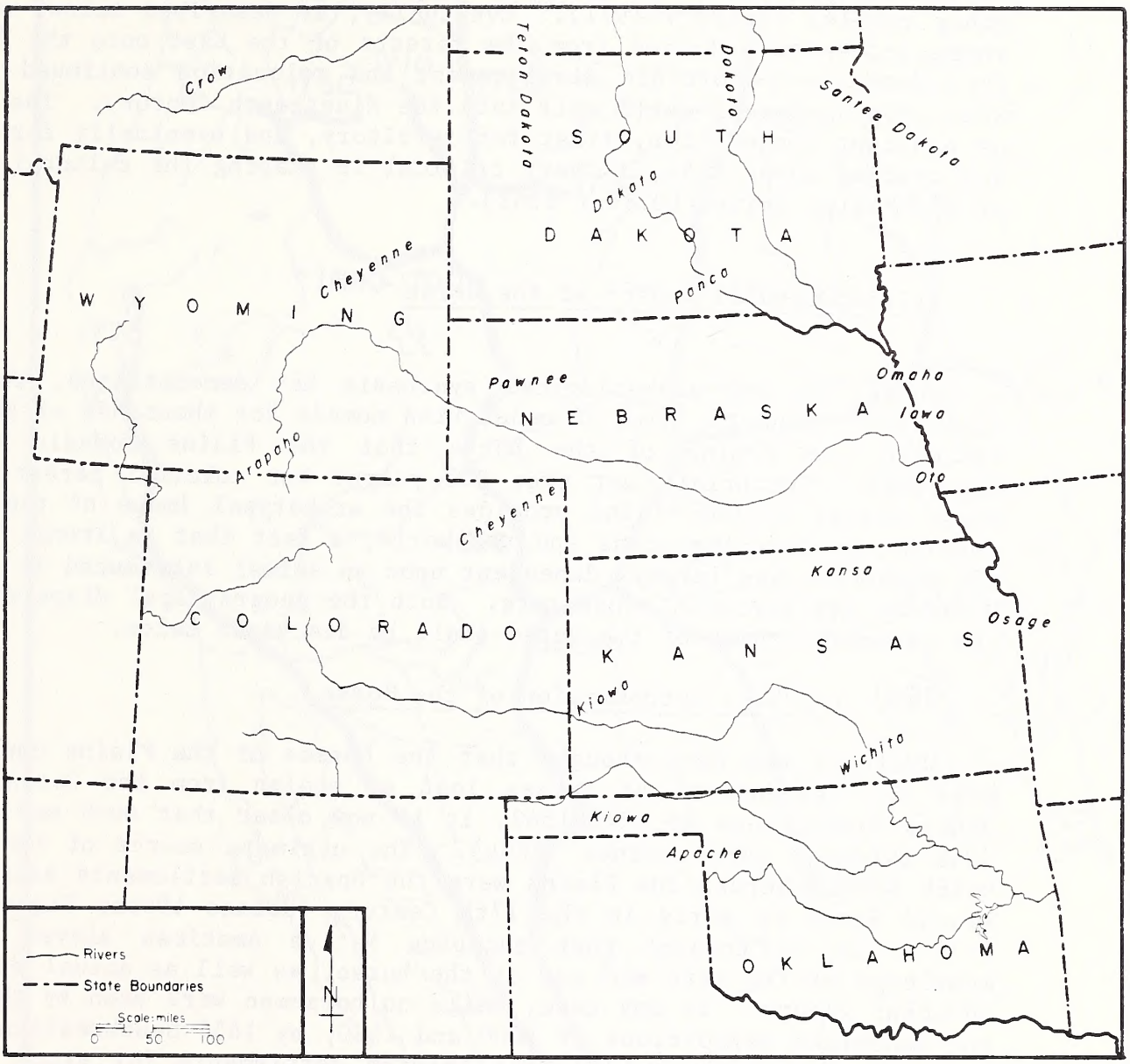


Figure 7-1. Plains Cultural Area: Native American Groups.

which eventually reached the Plains (Jablow 1951:6). Those eastern tribes such as the Cree, Chippewa and Ojibwa who had obtained guns through direct trade with the French and English were enabled by superior firepower to expand their territories. In doing so, they displaced the Dakota groups, who in turn forced westward the Cheyenne, Arapaho, and other peoples (Terrell 1971). Eventually, as described below, some of these tribes were forced from the forests of the East onto the Plains. This pattern of forcible displacement and relocation continued on the Great Plains itself until well into the Nineteenth Century. The factor of constant competition, first for territory, and eventually for horses and trading advantages, is very critical in shaping the cultural values of the Plains tribes (Oliver 1962).

7.2.3. Cultural Impact of the Horse

While, as the archeological synthesis has demonstrated, the High Plains have been the home of pedestrian nomads for thousands of year, it is with the coming of the horse that the Plains Nomadic culture flowered. The brief (not over 200 years) but colorful career of the Horse Indian on the Plains provides the archetypal image of the Native American to Euro-Americans and the world, a fact that is ironic in that the lifestyle was largely dependent upon an animal introduced to the New World by its European conquerors. Both the geographical dispersion and the cultural impact of the horse shall be discussed below.

7.2.3.1. Introduction of the Horse

While it was once thought that the horses of the Plains could have been the descendants of horses lost or stolen from the Coronado and DeSoto expeditions of 1540-1542, it is now clear that such was not the case (Wissler 1914; Haines 1966a). The ultimate source of the horses which spread across the Plains were the Spanish settlements established around Santa Fe early in the 17th Century (Haines 1966b; Figures 7-2, 7-3). It is thought that escaping Native American slaves carried knowledge of the care and use of the horse, as well as actual stock, to adjacent groups. In any case, while no horsemen were seen by the Onate and Benevides expeditions of 1600 and 1630, by 1659 Southwestern Native Americans had begun raiding the Spanish settlements for stock (Haines 1966a,b). By 1690 the Hasinai Caddo of Texas boasted 4 to 5 head per household (Lowie 1954:40). Horses had reached the Pawnee by 1719, though by 1735 there were no horses recorded either north or east of the Missouri River. The Dakota, however, were well supplied by 1772. The spread of the horse thoughout the Plains was complete by 1800 (Ewers 1967:495).

The spread of horses appears to have been initially carried out by the medium of trade. Two principal trade routes have been indicated (Figure 7-2; Haines 1966b).

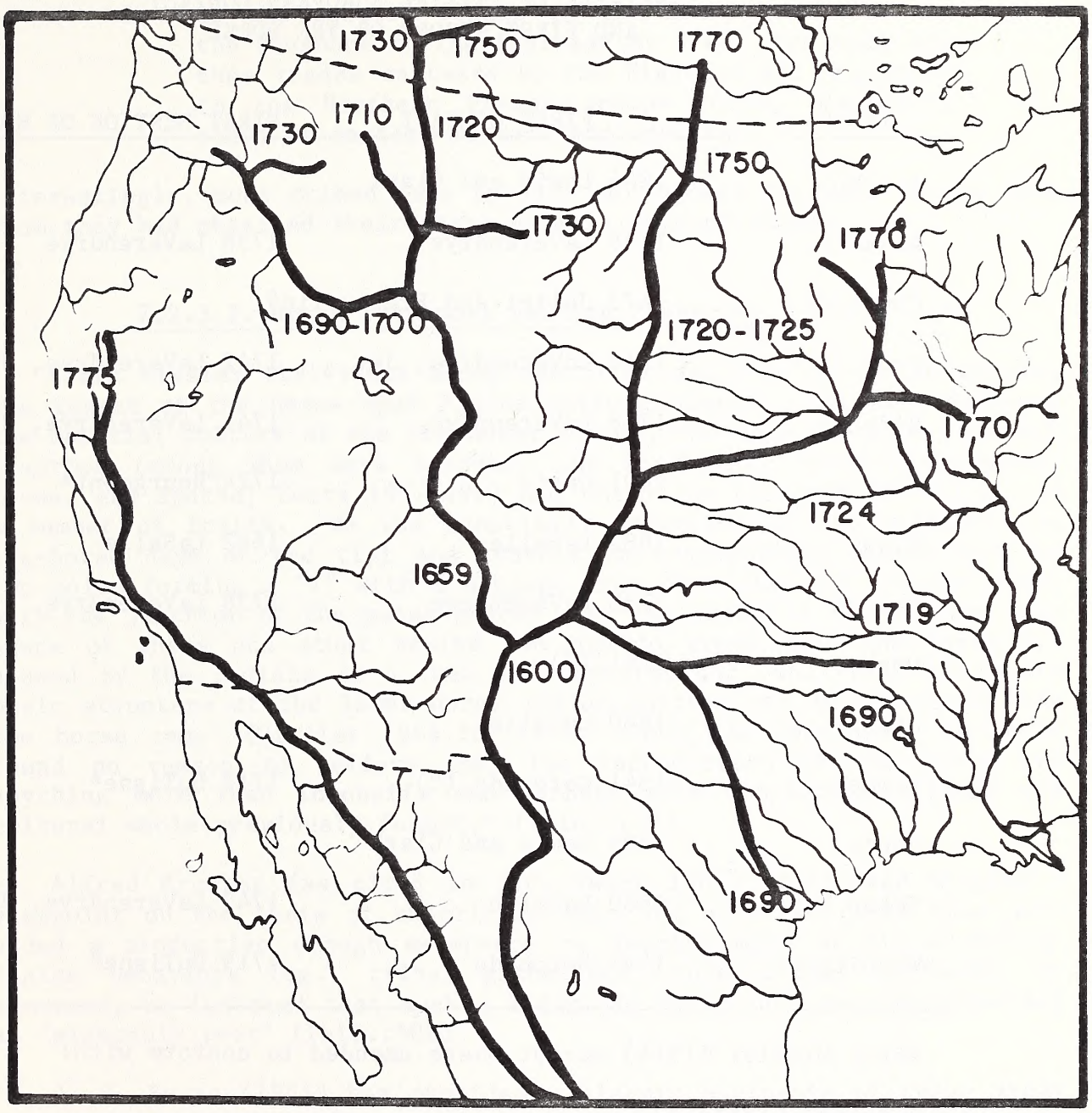


Figure 7-2. Hypothetical Routes for the Spread of the Horse (After Haines 1966b).

TIMETABLE OF INITIAL EUROPEAN CONTACT
AND FIRST RECORD OF THE HORSE

TRIBE	FIRST CONTACT	FIRST MENTION OF HORSES
Arapaho	1804 Lewis and Clark	
Arikara	1738 LaVerendrye	1738 LaVerendrye
Cheyenne	1673 Joliet and Franquelin§	
Crow	1742 LaVerendrye, Jr.	1742 LaVerendrye, Jr.
Hidatsa	1738 LaVerendrye	1741 LaVerendrye, Jr.
Kansas	1601 Onate	1724 Bourgmont*
Kiowa	1682 LaSalle	1682 LaSalle
Mandan	1738 LaVerendrye	1738 LaVerendrye
Omaha	1761 (?)	
Oto	1680 LaSalle	
Pawnee	1541 Coronado (?)	1719 DuTisne*
Ponca	1804 Lewis and Clark	
Teton Dakota	1680 LaSalle	1742 LaVerendrye, Jr.
Wichita	1541 Coronado	1719 DuTisne#

After Wissler (1914) except where amended to conform with:

* Haines (1966a,b)

Bell, Jelks and Newcomb (1974)

§ Jablow (1951)

Figure 7-3.

1. From Santa Fe, New Mexico, directly into the Southern Plains to the east, then northward.

2. Up the western flanks of the Rocky Mountains via the Shoshone to the Flathead by 1720. The stock was then traded eastward by the Flathead and Nez Perce to the Northern Plains groups (Crow, Blackfoot, etc.) of eastern Montana and Wyoming.

Interestingly, most tribes came to raid for horses the same groups from whom they had obtained their first animals through trade.

7.2.3.2. Horse Transport vs. Dog Transport

Clark Wissler (1914) was among the first anthropologists to examine the impact of the horse upon Plains culture history. Wissler analyzed the material culture of the pre-horse nomads, who depended upon dogs for traction (among whom were probably the Blackfoot, Shoshoni-Comanche, Kiowa, and Apache; Ewers 1967:494) and noted the presence or absence of a number of traits. He was especially impressed by the existence in pre-horse days of the tipi and travois (a transporting device made of two poles forming a "V" with a baggage area on a platform between them, with the junction of the poles placed over the animal's back). The presence of these and other traits led him to argue that the horse was viewed by the Indians as a "new and superior dog" and that "the whole basic structure of the later horse Indian culture was in existence when the horse came" (Wissler 1914:167,172). Thus, he concludes, "we have found no reason to believe that the introduction of the horse did anything more than intensify and perhaps more completely diffuse the cultural whole previously formed," (Ibid.:172).

Alfred Kroeber (as cited in J.C. Ewers 1967) criticized Wissler's viewpoint on the basis of skepticism that dog nomadism could have provided a productive enough existence to develop many of the elaborate Plains behaviors (eg., tribal gatherings, inter-tribal warfare). In contrast, he insisted that such a lifestyle could only be characterized as "miserably poor" (Ibid.:501).

J. C. Ewers (1967) has provided a classic synthesis of these views in his study of the influence of the horse. He regarded both Wissler's and Kroeber's positions as overstated, pointing to the evidence of thousands of years of successful pedestrian bison hunting on the Plains in response to Kroeber's skepticism. Ewers agreed with Wissler that the dog-traction cultures were "pre-adapted" to the horse and would "readily recognize that horses would be of great advantage to their way of life," (Ibid.:502). However, he saw qualitative changes, as well, which would "alter their habits of daily life, serve to develop new manual and motor skills, (and) change their concept of environment and the social relationship of individuals," (Ibid.:502).

7.2.3.3. Cultural Changes Due to the Introduction of the Horse

The major change preceived by Ewers is the end of the egalitarian social order characteristic of hunting and gathering societies. He saw the development of three intergrading classes, based mostly upon the ownership of horses:

1. A priviliged but responsible upper class;

2. A relatively independent middle class; and

3. A dependent lower class.

Ewers found examples of this sort of social stratification among other horse nomadic cultures around the world.

Most investigators agree with Ewers evaluation of the qualitative effects of the introduction of the horse. For example, Lowie (1954:41) cites that the horse "revolutionized the natives' economic conceptions. It created great differences in wealth and prestige." Spencer, Jennings, et al (1965:382) point to the horse-rich Kiowa as developing the most formalized system of stratification, one with named classes (ngop warrior aristocrat to marginal dapom). Like their northern neighbors, the Kiowa derived most of their prestige and wealth from warfare (in the form of horse raids on Spanish settlements). The Kiowa alone had time to make a critical transition, however. While the Kiowa still reinforced prestige through generosity, the accumulation of wealth had become a legitimate means of validating one's status. Private wealth was not only accumulated, but inheritance provided for its maintenance.

Surely such qualitatively distinct developments as the rise of social stratification and private wealth consequent with the introduction of the horse is not surprising when its utility is considered. In essence, ownership of horses represented control over the means of production: "The economic utility of horses...lay in enabling riders to kill large numbers of big game animals more rapidly and efficiently than was otherwise possible and in facilitating transport," (Lowie 1954:42). This production was not limited to subsistence items but applied as well to materials required for the European trade (Jablow 1951:15). Horses, indeed, could "produce" more horses by virtue of their utility as an instrument of warfare (Ewers, 1967:496). In addition, horses were the favored medium of exchange between a tribe with access to European goods and one without (Jablow 1951:15).

Similarly, it should come as no surprise that the horse would enable and encourage a wave of immigration onto the High Plains. Indeed, Oliver (1962:14) classifies most of the true Plains nomadic tribes as "relatively recent immigrants" who were formerly hunter-gatherers of the Basin-Plateau (Comanche), Athabaskan (Sarsi), or Hudson's Bay (Plains Cree) regions, or farmers from the Great Lakes area (Cheyenne, Crow, Dakota, Arapaho). It should be recalled that the latter groups were already in the process of retreating westward before the better-armed

allies of the fur trading interests. In additon to providing these hard-pressed groups with a new form of livelihood in bison-hunting, adoption of the horse change the military balance of power. Thus, the Siouian tribes were able to stop the advancing Ojibwa in about 1795 (Ewers 1967:496-7). In fact, sedentism became from that point on a serious strategic liability, as was illustrated by the expulsion of the Plains Apache (Secoy 1953:94). This point was no doubt not lost on groups like the Cheyenne, who had remained at least partly horticultural until late in the 18th Century (Jablow 1951). Consequently, by the turn of the 19th Century, the conjunction of a number of interactive factors (the introduction of the gun, the fur trade, and especially the horse) had transformed the potential productivity of the Great Plains, bringing together groups of diverse origin. These groups came into contact not only to pass on the features of the horse complex but also to compete over access to the resources of territory, trade, and horses. Therefore, an ecological system came into being in which humans interacted significantly not only with their environment, but also with other human groups. (Oliver 1962).

7.2.4. Food Acquisition

With the spread of the horse to the natural limits of the Plains by 1800 (Ewers 1967:499) the conditions were complete for the emergence of a fully developed Plains nomadic lifeway. That the groups employing this lifeway based upon use of the horse and hunting of bison share so many social as well as economic features introduces an important problem which will be dealt with systematically from an ecological viewpoint below. However, we must first define the basic characteristics of the horse nomadic subsitence adaptation.

7.2.4.1. Large Game Acqusition

Subsistence activities of the Plains nomads centered around the hunting of large game: elk, deer, antelope, and especially bison. At the most basic level, the dispersion/concentration pattern of the buffalo herds dictated two distinct hunting modes (Lowie 1954:13):

1. Individual stalking
2. The collective hunt

The scattering of the herds in the fall made individual hunting essentially the only viable means of production through the winter season. In contrast, the accumulation of the huge summer herds made collective hunting not only feasable but tremendously productive. Four methods were normally employed in the collective hunt:

1. The surround: The herd is encircled; the hunters then shoot (usually with bow and arrow even after the introduction of firearms) the milling animals. This technique became especially popular after the introduction of horses.

2. Driving the herd off of a cliff: This self-explanitory method could be very productive and has a several thousand year history on the Plains.

3. Impounding: By this method the herd was driven down a funnel consisting of two converging lines of rockpiles, brush, and people making noise and waving blankets. As the herd gets close to the compound escape is prevented by solid fences along the lines. Once the corral is filled it is sealed off and the animals may be killed at their captors' leisure. Impounding corrals were often used in conjunction with cliff jumps if the latter were insufficiently high to cripple or kill the animals.

4. Encircling by grass fire: Another self-explanatory method most popular with groups living on the edge of the prairies to the east of the proposed and alternate routes (Lowie 1954:13).

Antelope were frequently taken by surrounds in a process which was highly ritualized. Among the Cheyenne an "antelope shaman" located the animals and drew them into the trap (Hoebel 1960:65). In contrast, deer and elk were generally stalked individually in the forested river bottoms during the winter (Spencer, Jennings et 1965:356-357).

While collective hunts could involve persons of both sexes and all ages, hunting from horseback was regarded as a male task (Lowie 1954). In the event of a successful hunt, the carcasses would be skinned and butchered by the women among the Dakota (Spencer, Jennings et al 1965: 358) or by the men among the Cheyenne and most other groups (Hoebel 1960 :66; Lowie 1954:80). Work to preserve the meat and hides was in all cases handled by the women. The meat was often cut into strips and dried into jerky (Service 1963:119), which could be subsequently boiled in a stew and eaten or mashed with berry pulp, melted fat, and marrow to produce pemmican, an important food for bands or war parties in transit (Driver 1969:57).

7.2.4.2.1. Large Game Processing. The processing of bison hides was a very important activity as hides provided the primary raw material for Plains nomadic material culture. These hides and skins possessed three characteristics critical to a nomadic people (Spencer, Jennings, et al 1965:362):

1. Lightness of weight
2. Durability
3. Ease of transport

Hides might be left untreated and allowed to cure and shrink stiffly into preformed rawhide objects such as the "parfleche", an envelope-like storage parcel (Lowie 1954:63-65). Skins which were to be tanned were thinned by scrapers and fleshers, stripped of hair when desired by a

drawblade, treated with a tanning concoction of brains, liver, and soapweed, and mechanically softened by pulling over a rawhide rope or through a hole in a bison scapula (Hoebel 1960:62). Important functions for tanned skins were in the production of clothing and tipi covers.

7.2.4.3. Small Game Utilization

Small game and birds (other then eagles caught for their feathers) were virtually ignored among the Plains nomadic tribes. The Cheyenne were one of the few nomadic groups to utilize fish resources, a practice which Hoebel (1960:67) considers basically a survival from their days as a Woodland tribe.

7.2.4.4. Gathering

Gathering was a women's activity among the High Plains groups. Particularly popular and widespread wild vegetal foods included berries, chokecherries (*Prunus melanocarpa*; a favorite ingredient of pemmican), and the prairie or Indian turnip (*Psoralea sp.*) (Lowie 1954:17-18; Hoebel 1960:59-61). Peeled and dried for winter use, the latter item provided the major source of (wild) starch in the nomadic diet. Other localized vegetal foods include wild rice in the Sand Hills of Nebraska and the riverine post oak acorns eaten by the Kiowa. In addition, the nomadic tribes obtained considerable quantities of domesticated crops through exchange with or theft from the semi-sedentary gardeners. This relationship will be discussed in more detail below.

7.2.4.5. Native American/Bison Interrelationship

While possession of the horse made profitable a life based upon the full-time nomadic pursuit of the bison, the horse was not the dominant factor in shaping the cultures of the nomadic Plains peoples (Oliver 1962). The critical element in the Plains cultural formula was the behavior of the all-important prey: the bison. As Oliver succinctly puts it, (Ibid:14-15):

> Fundamentally, the horse was a means to an end. The horse was used to exploit the buffalo efficently. And the buffalo was emphatically not under the control of the Indians. The Indians had to adjust themselves to the habits of the bison, or do without.

The essential feature of bison natural history to which the nomadic groups had to adapt was the animal's yearly cycle. For most of the year, the bison were scattered over the Plains in small groups numbering from twenty to a hundred individuals. It is only during the "running season" from July to October that these little bands accrete themselves into huge herds of thousands of animals, so dense as to "blacken the face of the landscape," (Hornady, as quoted in Oliver 1962:16), and consequently, of course, depopulating the Plains for many miles around the herd itself.

Obviously, if the Plains nomad is to rely on the bison all year long, his yearly schedule must match this annual cycle of dispersion and concentration. During the greater portion of the year that the bison scatter in dispersed small herds (November to June), the nomadic population is forced to likewise disperse into minimal units, specifically, bands. These bands can be defined as "loose congeries of kinsmen, easily joined and easily left, as fluctuations in horse-holdings or hunting chances might dictate", (Sahlins 1968:42). Typical band size among the Kiowa has been cited as 12-50 tipis (i.e., households; Lowie 1954:87).

The tendency to disperse in pursuit of prey (as well as shelter and winter fodder for the horses) is offset by another necessity: that of defense. Given the chronic state of warfare on the Plains, Eggan (as quoted in Oliver 1962:54) outlines the opposing biases clearly:

> The conditions of Plains life demanded a local group small enough to subsist by hunting and gathering, but large enough to furnish protection against hostile war parties and raids. The extended family was adequate for the first condition but was at the mercy of any war party; the tribe, on the other hand, was too unwieldy to act as an economic unit for very long. The band provided an adequate compromise; this is perhaps the most important reason for its almost universal presence in the Plains area.

7.3 Plains Social Organization: Nomads

7.3.1. Tribal Dynamics

The social organization of the Plains groups will be examined almost entirely in the light of its adaptiveness to the Plains ecological situation. (In framing the overview of nomadic social organization in this manner, we are following directly from Chad Oliver's (1962) essential work, "Ecology and Cultural Continuity as Contributing Factors in the Social Organization of the Plains Indians"). An attempt to explain social behavior that is seemingly unsuitable to the horse nomadic way of making a living will be based on the specific history of the tribes exhibiting such behavior. Thus, the analysis shall contrast the sometimes diverging forces of ecological adaptation and cultural continuity to explain Plains social organization.

7.3.1.1. Environmental Influences

Oliver (ibid:17) identifies the following influences of the total ecological situation on Plains nomad cultural behavior:

1. The requirement to disperse in winter and concentrate in summer, mirroring the behavior of the bison.

2. This requirement for alternating patterns of dispersal and concentration made it necessary that society be rather fluidly organized.

3. The collective hunts of the summer required more coordination and central control than the individual hunts carried out during the rest of the year.

4. Mobility was absolutely required for three reasons:
   a. It was necessary to move to find the bison.
   b. With many enemies about, it was strategic folly to stay in one place.
   c. Mobility aided one in obtaining horses by raiding.

5. The presence of hostile competitors made it necessary that a system of rewarding military successes be devised.

6. The crucial role of the horse as the basic instrument of production (and the fact that the supply of horses was limited) encouraged raiding for horses. The successful horse thief gained in body and spirit: his feats as a warrior brought prestige while his spoils (the horses) represented both real and potential wealth.

Looking to ethnographic data on the Plains nomads, we find evidence of systematic cultural responses to the ecological pressures outlined above. There is abundant evidence of social behavior which acted to permit and reinforce this flexibility in social organization: Lowie (1954:88) empasized the fluidity of band membership and the ease with which its composition could change. All nomadic horsemen (except the Crow, who will be discussed below) were organized around the minimal unit of the nuclear family (Spencer, Jennings, et al; 1965:359), which bilaterally reckoned its descent (Ibid:364-5). Tracing kinship through both lines maximized a family's relations and made it easier for it to move from band to band. Looking to the other side of the coin, we find little evidence for kinship structures that would restrict flexibility (e.g. clans) by segmenting the society into formal corporate groups. (Oliver 1962:55-56). Among the characteristics of groups with band-level organizations capable of the fluidity required of the bison hunters are (Ibid:Service 1966):

1. Informal leadership; that is, a position of authority with no power base other than personal influence.

2. The nuclear family as the basic unit of kinship, with descent reckoned bilaterally (as discussed earlier).

3. Personal status based upon individual achievement (rather than hereditary rank).

The Oglala division of the Teton Dakota can provide a specific example of band dynamics (Spencer, Jennings, et al 1965: 359-361). In the fall the Oglala split into relatively large bands generally composed of patrilineally-related nuclear families. As winter descended, these units were further subdivided and each sought out a sheltered locality (forested riverbottom, etc.) for the balance of the bad weather. New bands arose easily by fissioning from population or social stress. Bands often had defined hunting grounds and were thus territorial groups, but were not confined within these boundaries in any strict sense.

The fluidity of band membership and in some sense the transience of the band itself is reflected in the varying figures cited through time for the number of bands composing a single tribal group. For example, the Kiowa are recorded as being divided into from 10 to 20 bands, while the number recorded for the Cheyenne varies from 4 to 13 groups, (Lowie 1954:87; Powers 1971:27).

7.3.1.3. Tribal Organization

With the coming of the "running season", massive congregations of bison made larger human gatherings not only possible but also economically necessary, since by congregating the bison emptied the hunting grounds over much of the tribe's territory. Thus, the collective hunts of the summer were not only extremely productive, but also virtually the only option available. It is for this reason that almost all tribal groups took actions during this period to police the hunt and reinforce tribal solidarity through various rituals (especially the Sun Dance). Summer tribal gatherings often numbered in the thousands of individuals and sometimes followed the Arapaho example of assigning each band to a specific position in the united tribal camp circle (Lowie 1954:87).

Social organization changed as well when the bands come together for the summer tribal hunt. At this time, it was not only possible for the tribe to act as a single economic unit but vital that it act in a cohesive and co-ordinated fashion in order for the hunt to be successful. (Spencer, Jennings, et al, 1965:357). Therefore, the focus of social behavior changed from maintaining a fluid social structure to integrating the members of the various bands and reinforcing a sense of tribal identity. Oliver (1962:54) ascribes part of the motivation to reinforce tribal solidarity among some of the Nomadic Plains groups to cultural continuity from their days as strongly tribal village farmers. He notes that it was among the Cheyenne, Arapaho, and the Teton Dakota, (all former gardeners) that the supreme Plains integrative institution, the Sun Dance ceremony, was begun.

7.3.1.3.1. The Sun Dance. The value of the Sun Dance was clearly established by its spread to nomadic tribes of other origins. The ceremony eventually came to be a major force in restoring the sense of tri

bal unity of every nomadic group but the Comanche. At its most elaborate (among the Dakota), the dance encompassed four days of preliminary activities and four days of the ceremony proper, including diverse rituals, feasting, and the famous climactic self-torture dance (Spencer, Jennings et al, 1965:378-381).

7.3.1.3.2. Tribal Societies. On a more secular level, the Plains tribes were united through the existence of numerous tribal societies whose memberships cut across band division. (Driver 1969:352-354). Again, every Nomadic tribe but the Comanche possessed such associations (Oliver 1962:57). Examples of tribal associations among the Dakota included (Spencer, Jennings, et al 1965:171-2:

1. Societies for men, especially military associations.
2. Feast and dance societies.
3. Dream cults, admission to which was based upon receiving supernatural visions.

Oliver (1962:57) sees tribal societies as providing "an ideal alternative device for structuring the Plains tribes on a non-kinship basis". They assume their most important function when during the summer gathering, one of the military societies is chosen to act as a police force for the encampment and especially, the communal hunt itself. Since discipline and obedience was vital to the success of the hunt, the police society authority (which was quite severe) marked the only time in the year that formal social controls were imposed upon the members of most Plains tribes.

7.3.2 Housing System

The basic item of the Plains nomadic housing system was, of course, the tipi (Driver 1969), a conical tent formed by a framework of poles covered with bison skins. The tipi was an extremely efficient adaptation of the circum-boreal conical tent to the availability of large numbers of bison hides and the horse for transportation (Spencer, Jennings, et al 1965:352). A single tipi generally provided shelter for one nuclear family.

Construction features of the tipi were rather standard across the Plains (Ibid.:352; Lowie 1954:31-32; Driver 1969 121-123; Powers 1971:71-75). Typical dimensions were as follows:

Diameter: 12 to 16 feet
Height: 10-12 feet
Number of hides: 8-20 (average for Crow is 14).

The number of poles was variable, though generally three or four main poles were employed. An important feature of Plains tipis were the

flaps ("ears") which permitted the closing of the smoke hole at the tent's apex in times of bad weather. The entrance was formed by a narrow opening in the hide covering, often shielded by a curtain. The covering itself was held together at a seam by bone or wooden pins, and secured at the lower margin by a ring of stones (except in hot weather, when it was often rolled up a few feet).

The interior of the tipi was often insulated by a liner which hung from poles running about the inner margin of the tent at a height of about 5 feet. The fire was always built in the center of the structure (though cooking was generally done out-of-doors in good weather).

Most groups slept upon robes lying directly upon the ground. The Crow are noted for fabricating backrests composed of woven willow and sinew (Lowie 1954:32). The dwellings have been described as, "warm and comfortable (in winter), although a bit smokey at times," (Spencer, Jennings, et al 1965:352).

Construction, assembly, and disassembly of the tipi were women's chores. The latter two tasks could be done quite quickly and it generally required 2-3 horses to carry the tent (Powers 1971:71). As European trade goods became increasingly available, canvas came to replace hides as a tipi covering and the travois was replaced by the horse-drawn wagon.

7.3.3. Technology

Oliver (1962:67) demonstrates "the crucial role of technology as a prime mover in cultural change" by providing evidence that despite the diverse origins (as village farmers or as hunter/gatherers from the North Woods and the Great Basin) of its bearers, Plains social organization converged on the ecologically adaptive "ideals" above. Further, Oliver is able to identify maladaptive divergences from these ideals as behavior with its roots in the specific histories of the tribes which had immigrated onto the Plains. For example, it is likely that the Cheyenne and Dakota (both originally horticultural tribes for whom clans are useful units) shed their clan systems as they adopted the nomadic lifestyle. The Crow, who alone retained a matrilineal clan system in the Plains, are also former gardeners, so their retention of the system can be accredited to cultural continuity. Similarly, while most tribes recognize no formal authority (except under special conditions: the collective hunt and war), the Cheyenne's formal pattern of chiefdom and tribal council appears to be residual from the tribe's agricultural days.

Both of the cases of maladaptive cultural continuity cited above refer to behavior ascribed originally to horticulturists. Most of the social forms of the prior hunter/gatherers were pre-adapted to bison-hunting nomadism-except during that brief period when the tribe can assemble for the communal hunt. Hence, Oliver imputes the absence of both the Sun Dance and tribal societies from the cultural behavior of the Comanche on their hunter/gatherer origins.

7.3.4. Competition

Oliver recognizes a final ecological factor as affecting Plains cultural behavior. This component was human competition. Hunting territory and horses were both necessary for survival on the Plains and both were finite resources. The struggle to maintain a viable position with regard to land and horses led the various peoples moving into the Plains to develop very similar value systems (Oliver 1962:62-65), systems which extolled:

1. Individual bravery in warfare

2. The ownership and distribution of horses as a means of gaining prestige

3. The combination of the above in the art and business of horse stealing.

All the above forms of achieved status made it possible for hostile tribes to co-exist (however unpeacefully) by preventing (ideally) one group from achieving complete control over the means of subsistence production.

7.3.5. Termination of Nomadism

The period of 1865-1890 saw the end of the Plains Nomadic lifeway. Basic, of course, to this decline was the extermination of the bison herds upon which the Plains peoples were so dependent. Bison-hunting became commercial in 1870, when the animal began to be killed at the rate of a million a year (Riegel and Athearn 1971:442-443). The southern herd reached extinction by 1875 and by the mid-eighties the northern herds were gone as well.

The Native Americans of the Plains attempted to fight back, even forming alliances with traditional enemies and fielding large bodies of warriors to attack the hunters, settlers, and soldiers encroaching on their land (Spencer, Jennings, et al 1965:383). Eventually,however, a combination of military defeats and starvation forced the Plains groups onto reservations, where their nomadic lifeway and the culture based upon it came to an end.

7.4. Tribal Descriptions: Historical/Linguistic Affiliations

7.4.1. Arapaho

Lowie (1954:192) describes the Algonkian group to which the Arapaho belong as "very different from other Algonkian tongues, and concludes that it diverged long ago. He cites Kroeber as believing the Arapaho to be the ancient occupants of the Northern Plains and the eastern Rocky

Mountains foothills, Terrell (1971:288) states that their "earliest known home was in northern Minnesota in the Red River Valley, where they dwelt in permanent villages". First European contact was with Lewis and Clark in 1804. Pushed out of Minnesota by the Siouian movement westward, the tribe became permanently allied with the Cheyenne. The tribe divided in historic times into two groups, the Northern Arapaho, living in Wyoming at the headwaters of the North Platte River, and the Southern Arapaho, occupying the Upper Arkansas River in eastern Colorado. They eventually allied with the Sioux, Kiowa, and Comanche against the whites.

7.4.2. Cheyenne

First referred to by Europeans in 1673, the Cheyenne appeared on a map of Joliet and Franquelin living east of the Mississippi River some distance above the Wisconsin River (Jablow 1951). The tribe appears twice more on Franquelin maps, in 1688 as living on the Minnesota River and in 1700 residing on the Sheyenne River in North Dakota. This movement was apparently under pressure from the westward-moving Dakota (Jablow 1951; Terrell 1971). They were then driven on to the Missouri River by the Dakota and Assiniboine, where they made the transition to equestrian nomadism by 1795, when they were observed camping near the Arikara by Trudeau. The last reference to Cheyenne horticulture is in 1802, when Perrin du Lac observed the planting of maize and tobbaco. By 1804 the tribe was in the Black Hills region of South Dakota (Lowie 1954).

7.4.3. Crow

Both legends and linguistic evidence support the hypothesis of the recent division of the Crow from the Hidatsa (Lowie 1954). Further proof is said to have been found in a village site in an area of Montana near Glendive which was later known as Crow territory. The site yielded an earthlodge and many cache pits. The bison scapula hoes, ceramics, and lithics all resemble Hidatsa models. Equestrian Crow territory ranged from the Big Horn Mountains to the Wind River to the Powder, Tongue, and Yellowstone Rivers, then to the Wind River Mountains (Terrell 1971).

7.4.4. Kiowa

No historical evidence places the Kiowa off the Plains (Lowie 1954). Linguistically, the group is related to the Tanoan (Eastern Pueblo) family. The Kiowa moved from the Northern and Central Plains to the Southern Plains in the 18th Century, where they came into conflict with the Comanches (Spencer, Jennings et al 1965). First contact of the Kiowa with Europeans was probably in a meeting on the Missouri River with LaSalle (Wissler 1914). By the end of the 18th Century they had become allied with the Comanches and co-operated in raids on the Spanish. Their territory included "contiguous parts of Oklahoma, Kansas, Colorado, New Mexico and Texas", (Terrell 1971).

7.4.5. Kiowa-Apache

The Kiowa-Apache were apparently long-time inhabitants of the area, especially southwest Oklahoma (Lowie 1954). First contact with the Europeans was in meeting LaSalle near the Missouri River (Wissler 1914). The Kiowa-Apache attached themselves as a band to the Kiowa for the Sun Dance but retained their identity and language. (They communicated with the Kiowa via sign language).

7.4.6. Teton Dakota

When first seen by Europeans (LaSalle in 1680) the Teton Dakota were a "forest people occupying the territory from the Upper Misissippi to the headwaters of the Minnesota River", (Lowie 1954:189). The Dakota were pressed westward from this area in the 17th Century due to pressure from the European-armed Chippewa, Cree, and Ojibwa. By 1742 they had reached the High Plains and obtained their first horses (Wissler 1914). By the end of the 18th Century this aggressive tribe's territory extended from Canada to the Platte River, Minnesota to the Yellowstone, and from the Black Hills to the Powder River (Terrell 1971).

7.5 Plains Culture: Semi-Sedentary Tribes

7.5.1. Introduction

As demonstrated in the preceeding Plains archeological synthesis semi-sedentary agriculture has been practiced on the Plains for about 1000 years. Further, archeologists using the direct historic approach of working backwards in time from sites of known ethnic affiliation have had notable success on the Plains. Thus, we can with some confidence identify many of the archeological ancestors of the Plains village tribes. While this material has largely been covered in the archeological synthesis, it shall be reviewed in the section which briefly outlines the antecedents and affilliations of each group on a tribe-by-tribe basis.

7.5.2. Environmental Factors

As the term "semi-sedentary" of course implies, the horticulturalists of the tall-grass prairie spent a portion of their yearly round away from their permanent villages. Time away from the village was generally spent in hunting activities, especially those aimed at the bison (Newcomb and Field 1974; Lowie 1954; Meyer 1977). However, the scheduling and the precise character of the subsistence calendar was quite variable from group to group. Some of the reasons for this variability seems to include:

1. The severity of the local climate (Lowie 1954:29).
2. The presence of hostile tribes in the surrounding countryside (Meyer 1977:65).

3. The abundant local availability of game (Newcomb and Field 1974:348).

Severity of climate was an important factor in the migratory round of Mandan and Hidatsa (Lowie 1954; Meyer 1977). The "permanent" villages of these groups were located on terraces above the forested floodplain so that the houses would be free from the danger of summer flooding. During the winter, however, these structures received the full force of cold fronts and were distinctly uncomfortable. In order to avoid this situation, tribes people would scatter down into the seasonally dry and sheltered forested riverbeds. There they would build smaller, cruder versions of their summer earth lodges. In addition to shelter, these riverbottoms would offer firewood as well.

During the summer, these same groups found their mobility severely restricted by the presence of their enemies (Meyer 1977:65). As a result, they dared not venture more than 40 miles from their fortified base villages.

7.5.3. A Typical Year of Semi-sedentary Groups

Considering both these factors, we may now outline the subsistence year of the Middle Missouri groups, the Mandan and Hidatsa. The agricultural year would begin in April, with the movement into the summer permanent villages and the initial agricultural activity of field preparation. Planting would take place in May. The Mandan and Hidatsa, unlike the Pawnee of the Central Plains, remained to watch over their crops through the growing season. Simultaneously, summer hunting parties would venture out onto the Plains. However, as mentioned, the presence of enemies greatly restricted the duration and distance of these forays. The summer hunting parties occupied skin tipis which were smaller duplicates of those used by the full-time nomads (Lowie 1954:29). Harvests began with the squash in August and continued until the end of fall and the dispersion into the sheltered riverbottom communities previously described (Meyer 1977:64-65). The major subsistence activity of the winter was individual bison stalking in the bottomlands.

In contrast to the Middle Missouri groups, the Pawnee of the Central Plains remained out of their main villages for virtually the entire year (Lowie 1954). They would abandon their villages in mid-June after the second hoeing of the maize for a major communal bison hunt. Returning in September, they would harvest and store the crops, and then depart again for a winter season of band-level hunting on the model of full-time nomads. With the coming of April, they would return for the spring planting.

La Harpe reported in 1719 that the Wichita, the most southerly group, followed a dual subsistence pattern. This includes " a sedentary gardening existence from spring through harvest in the fall,[and] a nomadic hunting life from late fall to spring "(Newcomb and Field 1974: 348).

Lowie (1954:18) contends that the importance of agriculture to the Plains as a whole has been undervalued by most investigators, who have erred in:

1) minimizing agriculture's place among the villagers;

2) ignoring that even the nomads obtained farm products from semi-sedentary groups in exchange for poultry, horses and sometimes European trade goods.

7.5.4. Agricultural Practices

Agriculture is generally considered to have been complementary to hunting activity and supplied about 50% of the food supply of the semi-sedentary peoples (Newcomb and Field 1974:343;Lowie 1954:18). Major crops grown included maize, beans, squash, pumpkins, sunflowers and tobacco. Since all the horticultural groups employed only the crudest of agricultural implements (bison scapula hoes, digging sticks and rakes) which were incapable of breaking the tough prairie sod, they were restricted to the soft, sandy soil of the river bottoms. Bottomland soils also had the advantage of a higher level of soil moisture, reducing the likelihood of crop failure due to drought (Spencer, Jennings, et al.1965:342-345). Plots were generally cultivated for two to three years, then abandoned (Meyer 1977:64). While there was apparently no serious competition for land in the Missori River area, soil exhaustion often made it necessary for gardeners to travel 5-8 miles to their plots, a practice made practical by the adoption of the horse. A description of the Hidatsa agricultural cycle can be considered representative of semi-sedentary horticulture (Spencer, Jennings, et al 1965: 343-345).

7.5.4.1. Maize

Maize was the staple of the Hidatsa diet, with most plots devoted to its cultivation. The layout of maize plots was rectangular with each plot 5 to 6 acres in area. Adjacent plots were separated by four-foot wide uncultivated strips. The soil was loosened and then mounded into rows of small hills with the digging stick and hoe. These mounds were aligned in rows about four feet apart. Six to eight seeds were pressed into each hill. Maize was planted on several successive occasions to provide a continuous supply of green corn. Hoeing to kill weeds took place when the maize sprouts were about three inches high. At the same time any mound which had not yet sprouted was replanted.

Corn harvested green was:

1. Left in the field overnight after picking;
2. On the following morning, it was carried to the village and husked;

3. The ears were boiled briefly;
4. They were then placed on racks to dry overnight;
5. Cobs were shelled "by running a pointed stick between the rows of kernels and then shelling the loosened kernels with the thumb" (Ibid:344);
6. Dried on skins for a few days;
7. Winnowed to remove chaff; and
8. Placed in skin bags for storage in the cache pits.

Most of the corn crop, however, was harvested after ripening. It was processed through the following stages:

1. Harvested by the entire family, with a feast in the field following the work.
2. The bulk of the corn was husked in the field and carried to the village in special baskets.
3. The "largest and finest" ears were selected, partially husked, and strung on braids to be carried to the village and preserved to seed the following year's crop.
4. Ordinary ears were laid out on racks for a week or so until dried.
5. The dried corn was then separated from the cobs of threshing with hardwood flails.
6. The cobs were burned for fuel, and
7. The corn was sacked for storage.

Dried corn was utilized by pounding into a meal and adding this substance to vegetable and meat dishes to produce a kind of mush. An upright wooden mortar of general Eastern Woodland character rather than a mano and metate was used to pulverize the corn.

7.5.4.2. Sunflowers

Sunflowers were planted at the margins of the maize plots. Seeds were again placed in small mounds, these ten feet apart. The sunflower seeds were parched and ground to provide another thickener for meat and vegetable dishes. Compressed balls of this meal were often used as a mobile food supply for hunting or raiding parties.

7.5.4.3. Beans

Beans were generally planted in hills between the rows of maize, or less commonly, in plots of their own.

7.5.4.4. Squash

Squash required separate plots to avoid shading by the tall maize plants. The vegetables produced were small, round, and of various

colors. The crop was sliced, strung, and dried on a long pole. Dried squash had a long storage life and was employed as an ingredient in corn and meat dishes.

7.5.4.5. Tobacco

Tobacco cultivation, considered a sacred practice, was confined to old men among the Hidatsa. It was grown in fenced gardens (mean size, 21 X 18 feet) in the early spring. The blossoms were picked in June and the leaves before the first frost, and its use was reserved for solemn or ceremonial occasions (Lowie 1954:28-29). The prevalent mode of smoking was with a pipe.

Agricultural fieldwork was done by women, assisted by children. Seasonal peaks in labor requirements brought in many workers, including young men. Agricultural products belonged to the women who produced them, and these women distributed the produce among the nuclear families within the extended family household.

7.5.5. Hunting Practices

Semi-sedentary bison hunting activity generally took the same form as that of the full-time nomads already described and therefore need not be repeated. The river valley village dwellers (with the exception of the Wichita) did make more use of fish resources, though the food never became a staple. Its utilization is evidenced, however, by the "considerable" quantities of catfish remains found at Mandan and Hisatsa sites (Lowie 1965:17).

The Mandan and Hidatsa also harvested a rather unusual source of protein: it seems they relished the half-rotten carcasses of drowned bison that drifted down the rivers every spring and would fearlessly leap from ice flow to ice flow in pursuit of such floating delicacies (Meyer 1977:65).

As among the nomads, hunting was done by males, usually in extended family units. The Mandan did exploit smaller mammals somewhat extensively, a significant variance from the nomads' reliance on large game (Spencer, Jennings, et al 1965:345).

7.6. Plains Social Organization: Semi-sedentary Villagers

The settlement systems of the semi-sedentary tribes has already been briefly outlined during the discussion of the annual rounds of several groups. We may now turn to a more detailed examinated of the geography, community patterning, and housing systems of these village farmers.

7.6.1. Tribal Organization

Just as the social organization of the nomadic peoples was at least in part an adaptation to their mobility, that of the village farmers

reflects their part-time sedentism. The basic kinship and economic unit among the Missouri River villagers was the extended family household (Spencer, Jennings et al 1965:345-347). The household consisted of the several nuclear families related through the female line that occupied a single lodge. Unilineal descent and matrilocal residency created lineages from groups of extended family households. These lineages in turn formed the land-holding bodies, with tenure to particular plots at the level of the household. (That is, a household continued to "own" a particular plot of land as long as it used it consistently).

Lineages were in turn grouped into clans (matri-sibs). Clan leadership was provided by male clan members who, because they had to marry outside the clan (clan exogamy) and reside with their wives' mothers (matrilocality), did not live in clan households. There were 13 such clans scattered through the Mandan villages of the early 19th Century (Ibid.:346). The clans functioned mainly as mutual-aid groups, especially in economic activity or in seeking vengeance. The clans were competitive in warfare and were ranked somewhat, mostly due to long ownership of certain sacred articles within particular clan lineages.

On the political level, a single village might constitute a political unit (as among the Chavi Pawnee) or such a unit might encompass a number of villages (Skidi Pawnee: 13 villages; Lowie 1954:89). Thirteen villages were once ascribed to the Mandan tribe, although by 1833 this number had declined to two. The semi-autonomous nature of Mandan and Hidatsa villages is evidenced in that there was some cultural and linguistic differentiation between villages.

7.6.2. Village Organization

Spencer, Jennings, et al (1965:341) provides an excellent introductory picture for the Mandan:

> [Mandan settlements were] located on benches or terraces along the Missouri River, usually at points where tributary streams entered. These locations gave them steep river banks as protection on two sides of their village and to protect the open sides, they constructed palisades of upright posts surrounded by a 10 to 15 foot-wide ditch. Early descriptions of their villages indicate a formal town plan with streets and a cental plaza, but this plan was not seen in the nineteenth century villages when houses were located irregularly. The houses were clustered close together and the intervening area covered with pole drying-racks. Their houses...surrounded a large open space in the center of the village where the Sacred Arc was located. The central plaza was the focal point of the community for it was here that the ceremonies were held and the competitive games were played.

The placement of villages upon the first terrace above the river provided protection from the spring floods but kept the village within easy access to riverine and bottomland resources: fish, bison, carcasses, and wood for fuel and construction, (Meyer 1971:1-3). Indeed, Meyer cites exhaustion of firewood as the most common reason for moving a village. In the Middle Missouri River region villages were generally confined to the Missouri River, itself, with the tributaries used only for transportation (Ibid:4). The tendency cited above to choose defensible sites persisted until well into the 19th Century, but Meyer (Ibid:62:63) believes that the availability of firewood and arable land became a more decisive factor.

Turning to the village plan of the Middle Missouri tribes, a focus upon ceremonial structures is seen among the Mandan and Arikara (Ibid:52-63). The Mandan ceremonial lodge lay on the north side of a plaza 150 feet in diameter. In the center of this plaza stood the sacred cedar pole, surrounded by a circular plank fence. The ceremonial lodge boasted a "flat front", rather than the circular design prevalent for historic dwelling lodges. The Arikara, on the other hand, had round ceremonial lodges located in the center of their villages and surrounded by an open dance area, which did not have a sacred post. The Hidatsa completely lacked ceremonial lodges until late historic times and it is similarly questionable if their village plan exhibited a plaza until very late.

Permanent settlements in the Central Plains were also fortified, (Lowie 1954:29). The Pawnee enclosed their lodges in a three to four foot embankment fronted by a three feet deep, five feet wide trench. Among the Omaha, there was no order to the layout of the lodges.

The Wichita of the Southern Plains also fortified their villages. A palisaded village with surrounding trench and rampart was described by Antonio Trevino, a former captive, in 1765 (quoted in Newcomb and Field 1974:301). Excavations at the Longest Site, a documented Wichita site on the Red River in Jefferson County, Oklahoma, revealed a portion of a large oval defensive earthwork in 1967 (Bell and Bastian 1974:80,144).

Village size among the Missouri River tribes had decreased from a peak of about 150 houses per village in protohistoric times to 38 and 65 lodges in the two Arikara villages visited by Maxmillian in the 1830's (Meyer 1977:62). Du Tisne counted 130 houses and 700 warriors at a Wichita village he visited in 1719 (Newcomb and Field 1974:286).

7.6.3. The Housing System

The housing systems of the semi-sedentary villagers has been extensively described (Lowie 1954: Spencer, Jennings, et al 1965; Meyer 1977). The major house types used in the permanent villages in historic times were:

1. The earth lodge of the Middle Missouri and Central Plains regions.

2. The grass lodge of the Wichita of the Southern Plains.

The architects and builders of the earth lodges were women, though males assisted in raising some of the heaviest timers (Meyer 1977:61; Lowie 1954:32-34). Lowie (Ibid) and Spencer, Jennings, et al (1965:341, 342) provide the sources for the following general description of earth lodge construction and design. The structures were (in historic times) circular and dome-shaped, and entered by a covered passageway. The lodges were quite spacious, as indicated by the following tribal ranges:

Hidatsa: Height = 11-13 feet
Diameter = 42-50 feet

Pawnee: Diameter = 46 feet, North-South by 44.5 feet East-West

Ceremonial structures could be much larger, including archeological examples with diameters of over 100 feet. The average duration of a lodge among the Hidatsa was 7-10 years, and typical capacity was up to 40 persons.

The erection of a new lodge was a collective effort, rewarded by a feast given by the lodge's owners. The core of the lodge consisted of a framework of vertical supporting logs connected by slender rafters. The central support logs numbered from 4 to 8 (though 4 was regarded as the "ceremonially proper" number) and averaged 10 feet high. Circling these central massive posts along the outer circumference of the lodge were a large number of smaller erect posts whose summits were joined by stringers. The rafter poles radiated from the center of the structure, resting upon the lintels topping the central posts and the stringers connecting the outer post circle. In addition, short poles were sometimes set next to one another around the outer ring of posts and slanted inward to lean against the ends of the rafters, in order to provide more floor space for storage. The framework was covered over by successive layers of willow branches, thatching, sod and earth.

The tunnel-like entryway was similarly constructed and varied from 6-10 feet long. The openings at either end of the entry were sealed by hanging skin drapes. In addition, an upright plant palisade just inside the inner doorway served to break drafts.

The floor of the earth lodge may be excavated slightly below the surrounding ground level, resulting in a semi-subterranean dwelling. Pawnee people excavated their lodges in such a manner as to create an earthen bench running around the circumference of the structure. A fire was built in the center of the lodge, whose roof was provided with an opening as a smoke vent. This opening was often covered by an old hide bull-boat in inclement weather. The flattened tops of the lodges were strong enough to bear considerable weight and were often used as a surface for drying maize or to support spectators at ceremonial events (Powers 1971:65).

The interior of a typical earth lodge has been described as "spacious, warm, and well-insulated", (Spencer, Jennings et al 1965:341). The lodge usually was laid out in several fairly well-defined activity areas (Figure 7-4):

1. A section of the lodge, often at the rear, is reserved for ceremonial articles such as sacred bundles.

2. Beds formed a circle about the lodge, usually lying between the posts of the outer framework circle. The beds were elevated boxes formed by covering upright corner posts with a skin canopy. Privacy was provided by closing the box opening with a curtain. There might be 6 or so bed boxes per lodge.

3. Storage platforms also often circled the wall of the structure.

4. Favorite horses were often corraled at night within the structure.

5. Large jug-shaped cache pits were often found both within and outside the lodge. If such a pit became damp and "sour", it would be used as a trash recepticle.

6. Backrests, bison robes, and perhaps a bed circled the fire, forming a warm and comfortable place for visitors and old males to sit.

The Witchita often employed a form of grass house similar to those of the Caddo and other Southeastern groups (Lowie 1954:35; Newcomb and Field 1924). It was constructed by planting a circle of stout but flexible poles into the ground. The tops of these shafts were then bent inward and joined at the ends to form a conical framwork, typically 10-20 feet high (Powers 1971). A covering of grass thatch was then tied to willows horizontally through this frame.

In addition, the Wichita would often build open-sided oval arbors of similar construction near their lodges. These were used for various activities in good weather (Ibid:73-73). The explorer LaHarpe described the Wichita use of wattle and daub structures in 1719 (Newcomb and Field 1974:353).

Those semi-sedentary groups which embarked on communal hunts employed tipis, as described before. Just as among the full-time nomads, groups had formal communal camping patterns, the Ponca forming three concentric circles of tipis, and the Omaha, two circles (Powers 1971:69-70).

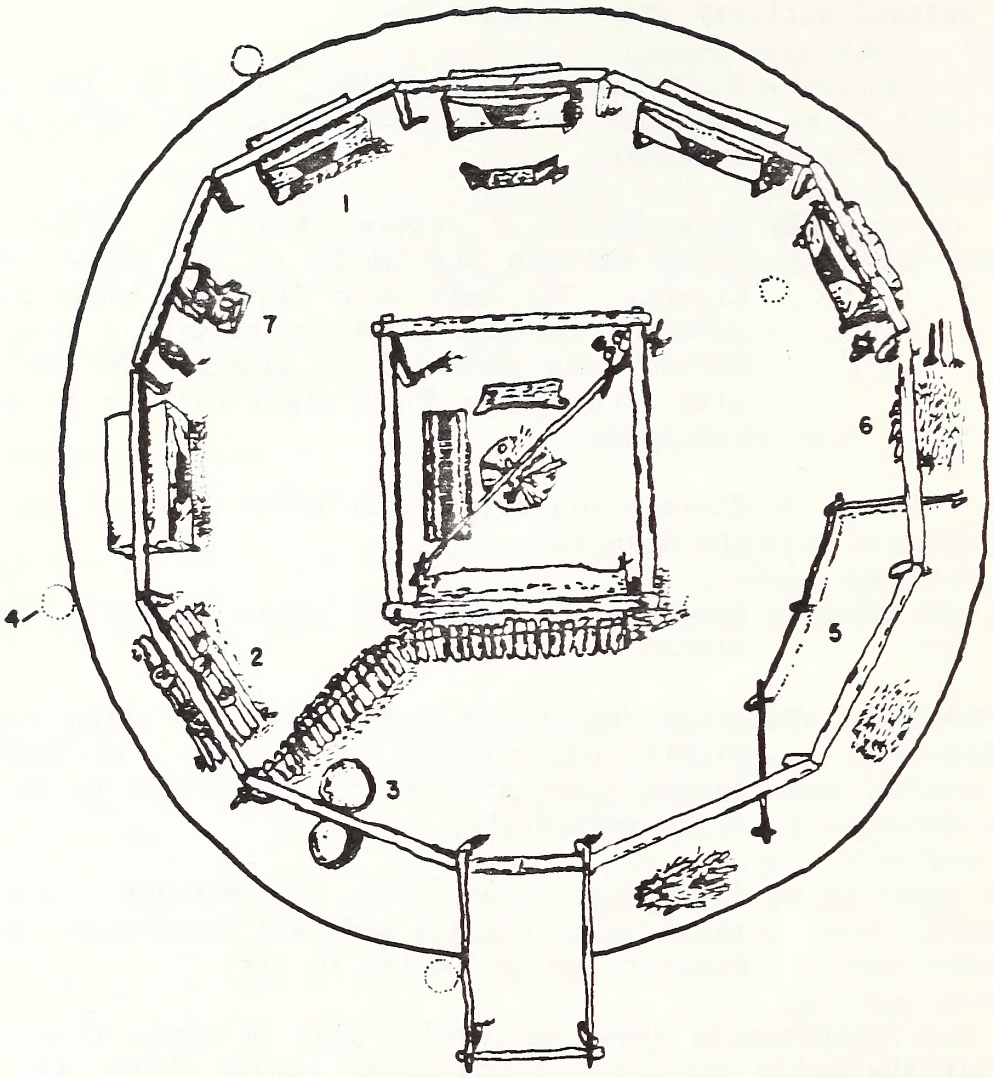


Diagram of a Twelve-post Earthlodge, Hidatsa.

Explanation

1 Bed
2 Food Platform
3 Bull Boats
4 Cache Pit
5 Horse Corral
6 Firewood
7 Shrine

Figure 7-4 Hidatsa Earth Lodge. (From Indians of the Plains, by Robert Lowie, American Museum of Natural History, 1954. Used by Permission.)

7.6.8. Material Differences Between Nomad and Semi-sedentary Cultures

Differences in material culture between the nomads of the High Plains and the villagers centered, of course, around sedentism and agriculture. The villagers produced pottery until its use was supplanted by trade wares (in 1840 for the Middle Missouri region; Meyer 1971:66). Similarly, they employed scapula, and later iron hoes. Wooden mortars were employed to grind grain, and the cache pit was of course a product of at least temporary sedentism.

7.6.9. Cultural Intercouse Between the Nomadic and Semi-sedentary Cultures

Intercourse between the nomads of the High Plains and the village Indians antedates the rise of the horse complex, as witnessed by the record of Coranado. In 1541 he observed pedestrian nomads exchanging robes for maize from the villagers (Lowie 1954:18) with the rise of horse nomadism, the relations of exchange became more intense and took an additional form: raiding, as well as bartering (Spencer, Jennings et al 1965:351). For example, the Dakota regularly raided the Mandan and Hidatsa, while the Cheyenne struck against the Pawnee (Ibid; Jablow 1951:16).

Raiding did not put an end to barter. Given the military superiority of the nomads, however, exchange was often an unequal process. For example, the Teton Dakota subjugated the Arikara in this manner and resisted efforts of the Cheyenne to break their trading monopoly (Jablow 1951: Spencer, Jennings, et al 1965:351).

Items exchanged often included (Driver 1969:214-216):

1. From the nomads: horses, dried meat, fat, wild turnip flour, dressed hides, tipis, bison robes and other furs, and items of clothing.

2. From the villagers: corn, beans, pumpkins, tomato, and, importantly after 1800, quantities of European trade goods.

The villagers were the first groups to deveolop trade relations with the European fur traders, not only acting as middlemen for furs from the Plains, but also provisioning the traders with agricultural produce (Jablow 1951:22). As mentioned before, the dynamics of the trade in European goods and horses was constantly shifting on the Plains and its peripheries and acted to increase intertribal conflict.

7.7. Decline of the Semi-sedentary Cultures

The decline of the Plains village tribes was largely a result of their sedentism. Because they were concentrated into villages, these peoples were much more severely struck by European diseases, especially smallpox, than the nomads, (Lowie 1954:11). The sedentary tribes were

particularly hard-hit by smallpox epidemics of 1781, 1802, and 1837 with the Mandan reduced to only 300 after the attack of 1837. Displacement and cultural disintegration was hastened by white settlement of their lands in the last half of the 19th Century.

7.8. Tribal Descriptions: Historical/Linguistic Affiliations

7.8.1. Arikara

As one of the Plains Caddoan tribes, Lowie (1954:190-191) links the Arikara to the Southeast. He further contends that their split from the Pawnee was recent, since the languages differ only at a dialectical level. Meyer (1977:7-10) traces the movement of the Proto-Arikara north from the Central Plains and onto the Big Bend of the Missouri River after AD 1400, probably in response to a prolonged drought in the Upper Republican River area. The Arikara contacted a southward-moving wave of Mandan peoples in the Bad and Cheyenne River regions of South Dakota, with conflict developing by AD 1450, probably in response to a prolonged drought in the Upper Republican River area. The Mandan then withdrew north of the present northern South Dakota border, eventually to the Cannonball River in North Dakota. Arikara influence on Mandan housing may be evidenced by the latter's change from rectangular to round houses. The blending of Central Plains Tradition and Middle Missouri has been termed by Lehmer the "Coalescent Tradition" (Jennings 1974:276,279). The Arikara had their first dealings with French traders near the mouth of the Cannonball River of North Dakota (Terrell, 1971, 261).

7.8.2. Hidatsa

Meyer (1977:10-11) calls the Hidatsa recent arrivals from the East who settled with the Mandans peacefully about AD 1550. The Crow in turn split from the Hidatsa some time later (Lowie 1954).

7.8.3. Kansa

Wedel (1964) considered the Kansa late-comers onto the Plains on the evidence of their use of bark-or mat-covered dwellings in addition to earth lodges. The Kansas are probably represented archeologically by the White Rock Aspect. Their villages stood on the Kansas River in 1601 when first encountered by Onate, and they remained in that vicinity until removal to Indian Territory in the 19th Century (Terrell 1971:282).

7.8.4. Mandan

The Mandan are affiliated linguistically with the Winnebago and Tutelo of the Eastern Woodlands (Terrell 1971:265-6). By the 1700's all Mandan villages were confined to a 20 mile radius around the juncture of the Heart and Missouri Rivers. Villages grew larger than their predecessors and were more fortified, probably in response to Arikara hostility (Meyer 1977:8-9). Smallpox reduced the Mandan to two villages by 1840, both on the junction of the Knife and Missouri Rivers (Terrell 1971:266).

7.8.5. Omaha and Ponca

These tribes resided together at the Catlinite Quarry area of Minnesota until about AD 1630. They retreated under Dakota pressure westward to White River, South Dakota, where they split in about 1650. The Ponca moved on westward to the Missouri River and the Black Hills, while the Omaha settled on Bow Creek, Nebraska. The Ponca later rejoined them and they resided "west of the Missouri River between the Platte and Niobrara Rivers" until removed to Indian Territory, (Terrell 1971:275-276).

7.8.6. Oto

Lowie (1954:189) calls the Oto language closely related to that of the Winnebago, a Woodland tribe. East of the Plains there is good archeological evidence to link the Oto to the Oneota Culture (Wedel 1968).

7.8.7. Pawnee

Another of the Caddoan Plains tribes, the Pawnee are identified archeologically with the Lower Loup focus in protohistoric times. These sites were scattered about the confluence of the Loup and Platte Rivers (Wedel 1964). The historic Pawnee fought the Sioux, Osage, and other Siouian groups and was always allied with the Federal government (Powers 1971:50).

7.8.8. Wichita

The Wichita are identified archeologically by Wedel (1964:206) with the protohistoric Great Bend aspect of the Walnut and other major tributaries of the Arkansas River. When first observed by Coronoado in 1541, the Wichita (then termed the Quivera) were living in villages on the Great Bend of the Arkansas River in Kansas (Terrell 1971: 331-332). These settlements were abandoned by the early 18th Century (Wedel 1961:454). Lorrain (1974:61-63) suggests that the Wichita peoples (represented archeologically by the Little River focus of Kansas, the Washita River focus of Oklahoma, and the Henrietta focus of North Texas) moved eastward in response to drought or some other pressure to settle adjacent to the Fulton aspect Caddoan sites of the Arkansas-Texas-Oklahoma area. This would account for the sudden appearance of Plains artifacts (Harahey knives, etc.) in Fulton assemblages and the adoption of Caddoan pottery and extended burial by the Wichita of the Norteno focus. With the arrival of the horse, and perhaps better weather, the Wichita peoples moved westward again by AD 1700 but Osage pressure steered them to the south, then west again. By 1800 the whole body of Wichitas were settled in the old Henrietta focus area of north-central Texas.

8. OZARKS ETHNOLOGY

8.1. Introduction

The absence of permanent habitation of the Arkansas Ozarks by Native American groups during early historic times forms an interesting problem in that region's culture history. It appears that the area of Northwest Arkansas was claimed by the Osage during the Contact period as part of their territory. However, this area was only used as a hunting preserve, not as an area of permanent residence (Chapman 1974, McNair 1960). The major villages of the Osage were located in the Upper Osage River Valley. Very little is known about the use of the Arkansas Ozarks by the Osage. Therefore, the Osage will be discussed in the geographical context in which they were found: the state of Missouri.

8.2. Background

The Osage share an origin legend with the Omaha, Ponca, and Oto tribes. They state that at one time they were all one people and then split into different political units at the time of historic contact. The Osage language is part of the Diaghen Seocian stock. It is felt that the geographical range of the Osage at contact extended from the Missouri River on the north to the Red River on the south and from the Mississippi River on the east to the margin of the Llano Estacado of western Oklahoma and northeastern Texas on the west (Figure 8-1) (Marriott 1974).

8.3. First Contact Situations and Accounts

In 1673 Father Pierre Marquette located the Osage on the Osage River, a tributary of the Missouri. In 1687 LaSalle encountered the Osage six leagues above the mouth of the Illinois.

> We crossed the Ouabache (Wabash?) there on the 26th of August, 1687, and found it a full sixty leagues to the mouth of the Illinois, still ascending the Colbert (the Mississippi). About six leagues above this mouth there is on the northwest the famous village of the Massourites, or Osages, at least as large as the river into which it empties; it is formed of a number of other known rivers, everywhere navigable, and inhabited by many populous tribes. . . They include also the Osages, who have 17 villages on the river of their name. . . (Nasatir, 1952:346).

The French proceeded to spread south and westward from their posts in Illinois. In 1703 the French entered Oklahoma through Osage Country.

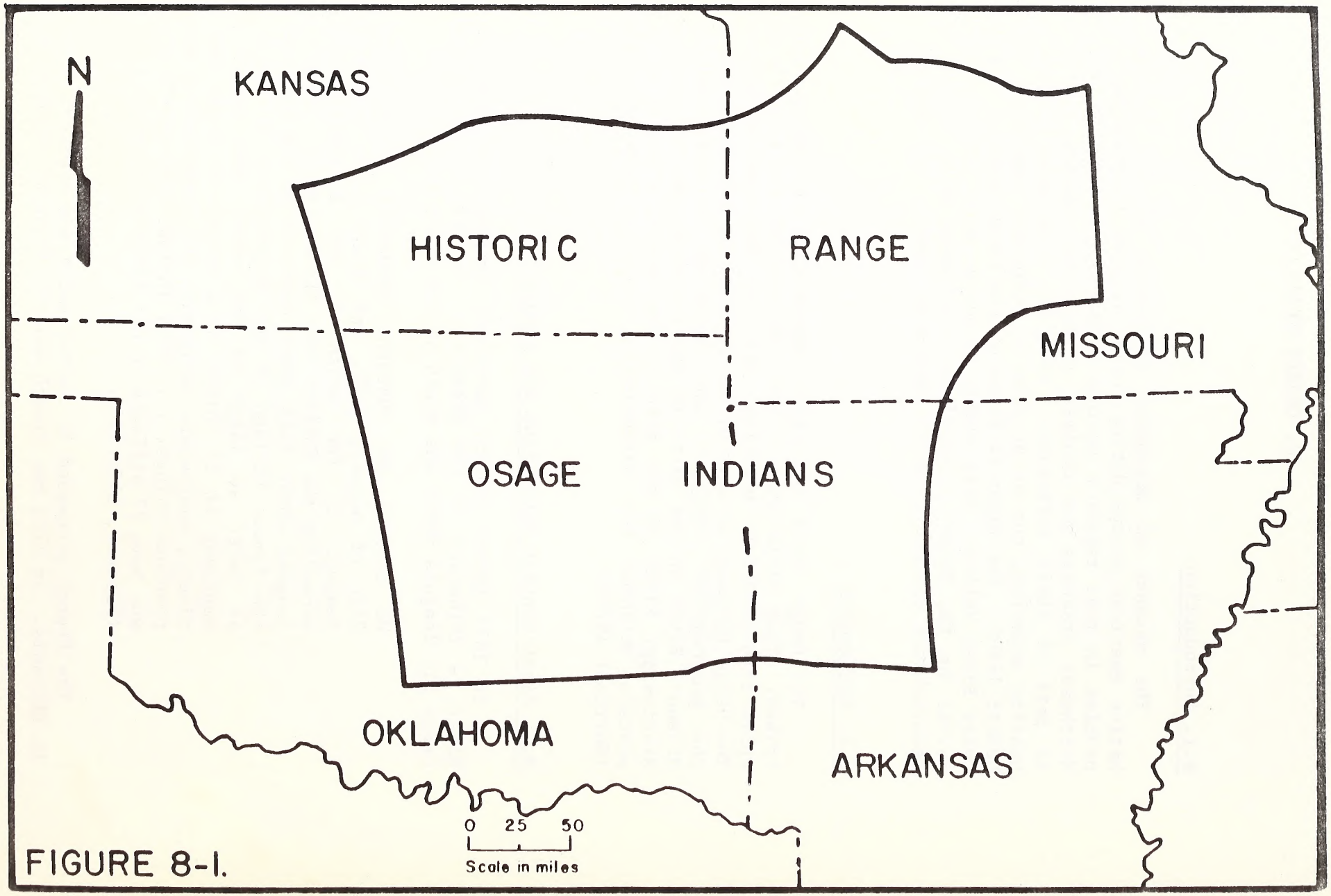

N
KANSAS
HISTORIC
RANGE
MISSOURI
OSAGE
INDIANS
OKLAHOMA
ARKANSAS
0 25 50
Scale in miles

FIGURE 8-1.

As early as 1703 the French traded with outposts in New Mexico (Thomas 1928). In 1719 Du Tisne became the first official visitor to visit the Osage.

> Du Tisne, at the order of Governor Bienville, sought to visit the Paniouassas by way of the Missouri River. He could not, however, reach his destination, because the Missouri Indians forced him to remain with them, a circumstance which obliged him to return to the Illinois and offer himself to Commander Boisbriant in order to go by land. With the Commandant's permission, Du Tisne in the spring of 1719 set out from the Kaskaskia, intending to visit the Missouris, Osages, Panis, and Padoucahs. Ascending the Missouri to the Osage, and up that river 80 leagues to the Osage villages, Du Tisne became the first official visitor to arrive among them, though, doubtless, independent or individual traders had frequented the district for many years. He found an Osage village on a height of one and one-half leagues northwest of the river, a village of 'one hundred cabanes and two hundred warriers'. Du Tisne traded with these folk, obtaining some horses, which the Osages had stolen from the Panis, and some skins. He described the Osages as well-built savages, having several chiefs of the various bands, though these leaders seemed to wield little power; he added that the Osages were sly and treacherous, and given to breaking their word (Nasatir 1952:18-19).

After the visit of Du Tisne it became one of the chief functions of the French outposts to report on the actions of the Osage. At about this time an account of Osage population in various villages was published anonymously.

The population list is as follows:

Osage - Grand Village	1695
Osage - Petit Village	824
Osage - Kansa	1500

The size of the Osage appears to have been at its historic maximum at this point in time.

Throughout the first half of the eighteenth century control of Osage territory passed back and forth between France and Spain. Each needed this territory as a buffer against English expansion policies. However, one of the regions major attractions was the slave market. The Osage captured Pawnee and sold them to the French or Spanish.

8.4. Economy and Material Culture

The Osage were primarily a hunting and gathering people, but small scale agriculture also played a part in their subsistence pattern. Very few early documents pay attention to the subsistence pattern of the Osage. Probably the best description comes from Tixler (1940) who observed the Osage in 1839.

> One of our years corresponds to two years of the Osage calendar, autumn-year. Each one has its hunting. The autumn-year begins in October and ends in March; it is at that time that pelts of all kinds are gathered and prepared - bison, deer, wolf, etc. The summer hunting begins during the early part of June and ends toward the middle of August. People leave their villages to avoid the mosquitoes, which torment men, and the buffalo flies, which not only persecute but sometimes kill horses. During the summer-year intermittent fevers and epidemics often kill many warriors. The stocks of dried meat stored up during the winter hunts are exhausted; corn sowed and weeded does not need any more care; the Osage get ready to leave the huts, where only the old people remain, too weak to stand the hardships of hunting, and the poor who have neither huts nor horses. . . (Tixler 1940:140).

The mention of corn indicates that hunting was supplemented by agricultural products. However, it was a secondary source and the people were not soley dependent upon it. Agricultural work was primarily considered the work of women and the elderly or infirm (Mun 1913).

> Whenever the inhabitants of a village go off on a hunt they put their corn in some place removed from the woods where they think there is less risk of being discovered by their enemies and they leave one or two old men and all the old women of the village to guard the cache; one must see such an assembly to get any idea of it, walking corpses, decrepits, most of them blind in one eye or almost blind, and just as squalid as it is possible to be . . . (Mun 1913:167-208).

As described by Tixler (1940) and Mun (1913) hunting played the most important part in the subsistence pattern. This probably also explains why the Arkansas Ozarks were claimed as their hunting territory; since a hunting people require a much wider range.

The principle source of food for the Osage appeared to be the bison. They also used the bison for clothing, tools, weapons, shelters, and horse equipment. Hunting was the work of men.

> The council assembled and sent scouts after the bison. They came back two days later with good news. It was known in camp as soon as they were seen, that the scouts had succeeded in their search, for they came following a crooked way; that is to say, they ran from side to side instead of coming straight toward the camp. They informed their brothers in this way that they had seen a great many bison. They told the council that several herds were grazing not far from the camp on the plains where hunting was easy. (Tixler 1940:188-189).

Most if not all of the clothing and decorations worn by the Osage were obtained from the bison, and other materials present in their everyday environment. The Osage mode of clothing and decoration was described by early explorers such as Marquette (1673), Catlin (1841), and by Tixler in 1839 (1940). Men dressed in moccasins, leggings, breech-clothes, and robes; women in skirts and robes; and children either in their parents hand-me-downs or in miniature copies of their parents clothing. Tatooing and body painting were also used as modes of decoration by both men and women.

Household utensils made by the Osage consisted of bowls and spoons made out of wood and spoons made out of either horn or wood. As observed by Marquette in 1673.

> They made their utensils of wood and their ladles out of the heads of cattle, whose skulls they know so well how to prepare that they use these ladles with ease for eating their sagamite. . . (Kenton 1927:271).

Descriptions of other utensils are lacking in the written records. Lacking also are descriptions of the division of labor as to who made the utensils. However it can be assumed that wood working was a man's activity, while the making of pottery, basketry, and the preparation of hides was delegated to the women. The production of weapons was the work of men. The bow and arrow were used by the Osage. The most characteristic weapon was the club. Catlin (1841) and Tixler in 1839 (1940) describe the club as a badge of honor. They were usually made out of bois d' arc or walnut and shaped like the stock of a gun.

The dwellings of the Osage were rectangular in floor plan, had a vaulted roof, and were covered with mat and bark coverings. It was

the job of men to erect the house structure, while women fabricated coverings for the houses from matting or elm bark. Summer habitations were spacious gabled-roof structures entered through a gable entryway. Villages might number as many as 200 to 300 houses.

In 1775 Adair (1930) described the inside of the Osage dwellings:

> The inside of their houses is furnished with genteel couches to sit, and lie upon, raised on forks of timber of a proper height, to give the swarming fleas some trouble in their attack, as they are not able to reach them at one spring: they tie with fine white oak splinters, a sufficient quantity of middle-sized canes of proper proportions, to three or four bars of the same sort, which they fasten above the frame; and they put their mattresses atop which are made of long cane splinters. Their bedding consists of the skins of wild beasts, such as of buffalo, panthers, bears, elks, and deer, which they dress with the hair on, soft as velvet. (Adair 1930:419-420).

Each house structure could hold from twenty to forty persons, and usually consisted of extended families.

Town sites were selected for defensive purposes. Towns were usually set on levees above the bed of the river which afforded some protection. The other sides of the town were protected by a ditch and palisade (Catlin 1841). Houses were built close together inside the palisade, but it is not described in the accounts how they were grouped.

8.5. Social Organization

No single individual or group had explicit control of the Osage. Swanton (191:157) describes the social organization of the Osage as follows:

> The gentile organization appears to have been very similar to that of the Omaha and other southern tribes of this division, involving paternal desent, prohibition of marriage in the gentes of both father and mother, and probably gentile tabus. The functions of the various gentes were also differentiated to a certain extent. Matters connected with war were usually undertaken by the war gentes, and peace-making by the peace gentes, while it was the duty of the chief of the Tsishuwashatake gens to defend any foeman who might slip into the camp-circle and appeal

> to him for protection. The Tsishu gentes (peace gentes) are also said to have had the care and naming of children. Heralds were chosen from certain special gentes, and certain others monopolized the manufacture of moccasins, war standards, and war pipes. On the death of a head-chief the leading man called a council and named four candidates, from whom the final selection was made. Seven appears as a sacred number in the social organization of the Osage, but from the war and other customs of the tribe it appears that the sacred ceremonial number was usually four.

While in hunting groups (which ranged over wide geographical areas) the Osage maintained a flexible set of social rules. The family became the basic governmental unit. Unfortunately, the early descriptions of the Osage do not indicate exactly how social units figured descent, although they were organized as clan units. Marriage is not discussed extensively, but we know that the extended family formed a part of the residence pattern.

8.6. Religion

The Osage believed in a omnipotent and all-merciful principal diety called Wakonta. He exemplified the manifestation of all living and inanimate power. No prayers were addressed to the Wakonta. From the time a person was born till the time they died ritual accompanied all rites of passage. Osage ceremonial equipment consisted of sacred bundles or medicine bundles which contained stone pipes, yard or filbar bags, small wooden bowls, shells, miniature weapons, and dessicated birds.

8.7. Concluding Remarks

Prior to 1803, the Osage retained control and occupancy of an area north of the Arkansas River and south of the Cuiure River. In 1825 these lands in Oklahoma, Missouri, Arkansas, and Kansas were ceded. They were then transferred to their present day reservation in Oklahoma.

9. LOWER MISSISSIPPI VALLEY ETHNOLOGY

9.1. Introduction

Much ethnographic information has been collected on the tribes once located within the Project area, including that by Gatschet (Powell 1888:XXXV; Dorsey and Swanton 1912); David Bushnell (1919); Sibley (1832); Dunbar (Jefferson and Dunbar 1804; Rowland 1930); and Perry (1978). Information specifically pertaining to the expeditions of early European explorers into the area has been published by many, including Jameson (1907); Lewis (1907); Phillips, Ford and Griffin (1951:347-421); and Brain, Toth and Rodriguez-Buckingham (1974).

Although all of these references and others have been consulted during the preparation of this section, the most reliance was placed on the considerable amount of literature compiled by John R. Swanton, without doubt the most respected authority on the Lower Mississippi Valley tribes. His (1911; 1918; 1919; 1928; 1931; 1932a; 1932b; 1946; 1952; 1953) works represent the most comprehensive compilation of material on the subject. Most of the information on the various tribes included in this section has come from his (1946) bulletin on the Indians of the Southeastern United States.

9.2. Early European Contacts

9.2.1. DeSoto's Expedition

The first European thought to have entered the study area is DeSoto, whose expedition explored portions of the Southeast and the Mississippi River in the early 1540's. The exact route of his expedition has always been and perhaps always will be in doubt. Several recent studies on the subject have cast doubt over whether his expedition even came near the area. Many of these argue for a more northerly route (cf. Brain, Toth and Rodriguez-Buckingham 1974).

Swanton (1946:53) notes that "there has been much discussion over the place where DeSoto crossed the Mississippi", and that "of the three routes which have been advocated by the most competent students, via Memphis, Commerce Landing, and Sunflower Landing" he believes the Sunflower Landing crossing to have been the one actually used. This version of his route places DeSoto in contact with several of the tribes who lived in or near the proposed corridor, including the Choctaw, Coushatta and Koroa. A map which depicts his (Ibid:Map 11) version of DeSoto's route is presented as Figure 9-1.

At any rate, the expedition encountered a tribe called the Quizquiz on the banks of the Mississippi (Ibid:52). This was the first time that they had seen the river, and Swanton thinks that the location was near the Alligator Mounds. The next month, the Spanish stayed with a tribe called the "Aquixo", and shortly afterward with a group called the "Casqui". At this last place, they conducted "the first Christian ceremony to take place in Arkansas" (Swanton 1946:52).

Native American Place Names and Tribal Groupings Depicted on Figure 9-1

(1) Guasco
(2) Soacatino
(3) Hias
(4) Nondacao
(5) Lacane
(6) Hissonone
(7) Amaye
(8) Naguatex
(9) Tula
(10) Tanico
(11) Tutilcoya
(12) Quipana
(13) Anoixi
(14) Quitmaya
(15) Aguacay
(16) Chaguate
(17) Anilco
(18) Tutelpinco
(19) Ayays
(20) Utiangue
(21) Quixila
(22) Palisema
(23) Calpista
(24) Coligua
(25) Ocalusa
(26) Quinguate
(27) Catalte
(28) Quigualtam
(29) Guachoya
(30) Aminoya
(31) Quizquiz
(32) Aquixo
(33) Casqui
(34) Pacana
(35) Sacchuma
(36) Alibamo
(37) Chicaca

Figure 9-1. (Key): DeSoto's Expedition as Depicted by Swanton (after Swanton 1946: Map 12).

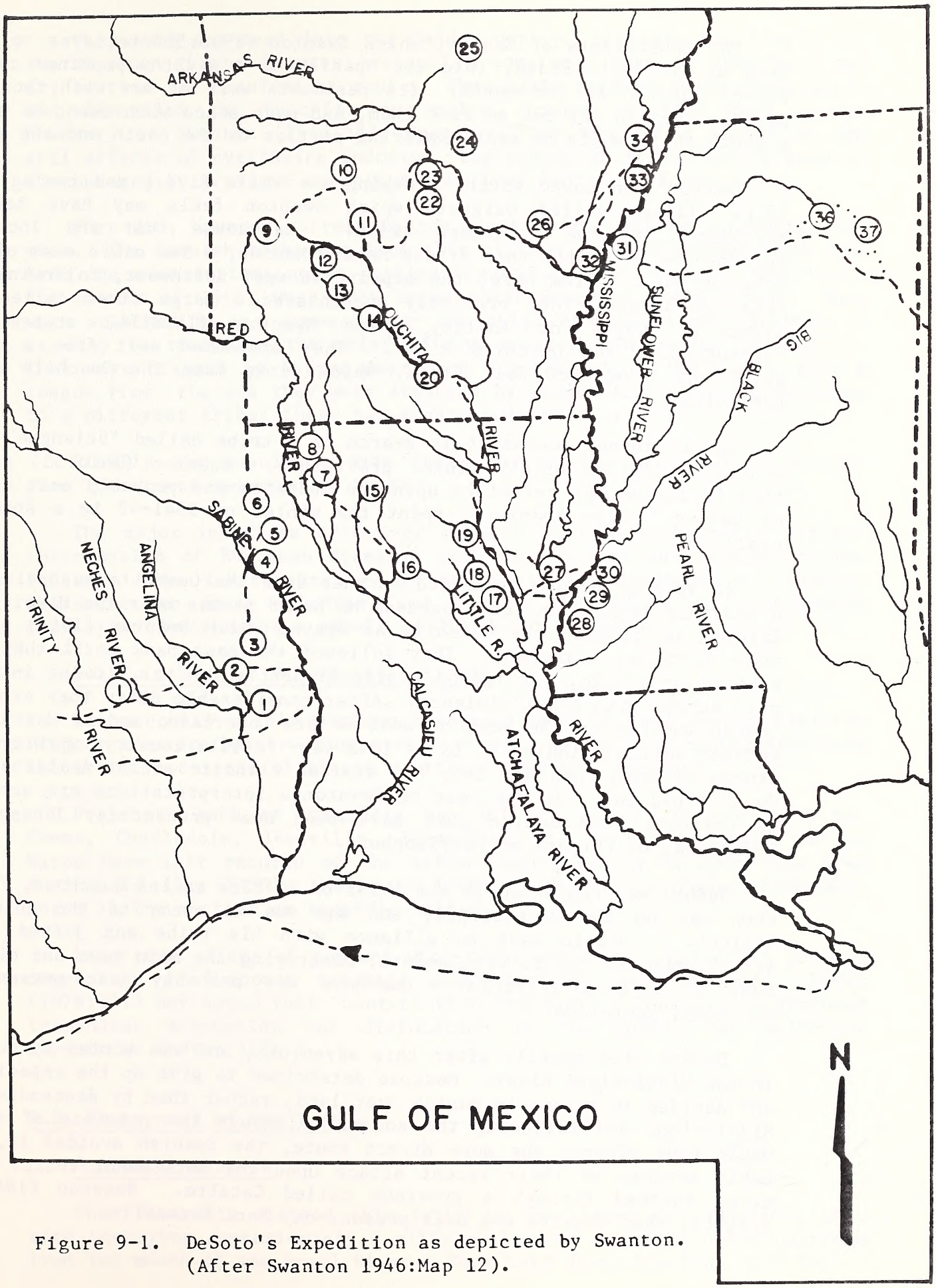


Figure 9-1. DeSoto's Expedition as depicted by Swanton. (After Swanton 1946:Map 12).

The inhabitants of Casqui, which Swanton (1946:53) believes to have been at Crowley's Ridge, told the Spanish of a wealthy province called Pacaha located to the north. Its residents were at war with those of Casqui. DeSoto set out to find them, and made peace with them; he spent a month there while he sent exploring parties to the north and the west.

DeSoto then moved south, crossing the White River, and coming to a large village called Quiguate which Swanton feels may have been a settlement of the Natchez tribe. He notes that the location corresponds well with that of the Menard Mounds, a few miles east of the Arkansas Post. From here, the expedition went northwest, following the Arkansas River. They presently encountered a large river called the River of Cayas or Anilco, which Swanton (Ibid:54) states was "undoubtedly" the Ouachita River. They extracted salt from a creek which may have been Salt Creek, which flows into the Ouachita above Arkadelphia.

DeSoto turned southeast in search of a tribe called "Utiangue" from whom he hoped to obtain winter provisions. Swanton (Ibid:55) states that "Utiangue was certainly upon the Ouachita and probably near Camden or Calion." The Spaniards spent the winter of 1541-42 in a stockade nearby.

In spring, DeSoto descended further down the Ouachita searching for a province called "Anilco", because he heard it was near the Mississippi River. He crossed the Ouachita at Ayays, which Swanton (Ibid) places near Columbia, Louisiana. They followed the east bank until they were stopped by a lake, "or rather a side branch, which was flowing into the main stream with great violence. After considerable delay they crossed, though whether to the east or west we are uncertain, and on March 29th entered Anilco, finding it to be in a very fertile country, with greater stores of corn than any they had visited hitherto except Apalachee and Coca" (Ibid:56). If the rest of Swanton's interpretations are accepted as correct, then Anilco must have been near present-day Jonesville, Louisiana, or perhaps at Harrisonburg.

DeSoto was contacted by the chief of a tribe called Guachoya, "whose town was on the Mississippi, and who was an enemy of the chief of Anilco". DeSoto made an alliance with his tribe and joined in an attack upon the Anilco settlements, destroying the main town and killing many of it's inhabitants. Guachoya was probably near present-day Ferriday, Louisiana.

DeSoto died shortly after this adventure, and was buried by Moscoso in the Mississippi River. Moscoso determined to give up the expedition, and decided to return to Mexico over land, rather than by descending the Mississippi and following the coast. Although the province of Anilco would have offered the more direct route, the Spanish avoided it, probably because of their recent attack upon the settlement there. They moved instead through a province called Catalte. Swanton (1946:57) suspects that Catalte was near present-day Fort Necessity.

They went westward into the Caddo country, past the Red River, but the dryness of the country eventually convinced them to turn back and try to find the Mississippi route. They again came to Ayays (Columbia), and descended the Ouachita to Anilco, hoping to find more grain. However, as Swanton (Ibid:58) remarks, "They now had a sample of the evil effects of overtaxing industry, the people of Anilco having been so discouraged by previous exactions that they had not planted."

They did, however, direct DeSoto north to the village of their enemies. The Spanish took corn from this village, called Aminoya, and also from one even further north, called Taguanate. They stayed there until the summer of 1543, when they began their descent of the river. They were attacked by war canoes under the chief of Quigualtam, "in whom it is easy to recognize the chief of the great Natchez tribe" (Ibid:59). They were plagued by Native Americans all the way to the Gulf. Half a league from the sea they were attacked by Native Americans who belonged to a different tribe; these had spears and atlatls.

Finally the Spaniards made their way to the sea, and to Mexico. From there most returned to Spain.

The major immediate effect of contact with DeSoto's party was the introduction of European diseases such as smallpox and measles to the Indians. The inhabitants of the New World had developed no immunity whatsoever to these maladies, and many of the tribes suffered severe population declines as a result of Old World illnesses.

9.2.2. Other Early European Contacts

The accounts of the various Europeans who followed DeSoto into the Project area are better documented, and there is far less controversy over the actual locations of places mentioned in their accounts.

Frenchmen such as Marquette and Joliet, Joutel, De Montigny, St. Cosme, Charlevoix, Iberville, Bienville, St. Denis, Du Pratz and La Harpe have left records of the Native Americans who occupied the area during the late 1600's and early 1700's. Relevant portions have been noted in the section on specific tribes.

Long-term effect of contact with these explorers included a growing dependence on European material goods and the loss of land. Perry (1978:121) has noted that "Contact with Old World cultures also produced tremendous disruption and dislocation in the social and political aspects of Indian life."

9.3. Background of the Tribes

9.3.1. Acolapissa

When Bienville visited this tribe in the winter of 1699-1700, they were occupying approximately 6 villages located about 11 miles upstream from the mouth of the Pearl River. They told Bienville that they had

been attacked two days previously by 200 Chicaksaw led by English slave-hunters (Swanton 1946:82).

In either 1702 or 1705, they moved to the north shore of Lake Pontchatrain. They were joined temporarily by the Natchitoches, who moved there at the urging of St. Denis, commander of the fort at Natchitoches. When he persuaded the Natchitoches to return to their own country in 1714, the Acolapissa attacked them, killing 17 men and taking some 50 women and children as slaves.

Between 1718-1722, the Acolapissa moved to the Missisippi River so that they could be nearer to New Orleans (Ibid:82). They were visited there in 1722 by Father Charlevoix. The Bayogoula and Houma also resided in this area, and the three tribes were eventually amalgamated. The Acolapissa and Bayogoula combined first, and later joined with the Houma. The group name of the Houma seems to have lingered the longest, and information recorded about the Houma in later times probably included the Bayogoula and Acolapissa as well.

Bienville estimated the number of Acolapissa warriors in 1699 as about 150, but La Harpe places it at 300. In 1702 Iberville estimated that there were 250 families, and the figure apparently remained fairly constant until 1722, when Charlevoix estimated that they had 200 warriors (Swanton 1911:41). In 1739, the Acolapissa, Bayogoula and Houma together had 90-100 warriors, with a total population of 270-300 (Swanton 1946:83). After this time, the Bayogoula and Acolapissa population figures are included with the Houma. Swanton speculates that the Houma "evidently formed the bulk" of the Native American population of Louisiana listed in the 1930 Census, which was 1,089.

9.3.2. Apalachee

The Apalachee were originally encountered by the Spanish in Florida. They remained in that state until 1764, when they moved to Louisiana and settled on the Red River with the Taensa (Swanton 1946:91). Their land and that of the Taensa adjoined, and stretched from Bayou D'Arro to Bayou Jean de Jean. Miller and Fulton purchased the land from the Taensa, but the United States courts later did not uphold the sale, since the Apalachee tribe had not agreed to it. However, they had already died out or become amalgamated with other tribes. Sibley in 1805 reported that there were only 14 Apalachee warriors (Ibid). A few moved to Oklahoma with the Creeks.

9.3.3. Atakapa

The original French name "Atakapa" was applied to a large number of groups living in Louisiana and Texas. The Spanish used the term to refer to a smaller, more homogenous number of groups, and Swanton's (1946:93) use of the term is therefore limited to the bands residing on Vermilion Bayou, the Mermentau River, the lakes near the mouth of the Calcasieu River and some on the Lower Sabine River.

Gibson (1976) refers to three major bands as comprising the "Atakapas Proper" in Louisiana. The western group, located in the Mermentau basin, developed a culture with distinct artifacts and social systems. However, the culture of the two eastern groups was more closely attuned to Lower Mississippi Valley cultural manifestations.

Swanton (1946:93) refers to an exploring party sent westward by Bienville which "finally reached a tribe of cannibals". These, Swanton concludes, were "undoubtedly some one of the Atakapa groups". His deduction was perhaps partially based on the fact that "Atakapas" literally means "man-eaters" (Read 1927:ix).

Because they were some distance from the Mississippi and from early European colonies, the Atakapa "did not suffer seriously from white intrusion" until well into the 18th Century (Ibid). However, certain members of the tribes did have contact with the Europeans, visiting occasionally at French forts.

In 1760, their chief Skunnemoke (Kinemo) sold the land on which his village was built and a 2-league wide strip of land between Bayou Teche and Vermilion Bayou to a Frenchman named Fusilier de la Clair. Although they had trouble with European encroachment from that time forward, their villages were not entirely abandoned until the mid-1800's (Griffin 1959:8). In fact, 60 men from the village assisted Governor Galvez in an expedition against British forts on the Mississippi in 1779 (Swanton 1946:93).

The principal Atakapa village was the "Island of Woods", later called the "Island of Lacasin". This village was largely abandoned about 1799 when the Atakapas moved to the Mermentau, but may have retained some occupants as late as 1836 (Ibid). The western branch of the Atakapa occupied their last village, located on Lake Prien, until after the middle of the 19th Century.

When Dr. Gatschet of the Bureau of Ethnology visited them in 1884-85, he was able to collect a measurable amount of their language (Powell 1888:XXXV), but noted that only the western dialects still seemed to be extant.

Little is available in the way of early estimates of Atakapa population, except for the fact that they mustered 60 warriors for the attacks on British forts mentioned above. Sibley estimated that their population in 1805 was about 50, but in 1806, Dunbar stated that "the Atacapas properly so called dispersed throughout the district and chiefly on the bayou or creek of Vermillion about 100 souls" (Rowland 1930:209). Swanton (1946:94) admits that his original estimate for 1650 of 3500 Atakapas was much too high.

9.3.4. Avoyel

Swanton (1946:94) characterizes the Avoyel as "a small tribe" located near Marksville and on the lower portion of the Red River. Their name translates to "Stone People", "Flint People" or "People of

the Rock" (Ibid). The Mobilian name for the Avoyel, "Tassanek Okla" was also given to Iberville in 1699 as the name of the Red River. Iberville referred to the Avoyel as the "little Taensas", but this was a misnomer (Swanton 1911:272). Forty warriors was considered by Iberville and Bienville to be the full strength of the tribe at that time (Swanton 1946:94).

The Avoyel were mentioned by St. Denis in 1714 and La Harpe in 1719. Perry (1978) notes that the first application of the term "Avoyel" was made by Du Pratz in 1758. Du Pratz characterized the Avoyel as middlemen who provided a market for horses and cattle stolen by western tribes from the Spanish (Swanton 1946:94).

In 1764, they joined with the Ofo, Tunica and Choctaw to attack a British regiment ascending the Red River. In 1767, they were said to occupy a village near that river's rapids (Ibid).

Perry (1978) cites Sibley (1832:725) concerning a severe population decline among the Avoyel in the late 18th century. According to Sibley, the tribe had in 1805 been extinct for many years with the exception of 2-3 women who lived on the Ouachita River with the French. Some of the Avoyel had settled with the Tunica south of Marksville and became amalgamated into that tribe. The last person who claimed to have Avoyel blood died in 1932 (Swanton 1946:94).

9.3.5. Bayogoula

Tonti encountered a tribe in 1686 called Pischenoa about 49 leagues above the Quinipissa; Swanton (1946:95) feels that this tribe may have been the Bayogoula. LaSalle did not record any Indians along the portion of the Mississippi River (near present-day Bayou Goula) where the Bayogoula were living when the French colony was founded in 1699. At that time, they both lived in the same town with the Mugulasha, and Iberville's population report for both tribes in that year lists a total figure of 400-500, with 100 warriors and 100 cabins (Ibid). He took a young man from the Bayogoula tribe to Europe with him to learn French, but the man died before he returned to his tribe.

The Bayogoula and Houma were at war. In 1700, the Bayogoula attacked the Mugulasha, with whom they lived, for being too friendly with the Houma. It was estimated by Father Gravier that the Bayogoula had about 200 members that year.

In 1706, the Taensas settled with the Bayogoula, but soon attacked them, driving the Bayogoula to a French fort on the Mississippi. The Bayogoula sent 20 warriors with St. Denis in his 1707 raid on the Chitimacha to avenge the death of the missionary St. Cosme (Swanton 1946:95).

By 1725, the Bayogoula had moved to a location about 13 leagues north of New Orleans. Bienville estimated that they possessed about 40 warriors that year. By 1739, they had become amalgamated with the

Acolapissa and the Houma. The Houma tribe's name was assumed, and further history of the Bayogoula is given under that name.

9.3.6. Biloxi

The Biloxi, a tribe located on the Pascagoula River and Biloxi Bay in Mississippi, were a Siouan tribe which Swanton (1946:96) deems former residents of the Ohio Valley. Perry (1978) groups them with the Southeastern United States tribes which sought refuge in Louisiana during the 17th and 18th centuries because of European settlers' encroachment upon their native lands.

They were encountered near Mobile by Iberville when he brought colonists there in 1699. The combined tribes of the Biloxi, Pascagoula and Moctobi had approximately 130 warriors at that time (Swanton 1946:98). They were visited that same year by Bienville; however the next year Iberville found their principal village (which had some 30-40 cabins) abandoned.

A few years later, they were persuaded by St. Denis to settle on a small bayou between New Orleans and Lake Pontchartrain, and fifteen warriors joined him in his expedition against the Chitimacha in 1707.

In 1722, the abandoned Acolapissa village on the Pearl River was occupied by the Biloxi, but before 1730 they had moved back to the Pascagoula River with the Pascagoula tribe (Ibid). In 1763, both the Biloxi and the Pascagoula moved to the mouth of the Red River near Marksville. They did not remain there long, moving soon to Bayou Rapides and then to the mouth of the Rigolet de Bon Dieu, and then to Bayou Boeuf.

Sibley's estimate of the Biloxi population in 1805 is 30, but other estimates made the same year indicate a population between 65-70. In 1806, Dunbar (Rowland 1930:209) encountered about 50 Biloxi on Bayou Crocodile near Bayou Teche, and about 60 others on the Red River.

Swanton (1946:97) states that although the Biloxi and Pascagoula sold their land to Miller and Fulton early in the 19th century and the sale was confirmed by the government in 1805, the Biloxi remained on their lands until they died out or were amalgamated with the Tunica and Choctaw. Still others moved to Angelina County in Texas.

9.3.7. Chatot

This tribe migrated into Louisiana from eastern Florida via Mobile Bay (Swanton 1946:107), after the British gained control of the Southeast. They settled on Bayou Boeuf and were encountered there by Sibley, who called them "Chactoos". He gave their population as 30 men (Ibid).

They had moved to the Sabine River by 1817. Morse estimated their population that year as 240, but Swanton (Ibid) considers this far too high, since they disappeared from history shortly thereafter. Swanton believes that they moved to Oklahoma and merged with the Choctaw.

9.3.8. Choctaw

Surpassed only by the Cherokee, this tribe was the second largest in the Southeast. Swanton (1946:123) estimates that the Choctaw population in 1650 was approximately 15,000. He believes that they were the group encountered by DeSoto's expedition in the province of "Pafallaya". The group was called "Apafalaya" which may have been a form of the Choctaw word "Pasfalaya" meaning "Long Hair"; Swanton (Ibid) cites Adair as saying the name was applied to the Choctaw because the men let their hair grow to its full length, while the tribes surrounding them did not.

In 1675, the Choctaw were encountered by Bishop Caldero, who reported that they possessed a "great and extensive province" which included 107 villages. Only passing mention was made of the tribe between this date and 1699, when the French settled in Louisiana.

The French began to befriend the Choctaw, since they provided a buffer between them and the English to the east. Several of the Choctaw groups sided with the French, but a number remained loyal to the British. A civil war among the Choctaw groups resulted, and the English faction was defeated in 1750. The Choctaw continued to fight against the Chickasaw and Creeks until 1763, when France ceded all of her territories east of the Mississippi to England. Spain obtained France's territory west of the Mississippi and continued to incite the Choctaw against the English, and friction between Choctaws and Creeks continued.

Filhiol, commandant of the Poste du Ouachita (with headquarters at Monroe, Louisiana) during the Spanish colonial period, reported that Choctaws crowded the post during the winter months (Greene et al 1975:17).

When the United States gained control over the territory on both sides of the river, the hostilities between the Choctaws and Creeks more or less ceased. The Choctaw were never at war with the United States (Swanton 1946:122). However, difficulties began to arise with the Caddoan peoples to the west. Hunting rights along the Red River which were given to the Choctaw by the Spanish Governor Carondelet led to hard feelings between the two groups, and efforts to mediate their disputes were hampered by the fact that the Louisiana Choctaw had become quite autonomous from the tribal center in Mississippi (Perry 1978).

Census figures during the early years of United States rule (1814; 1822; 1831) for the Choctaw population range between 15,000 and 25,000.

Filhiol's successor during the initial period of United States control was Lt. Joseph Bowmar. He reported "...a village of from eighty to One hundred Choctaw Hunters lying south westardly eight or nine leagues from this place on the route to Natchitoches - I am informed that nearly four hundred of that Nation hunt and trade here every year" (Carter 1954:224). From about 1785 to 1825, 50 Choctaw families occupied this village, located near Calhoun, in Ouachita Parish, Louisiana, approximately 15-20 miles east of the proposed and alternate

routes. The site has been recorded as 16OU8, the Indian Village Methodist Church Site. The leader of the village, Tusquahoma, led his people west when their land was sold in 1825. In 1805, Sibley (1832:723) noted another Choctaw village on the Ouachita River approximately 12 miles north of Monroe, Louisiana.

More and more English settlers began to make demands upon the Choctaw land. The Treaty of Dancing Rabbit Creek, signed in 1830, ceded Choctaw land, and granted them other tracts along the Red River in Oklahoma. Most of the tribe emigrated to Oklahoma in 1831-33 (Ibid).

However, certain of their groups have remained in or near the study area until the present time. These include the Jena Choctaw, located near Jena, Louisiana. The Jena Choctaw are composed of families from the Ouachita Valley area and groups from Mississippi which merged around the mid-19th Century (Perry 1978). The group was first centered around Eden, Louisiana, and then on Trout Creek and Bear Creek. The band still maintains elements of the traditional tribal organization (Ibid).

9.3.9. Coushatta

About 300 Coushatta live in a small community a few miles east of the proposed and alternate routes, near Elton, in Allen Parish, Louisiana (Figure 9-2). The Coushatta have resided there since 1884 (Johnson 1976:47).

At the time of contact, the Coushattas were associated with the Creek Confederacy. Johnson (1976:4-5) cites Debo (1941) as stating that the Coushattas were probably brought into the confederation through military conquest by the Muskogees.

Although several authorities have concluded that the Coushatta came to the Creek territory from the West, their earliest history is still extremely speculative. Johnson (Ibid:13) notes a field study conducted by Daniel Jacobson which concluded that the Louisiana Coushatta had no knowledge of their origins. Several contended that they were indigenous to Louisiana.

Johnson believes that the Coushatta were the Coste or Costehe encountered by DeSoto on an island in the Tennessee River, and that the Indians "suffered some mistreatment" at the hands of the Spanish, who seized a quantity of Indian's corn. Later European groups created similar problems, and the Coushatta made a voluntary decision to migrate westward, beginning in the early 1790's. They settled on the Red River, about 60 miles from its mouth (Johnson 1976:25-26), but red ants made life there "miserable". They moved to the east bank of the Sabine River, near Merryville, and then to Bossier Parish in 1805. In 1813, they left U.S. territory once again, moving to Texas.

Troubles connected with the Texas Revolution and its eventual admission to statehood caused some of the Coushattas to return to Louisiana in the mid-1800's. They settled first on the Calcasieu River, near Kinder; then near present-day Coushatta, approximately 25 miles

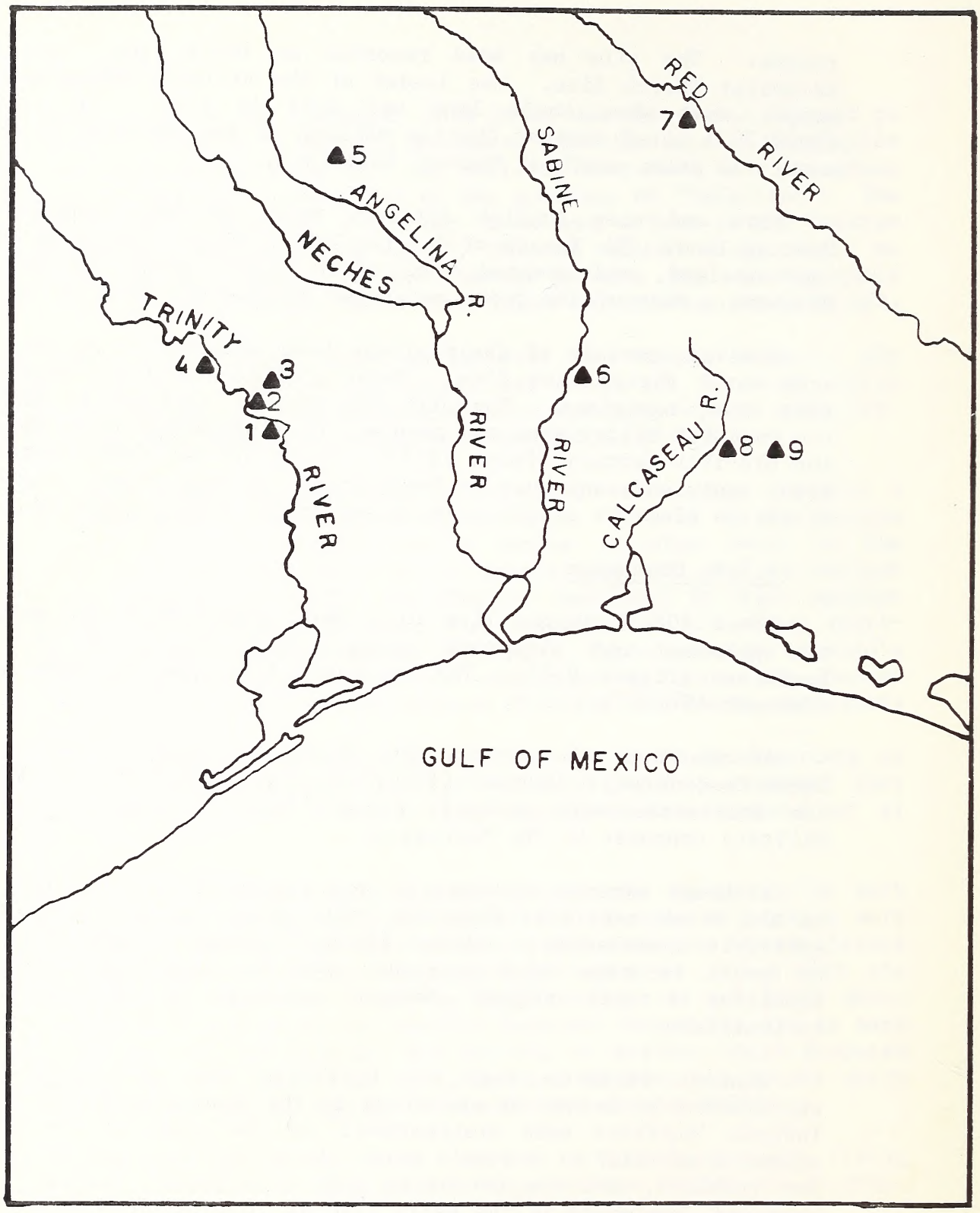


Figure 9-2. Principal Coushatta Sites. 1) Colita's Village; 2) Long King's Village; 3) Livingston; 4) Battise; 5) Nacogdoches; 6) Merryville; 7) Natchitoches; 8) Indian Village; 9) Elton (After Johnson 1976).

northwest of Natchitoches; then on Blue Bayou; and finally at the present community near Elton.

9.3.10. Houma

This tribe, which Swanton (1946:139) feels was probably a branch of the Chakchiuma, was first mentioned in the narratives of LaSalle's journey in 1682. Located on the east bank of the Mississippi opposite the mouth of the Red River, they were visited by Tonti in 1686, and by Iberville in 1699. Iberville reported that the population was about 600-700, with 350 warriors and 140 cabins. When he visited them again in 1700, he found that about half the tribe had been destroyed by some sort of abdominal disorder. A Jesuit mission was begun in the village that year by Father du Rut, who built a church.

Tunica Indians settled with them in 1706, but they soon attacked the Houma and killed many of them. The survivors of the Houma tribe moved to Bayou St. Jean near New Orleans, and then to Ascension Parish (Ibid). Two settlements were formed, and the groups became known as the Great Houmas and the Little Houmas.

By 1739, the Houma were beginning to be amalgamated with the Acolapissa and Bayogoula. It was estimated that year that the population of the three tribes was 270-300, with 90-100 warriors.

The Houma name continued to be used the longest, and they apparently remained in this area until well into the 1800's. By 1836, they had intermarried with the Atakapa, and many were living in the territory of that tribe (Ibid:140).

9.3.11. Koroa

Swanton (1946:147) feels that the Koroa were the tribe called the Coligua or Coligoa encountered in Arkansas by the DeSoto expedition. He places their location at that time (1541) as Little Rock. He identifies them with the Akoroa on Marquette's map, which places them west of the Quapaw.

LaSalle, who encountered the Koroa in 1682, gave the name to two different groups of Indians; one was located on the Yazoo River, and one was south of Natchez (probably called the Tiou by later writers). The group on the Yazoo River also had settlements west of the Mississippi; they were visited by Tonti.

In 1702, a French missionary, Foucault, was killed by a Koroa Indian, but he was killed in return by his own people (Ibid). Iberville estimated the population of the Tunica, Yazoo and Ofo that year to be some 300 families, and Swanton feels that the Koroa were probably included within that number. Quapaw and Illinois Indians drove the Koroa back to the Yazoo River in 1704.

When the Natchez uprising occurred in 1729, Koroa and Yazoo Indians murdered the missionary Seuel and massacred the garrison at Fort St.

Peter. The Chakchiuma and Choctaw, French-allied tribes, attacked the Koroa in revenge; the Quapaw also attacked them soon after. Reported to be occupying a fort by themselves when Perrier advanced against the Natchez in 1731, the Koroa took part in a raid with the Natchez on the Tunica.

The Koroa were not mentioned again, and Swanton (Ibid:148) believes that they merged with the Chickasaw and the Choctaw.

9.3.12. Okelousa

Swanton (1946:167) speculates that DeSoto may have encountered this small branch of the Creek nation in Mississippi, but notes that the reference may have been merely a "general appellation for occupants of certain alluvial lands along the Mississippi or its tributaries."

In 1682, the Okelousa and Houma destroyed a Tangipahoa village east of the Mississippi River. La Harpe described them as a "wandering group living west of the river" (Ibid:167-168).

The only exact location given for the group was that of Du Pratz, who placed them on two small lakes "to the west of and above Pointe Coupee" (Ibid:168).

Swanton feels that the Okelousa merged with the Houma or some other Choctaw tribe.

9.3.13. Opelousa

Bienville was apparently the first European to contact the Opelousa. In 1725, he placed them near the present-day city of Opelousas, and estimated that they had about 130 warriors (Swanton 1946:168-169).

By 1805, they had moved their village some 15 miles to the west. Sibley estimated that they had only 40 persons in the tribe that year, and that there were only 20 by 1814. The last members probably merged with the Atakapa (Ibid).

9.3.14. Pascagoula

Bienville also made the first European contact with this tribe. In 1699 he visited them at their village on the Pascagoula River. He reported that the Pascagoula and Biloxi together had less than 20 cabins, and that they had about 130 warriors (Swanton 1946:170-171). He revisited them in 1700 and noted 20 Pascagoula families.

Swanton cites Du Pratz as saying that the Pascagoula moved to the Gulf Coast soon afterward, where they occupied 30 cabins.

Settling temporarily on the west bank of the Mississippi River near its confluence with the Red in 1764, they moved in 1787 to the confluence of the Red River and Bayou Rigolet du Bon Dieu. They moved to

lands given them by the Choctaw on Bayou Boeuf in 1795, and they stayed there until they and the Biloxi sold their lands to Miller and Fulton.

In 1822, there were three groups of the Pascagoula; two lived on the Red River and the third on Biloxi Bayou in Texas. Swanton (Ibid) believes that they probably moved to Oklahoma with the Biloxi. In 1908 he encountered two Indians with the Alabama in Texas who claimed to be descendants of a Pascagoula mother.

9.3.15. Quapaw

The Quapaw came to Arkansas from the Ohio River Valley above the mouth of the Wabash River (Swanton 1946:176). They left Ohio with the Omaha. When they reached the Mississippi, the Omaha went upstream; their name literally means "those going against the wind or current" (Bushnell 1919:16). The Quapaw went south, and their name, which means "downstream people," reflects this. Bushnell (Ibid) suggests that they constructed and left behind them "the great earthworks in the form of circles, squares, and many of complicated designs, which are the most remarkable of the many ancient works existing east of the Mississippi" that were found abandoned when Europeans entered that portion of the Ohio Valley.

The Quapaw referred to themselves as the Ogapa, and their legends state that they and the Osage and Kaw were descended from three brothers (Hadley 1882:2). Ponca legends say that the Omaha and Ponca came north from Mexico together, and that the Osage, Kaw and Quapaw "sprang from the same ancestors" (Ibid).

Swanton (1946:176) states that the Quapaw are sometimes identified with the Pacaha encountered by DeSoto, but he does not believe that they are the same tribe.

In 1673, when Marquette descended the Mississippi River, he found the Quapaw living near its confluence with the Arkansas River. One settlement was actually located at the confluence; one was upstream on the east bank of the Mississippi; one was on the west bank of the Mississippi even further upstream; and one was located on the Arkansas River (Ibid).

When LaSalle descended the Mississippi River in 1682, he also reported three Quapaw villages near the confluence of the Arkansas with the Mississippi; these were called Kappa, Tongigua and Tourimas (or Imaha) (Phillips, Ford and Griffin 1951:402). It was reported that two unnamed villages also existed nearby, but away from the river; however, this was not confirmed by the expedition. Reports by residents of the Arkansas Post in 1689 refer to a fourth Quapaw village, called Osotouy (Ibid:405).

Joutel visited with the Quapaw in 1687. His reports also describe the village of Osotouy (Phillips, Ford and Griffin 1951:406-407). Tonti made a third visit to the four villages in 1690.

French missionaries, including De Montigny, St. Cosme and Davion, arrived in 1698. Their reports note that the Quapaw population had been decimated by smallpox; they estimated that there were not over 100 persons left alive (Ibid:410). Gravier visited the Quapaw in 1700.

Phillips, Ford and Griffin (1951:402-419) have debated at length the possible locations of these Quapaw villages, discussing whether these early explorers might really have been on the White River, rather than the Arkansas. Their (Ibid:Figure 72) map which depicts possible locations for the Quapaw villages has been presented as Figure 9-3.

In 1725, Bienville stated that the Quapaw had once had more than 500 warriors, but then had only 220. In 1750, Father Vivier estimated that they had 400 warriors, with a total population of 1400 (Swanton 1946:176).

After some time, all of the Quapaw villages moved to the Arkansas River. In 1805, Sibley reported three villages on the south bank of that river about 12 miles above the Arkansas Post.

Thomas Nuttall travelled in Arkansas in 1819. A map from his journal (Thwaites 1905) which depicts several Quapaw villages is presented as Figure 9-4.

All Quapaw lands south of the Arkansas River (except for a small area between Arkansas Post and Little Rock which extended inland to the Saline River) were ceded by a treaty signed at St. Louis on August 24, 1818 (Swanton 1953:214). In 1824, this remaining portion was also given up by a treaty signed at Harrington's in the Arkansas Territory. The Quapaw agreed to live in the Caddo's country on the Red River in Louisiana. The Caddo assigned them a tract located on Bayou Treache. It was swamp land which was often flooded; the consequent diseases and crop failures made them move back to their old lands. This annoyed the Euro-Americans who had already settled there, and the Government tried in vain to persuade the Quapaw to return to the Caddo lands (Figure 9-5).

In 1833, the Government gave them 150 sections of land in southeastern Kansas and the northeastern part of the Indian Territory. Their population 10 years later was given as 476. In 1867, the Quapaw ceded their lands in Kansas, and the northern part of their land in the Indian Territory; the remainder of their land in the Indian Territory was designated as their reservation.

The Ponca came to live with them there in 1877, but were soon given a reservation of their own further west. When they moved, most of the Quapaw went with them.

The Quapaw were finally made citizens of Oklahoma. In 1930, the United States Census listed 222 Quapaw.

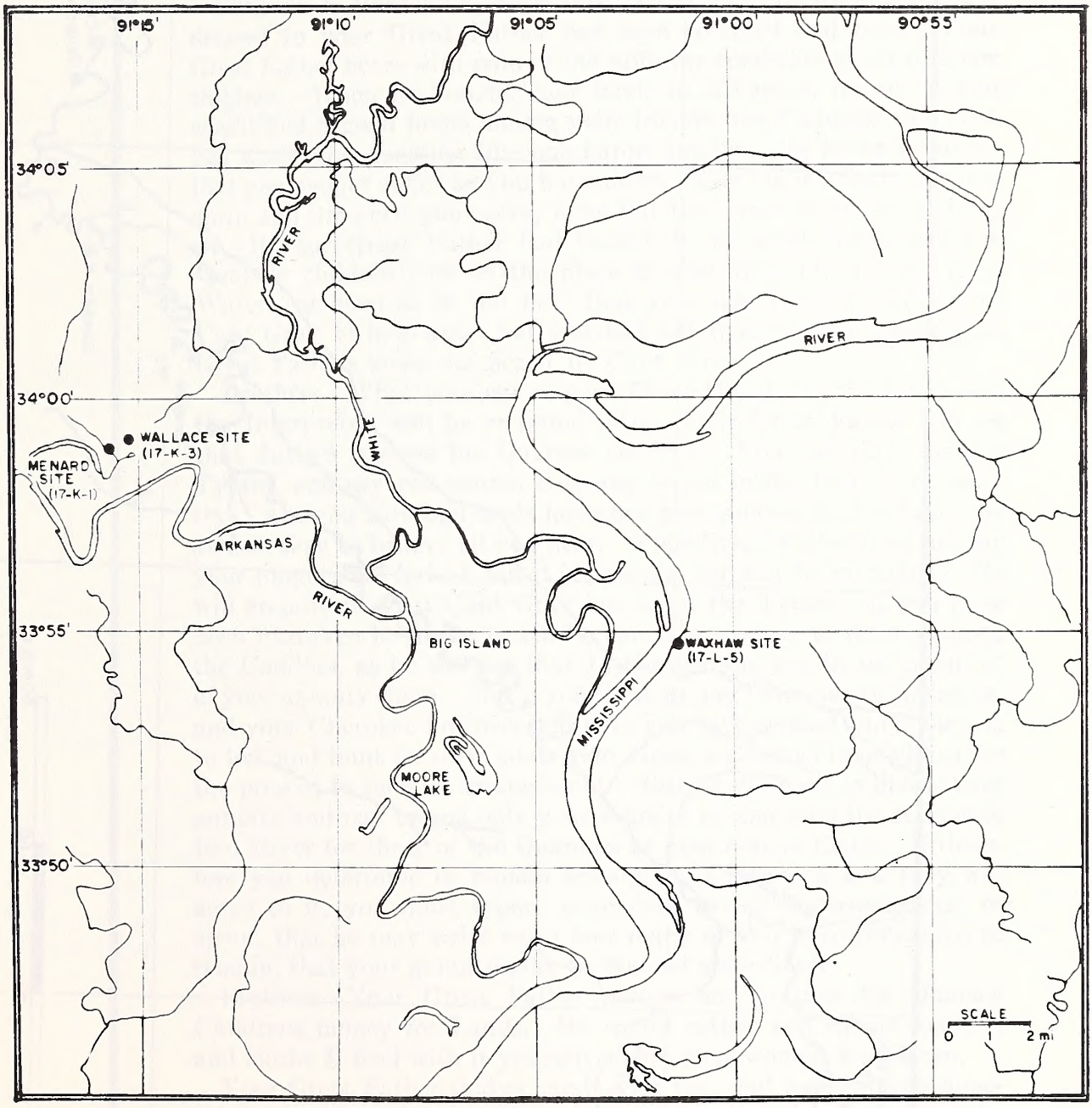


Figure 9-3. Quapaw Village Sites (After Phillips, Ford, and Griffin 1951)

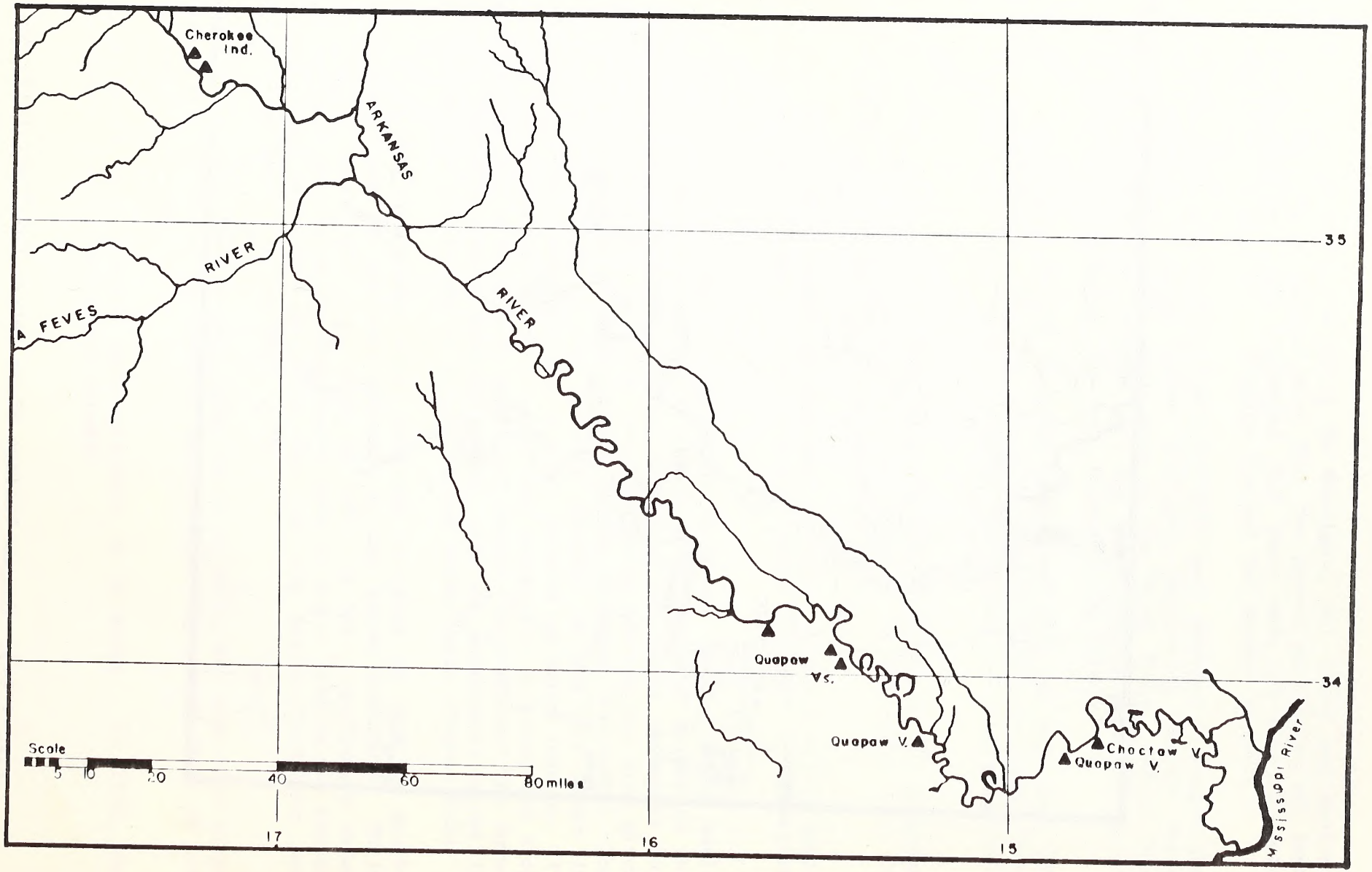


Figure 9-4. Nutall's Journey (After Thwaites 1905)

THE SECRETARY OF WAR TO QUAPAW CHIEFS OF ARKANSAS RIVER

[NA:OIA, Lets. Sent, Bk. 3]

DEPARTMENT OF WAR, *March* 26th 1827

TO SAR-RA-SIN NIAT-TI-WAT-TO AND OTHERS, Head men and Warriors of a part of the Quapaw Tribe of Indians now near the Arkansas River

FRIENDS & BROTHERS, Your talk of the 28th January last,[88] addressed to your Great Father has been received and read. Your Great Father hears with pain of the suffering condition of his Quapaw children.--When he bought your lands in Arkansas, he hoped you would find a good home among your friends, the Caddoes; and that you would live together like one happy family. He never intended that you should suffer as you have done. The big waters that came down and drowned your corn, none but the Great Spirit could foresee -If your Great Father had forseen it, he would have sent his Quapaw children corn in the place of that they lost by the great Waters, as soon as he did hear that you were suffering he ordered Capt Gray to help you --but you had left that country before your Great Fathers voice was heard by Capt. Gray.

Brothers - What you say of your Chief Hekatton, the agent, and the Interpreter, will be enquired into. Your Great Father will see that Justice is done his Quapaw children. You call Capt Gray a Tyrant, and say you cannot stay any longer in the Red River country. Are you sure bad birds have not been among you?--Take care and be slow to believe all you hear. Your Great Father does not say your tongues are forked, but it is possible you may be mistaken. He will enquire in what Capt Gray has acted the Tyrant --If you have been mistaken he hopes it will be agreeable to you to return among the Caddoes, as he will see that Justice is done you in the payment of your annuity there. But if you think proper to remain in Arkansas, and your Cherokee brothers will take you by the hand and allow you to live and hunt on their lands your Great Father will not object for the present to such an arrangement. But he will have to divide your annuity and pay to you only your share of it; and send the residue to Red River for those of the Quapaws as may remain there. If therefore you determine to remain among the Cherokees, and they will agree to it, you must report yourselves to the Superintendent, or agent, that he may write word how many of you have concluded to remain, that your annuity may be divided accordingly.

Brothers -Your Great Father prefers not to take his Quapaw Childrens money for Lands. He would rather you should keep it, and clothe & feed with it yourselves and your women & children.

Your Great Father shakes hands with you, and has sent you something to eat and hopes if he can satisfy you that Justice will be done you among the Caddoes that you will return. He sends a talk to the Red River Agent; and one also to the Arkansas agent.--Listen to what your Arkansas Father says.[89]

I am your friend & brother

JAMES BARBOUR.

Figure 9-5. Letter from the Secretary of War to the Quapaw Chiefs. In the Territorial Papers of the United States (Carter 1954:433-434).

9.3.16. Taensa

Swanton (1946:188) believes that the Taensa may have been the Guachoya and/or Aminoya groups encountered by DeSoto.

LaSalle encountered them in 1682 on the west end of Lake St. Joseph, near present-day Newellton, Louisiana. Tonti estimated that they had over 700 warriors. He spent 4 days in their villages that spring. The Taensa were re-visited by Tonti in 1686 and 1690, and several French missionaries, including De Montigny, La Source, Davion and St. Cosme, worked among them in 1699.

Swanton (1911:28) notes that Iberville was told in 1699 by a Taensa Indian that his tribe had 7 villages. These were called Taensas, Ohytoucoulas, Nyhougoulas, Couthaougoula, Conchayon, Talaspa and Chaoucoula. He was told that they had some 120 cabins and 300 warriors. He actually visited them in 1700. During his visit, their temple was struck by lightning and destroyed by the resulting fire. When he left, the missionary De Montigny went with him, and no other missionaries ever came to work among the Taensa (Swanton 1946:188).

The Taensa were driven south in 1706 by the Yazoo and Chickasaw, and they settled with the Bayogoula. Swanton (Ibid) notes that although "they were well received by the Bayogoula...soon afterward the Taensa rose upon them, destroyed a large portion, and drove the rest away." They lived at various locations near Mobile and/or New Orleans until 1744.

At about that date, they moved to the Taensas River in northeast Louisiana. They stayed there until 1763, when they moved to the Red River. They lived along the Red with the Apalachee, and Swanton (Ibid) states that the villages of the two tribes extended from Bayou d'Arro to Bayou Jean de Jean. D'Abbadie, the Governor of Louisiana in 1764, reported that the Taensa, Apalachee and Pakana Creeks together consisted of approximately 200 persons (Ibid).

Both the Taensa and Apalachee finally sold their land along the Red and moved to Bayou Boeuf, and finally to a small bayou at the head of Grand Lake.

The final population estimate for the Taensa is Sibley's 1805 figure of 25 warriors.

9.3.17 Tunica

Brain (1977:4) states that the Tunica were "almost certainly" the group encountered by DeSoto and termed the Quizquiz. They were living in northwestern Mississippi and at the confluence of the Mississippi and Arkansas Rivers, where they were engaged in salt trade.

They had a village on the Ouachita River in 1699, which may correspond to two shown at the mouth of Bayou D'Arbonne on a map drawn in 1718 (titled "Partie Meriodionale de la Riviera de Mississippi, et

Ses environs, dans L'Amerique Septentrionale, Mis au jour par N de Fer, Geographe de sa Majeste Catolique 1718"). However, these were probably small hamlets, as the main Tunica body, fearing attack from the Chickasaw, had abandoned their villages along the Ouachita and moved to the mouth of the Red River in 1706 (Swanton 1949:198). They lived near Angola, in West Feliciana Parish.

The Natchez visited them there under the pretense of peace, and massacred many of the Tunica while they slept (Ibid:12). The Tunica moved south again, this time only a few miles, to the Trudeau Site. When the French lost control of the area in 1763, they moved, but again not far, remaining in the Pointe Coupee area (just north of the proposed and alternate routes).

Sometime before 1800, they moved to the Red River near Marksville, Louisiana. Some of their descendants still live in that vicinity.

The Tunica were very successful at trading, and amassed a huge store of European and Indian artifacts which have come to be known as the "Tunica Treasure." The availability of large numbers of artifacts have stimulated a renewal of interest in the history of the Tunica (cf. Brain 1977).

9.4. Linguistic Affiliation

Swanton (1911:1) has noted that the Lower Mississippi Valley is a region of "unusual interest" to the ethnologist, "owing to its exceptional linguistic complexity, in which in the territory north of Mexico it is exceeded only by the Pacific coast".

He (Ibid:8-9) divided the languages of the Lower Mississippi Valley into five major groups, the Natchez, Muskhogean, Tunican, Chitimachan and Atakapan (Figure 9-6).

Actually, the Muskhogean and Natchez groups are the two substocks of the Muskhogean stock. Of those tribes which occupied areas in or near the presently proposed corridor, he places the Bayogoula, Acolapissa, Houma, Pascagoula and Chatot within the Muskhogean substock. The Taensas and Avoyel were members of the Natchez substock. A dictionary of the Taensas language was published in Paris in 1880, but was exposed as a fraud in 1885. Swanton (1911) provides a thorough analysis of the dictionary and the problems which it caused, concluding at length that the Taensas did indeed speak the Natchez language.

The Siouan stock is represented by the Quapaw and the Biloxi. The Atakapa were members of the Atakapan stock. The Tunica group's only representative within the study area was the Koroa. None of the tribes within the study area belonged to the Chitimachan language grouping.

In 1884, Albert S. Gatschet, a linguist with the Bureau of American Ethnology, spent a month with the Atakapa at Lake Charles in Calcasieu Parish, Louisiana. He concluded that "of the two dialects traceable,

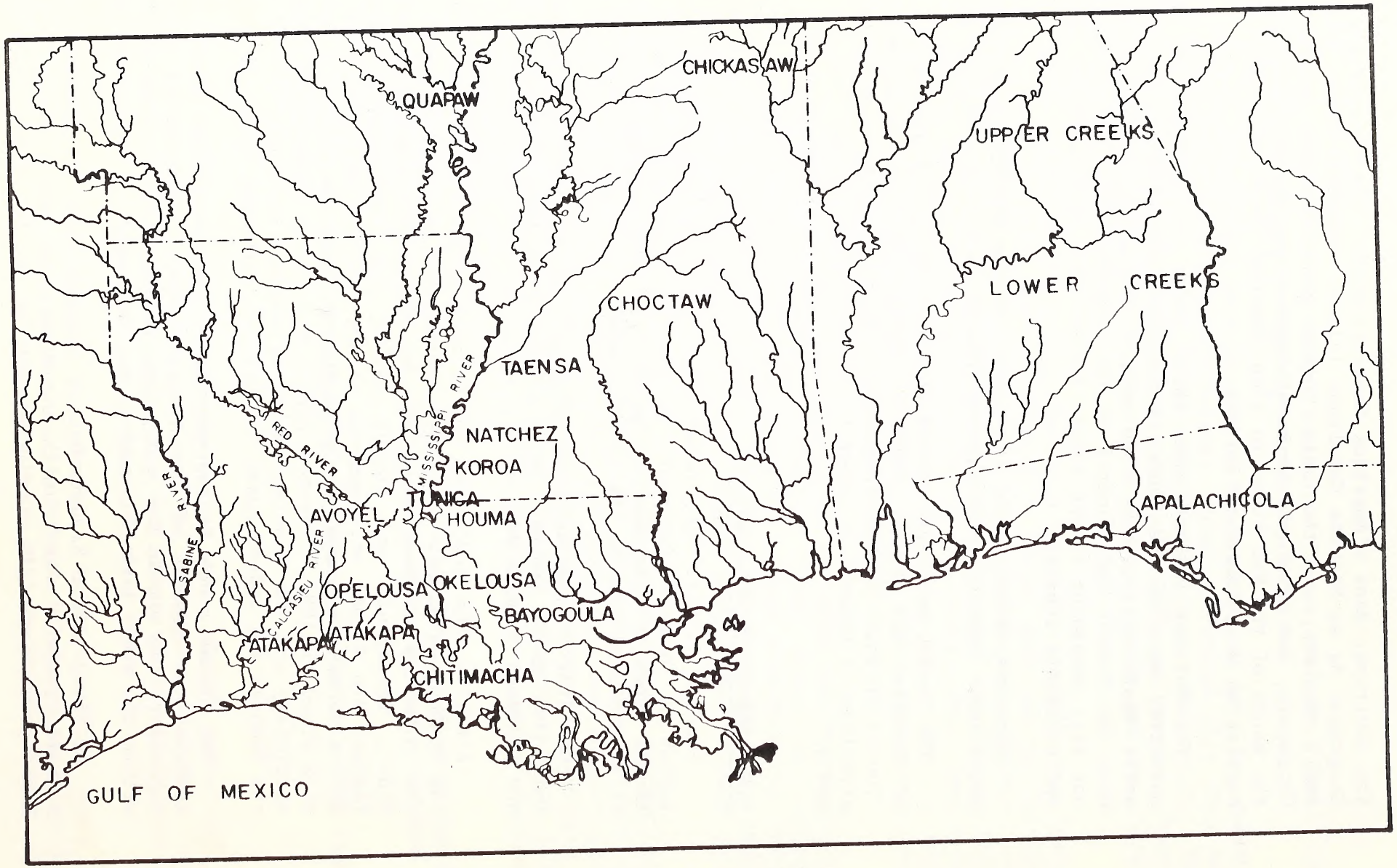


Figure 9-6. Lower Mississippi Valley Native American Groups (Swanton's 1911 map)

only the western one seems to exist now, being still spoken by a few women living at the town. The language is sonorous, but strongly nasal" (Powell 1888:XXXV).

The only languages aside from the Atakapa which Swanton (1911:9) felt in 1911 to have been documented with vocabularies "approaching completeness" were the Natchez and Tunica. He also collected about eighty words from an old Houma woman, but of the remaining languages, he had collected information "only by means of statements of early travellers and scanty bits of circumstantial evidence."

In 1886, Dr. Gatschet had discovered remnants of the Biloxi tribe near LeCompte, Louisiana, and by 1912 he and other linguists were able to collect enough material for a Bureau of American Ethnology Bulletin to be published on that language (Dorsey and Swanton 1912). Bushnell (1919:16) has described the Biloxi as a "detached" Siouan tribe, and compares their language to that of the Tutelo and Saponi groups in Virgina.

In 1919, Swanton published a comparison of the Tunican, Chitimachan and Atkapan languages.

9.5. Housing

In general, Indian groups in the study area lived in "relatively permanent" villages located on rivers and bayous (Perry 1978). Their houses were constructed of poles covered with mud-plastered (wattle-and-daub) walls. The domed roofs were covered with palmetto leaves or grass. Specific descriptions for houses exist for only a few of the tribes.

Bushnell (1919:99) cites Tonti who in 1682 described a Taensa house as "being all made of Earth". Bushnell was certain that this referred to wattle-and-daub structures, and compares them to the winter houses of the Chickasaw and Cherokee. Tonti was very impressed with the Taensa houses, stating:

> I was never so surprised as on entering the cabin of the chief, because the other savages do not build in this manner. One recognized in this nation some of the qualities which civilized people possess. They first made us enter a cabin having a front of 40 feet; the walls of mud, 2 feet thick and 12 high. The roof is made dome shaped, of cane mats, and so well worked that the rain does not pierce through them at all.

Tonti also noted hammocks, paintings, and brass bucklet ornaments inside the cabin. He referred to "camp beds" made of delicately worked cane mats, and stated that the entire floor was covered with more cane mats.

Choctaw houses were also made of wood covered with mud, but were then covered with cypress or pine bark (Bushnell 1919:63-64). They had no windows, doors which ranged from three to four feet in height, and two smoke-holes. The inside was surrounded by cane beds which were raised from three to four feet from the ground.

Quapaw dwellings at the time of contact were, according to Swanton (1946:416), all alike. They were long dome-shaped cabins covered with bark. Several families lived in each cabin, but each family had a separate fire. There were no smokeholes in the Quapaw houses. The doors were 5 feet high, which is taller than those used by most tribes (Ibid:430). Most Quapaw slept on skins on the floor, but some slept on raised beds at the end to escape the mosquitoes.

Charlevoix characterized an Acolapissa village that he visited in 1722 as "the finest in all Louisiana" (Bushnell 1919:66). "Their cabbins are in the form of a pavilion...They have a double covering, that within being a tissue of the leaves of Lataniers trees, and that without consists of Matts. The chief's cabbin is thirty-six feet in diameter: I have not hitherto seen any of a larger size, that of the chief of the Natchez being no more than thirty."

9.6. Subsistence and Related Material Culture

Perry (1978) has stated that at contact, the tribes of Louisiana "may be described generally as semi-sedentary agriculturalists, who made considerable use of the abundant faunal and floral resources of the region."

She (Ibid) also cites Hodge's (1907:288) description of the Choctaw as the "pre-eminent agriculturalists of the Southeastern tribes." Bushnell (1919:63) describes Choctaw settlements as being dispersed over a wide area in the midst of a virgin forest, so that each habitation would have room for a small garden.

LaSalle was sent canoes from the chief of the Taensa which contained corn, dried fruits and salt, along with "figures of men, bison, stags, alligators and turkeys, made of dough, with fruits" (Swanton 1911:161).

The French missionary De Montigny (Ibid:265) wrote a letter in 1699 in which he described the agricultural practices of the Taensas:

> The soil is very good, the Indian corn grows sometimes 20 feet high, and a single grain will send out ten or twelve stalks almost as thick as your arm. There are a great many herbs and plants, and others that are unknown to us.

Despite their good soil and excellent crops, the processing of the corn had evidently not advanced as quickly among the Taensa as among

certain other tribes, for on Iberville's second voyage he wrote that he left with six men to go to the Taensa, "leaving my brother with the rest of his people among the Nadches to prepare corn flour for the journey, where it is made more conveniently than among the Taensas" (Ibid:266).

Hunting and fishing and other uses of natural foodstuffs continued to be important to the tribes of the Lower Mississippi Valley long after agriculture became an accepted practice. D'Abbadie wrote in 1764 that the Taensa were both "hunters and tillers of the soil" (Ibid:271). Gibson (1976:14) notes that horticulture was "of little importance" to the Atakapas in comparison to hunting, gathering and fishing even as late as historic times.

Such differences in subsistence patterns were thought by Bushnell (1919:14) to contribute to the friction between tribes such as the Choctaw and Chickasaw. Although they were closely related and spoke the same language, they were enemies. Bushnell felt that this was partially because the Choctaw lived in low, level country and were agriculturists, while the Chickasaw, who lived in the hills where wild game was plentiful, were expert hunters.

Fishing was an important subsistence activity for all the groups. A number of methods were used for fishing, including several described by Swanton (1969:332-343):

> 1) A hook and line, employing bone and live bait (i.e. worms, grasshoppers or crayfish) may have been employed as a bank fishing technique.
>
> 2) Weirs made of stone and/or reeds may have been utilized as a trapping device in two ways. One method utilized the weir as a "corral" that congregrated fishes driven by Indians wading through the water. Another method entailed the building of a weir during flood stage. As the water receded, the fishes' movement was restricted by the weir.
>
> 3) Nets known to the Native Americans were of two types, active and passive. Active nets would by physically moved through the water to entrap sunfishes, suckers and catfishes. Passive nets were maintained in one position by weights, rope, etc.
>
> 4) Traps such as slat traps and mazes were constructed so that a fish could enter but not exit and set in place in the water.
>
> 5) The technique of dragging utilized a heavy object, such as a log, that was physically pulled through the water so that it disturbed the bottom layer. Fishes along the bottom swam from the disturbance and were netted.

6) Poisoning may have been done either by blocking a stream or by poisoning an isolated hole or sink. Horse chestnut, devil's shoestring, and black walnut are some of the natural poisons that were used. As the fish floated to the top, the Indians would gather them by hand or with baskets.

7) Bow and arrow fishing is perhaps one of the more interesting techniques used by the Native Americans. Du Pratz wrote that the arrows intended for killing small fishes were made from little pieces of hard cane, while those intended for large fish were made of bone pointed at both ends "so that the first point pierces and makes an entrance for the arrow, and the other end, which stands out from the wood, prevents the arrow from falling out of the fish's body" (Swanton 1911:59). The arrow was also attached by a cord to a wooden float; this kept the fish from escaping by diving to the bottom.

Du Pratz (Swanton 1911:59) also described bows and arrows used for other game. The bows were made from acacia wood, with cords made from tree bark. The arrows themselves were made from bois d'arc, a very hard wood. Feathers were attached to the arrows with fish glue.

Arrows intended for use on bigger game, such as deer, were "armed with great splinters of bone adjusted in a split end of the arrow shaft, the cleft and the casing being bound with splints of feathers and the whole soaked in fish glue. War arrows were ordinarily armed with scales of the garfish (poisson-arme) fixed in place in the same manner" (Ibid).

Other tools were described by Du Pratz (Ibid), including knives, which were made of cane split into four pieces. These made good knives, but they did not last long, and new ones were constantly being made. The cane also furnished the raw material for mats, sieves, and little boxes.

Axes were ground down from sandstone. They were described as follows:

> These stone axes are fully an inch thick at the head (or butt), and half an inch thick three quarters of the way down. The edge is beveled, but not sharp, and may be 4 inches wide except that the head is only 3 inches wide. This head is pierced with a hole large enough to pass the finger through in order to be better bound in the cleft at one end of the handle, and this end itself is well bound so as not to split farther (Ibid).

Basketry was important in both food processing and storage. Items used in processing included sifters, sieves and winnowing baskets, all made of cane. The sifters graded from fine to coarse. These items were popular in the trade market with the French (Swanton 1911:62).

Hampers and baskets were used for corn storage. Burden baskets were used to carry grain, meat, or fish or other foods. Du Pratz described them as being round, and deeper than they were wide (Ibid). The burden baskets were made in all sizes, with medium-sized ones being used by young girls, and very small ones used for gathering strawberries.

Double baskets were also used to store valuables, such as jewelry and paints, and the women were skilled at constructing them.

Ceramic vessels had many uses in the processing, storing and preparing of foods.

The division of labor regarding food procurement and processing was quite strict. Men hunted and fished, cut firewood, cultivated sacred fields, and made tools such as bows and arrows. Women pounded the corn into flour, cooked, fed the fires, made the pottery and baskets, and assumed the major portion of caring for the crops. "Men always had precedence over women and were fed first" (Swanton 1911:86-90).

9.7. Social Organization

It is impossible to classify the diverse tribes of the Lower Mississippi Valley into one type of social organization pattern. Section 9.3., Background of the Tribes, demonstrates that even just those tribes along the proposed and alternate routes had their origins over a vast geographic expanse, coming from such locales as Florida, Mexico, and the Ohio Valley. A number of tribes were relative late-comers, while others had been in the area long enough for members of the group to believe they were indigenous.

The major division of many tribes of North America was the moiety, a system by which a group was divided in half, resulting in two seperate social units. This division existed among several tribes of the study area.

The Choctaw had a true moiety system. One was called Imoklahsa, which means "their own people" or "friends"; and the other Kashapa okla, or "divided people". Another early writer gives them the names Yuka-tathlapi, "the five slave groups" and Iholahta, or "chiefs" (Swanton 1946:663). One moiety seems to have been a war division, with the other being concerned with ceremonial matters relating to peace.

The Choctaw moieties were strictly exogamous. Funerals for a person of one moiety were conducted by persons from the other (Ibid).

The Chickasaw also once had a moiety system. Johnson (1976:55) states that although both the moiety and phatry concepts have died out

among the remaining members of the tribe, the clan has survived "in a vague way." The family is the basic unit of social structure, and several families bind together into a clan, named after an animal or a natural phenomena. Descent is matrilineal; individuals gain entrance to a clan through their mother. "Tribal members still refer to their clans, and a renewed interest in traditional ways is evident in the community today, probably as a result of the pan-Indian movement that has stressed pride in native culture" (Ibid).

The Quapaw had a true moiety system, which Swanton (1946:665) terms similar to that of most of the other tribes of their division of the Siouan linguistic stock. He lists the Hanka moiety and an unnamed moiety. The Hanka moiety consisted of the Large Hanka or Crawfish People, also called the Ancestral People; the Small Bird, Bison or Small Hanka, Elk, Eagle, Reddish-yellow Bison, and Dog or Wolf. The unnamed moiety consisted of the Fish People, Nikiala and Turtle People. The Lion People, Tiju, Deer, Black-bear, Grizzly-Bear, Beaver, Star, Crane, Thunder-being, Serpent, Sun and Panther or Mountain Lion groups also apparently existed, but it is not clear which moiety they were affiliated with (Ibid).

Ruling classes and/or chieftains of the study area seemed to have more authority than in other parts of North America, and Swanton (Ibid: 649) remarks that "absolutism reached its height, as is well known, among the Natchez and Taensa Indians of the lower Mississippi".

The bones of the dead chiefs were preserved in their temples, and regarded as gods. The chiefs had servants who waited upon them hand and foot, and no one was allowed to pass between them and a special fire which burned inside their dwelling.

A revealing story concerns the chief of the Taensa who came to visit LaSalle, and had five or six of his slaves sweep the road with their hands and lay a cane mat on it before he passed over it.

Nevertheless, Swanton (Ibid) feels that the power of a chief depended in some part upon his age and personal abilities, and that the other town chiefs had some measure of influence upon his decisions.

Shortly before 1700, the Houma tribe had a chieftainess who led many of their war parties, and four young men who sang and danced preceded her wherever she went. She was, however, not the head chief of the tribe, and her privileges were "immediately connected with her personal abilities" (Ibid).

In 1884, Gatschet was told that Atakapan chiefs existed who had authority over a number of towns (Ibid).

Swanton (1946:652) notes that in contrast to the tribes previously discussed, the Choctaw seem to have been among the most democratic of all southern tribes. The most important element of the social organization was called the iksas. Each town was composed of several of these exogamous subdivisions (Perry 1978). Some elements of the tribal council

and their other traditional social organization still linger among the Choctaw groups extant today.

Marriage customs among the tribes of the study area were extremely diverse, ranging from the Choctaw, who took wives "without much ceremony, and lived together during pleasure", to tribes where "infidelity after marriage was uncommon, divorce rare and repudiation of the wife not allowed after a child was born" (Swanton 1946:706-707). Wives of some tribes were, however, lent to friends, and sexual freedom before marriage was encouraged. Polygamy was also common, with the wife who bore the first child taking precedence.

9.8. Religion

Religion also varied greatly among the tribes, differing not only in orientation, but even in the amount of interest shown in the subject. The Choctaw were known as being "relatively indifferent to religion", while the state religion was the most important factor in the life of the Taensa nation (Ibid:777-780).

The Choctaw did have a sky deity concept, associated with the sun, and their were many subordinate beings such as pygmies and a "Long Black Being". They believed that the world had once been flat and marshy, and that a human form had descended from above and caused the sacred hill Nanih Waiya to rise. The Choctaw were brought out of the hill. Thunder and Lightning were presented as two great birds, and a number of legends existed regarding the origin of corn.

There were few religious ceremonies among the Choctaw, but they did have a five-day green corn ceremony. There were two classes of shamans, one which could foretell the future, and the other which could make rain.

The Taensa were sun worshippers, and revered a single supreme diety. During Iberville's visit with the tribe in 1700, their temple was struck by lightning and destroyed by fire. The Taensa were convinced that this was because earlier French visitors had persuaded them not to kill persons to accompany their last chief who had died; (it was their custom to sacrifice his youngest wife, his house steward, and a hundred other men). At least five mothers threw their infants into the burning temple in an effort to appease the spirit which had been angered. These women were greatly honored for their action, and a new temple was begun in the chief's cabin (Swanton 1911:266-267).

The temple which had been destroyed had been an oval building, 30 feet long and 12 feet wide. It was dome-shaped, and was painted red. The building was ornamented with cane mats. There were twin eagles which faced the east atop the structure. Tonti (Ibid:260) states that "the whole building was enclosed in a kind of redoubt, where they put upon the wall the heads of their enemies who they have killed in war. They keep watch there day and night".

Inside the temple, the bones of dead chiefs were preserved in a small cabinet. They also kept treasures such as pearls and idols of men and women made of stone or baked clay, heads and tails of unusual serpents, some pieces of crystal, and jawbones of large fish. In 1699,. they also had a bottle and the foot of a glass and regarded them as very precious (Swanton 1911:269).

The Quapaw apparently constructed no religious temples (Swanton 1911:167). It has been suggested by Ingonompishi, clerk of the Quapaw nation in 1882 (Hadley 1882) that they had once been fire worshippers, but the evidence that he presents for this argument is not conclusive.

The Atakapa believed that man came from the sea and that the first rules of conduct were given by a supreme being. They believed that differention after death existed, and was dependent upon conduct in this life (Swanton 1946:781-782).

10. CADDO ETHNOLOGY

10.1. Introduction

At the time of Spanish and French contact the Caddo peoples were found in three geographic locations within the range illustrated in Figure 10-1. Various tribes in the Natchitoches Confederacy lived along the Red River in Louisiana from the City of Natchitoches northward; the Kadohadacho occupied the area along the Great Bend section of the Red River in Arkansas and Texas; and the Hasinai Confederacy inhabited the upper drainages of the Neches River in Texas (Neuman 1974:122).

The two Confederacies with known tribal units are the Kadohodacho and the Hasinai. The Kadohodachos (or Caddo) were comprised of four tribes: the Kadohadacho, Nanatsoho, Nasoni, and the upper Natchitoches (Newcomb 1961:282). The Hasinais appear to have been composed of eight tribes. These include the Hainai, Neches, Nacogdoche, Nacono, Namidish, Nasoni, Anadarko, and the Nabedache (Swanton 1942:12).

10.2. Linguistic Affiliations

The Caddoan Confederacies shared a common language (called Caddo) and only minor dialect differences existed between them. Caddo is part of the Caddoan linguistic stock. This linguistic stock includes the Plains Indian languages Pawnee, Wichita, and Kichai. Caddo, however, is not mutually intelligible with these Plains languages (Gallatin 1836; Powell 1891).

10.3. Early European Contacts

It appears that the first European contact with the Caddo Native Americans occurred in 1541, when members of the DeSoto Expedition encountered Caddo peoples along the Caddo River in South Central Arkansas near Caddo Gap. After DeSoto's death in 1542 the expedition moved from the Mississippi River in Louisiana exploring west to the Red River Valley near the present-day city of Shreveport, Louisiana.

From the Red River Valley, the expedition continued west and southwest until they reached a point on the Trinity River in Texas (Garcilaso 1723; Bourne 1904; Swanton 1939).

Linguistic evidence suggests that these contacts were Caddoan in nature. The village or province names have been analyzed as belong to the Caddo language. These tribes or provinces are Tula, Amaye, Naguatex, Hacanac, Nissohone, Lacane, Nandacao, Hais, Soacatino, Guasco, Naquiscoca, Nacacahos (Bourne 1904; Robertson 1933, Garcilaso 1723; Swanton 1939).

From the termination of the DeSoto Expedition until the later part of the 17th Century, references in Spanish chronicles merely alluded to tribes and/or a region called "Tejas" in east Texas. In 1686 Robert Cavelier Sieur de La Salle led an expeditionary force north from the French post near Lavaca Bay on the Texas Coast. As reported by Joutel

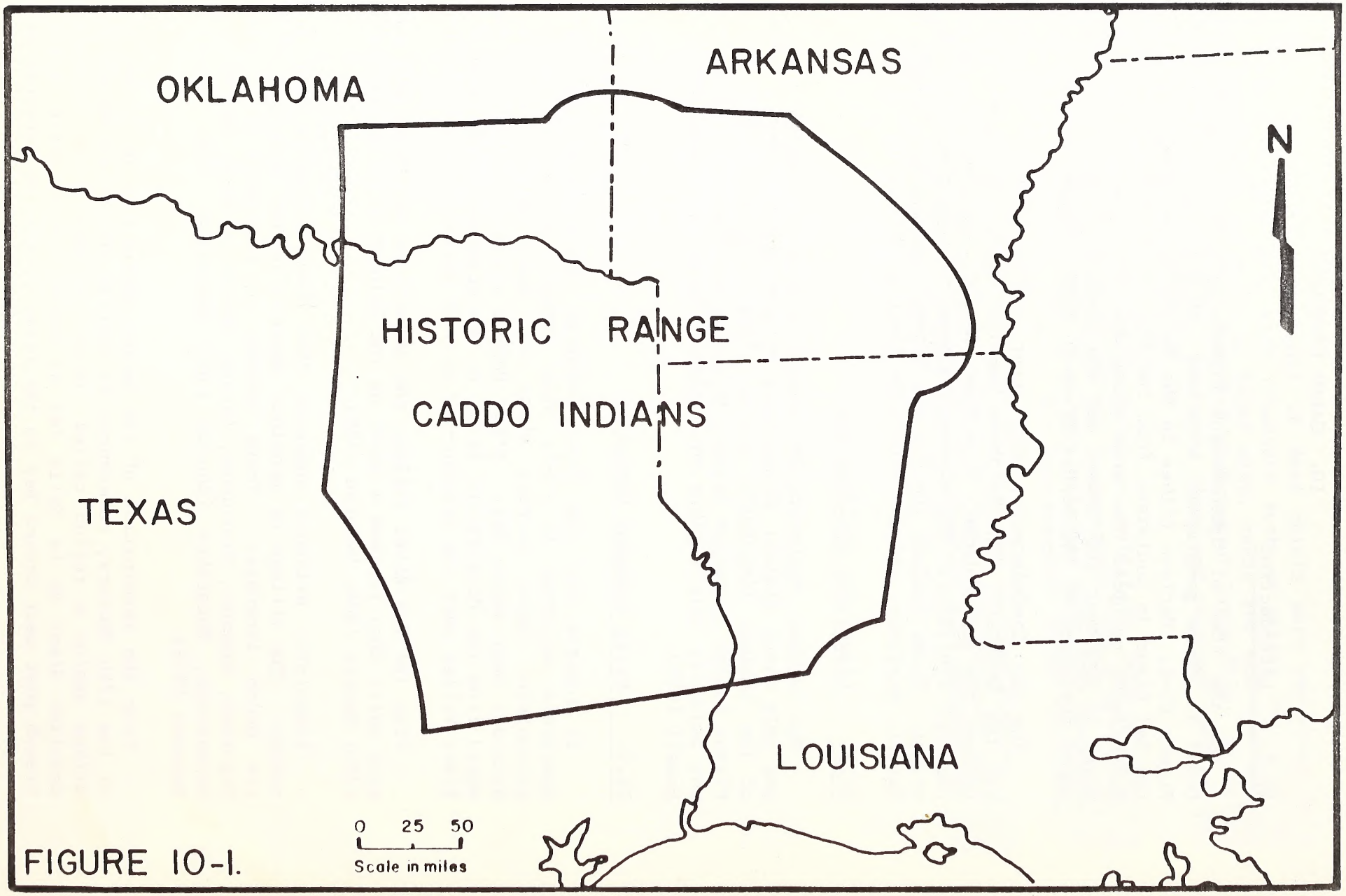

OKLAHOMA
ARKANSAS
HISTORIC RANGE
CADDO INDIANS
TEXAS
LOUISIANA
N
0 25 50
Scale in miles

FIGURE 10-1.

(Margry 1875-1876), LaSalle visited Hasinai Villages near San Pedro Creek and the Neches River in Houston County, Texas. In 1687, during another expedition north, LaSalle was murdered by members of his expeditionary force. The remainder of the force continued on their trek until they reached the confluence of the Mississippi and Arkansas Rivers. During this part of the journey the force encountered a number of Hasinai and Kadohadacho villages.

In 1689 Henri de Tonti, hearing of LaSalle's demise, left Fort St. Louis (located on the Illinois River) and travelled south in search of survivors. In 1690 Tonti reached the Red River in Louisiana and encountered villages of the Natchitoches Confederacy. From this area he traveled up the Red River to Kadohodacho villages and turned south to a Hasinai settlement. Concluding that further search would prove fruitless, Tonti returned to the Kadohadacho villages on the Red River and proceeded from there to the Poste du Arkansas (Arkansas Post) (Margry 1875-1876).

During 1689, on hearing of French incursions into Spanish territory, Alonso DeLeon led an investigative expedition, which encountered a group of Nabedache (a tribe of the Hasinai Confederacy) along the Guadalupe River. A second expedition led by DeLeon in 1690 encountered a village of Nabedache on San Pedro Creek. Fray Francisco Casanas de Jesus Maria established a Mission among the Nabedache on the Neches River in Texas. Detailed accounts of the various tribes and locations of the Hasinai were sent to the Viceroy of Mexico, as well as the locations of the Kadohodacho and Natchitoches Confederacies (Bolton 1916; Casanas 1927).

10.4. Religion

The belief system of the Caddo was centered around a supreme male diety, Ayo-Caddi-Aymay, who was thought to be the creator of the universe (Swanton 1942). This central figure was believed to be created from a drop of blood: all that remained from a pregnant woman slain by a monster. Even though this central figure was supreme, the Caddo believed the universe was populated by numerous spiritual beings. "They believed that the world was or could be inhabited by multitudes of supernaturally powerful creatures, and very possibly by large amounts of nonanimistic, impersonal supernatural power" (Newcomb 1961:309).

Various individuals within Caddo society acquired spiritual helpers that could take the form of animals; however spiritual manifestation could also inhabit inanimate objects or natural forces. These spiritual helpers were not acquired in a vision quest as was common among the Plains groups.

The spiritual leader of the people was the xinesi. The xinesi was the chief attendant of the temple, the figure upon whom all religious practices were focused. The will of the supreme being was manifested through two adolescents (coconicis). These adolescents functioned as oracle intermediaties between the god and the xinesi (Casanas 1927).

In every tribal unit of the Caddo Confederacies there existed medical societies whose principal members were shaman. Although devoted primarily to curing physical ills, these shaman also served to control supernatural illnesses which were believed to be caused by witches. Initiation into these medical societies was accompanied by the ingestion of an herbal drink which placed the neophyte into an unconscious dream state lasting twenty-four hours (Casanas 1927).

Religious ceremonies of the Caddo were seasonally scheduled. The most important of these festivals was the ceremony marking the beginning of the harvest season. Although this festival was one of general feasting, the xinesi spent this time fasting and praying in order to procure good fortune for the population (Newcomb 1961).

10.5. Social Organization

The social organization of the Caddo confederacies was bureaucratic in nature. Each confederacy was ruled by the xinesi, whose office was hereditary. Under the xinesi were tribal chiefs called caddices. The caddice's office was also hereditary. Subordinate to the caddices were canhas, who carried out the wishes of the xinesi. Duties of the canhas appeared to have been replacing the caddi when he was absent and calling together the tribal elders for council. Officials called chayas were subordinate to the canhas. Their principal service was to carry out the orders of the canhas. The last bureaucratic group, the tammas appear to have served as law enforcers (Casanas 1927).

The kinship unit of the Caddo appears to have been the clan. Among the Kadohadacho, clan names included Beaver, Otter, and Wolf. The clans were apparently matrilineal in nature (Parsons 1941).

The kinship terminology of the Caddo is the type known as "Iroquois". In this system a father's sister's children and a mother's brother's children considered each other brothers and sisters. "There were distinguishing terms for an older sister of a woman and for the older brother of a man. Such terminology was also applied to parallel cousins...but their seniority depended upon the relative ages of their parents, rather than those of the speakers. The same concept was extended to cross-cousins, the principle being that the children of a sister were considered to be senior to children of a brother" (Newcomb 1961:305-306).

Marriage among the Caddo was not of major ceremonial significance and does not appear in general to have been of lifelong duration (Casanas 1927; Morfi 1935). Although presents were brought to the prospective bride to gain her favor, the obtaining of the parent's favor was vital. If presents of venison were accepted by the parents, the marriage was considered legal (Morfi 1935; Casanas 1927). Residence of the couple was matrilocal (Swanton 1942). Divorce was obtained upon mutual agreement of the couple. Thereafter, marriage could be sought with a new partner. The levirate (a practice by which a man inherits his dead brother's wife and children), was also practiced among the Caddo. As a result, although the Caddo were basically monogomous, polygyny also existed (Morfi 1935).

Among the noble families marriage was taken seriously and adultery was punishable by death (Swanton 1946). "The wives of the xinesi and the wives of the caddices-and each official only has one wife-are designated by one general title, which is aquidau. When this name is mentioned it is immediately understood that the person spoken of is either the wife of the grand xinesi or of some caddi" (Casanas 1927:216-217).

10.6. Economy and Material Culture

The major mode of subsistence of the Caddo was agriculture. Both men and women participated in field activities. The men did most of the heavier activities such as field preparation and cultivation (Margry 1875-1876). Maintainance of the fields appears to have been communally undertaken, with the plots of tribal leaders planted first (Casanas 1927).

The Caddo cultivated corn, beans, pumpkins, sunflowers, and tobacco (Margry 1875-1876; Espinoza 1927; Morfi 1932; Hidalgo 1927; Solis 1931). Two types of corn were under cultivation. The first type was an early maturing variety called "little corn", which was planted around April and matured in about a month and a half. The other variety, called "flower corn", was planted after the harvest of "little corn" and matured in about three months (Espinoza 1927; Morfi 1932). In this way, two crops were harvested in a single year, time serving as a hedge against crop failure. Agricultural tools consisted of hoes fashioned from bison scapula or wood. These tools could only be used to till lighter soils. Little is mentioned about soils used for cultivation in the early reports by explorers. It can be assumed, however, that due to the proximity of villages to major rivers (as reported by early expeditions) natural river levees served as the locations of cultivated fields.

The Caddo also practiced hunting and gathering. Women gathered acorns, nuts, persimmons, plums, wild cherries, mulberries, stawberries, and blackberries (Casanas 1927; Hidalgo 1927; Espinoza 1927). Men hunted deer, bison, bear, rabbit, wild boar, wild turkeys, geese, ducks, partri es, cranes, quails, snakes, and polecats (Casanas 1927; Espinoza 1927; Morfi 1932; Margry 1975-1876). Men also fished extensively (Swanton 1946:292). During times of famine or in connection with specific ritual occasions dogs were eaten.

Besides being responsible for hunting and garden preparation, Caddo males were generally responsible for house building. Caddo houses were round, resembling beehives, and were covered with grass from top to bottom (Swanton 1946). They were constructed by placing poles in a circle of pre-excavated holes. Then a temporary center pole was erected from which two men gathered the out side poles towards the center where they were lashed and secured. The framework was then covered with timbers and the outside covered with thick grass. The center pole was then removed since it only served as a scaffold-like device (Espinoza 1927). "In 1690, Massanet, visiting the house of a Nabedoche chief, described it as being furnished with ten beds that occupied one-half of the

interior. The beds were made of reed matting laid on forked sticks, and over this framework were spread buffaloskins" (Newcomb 1961:296-297).

The rest of the dwelling was taken up by shelving stocked with foodstuffs, ceramic jars, and wooden mortars used for pounding corn into meal during inclement weather. Little is known about the interior of common dwellings but it can be assumed that they were smaller and more spartan in nature. Adjacent to dwellings were arbors that, besides being used as cooking areas in the summer months (Swanton 1911), may also have served as an area where foods were processed (such as grinding of corn, shelling of nuts).

During the early historic period the Caddo were known for their ceramics, basketry, reed mats, wood carvings, and feather garments (Margry 1975-1876; Espinoza 1927; Morfi 1935). However little is known about the division of labor concerning the production of these items, since they were soon replaced with goods of European manufacture.

Early explorers found that the Caddoes subjected themselves to tattooing and artificial cranial deformation (Swanton 1946). Cranial deformation was achieved in childhood by the use of a cradleboard. Tattooing continued throughout life and was produced by pricking the skin with a needle and then rubbing charcoal into the wound. Designs included scores or streaks, animal, and floral designs. Body painting also appeared to be a popular mode of ornamentation. Hair styles varied from tribe to tribe. Garments were fashioned from tanned deerskin.

Little is known about the settlement system of the Caddo since the subject was not discussed in the reports of the early French and Spanish explorers. However, from early descriptions it can be assumed that most settlements were located adjacent to major rivers and their associated drainages to take advantage of the rich alluvial soils for agriculture, as well as the natural resources associated with a riverine environment. Caddo towns were generally scattered about as small villages (hamlets). Each village may represent a separate clan. An exception to this norm appears to be the Cashinnio, who in 1687 lived in a village of 100 houses (Swanton 1946). This consolidation may possibly be due to the need for defensive measures.

10.7. Warfare

As observed by Joutel, the two major motives of warfare among the Caddo were vengence for the slaying of relatives and the achievement of personal glory. Upon preparation for warfare Caddo warriors (called amayxoya) built a house in which they stayed for seven or eight days. During the pre-war interim, feasts, dances, prayers and offerings were made. Before setting out, the war party burned down the house. One of the warriors was then elected to lead the war party. Wars consisted of hit-and-run raids and flight in the face of danger was not considered dishonorable (Margry 1975-1876).

10.8. Concluding Remarks

Up until the 19th Century the geographical location, cultural integrity, and territory of the Caddo Confederacies remained basically intact. However, around the beginning of the 19th Century, other tribes who had given up their lands in the East began to settle in Caddo territory in Arkansas and Louisiana. It is also doubtful that after the first decade of the 19th Century Caddo lands in Texas were exclusively occupied by Caddo tribes. All indications are that non-Caddo tribes were moving into the Sabine, Neches and Trinity drainage systems in eastern Texas. In 1835, the Kadohadocho sold their lands in Louisiana to the U. S. government and moved into Texas, where they joined the Hasinai. Farmstock and villages were established along the Neches, Trinity, and Brazos Rivers. However, since the government of Texas would not allocate land to the Caddos, they were removed to a federal reserve in Caddo County, Oklahoma, where they reside today.

11. MAN AND ENVIRONMENT: A SUMMATION

11.1. Introduction

Chapter 2, a detailed description of the environmental setting of the Project area, provides a wealth of information on the resources available to human occupants. It has called ttention not only to general resources, but also to particular resources available to occupants of limited areas (such as lithic outcrops, edible wild flora, etc.).

This chapter will consider the relationships between those resources and the men who used them. It will outline the nature and dynamics of human adaptation within the constraints of the environment. No attempt will be made to repeat the data presented in Chapter 2.

The concepts of the man/land relationship are not static. Rather, increasingly sophisticated models have been developed over the years, and new models are still being formulated. This chapter will discuss some of these theories; where relevant, studies performed within the Project area which illustrate a given theory will be mentioned.

Various categories of information which would provide the ideal background for the utilization of these models are enumerated in section 11.3. It is pointed out that a great deal of this information is provided within the body of this report. Those categories for which information is lacking in this report (and, because of their scope and nature, in virtually all reports) are also addressed.

11.2. Defining the Nature of the Man/Land Relationship

The most fundamental manner of placing human groups in the context of their environment is "possibilism", determining the opportunities and constraints which the habitat places upon its human populations (Kaplan and Manners 1972:78):

> . . . [T]he features of the natural habitat are seen as playing, not a determinative role, but a permissive or limiting role, offering opportunities in certain directions and limiting them in others. . .

The environmental background constituting Chapter 2 forms in essence a catalog of such environmental "possibilities", that is, potentially-exploitable resources within the project boundaries. Discussions of the spatial distribution of various of these potential resources (e.g., gregarious herbivores, surface water supplies, etc.), in turn, implies limits or constraints to the realization of any particular resource. In addition, "historical" discussions such as those of vegetative succession define changes in regional opportunities and constraints, lead-

leading to the examination of the dynamics of adaption. It is within the arena of adaptation that we are at last led beyond the simple enumeration of existing potential resources to the key concept in any examination of man/land relationships: that man's adaptations to his habitat are primarily extra-somatic, that is, cultural. Culture is "the primary mechanism through which man begins by adapting to and ends by controlling his environment" (Kaplan and Manners 1972:77). Thus, ". . . what constitutes an environmental opportunity or limitation can never be stated in absolute terms but is always relative to the cultural means available for exploiting the opportunities of the environment" (Ibid:78).

Kroeber's classic monograph, "Cultural and Natural Areas of Native North America," (1953) employed environmental possibilism in his examination of climatic factors controlling maize cultivation in North America, a study which encompased most of the project area. The Project region was dealt with more specifically in Wedel's (1961b) work on rainfall as a limiting factor in the expansion and retreat of horticulture in the Plains. In this study Wedel defined 20 inches of annual rainfall as minimal for prehistoric horticulture and asserted that the westward expansion of the Upper Republican culture into the high plains was made possible by an extended westward shift of this 20 inch rainfall line. Further, the abandonment of these Upper Republican sites was made unavoidable by the eastward shift of the line to its current position at approximately the 100th meridian.

Both the above studies employ culture as the mechanism by which a particular group of human beings "select" resources for exploitation from the set of potential environmental resources. However, the approach of environmental possibilism is a rather static one: it focuses upon the specific history of the cultural feature under study and employs environment exclusively to determine why a particular cultural element did not occur (Hardesty 1977:4). It was with the introduction of the concept of ecology that "culture" and "environment" ceased to be thought of as two independent realms. Rather, as Kaplan and Manners (1972:79) put it:

> . . . [T]he environment that figures in the cultural ecologist's considerations is always a culturally modified environment. . . [T]he interaction between the natural habitat and a cultural system inevitably involves a dialectic interplay of the elements, of what is called feedback or reciprocal causality.

The introduction of this concept of inter-relatedness or reciprocal causality leads to two ideas which are critical to an ecological view of man/land relationships (Hardesty 1977:9), "the idea that neither environment or culture is a 'given' but that each is defined in terms of the other, and the idea that environment plays an <u>active</u>, not just a limiting or selective role in human affairs." An early and important expression of the systematic interaction of man and environment was Julian Steward's (1955:40-41) definition of the "<u>cultural core</u>":

> [T]he constellation of features which are most closely related to subsistence activities and economic arrangements. The core includes such social, political and religious patterns as are empirically determined to be closely connected with these arrangements.

Chad Oliver's (1962) analysis of the Plains nomadic bison hunters (referred to extensively in Chapter 7) constitutes a sophisticated application of the culture core concept to a major portion of the project area. Oliver was able to demonstrate that despite diverse origins (e.g., hunter/gatherers, horticulturalists), the social organization of the horse nomads was converging upon a common system based upon winter dispersal, summer communal gathering, status derived from horse ownership and warfare, weak tribal leadership, and other features which reflected two ecological conditions:

> 1) the yearly cycle of dispersal and gathering of the bison; and,
>
> 2) the intense competition between human groups struggling for the same objectives (especially bison, horses, and European goods) within the same territory.

The latter point is especially vital as it highlights the fact that ecological relationships apply to the relations between human groups as well as to the relationship between humans and the natural world. As Oliver, himself, puts it (1962:67-68), while his work has "underscored the crucial role of technology as a prime mover in cultural change . . ., it is not technology alone that is so important - it is rather the role played by technology in the total ecological system."

Recent examples of the ecological systems approach have borrowed more strongly from biological ecology, applying especially the quantifiable units of analysis of the general ecologist (Kaplan and Manners 1972:86-87; Hardesty 1977). Among the best received of these attempts to integrate general and cultural ecology is Rappaport's (1968) study of the Tesembaga Maring of New Guinea. Rappaport was able to link the Tesembaga's elaborate cycle of rituals (which included massive pig slaughters) to a variety of subsistence and social behaviors (e.g., protein consumption, pig population, incidence of fighting, total garden acreage, etc.) demonstrating that the ritual cycle was (in systems terminology) a homeostatic mechanism regulating the above behaviors.

11.3. Assessing the Prehistoric Man/Land Relationship

Most recent attempts at understanding specific prehistoric man/land interactions have worked from a general ecological perspective as described above, often oriented toward fine-scale definition of environmental zones, zonal boundaries (ecotones), and demographic interpretations. Examples of this type of analysis includes Streuver's (1968) study of changes in the Woodland subsistence-settlement system of

the Lower Illinois Valley and Flannery and Coe's (1968) work on the Formative in lowland Mesoamerica. Similarly, fine-grained analysis of the distribution of resources within a particular habitat and the mobility, logistics, and scheduling necessary to exploit these resources have formed the essence of current ethnoarcheological research (e.g., Binford 1980), work that is in part aimed at providing a better perception of the significance of the patterning of prehistoric remains.

Karl Butzer (1971:401-402) has provided a lengthy catalog of specific elements ideally required for a systematic examination of prehistoric man/land relationships. This enumeration requires contributions from ethnology, biological sciences, and earth sciences as well as archeology. The listing is intended to guide the analysis of specific sites and small regions and is therefore, of course, beyond the scope of this report. It will be equally clear, however, that the Environmental Background (Chapter 2) and other sections of the report have, on a broad scale, fully answered some of Butzer's requirements:

> 1) Understanding the regional environment, including the climate, vegetation, soils, and geomorphic agencies.
>
> 2) Understanding the regional food resource base or economic area. In the case of hunter-gatherer populations this requires:
>
> a) analysis of the fossil fauna from several archeological sites or natural sediments;
>
> b) estimation of the biomass existing in the region, based on paleontological data and an understanding of vegetation and animal ecology;
>
> c) identification of preserved vegetable food or at least pollen of species with edible fruits, bark, roots, etc.;
>
> d) understanding of the nutritional patterns of modern "primitive" groups having comparable technology and living in comparable environments; and
>
> e) over-all assessment of the human resource base in terms of potential population level. (Butzer admits that much of the information from Item #2 above is difficult to obtain).
>
> In the case of agricultural populations, understanding of the economic area would entail:

a) an assessment of how much of the human diet was based upon agricultural plants, domesticated animals, and native food resources, including game and wild vegetable foods;

b) assessment of area of local arable land as bounded by topographic features (coasts, rivers, swamps, mountains) and conditioned by vegetation cover (grassland, parkland, open or dense forest), soil depth, and terrain slope;

c) assessment of native vegetation as an obstacle to clearing and tilling;

d) assessment of soils as to friability and fertility;

e) assessment of available grazing for herd animals; and

f) assessment of game and fishing resources

3) Understanding the local setting of a site, i.e., location with respect to terraine, hydrography, groundwater, and other features. This would include:

a) factors other than food supply that would influence selection of a settlement site on a seasonal or perennial basis (water availability, natural shelter, exposure, dry ground, fuel resources);

b) factors impeding or facilitating human movements (coasts, rivers, swamps, steep slopes, vegetation patterns);

c) factors affecting game movements, such as availability and localization of drinking water, topographic barriers impeding or channeling movements;

d) factors providing an added marine or aquatic food element, such as location near the seashore, lakes, rivers, or streams.

Chapter 2 has certainly sufficed to define Item #1, the regional environment, as phrased above. In addition, specific discussions of information relevant to Items #2 and #3 appear within the various regional syntheses. For example, faunal remains are discussed at length

in the Plains archeological synthesis and ethnographic analogs for prehistoric behaviors are provided by the various ethnographic syntheses. (These examples, by no means exhaust the data applicable to Butzer's guidelines appearing in this report; however, to itemize and repeat each contribution would be redundant).

11.4. Conclusions

To assert that this report defines the essential character of the relationship between man and environment for the project area, with its vast scope, great diversity, and deep span of occupation would clearly be an arrogant falsehood; such a definition is beyond the current scope of archeology and cultural ecology. However, this chapter has served to outline briefly the progression of understanding regarding man/land relationships and to point out particular contributions to this understanding based upon project area cultural resources. It has further served to call attention to other sections of this report which provide information regarding opportunities, constraints, and system dynamics of the human/environmental interaction.

12. SUMMARY AND INTERPRETATIONS

12.1. Scientific Value and Human Interest of Area Cultural Resources

In order to assess the scientific value and human interest of cultural resources within the Project area, we must begin by asserting the general scientific and humanistic value of the study of the prehistoric past. This groundwork is necessary since the utility of any particular segment of the past cannot be demonstrated until the relevance of the past in general for the conduct of current human affairs is established. We may define three by-no-means mutually exclusive realms for which the merit of studying the prehistoric past can be evaluated and accepted:

1) Scientific: essentially, the extent to which this study of the past can answer the goals defined by the discipline itself. For anthropological archeology these goals have traditionally included the establishment of areal chronologies, reconstruction of past lifeways, and the study of culture process, (Binford 1968). It must be kept in mind, of course, that goals change within developing disciplines, thereby making previously 'useless' categories of information (e.g., faunal remains, spatial relationships, or quantifications of data) invaluable in answering currently important questions (such as the study of culture processes, as discussed in Section 12.3.).

2) Humanistic: the degree to which the study of prehistory answers the broader elemental needs of the sweep of humanity. Humanistic values may range from the purely intellectual through the ethical and aesthetic to the emotional. Examples of humanistic questions answerable by reference to the past include:

   a. How can one account for the origins of a culture's value system?

   b. What has been the historical price of human progress as measured in terms of the relationship of individuals within a society?

   c. Of what value is the past in restoring a sense of pride and dignity to the descendants of those persons displaced and dispossessed by the course of history?

3) Practical: the estimation of the utility of information from the human past in providing solutions to immediate or potential social problems, for example environmental degredation, public health, or social inequality.

The extent of the scientific value of the project area's cultural resources in providing answers to previous important archeological questions will be discussed briefly in Section 12.2, "Research Orientations." Further, the potential of the region's cultural resource data base in providing solutions to current archeological problems will be discussed at length in Section 12.3, an enumeration of immediate research goals of each of the archeological areas under study. On these grounds we will defer a discussion of the past, present, and potential contributions of project area cultural resources but will assert that their scientific value has been and remains enormous.

The humanistic value of archeological investigations into the past is at one level impressionistic and at another both academic and philosophical. Much of the public value of archeology lies at the impressionistic level, as implied by Davis (1978:16):

> This (interest in the nature of the human community) is a concern with archeological materials as representing the lives of real people - as we ourselves are real people - living in the real past. There is an increasingly widespread public interest in the richness, variety, and depth of human experience, experience whose fragile signs must be treated with respect and skill lest they be lost forever. This is the 'human connection,' the appreciation of the true subject matter of archeology.

Obviously, with proper attention to public interpretation the investigation of the archeological resources of the Project area can serve to further enhance and refine the public's interest in the depth and variety of human experience. Furthermore, as Davis (Ibid:17) recognizes, Project area archeology can provide a foundation for revitalizing the cultures of existing Native American groups. A good example of the application of area archeological data to the renewal of native cultural pride is the work of Meyer (1977) in analyzing both archeological and ethnohistorical data for the Middle Missouri tribes. Among Meyer's explicit goals was that of restoring pride to the remaining Mandan, Hidatsa, and Arikara, clearly answering affirmatively Question C as proposed above.

Questions A and B above represent enquiries into the nature of man and society that lean more toward the academic and ethical end of the humanistic spectrum than the impressionistic and emotional. To attempt to answer quesions such as these obviously requires reference to the past, a past which is greatly expanded by the inclusion of prehistory. These questions also serve to illustrate the worth of Project area cultural resources because both can be answered in part through reference to these resources. Chad Oliver's (1962) study of the Plains horse nomads has offered provocative answers to the question of cultural values which are based on considerations of ecological adaptation, human competition, and cultural continuity. Similarly, information from

various Mississippian or Mississippian-like stages within the Project area (Haas 1971; Brown 1971) serve to illustrate the growth of social inequality and social complexity. These brief illustrations serve to amply demonstrate, in any case, the humanistic merit of the evidences of the past in the Project area.

The practical value of prehistory, long undervalued, has recently begun to be appreciated. Joel Gunn (1978:19) offered this summary of its potential:

> . . . [A]ccurate knowledge of the human past contributes to a realistic assessment of ourselves and our potentials. Prehistory, then, is a contributor to that general background of knowledge about ourselves through which we can cope with the problems of designing society and environment to benefit us. In other words, it is basic and long-term benefits that can be expected from [archeology].

Gunn (Ibid:19) points specifically to the contributions of archeology to the study of "dramatic climate changes leading to crises in cultural adaptations." Project area cultural resources have contributed to pioneer studies along these lines (e.g., Wedel:1961) and hold enormous potential for further fruitful enquiries. The Plains have also formed a laboratory for evaluating the extent to which human activities have modified the natural environment (e.g., Wedel:1957), a topic of undeniable current importance. Further, the large and growing body of carefully collected prehistoric human skeletal material holds potential for contribution to the field of public health through the historical analysis of disease patterns. Other innovative contributions of data from the prehistoric past have been admirably cataloged in Dixon's (1977) discussion of non-anthropological applications of archeological resources. The passage of time will undoubtedly reveal additional pragmatic uses of prehistory, applications for which the continuing contribution of the Project area is ensured by its size and diversity.

12.2 Research Orientations

Given a project area as large and diverse as that covered by this study, a summary of prior and current research orientations is basically an enumeration of research orientations for the discipline of archeology at large. Basic among these objectives, of course, was the establishment of area chronologies, a goal which has been pursued with varying degrees of success within the project area. Chronologies are well-defined, for example, in most of the Plains areas and in the Lower Mississippi Valley but are less well-established in the Ozarks, a region unfortunately characterized by the destruction of the stratigraphic integrity of many multi-component sites. Among the groundbreaking work

in the methodology of establishing regional chronologies carried out within the Project area was James A. Ford's (1936) pioneering employment of ceramic seriation in the Lower Mississippi Valley.

An outgrowth of both chronological and ethnological considerations was the development of the "direct historic" approach on the Plains (Strong 1935). By working backward from well-documented historic tribal sites, Strong and Wedel were able to establish linkages between wholely prehistoric archeological cultures and known historic tribes.

The Plains also provided a laboratory for important early work correlating environmental change and subsistence/settlement pattern adaptation. The classic example of this approach is Wedel's (1961b, 1963) work on environmental change and the viability of horticulture on the High Plains.

The Project area has been the scene of the collection of enormous quantities of data relevant to subsistence activities, settlement patterns, housing systems, and other activity spheres generally subsumed under the discipline's goal of reconstructing past lifeways (Binford, 1968:12). Examples of the above would run from information on changing pit-house styles in the Middle Missouri area to analysis of preserved plant remains from Ozark cave sites.

Attempts to deliniate culture processes, as the most recent of the discipline's overall research orientations, will naturally be discussed at most length under the subject of current and future research problems. However, we should note that the Project area has been the scene of some of the earliest attempts at processual archeology. We may site for example Deetz' (1965) attempt to demonstrate the existence and eventual decline of matrilocal residence among the Plains Arikara on the basis of a spatial analysis of ceramic attributes.

12.3 Directions for Future Research

Cultural resource management reports often deal with project impacts upon specific cultural resource sites. This study, however, is not intended to discuss specific sites within the Project area, but rather to provide a knowledgeable framework for interpretations of such sites (see Chapter 1). As a generalized synthesis of Project area prehistory and ethnology, current research problems which apply to the several culture areas affected by the Proposed and Alternate Actions are discussed. An introduction to potential directions for future research, in addition to the discussion of the value of cultural resources provided in Section 12.1., should provide managers and other interested persons with a sense of perspective which will aid in the decision-making process. Further, specific recommendations for Project area cultural resource management organization are presented in Chapter 13.

Broad interpretive problems are generally considered the most fruitful directions for future research but these are limited by the amount and accuracy of basic field and archival data. Modern researchers often develop elaborate research problems with interpretive potential and this

certainly appears to be the direction of future research. But the compilation of basic information in the form of site inventories, excavation data and archival searches can not be ignored as the underpinning for all future research along the proposed and alternate routes; these data to be used to refine and modify basic temporal and cultural models.

That is not to say that interpretive problems should be ignored, for in fact we have ample evidence to address many of these and it is only by posing problems and generating hypotheses that we can identify shortcomings in our data, limitations to research and begin to understand the cultural processes and people being studied.

In the following sections two levels of research are considered. These are 1) problems pertaining to chronological frameworks and definitions of valid cultural units through time and space. 2) problems that deal with interpreting cultural processes that occured through time and space.

12.3.1. Plains Research Problems

A. Analyses of the relationships between topography and types of sites should be addressed. An association has been demonstrated between bison kill sites and riverine areas, canyons, draws, and dry gulches. Are there any systematic relations between landforms and other types of sites, e.g. campsites? Wedel (1963) offered an introductory model to this line of thought but it has not been fruitfully pursued in the published record.

B. More detailed analysis is needed of the internal spatial aspects of excavated campsites in order to glean data respecting what occured at these sites during their occupation. Such information could be obtained from dimensional analysis of features, i.e. firepits and their contents, artifactual concentrations, postholes, etc., and the spatial relationship between such features within the campsite. This study could be broadened to a synthesis for any particular culture complex, e.g. the McKean Complex.

C. Presently there would seem to be enough data to make comparisions within a particular complex of the semblances and differences between open sites and sheltered sites.

D. Interpretations of the type suggested above may be strengthened by researching the regional ethnohistorical literature for analogous geographical areas. Or, inversely, these ethnohistoric data may provide avenues whereby observed archeological phenomena may be explained.

E. Preliminary reports and short notes regarding some of the very earliest Paleo-Indian sites, i.e., the Selby and Dutton sites, the Colby Site, and the Carter-Kerr-McGee Site have provided data whereby predictive models may be formulated to assist in searching for other sites of comparable age.

F. It seems that on the High Plains very little has been provided from the archeological standpoint about sites during the early historic period after the acquisition of the horse. Most of the data pertains to burials and/or pictographs. From the campsites, does it appear that demographic changes took place? Did cultural units become larger (band, clans, tribes)? Can differentiated social units be recognized from archeological distributions?

G. A recent synthesis of ethnobiological data (Neuman, in Press) has indicated that bison was not an important prehistoric staple in eastern Oklahoma and northeastern Texas. Other applications of zooarcheological analysis could include, for example, a diachronic analysis of recovered horse material, to provide data independent of the documentary evidence on the spread of the horse complex.

H. It would worthwhile to develop our understanding of the transition from using indigenously produced goods to a dependence upon European-made trade items in protohistoric sites. Both existing archeological and documentary evidence could be employed to examine the creation of markets and changes in the relations of production among historic groups. Potential study areas could include Wichita sites in Oklahoma in which manufactured goods came to completely supplant the native lithic technology between AD 1700 and 1750.

I. Lorrain (1974) has suggested that the Wichita resided with the western Caddo groups of the Fulton aspect between ca. 1500 and ca. AD 1700 (see 7.7.8., Wichita Historical/Linguistic Alliliation section). She further suggests that this hypothesis could be tested by excavating protohistoric sites in the western Caddo area in an attempt to locate sites identifiable with the Proto-Wichita Henrietta, Washita River, and Little River Plains foci. The presence of such Plains-type sites in the Caddo area would tend to confirm her thesis, and explain the introduction of Caddo traits into the Wichita and vice versa, as evidenced by the Fulton and Norteno aspects.

12.3.2. Ozark Research Problems

The following section reflects strategic research orientations and priorities reflecting trends in the rapid destruction of archeological resources in the Ozarks. Although a multitude of questions could be asked, it is felt that the tentative list of problems presented in this section represents a base from which others can be written as the data base is expanded. Enough leeway is given within each question so that the establishment of cultural chronologies, reconstruction of culture histories, and understanding of culture change processes can be encompassed.

A. Paleo-Indian points recovered as surface finds as well as isolated points from excavations indicate a Paleo-Indian occupation of the Ozarks. Basic information is needed on the extent and nature of this occupation. This information on the adaptation of Paleo-Indian to the Ozark region can be obtained from buried sites. The types of evidence that need to be recovered include faunal remains, floral macrofossils, C-14 samples, soils, pollens, and gastropods in order to develop a general theory concerning subsistence and settlement patterns (Raab et al 1979).

B. What was the nature of the subsistence response, if any, necessitated by changing climatic conditions on the Ozarks/Plains margin during the Archaic?

A climatically induced pattern of culture change is hypothesized to be demonstrated in the shift from the Paleo-Indian Era through the Archaic Era, but needs to be demonstrated. The development of a warmer and drier climate (altithermal) caused a recession of the Ozark forest at the edge of the Great Plains (around 6300 BP). A change in sibsistence away from big game hunting (associated with specific types of tool kits and lithic assemblages) to an increased reliance on small game and plant exploitation (suggested by an apparent decrease in the number of chipped stone tools) is suggested. Around 3000 BC change in the archeological assemblages indicates a shift back to large game hunting. This appears to be associated with a change back to a cooler and wetter environment (Raab et al 1979).

C. Does the cultivation of native plant species (for example, pigweed, sunflower, and marshelder) predate the introduction of tropical species (for example, beans, corn and squash) in the Ozarks?

Although there is a suggestion that indigenous native plant cultivation in the Ozarks predates the cultivation of tropical plant species, this has not be definitely ascertained. There is possible evidence that cultivation of squash may predate the cultivation of native plant species, thereby serving as a model for native plant cultivation. The excellent preservation of organic remains in cave deposits in the Ozarks should serve to furnish information on the development of plant domestication, culture change, and human adaptation to the Ozarks induced by plant domestication (Raab et al 1979).

D. Did the exploitation of native and/or tropical cultigens have an immediate or gradual effect on the social evolution of prehistoric populations in the Ozark region?

Agriculture may represent a type of procurement that existed within a varied economic system. Economic systems such as hunting and gathering may never have been totally relinquished through time. We should, therefore, seek to derive answers to the following questions: What were the cultural and demographic ramifications of the exploitation of native and/or tropical cultigens for the peoples of the Ozark region? To what extent did horticulture replace or merely supplement the pre-existing hunter-gatherer subsistence? Raab (Ibid) has suggested that the shift to storeable agricultural produce may have increased population growth rates and led to a more sendentary lifestyle.

E. The mound groups of the Ozark region suggest a series of related research problems revolving around two central issues: the identification of the mound-building populations as indigenous or intrusive to the Ozark region, and the identification of the cultural "core area" (if any) with which the mound groups themselves exhibit a definitive stylistic affinity (in terms of mound configuration, artifact assemblages, mortuary practices, and settlement plans).

Addressing the first of these problems, it has been suggested (due to the presence of argillite spades) that one of the resource bases of the Woodland Stage Goober Complex was horticulture associated with a sedentary or semi-sedentary lifestyle. This may represent an evolutionary progression to which Caddoan or Mississippian socio-economic lifestyles could be adapted. It is, therefore, possible that the Ozark mound groups reflect the diffusion of a mound-building cultural complex into a region whose native population is at least partially pre-adapted to a Caddoan/Mississippian lifeway.

Alternately, in the absence of evidence for cultural continuity between the indigenous Woodland population of the Ozarks and the groups responsible for the later Ozark mound-building it may be suggested that the mound-building phenomenon represents the intrusion of a non-indigenous population. However, one cannot currently distinguish intrusion of non-indigenous populations from the adoption of Mississippian or Caddoan cultural features by resident Ozark populations. The adoption of these cultural characteristics may have forced an increased dependence upon agriculture that resulted in a shift in settlement patterns, an increase in social complexity, and changes in material culture.

Turning to the question of stylistic affinities between the Ozark mound groups and potential cultural "core areas", two sources of innovation may be proposed as alternatives, the Caddo area of the Arkansas River Valley in Oklahoma and the Mississippian cultures of the Mississippi River Valley. Ecological similarity between the western Ozarks and the Caddo area are suggestive of a basis for affiliation between the two areas. However, despite greater distance and ecological dissimilarity, the possibility of Mississippian affinities cannot be ruled out at this time. Solution of this problem is of course interlocked with resolution of the problem of indigenous versus intrusive origin of the actual mound-building population

(since the mound-building complex could have been transplanted in toto into the region from either core area by an intrusive population or diffused to overlay the indigenous Ozark resident culture).

Identification of the Ozark mound groups with intrusive colonizing elements from a core area may reflect a clearer picture of the social system in the core area since, as single component sites, the Ozark mound groups present fewer interpretive difficulties (e.g., regarding temporal control) than the deeply stratified multicomponent sites of the core area proper. This analytical property of marginal single-component sites has recently been demonstrated in the Lower Illinois Valley and in Southeast Missouri. Questions regarding the viability of complex cultural developments in areas marginal to their origin (and presumably best adaptive fit) would be answered by this line of inquiry, as well.

F. During the Late Mississippian Era, were either the Caddoan or the Mississippian traditions in decline, with the Ozark region being usurped by the Osage for hunting territory?

Currently there is no indication that Mississippian Stage cultures survived to the time of European contact in the Ozark region as they did to some extent in other parts of the Eastern United States. At the time of the first European contact, the Ozarks were being used by the Osage as their hunting territory. Within the context of this statement a number of questions must be addressed. Did the Mississippian cultures in the Ozarks collapse as a result of the abandonment of the rest of the Mississippian spheres of influence? Or, was the Mississippian manifestation in the Ozarks unsuccessful because it could not provide Mississippian socio-political structure with an adequate agricultural resource base? There is also the possibility that the Mississippian tradition collapsed due to the intrusion of the Osage into the Ozarks (Raab et al 1979).

G. Were raw materials in the Ozarks exploited by non-local populations during the prehistoric period?

A current idea is that the Ozarks served as a source of raw materials for external populations. It has already been demonstrated that the Eastern Ozarks served as a source for lithic materials for non-local populations located in the Mississippi River Valley to the east. Further archeological study should enhance our knowledge of population interactions and trade networks and their possible influence on social and economic evolution in the Ozark region (Raab et al 1979).

H. As culture change occurred in the Ozarks (social structure, economics), did the health status of the native Ozark population change?

The study of human skeletal material offers a unique way in which to study the effects of socio-economic change on the health status of human populations, and vice versa. Currently, it is becoming increasingly apparent that questions which cannot be answered directly from the available prehistoric record (such as, are changes in past lifeways present before the advent of their temporal markers?) can be answered by the bio-archeologist. Due to different environmental pressures it will be interesting to see whether the interrelationship between environment, disease, and culture observed in the eastern United States also holds true for the Ozark region. The observed patterns for the eastern United States are as follows:

1. During the Paleo-Indian Era it is believed that long term non-debilitating disease processes are at work. The process through

2. The Archaic Era should basically reflect a continuation of the disease processes at work during the Paleo-Indian Era due to similar environmental exploitation strategies. However, due to a more settled lifestyle bringing about less sanitary conditions, chronic disease patterns should start showing up.

3. The Woodland Era with its increased sedentism, increase in population density, the beginnings of horticulture, and the introduction of trade networks, should mark the initiation of short term, chronic, debilitating disease patterns.

4. The Mississippian Era, although similar to the Woodland Era, should show a distinct increase in short term, chronic, debilitating disease patterns due to the use of tropical cultigens with less reliance upon hunting and gathering, increased population density, settlement size, and the intensification of trade networks.

12.3.3. Caddo Research Problems

Prior to the 1970's, research in the Caddoan culture area was typified by the excavation of elaborate civic-ceremonial centers (mounds and their associated burial areas). Most often these excavations yielded important information about the existence of specific cultural groups in a geographical area. However, the archeological data recovered from these sites represents hundreds of years of occupation which, to say the least, made cultural interpretation of these sites difficult. Whatever cultural data was extracted from the archeological materials was biased towards the social groups that inhabited the civic-ceremonial centers. Very little could be stated about the typical member of Caddo society.

Although the classification of artifact types, along with the definition of cultural groups will, and should remain important to Caddo archeology, the days of cultural definition based soley upon the excavation of elaborate civic ceremonial centers is drawing to a close.

The following research problems are intended to help in answering questions of how and why culture changes over time. Each research problem is designed to be applied to any particular prehistoric Caddo population or group of populations, whether they existed in a specific geographical location or over a wide geographical area. The nature of these research problems was left general enough so that as new data recovery techniques are developed ancillary research problems can be appended.

In recent years, information concerning site types (such as villages, hamlets, extraction sites, and isolated-find sites) associated with civic-ceremonial centers has begun to emerge. However, the data on the distribution of these different types of sites and their associations with different environmental conditions are sorely lacking. Therefore, settlement-subsistence models must be produced.

A. Settlement pattern study should be initiated by plotting site localities and seeking to correlate specific site types (e.g., villages, hamlets, or extraction sites) with current topographical and ecological features. However, particularly for earlier sites, this matching of site type with current features must be regarded with precaution. Reliable evaluations must await the construction of paleo-environmental models based upon pollen and geomorpological data.

B. The emergence of the Caddo cultural tradition from the preceeding Fourche Maline-Coles Creek cultures, and the succeeding culture change during the Caddo I through IV periods have probably been the most difficult areas of interpretation confronting Caddoan archeologists. At the end of the Fourche Maline-Coles Creek period, formal changes occurred in cultural attributes (mortuary practices, trade, technology, and earth work construction). During each succeeding Caddo period, changes in cultural attributes also occurred. Although these changes in cultural attributes are concurrent with changes in social organization, the nature of the social changes has never been demonstrated. All that has ever been stated by archeologists is that due to changes in various cultural attributes the complexity of social organization either increased or decreased.

A procedure developed by Tainter (1977) and utilized in the Lower Illinois Valley for demographic data to detect the degree and kinds of change in social organization that occurred during the Middle Woodland to Mississippian periods can be applied to the Fourche Maline-Coles Creek to Caddoan cultural transition, and the attendant transitions in culture change during the Caddo I through IV periods.

By using "information theory" (a branch of the mathematical theory of probability and statistics), changes in the amount and degree of social organization can be detected. Further, by using "graph theory" the degree of rank differentiation can be observed (Tainter 1977).

Interestingly enough, the advantage of using this type of system for data analysis is that forms of social organization not normally thought to exist during earlier cultural periods (such as a Mississippian type of social organization during the Woodland Period) can be detected.

C. Caddo socio-political organization appears to have been based on rank (Brown 1971). However, most of the information on which A similar pattern has been suggested and demonstrated for Mississippian sites, whereby sites (such as villages and hamlets) located in isolation from civic-ceremonial centers were organized on the egalitarian level (Goldstein 1976; Black 1976). However, when studies have focused on small Mississippian sites (i.e., villages and hamlets) that existed in proximity to ceremonial centers, evidence for participation in a ranked society has been observed (Peebles 1971).

D. In the Lower Mississippi Valley two specific problems should be mentioned. Both are related to the archeological record and the Historic Caddo.

1. The Glendora Focus is defined on the basis of a partially described collection; that is the materials Moore (1909) reported from the Glendora and Keno sites. Large numbers of pottery vessels from both sites were not included in his publication. Thus, a comprehensive view of the historic Caddo has not been developed and recent findings of the Historic period in Louisiana and adjacent Arkansas are difficult to "match" with the predescribed focus. Therefore, an attempt should be made to locate and re-analyze this material.

2. The relationship of the Tunica and Caddo is poorly known. It is likely that both Tunica and Caddo materials are being recovered from the same historic sites (Brain 1978:Personal Communication) but a suitable explanation has not been developed.

12.3.4. Lower Mississippi Valley Research Problems

A. For many years, it was believed that because of deep alluvial deposits evidence of the Paleo-Indian Period would not be recovered from the Mississippi Alluvial Valley (Haag 1971). However, in recent years scattered finds of early cultural materials indicates that sites dating to this period can be found on older land surfaces protruding above the valley and along the valley margins. Land altering activities, particularly strip mining will soon expose the entire Pleistocene sedimentary record in several locales in the Alluvial Valley.

Locating and describing human activity during Pleistocene and early Post-Pleistocene times may soon become a feasible avenue of research.

B. Recently, Brain (1971) pointed out that the Archaic is the least known interval of prehistory in the Lower Mississippi Valley. As with the Paleo-Indian Period, the problem lies largely with the depth and extent of sedimentation in the Mississippi Alluvial Valley. However, Archaic remains have been found in the region and further definition of this early temporal and

C. Although much is known about the complex Post-Archaic sequence in the Lower Mississippi Valley, it should be more carefully defined. Transitions from one temporal/culture unit to another are rarely clear and the resultant problems are reflected throughout the sequence. Interpretation of extensive site inventory data compiled in recent years will surely contribute to a better understanding of been settled. Further, the introduction of maize into the Lower Mississippi Valley has not been documented although it is generally assumed to have occured during the Baytown Period (Brian 1971).

D. The management of native plants and the introduction of cultigens are poorly documented in the Lower Mississippi Valley. For instance, whether the Poverty Point cultural was horticultural or dependent upon efficient exploitation of wild foor resources has not been settled. Further the introduction of maize into the Lower Mississippi Valley has not been documented although it is generally assumed to have occured during the Baytown Period (Brian 1971).

E. The Poverty Point culture is best represented at the Poverty Point Site. However, investigations at this site have been limited to surface collections and limited test excavations. An ongoing program of the Louisiana Department of Culture Recreation and Tourism, State Parks is directed towards long range investigations on the site. A research strategy and master plan for the site are being developed and it is expected that a 1980 summer archeological field school under the auspices of Louisiana State University will be the first in a series of investigations.

F. The Coles Creek Culture is believed to have been an indigenous cultural phenomenon. Coles Creek and Caddo areas overlap and some pottery types and other traits are common to both cultures. With the beginning dates of the Coles Creek and Caddo in question, there is considerable debate about their relationships.

G. Cultural phenomena in the Lower Mississippi Valley appear to have been dynamic and far reaching developments. The spread of Poverty Point from a cultural node in northern Louisiana, the development and northern spread of Tchefuncte and later

Plaquemine cultures from the southern part of the valley and the influx of Marksville and later Mississippian cultures from the north present an image of elaborate cultural developments sandwiched together over a broad area. Unfortunately, most of the phenomena are known from one or a few major sites in the valley and the influence of these overwhelming systems on local indigenous populations is not known.

H. Recent archeological and archival investigations of the Tunica by archeologists from Harvard University has placed a new emphasis on the Native American/Euro-American Contact Period.

12.3.5. Project Area-Wide Research Problems

Recognizing the breadth and diversity of the Project area, it is appropriate to conclude by acknowledging research problems of continental scope in addition to those defined for particular culture areas. Jennings (1974:353-372) has provided a summary of essential problems for North American archeology which should serve to satisfy the above condition. Jennings' enumeration of over-riding research problems includes:

A. Determination of the precise time and place of human entry into North America.

B. Revealing the origins of American material culture: Does a 'Pre-Clovis tradition' definitively exist?

C. Jennings proposes that the division of the Archaic into western and eastern provinces may be the consequences of accidents of preservation and "[s]hould the Archaic turn out to be quite uniform in its total inventory of both perishable and nonperishable objects and overall technology, as is suggested here, this would strengthen the concept of Archaic efficiency and would eliminate the many apparent differences in subsistence and other technology which appear in the trait lists to separate the provinces of East and West," (Ibid:354). Within the Project area, of course, Ozark Bluff Dwelling sites (as well as other dry cave sites outside the Project range) have yielded a wide variety of perishable artifacts. While Jennings acknowledges that these materials may not, in actuality, date from the Archaic but rather from the later Woodland period, "[o]ne can still view the dry cave perishable finds of the East as presenting evidence that the range of Archaic artifact classes over the entire continent was similar to, and perhaps well represented by, the richer Western Archaic finds," (Ibid:151).

D. Defining the origins of the Woodland cultures, including the question of indigenous versus exotic (i.e., outside the continental United States) derivation.

E. Development of the ability to identify late prehistoric and protohistoric assemblages.

12.4 Results of Study

This report has collected and synthesized environmental, archeological, and ethnographic data regarding the existing cultural resources located within or near the proposed and alternate routes. Literature surveys, archival research, interviews and other sources have provided information necessary to define and summarize the important substantive archeological and ethnographic themes of the Project area. Past, present, and future research orientations have been defined and specific research goals for future work in the region have been recommended.

13. RECOMMENDATIONS

As stated in previous sections of this report, the Proposed and Alternate Actions have the potential to impact a wide spectrum of prehistoric cultural resources. Although the management objectives vary somewhat from state to state and even differ among Federal Agencies, Federal stipulations set forth comprehensive compliance procedures. Federal guidelines provide for development of programatic memoranda among concerned agencies, a procedure which is underway for this project.

In response to the complexity of the cultural resources domain and the state and Federal agencies that will participate in the compliance process it is recommended that a single management program be developed. This program should be multi-phase and consistent from state to state for the entire project. The project should be designed so that:

1) Data already gathered will be fully utilized,

2) Each phase is a unit; completely coordinated (and comparable) to previous phases to avoid costly delays and repetitions,

3) Regional expertise can be utilized as needed; but insuring that each effort is compatable with the project as a whole.

Coordination and concurrance from involved Federal and State agency personnel should be maintained at all times. This should

1) Establish avenues of communication between decision-making personnel in both the public and private sector.

2) Aid in the definition of Project-wide cultural resource management and research goals where feasible.

3) Clearly define those differences in planning and compliance procedures that do exist between states in the Project area.

4) Aid State Historic Preservation Officers in the establishment of meaningful criteria for assessing significance within their states.

5) Minimize the potential for conflicting compliance procedures between State and Federal reviewing agencies.

6) Ensure rapid and effective compliance with Federal regulations for each phase of the Project.

7) Inform interested private citizens of the measures being taken to protect the cultural resources affected by the Project within each state.

REFERENCES CITED

ADAIR, JAMES

1930 History of the American Indians. London. (new ed., edited by Samuel Cole Williams under the auspices of National Society Colonial Dames of America, in Tennessee). The Wautaugo Press, Johnson City, Tennessee.

AGOGINO, GEORGE A.

1962 A Middle Prehistoric Burial from Laramie, Wyoming. Plains Anthropologist, Vol. 6, No. 13. Lincoln.

1963 The Plains-Indian Relative Age and Cultural Sequence. Great Plains Journal, Vol. 3, No. 1. Lawton.

AGOGINO, GEORGE A. and EUGENE GALLOWAY

1965 The Sister's Hill Site: A Hell Gap Site in North-Central Wyoming. Plains Anthropologist, Vol. 10, No. 29. Lincoln.

AGOGINO, GEORGE A. and W. D. FRANKFORTER

1960 The Brewster Site: An Agate Basin Folsom Complex Multiple Component Site in Eastern Wyoming. Masterkey, Vol. 35, No. 3. Los Angeles.

AHLER, STANLEY A.

1978 Preceramic Archeology at the Medicine Crow Site, South Dakota Abstracts, Thirty-Sixth Annual Plains Conference. Denver.

AHLER, STANLEY A., DAVID K. DAVIES, CARL R. FALK and DAVID B. MADSEN

1974 Holocene Stratigraphy and Archeology in the Middle Missouri River Trench, South Dakota. Science, Vol. 184. Washington.

ALLRED, B. W. and H. C. MITCHELL

1955 Major Plant Types of Arkansas, Louisiana, Oklahoma and Texas and Their Relation to Climate and Soil. Texas Journal of Science, Vol. 7, No. 1, pp. 7-19.

AMERICAN ASSOCIATION OF PETROLEUM GEOLOGISTS (A.A.P.G.)

1966 Mid-Continent Region Geological Highway Map.

ANDERSON, DUANE C.

1966 The Gordon Creek Burial. Southwestern Lore, Vol. 32, No. 1. Boulder.

ANTEVS, E.

1955 Geological-Climatic Dating in the West, American Antiquity, Vol 20. Menasha.

ANTLE, H. R.

1939 A Bluff-Shelter Site in Pontococ County, Oklahoma. The Oklahoma Prehistorian, Vol. 2, No. 1, pp. 6-11. Tulsa.

AVERY ISLAND CONFERENCE
1978 Papers presented at the Conference on Lower Mississippi Valley Archeology, sponsored by the Lower Mississippi Survey, held at Avery Island, May 11-14, 1978.

BAERREIS, D. A..
1954 The Huffaker Site, Delaware County, Oklahoma. Bulletin of the Oklahoma Anthropological Society, Vol. 2, pp. 35-48. Oklahoma City.

1955 Further Material from the Huffaker Site, Delaware County. Bulletin of the Oklahoma Anthropological Society, Vol 3, pp. 53-68. Oklahoma City.

BAERREIS, DAVID and JOAN E. FREEMAN
1960 A Report on a Bluff Shelter in Northeastern Oklahoma (DL-74). Archives of Archeology No. 1, University of Wisconsin Press, Madison.

BARBOUR, E. H. and C. BERTRAND SCHULTZ
1932 The Scottsbluff Bison Quarry and Its Artifacts. Bulletin of the University of Nebraska State Museum, No. 1. Lincoln.

BARTLETT, CHARLES S. JR.
1963 The Tom's Brook Site--3J01: A Preliminary Report. In Arkansas Archeology 1962, edited by C. R. McGimsey III, pp. 15-67. Arkansas Archeological Society.

BASS, WILLIAM M.
1970 Excavations of a Paleo-Indian Site at Agate Basin Wyoming. National Geographic Society. Research Reports 1961-1962.

BASS, WILLIAM M. and PATRICIA A. GRUBBS
1966 Human Skeletal Material from a Keith Focus Plains Woodland Site (14PH10), Kirwin Reservoir, Phillips County, Kansas. Plains Anthropologist, Vol. 11, No. 32. Lincoln.

BASS, WILLIAM M., DICK MCWILLIAMS and BRUCE A. JONES
1968 Archeological Investigations at Five Sites in Lyon, Jefferson and Phillips Counties, Kansas. Transaction of the Kansas Academy of Science, Vol. 70, No. 4. Lawrence.

BASS, WILLIAM M. and TERRELL W. PHENICE
1975 Prehistoric Human Skeletal Material from Three Sites in North and South Dakota. Nebraska State Historical Society Publications in Anthropology, No. 6. Lincoln.

BEAVERS, RICHARD C.
1979 The Coquilles Site (16JE37). Louisiana Archeological Society Newsletter, Vol. 6, No. 2.

BECKMAN, H. C. and N. S. HINCHEY
1944 The Large Springs of Missouri. Missouri Division Geological Survey and Water Resources Bulletin No. 29.

BELL, EARL H. and ROBERT L. CAPE
1936 Rock Shelters of Western Nebraska. In Chapters in Nebraska Archeology, edited by Earl N. Bell. University of Nebraska, Lincoln.

BELL, EARL H. and G. H. GILMORE
1936 The Nebraska and Table Rock Foci of the Nebraska Aspect. In Chapters in Nebraska Archeology, edited by Earl N. Bell. University of Nebraska, Lincoln.

BELL ROBERT
1966 Field Reports at 7th Caddo Conference (1963), Oklahoma. Harlan Site, Grand River Area. Caddoan Field Reports, 1962-1964 Seasons, edited by H. A. Davis, pp. 12. Univesity of Arkansas, Fayetteville.

1972 The Harlan Site, CK-6: A Prehistoric Mound Center in Cherokee County, Eastern Oklahoma. Oklahoma Anthropological Society Memoir No. 2, pp. 1-266. Oklahoma City.

BELL, ROBERT E. AND TYLER BASTIAN
1974 The Longest Site in Wichita Indians: Wichita Indian Archeology and Ethnology; A Pilot Study. Robert E. Bell, E. G. Jelks, and W. W. Newcomb, eds. Garland. New York.

BELMONT, JOHN S.
1961 The Peabody Excavations, Coahoma County, Mississippi, 1901-1902. Unpublished honors thesis, Department of Anthropology, Harvard University.

1967 The Culture Sequence at the Greenhouse Site, Louisiana. Proceedings of the 23rd Southeastern Archeological Conference, SAC Bulletin , No. 6, pp. 27-35.

1979 Troyville and the Goldmine Site. Unpublished manuscript on file at Peabody Museum, Harvard University.

BENEDICT, JAMES B.
1974 Early Occupation of the Caribou Lake Site, Colorado Front Range. Plains Anthropologist, Vol. 19, No. 63. Topeka.

1975 The Murray Site: A Late Prehistoric Game Drive System in The Colorado Rocky Mountains. Plains Anthropologist, Vol 20, No. 69. Lincoln.

1978 Getting Away From It All During the Two-Drought Antithermal: The Colorado Front Range. Abstracts, Thirty-Sixth Annual Plains Conference. Denver.

BEYER, GEORGE EUGENE

1895 Report on the Mounds of Louisiana. Louisiana Historical Society Publications, Vol. 1, Pt. 4, pp. 12-32.

1896 The Mounds of Louisiana. Publications of the Louisiana Historical Society, Vol 1, Pt. 4, pp. 12-32. New Orleans.

1897 The Mounds of Louisiana II. Louisiana Historical Society Publications, Vol. 2, Pt. 1, pp. 7-27.

BLAKESLEE, DONALD J.

1979 Hillsdale Lake Archeology: New Information from Northeast Kansas. Abstracts of the Thirty-Seventh Annual Plains Conference. Kansas City.

BINFORD, LEWIS R.

1968 Archeological Perspectives. In New Perspectives In Archeology. Sally R. Binford and Lewis R. Binford (eds). Aldine. Chicago.

1980 Willow Smoke and Dogs' Tails: Hunter-Gatherer Settlement Systems and Archeological Site Formations. American Antiquity Vol. 45, No. 1, pp. 4-20.

BOHANNON, C. F.

1962 Excavations at the Mineral Springs Site, Howard County, Arkansas. The Arkansas Archeologist, Vol 3., No. 10, pp. 7-9. Fayetteville.

1973 Excavations at the Mineral Springs Site. Arkansas Archeological Survey Reserach Series 5.

BOLTON, H.E.

1916 Texas in the Middle Eighteenth Century. Studies in Spanish Colonial History and Administration. University California Publ. Hist., Vol. 3.

BOURNE, EDWARD GAYLORD

1904 Narratives of the Career of Hernando de Soto. In Trail Makers Series, Vol. 2. A. S. Barnes and Co., New York.

BOWMAN, PETER W.

1960 Coal-Oil Canyon. Bulletin of the Kansas Anthropological Association. Hays.

BRACKENRIDGE, HENRY MARIE

1818 On the Population and Tumuli of the Aborigines of North America. Transactions of the American Philosophical Society, n.s., Vol. 1, No. 7, pp. 151-159.

1814 Views of Louisiana, Together With a Journal of a Voyage up the Missouri River, in 1811. (Reprinted 1962.) Quadrangle Books. Chicago.

BRAIN, JEFFERY P.

1970 The Tunica Treasure. Lower Mississippi Survey, Peabody Museum, Harvard University Bulletin No. 2.

1971 The Lower Mississippi Valley in North American Prehistory. Manuscript prepared for the National Park Service, Southeast Region, and the Arkansas Archeological Survey.

1973 Trudeau: An 18th Century Tunica Village. Lower Mississippi Valley Survey, Peabody Museum, Harvard University Bulletin No. 3.

1977 On the Tunica Trail. Louisiana Archeological Survey and Antiquities Commission, Anthropological Study No. 1, Department of Culture, Recreation and Tourism, Baton Rouge.

1978 Late Prehistoric Settlement Patterning in the Yazoo Basin and Natchez Bluffs Regions of the Lower Mississippi Valley. In Mississippian Settlement Patterns, edited by Williams. Academic Press.

BRAIN, JEFFREY P. and PHILIP PHILLIPS

1979 Archeological and Historic Bibliography of the Lower Mississippi Valley. Peabody Museum Bulletin No.4. Harvard University.

BRAIN, JEFFREY P., ALAN TOTH and ANTONIO RODRIGUES-BUCKINGHAM

1974 Ethnohistoric Archaeology and the DeSoto Entrada Into the Lower Mississippi Valley. John M. Goggin Award Papers, Part 4 of the Conference on Historic Site Archaeology Papers, University of South Carolina, Columbia.

BRETERNITZ, DAVID A., ed.

1969 Radiocarbon Dates: Eastern Colorado. Plains Anthropologist, Pt. 1, pp. 14-44.

1971 Archeological Investigations at the Wilbur-Thomas Shelter, Carr, Colorado. Southwestern Lore, Vol. 36, No. 4.

BRETERNITZ, DAVID A., ALAN C. SWEDLUND and DUANE C. ANDERSON

1971 Comments on the Bisterfeldt Potato Cellar Site and Flexed Burials in the Western Plains. Southwestern Lore, Vol. 31, No. 3. Boulder.

BRETERNITZ, DAVID A. and JOHN J. WOOD

1965 Comments on the Bisterfeldt Potato Cellar Site and Flexed Burials in the Western Plains. Southwestern Lore, Vol. 31, No. 3. Boulder.

BROWN, C. A.
1938 The Flora of Pleistocene Deposits in the Western Florida Parishes, West Feliciana Parish, and East Baton Rouge Parish. The Louisiana Geological Survey Bulletin #12.

BROWN, JAMES A.
1971 The Dimensions of Status in the Burials at Spiro. In Approaches to the Social Dimensions of Mortuary Practices, edited by J. A. Brown. Memoirs of the Society for American Archeology, No. 25, pp. 92-112.

1975 Spiro Art and Its Mortuary Contexts. In Death and the Afterlife in Pre-Columbian America, edited by E. P. Benson. Dumbarton Oakes Research Library and Collections, pp. 1-32. Washington, D. C.

BROWN, KENNETH L.
1979 Late Prehistoric Settlement Patterns in Southwestern Kansas. Plains Anthropologist, Vol. 24, No. 85. Lincoln.

BROWN, LIONEL A.
1966 Temporal and Spatial Order in the Central Plains. Plains Anthropologist, Vol. 11, No. 34. Lincoln.

1968 The Gavins Point Site (39YK203): An Analysis of Surface Artifacts. Plains Anthropologist, Vol. 13, No. 40. Lawrence.

BRUNER, W. E.
1931 The Vegetation of Oklahoma. Ecological Monographs, Vol. 1, No. 2, pp. 99-205.

BRYSON, REED, DAVID A. BAERREIS and WAYNE M. WENDLAND
1970 The Character of the Late-Glacial and Post-Glacial Climatic Changes. Pleistocene and Recent Environments of the Central Great Plains. University of Kansas, Special Publication No. 3. Lawrence.

BUCKLES, W. G., G. H. EWING, NANCY BUCKLES, G. J. ARMELAGOS, J. J. WOOD and J. D. MCCULLOUGH
1963 Excavations of the Hazeltine Heights Site. Southwestern Lore, Vol. 29, No. 1. Boulder.

BUSHNELL, DAVID I., JR.
1919 Native Villages and Village Sites East of the Mississippi. Bureau of American Ethnology, Bulletin, No. 69. Washington.

BUTZER, KARL W.
1971 Environment and Archeology: An Ecological Approach to Prehistory. 2nd ed. Aldine. Chicago.

BYINGTON, E. S.
1912 Arkansas and Oklahoma Notes. The Archeological Bulletin, Vol. 3, No. 3, pp. 81-82. Council Grove, Kansas. (Reprinted in Oklahoma Anthropological Society Newsletter, Vol 3, 1954.)

BYRD, KATHLEEN M. and ROBERT W. NEWMAN
1978 Archeological Data Relative to Prehistoric Subsistence in the Lower Mississippi River Alluvial Valley. In Geoscience and Man, Vol. 19, pp. 9-21. Louisiana State University, Baton Rouge.

CALDWELL, JOSEPH R.
1958 Trend and Tradition in the Eastern United States. American Anthropologist, Vol. 60, No. 6, Pt. 2, American Anthropological Memoir, No. 88, and Illinois State Museum Scientific Papers, Vol. 10. Menasha.

CALDWELL, WARREN W. and RICHARD E. JENSEN
1969 The Grand Detour Phase. Smithsonian Institution, River Basin Surveys, Publications in Salvage Archeology, No. 13. Lincoln.

CAMPBELL, R. G.
1969 Prehistoric Panhandle Culture on the Chaquaqua River, Southeast Colorado. Ph.D. dissertation, University of Colorado, Boulder.

CARTER, CLARENCE EDWIN (ed.)
1954 The Territory of Arkansas 1825-1829. The Territorial Papers of the United States, Vol. XX. U. S. Government Printing Office, Washington, D. C.

CASANAS DE JESUS MARIA, FRAY FRANCISCO
1927 Descriptions of the Tejas or Asinai Inidans, 1691-1722. Translated from the Spanish by Matie Austin Hatcher. I and II. Fray Francisco Casanas de Jesus Maria to the Viceroy of Mexico, August 15, 1691. Southwestern Historical Quarterly, Vol. 30, pp. 206-218, 283-304; Spanish text in Bureau of American Ethnology Bulletin 132, pp 241-263. See Swanton 1942.

CASIS, LILIA M., Translator
1899 Carta de Don Damian Manzanet a Don Carlos de Siguenza sobre el Descubrimiento de la Bahia del Espiritu Santo. Quarterly of the Texas State Historical Association, Vol. 2, No. 4, pp 253-312.

CATLIN, GEORGE
1841 Letters and Notes on the Manners, Customs, and Condition of the North American Indians. 2 vols. London, England, Published by the author.

CHAMPE, JOHN L.
1949 White Cat Village. American Antiquity, Vol 14, No. 4. Menasha.

CHAPMAN, CARL
1974 The Indomitable Osage in the Spanish Illinois (Upper Louisiana) 1763-1804. In The Spanish in the Mississippi Valley, 1762-1804, edited by John F. McDermott, University of Illinois Press.

1975 The Archeology of Missouri, Volume I. University of Missouri Press, Columbia, Missouri.

CHARLEVOIX, PIERRE F. X. DE.
1761 Journal of a Voyage to North America, Vols. I and II. London.

CLARK, J. D. G.
1957 Archeology and Society. (2nd ed.) Bethuen. London.

CLARK, T. H. and C. W. STEARN
1968 Geological Evolution of North America. Ronald Press Company, New York.

CLELAND, C. E.
1965 Faunal Remains from Bluff Shelters in Northwest Arkansas. The Arkansas Archeologist Vol. 5, pp. 39-63.

CLEMENTS, F. E.
1945 Historical Sketch of the Spiro Mound. Contributions from the Museum of the American Indian, Heye Foundation, Vol. 14, pp. 48-68. New York.

COLLINS, H. B., JR.
1932 Excavations at a Prehistoric Indian Village Site in Mississippi. Proceedings of the of the United States National Museum, Vol. 79, Art. 32.

COOGAN, ALAN H. and WILLIAM N. IRVING
1959 Late Pleistocene and Recent Missouri River Terraces in the Big Bend Reservoir, South Dakota. Iowa Academy of Science, Proceedings, Vol. LXVI. Des Moines.

COOPER, PAUL L.
1949 Recent Investigations in Fort Randall and Oahe Reservoirs, South Dakota. American Antiquity, Vol. 14, No. 4. Menasha.

CRONEIS, C.
1930 Geology of the Arkansas Paleozoic Area, with Special Reference to Oil and Gas Possibilities. Arkansas Geological Survey Bulletin No. 3.

CZAJKOWSKI, K. RICHARD
1934 Preliminary Report of Archeological Excavations in Orleans Parish. Louisiana Conservation Review 4:12-18.

DANE, C. H.
1929 Upper Cretaceous Formations in Southwestern Arkansas. Arkansas Geological Survey Bulletin No. 1.

DAVIS, E. MOTT
1953 Recent Data from Two Paleo-Indian Sites on Medicine Creek, Nebraska. American Antiquity, Vol. 18, No. 4. Salt Lake City.

1959 Notes and News. American Antiquity, Vol. 24, No. 3. Salt Lake City.

1961 Proceedings of the Fifth Conference on Caddoan Archeology. Bulletin of the Texas Archeological Society, Vol. 30, pp. 77-143. Austin.

1962 Archeology of the Lime Creek Site in Southwestern Nebraska. Special Publication of the University of Nebraska State Museum, No. 3. Lincoln.

1970 Archeological and Historical Assessment of the Red River Basin in Texas. Archeological and Historical Resources of the Red River Basin, edited by H. A. Davis. Arkansas Archeological Survey, Research Series, No. 2, pp. 25-65. Fayetteville.

1978 Archeology, A Matter of Public Interest. In Papers In Applied Archeology. Joel Gunn (ed). Center for Archeological Research, Univeristy of Texas at San Antonio. San Antonio.

DAVIS, HESTER A.
1966 An Introduction to Parkin Prehistory. Arkansas Archeologist, Vol. 7, No. 1-2, pp. 1-40. Fayetteville.

1967 Paleo-Indian in Arkansas. Arkansas Archeologist, Vol. 8, No. 1, pp. 1-3. Fayetteville.

1969 A Brief History of Archeological Work in Arkansas up to 1967. Arkansas Archeologist, Vol. 10, Nos. 1, 2, 3. University of Arkansas Museum, Fayetteville.

DEBO, ANGIE
1941 The Road to Disappearance. The University of Oklahoma Press, Norman, Oklahoma.

DEETZ, JAMES
1965 The Dynamics of Stylistic Change in Arikara Ceramics. University of Illinois Series in Anthropology, No. 4. Urbana.

DELCOURT, H. R.
1976 Presettlement Vegetation North of the Red River Land District, Louisiana. Castanea, Vol. 14, pp. 122-139

DELLINGER, S. C.
1936 Baby Cradles of the Ozark Bluff Dwellers. American Antiquity, Vol. 1, No. 3, pp. 197-214.

DELLINGER, S. C. and S. D. DICKINSON
Pottery from the Ozark Bluff-Shelters. American Antiquity, Vol. 7, No. 3, pp. 276-289.

DICK, H. W. and B. MOUNTAIN
1960 The Claypool Site: A Cody Complex Site in Northeastern Colorado. American Antiquity, Vol. 26, No. 2.

DICKSON, DON R.
1969 Archeology of the Lincoln Reservoir, Northwest Arkansas. Arkansas Archeological Society Special Report, No. 1.

1970 Excavation at Calf Creek Cave. Arkansas Archeologist, Vol. 11, Nos. 3 and 4. pp. 50-82. Fayetteville.

DIXON, KIETH A.
1977 Application of Archeological Resources: Broadening the Basis of Significance. In Conservation Archeology: A Guide for Cultural Resource Management Studies, edited by M. B. Schiffer and G. J. Gunnerman. Academic Press, New York.

DOMNING, D. P.
1969 A List, Bibliography, and Index of the Fossil Vertebrates of Louisiana and Mississippi. Transactions, Gulf Coast Association of Geological Societies, Vol. 19, pp. 385-422.

DORSEY, J. O. and J. R. SWANTON
1912 A Dictionary of the Biloxi and Ofo Languages, Accompanied with Thirty-one Biloxi Texts and Numerous Biloxi Phrases. Bureau of American Ethnology Bulletin, No. 47.

DUGUID, J. O.
1968 The Irvine Site: A Possible Avonlea Site in Eastern Wyoming. Wyoming Archeologist, Vol. 11, No. 2.

DUNLEVY, M. L.
1936 A Comparison of the Cultural Manifestations of the Burkett and Grey Wolf Sites. In Chapters in Nebraska Archeology, edited by Earl N. Bell.

ESPINOSA, FRAY ISIDRO FELIS DE
1927 Descriptions of the Tejas or Asinai Indians, 1691-1722. Translated from the Spanish by Mattie Austin Hatcher. IV, Fray Isidro Felis de Espinosa on the Asinai and their allies. Southwestern Historical Quarterly, Vol. 31, pp. 150-180. Spanish text in Bureau of American Ethnology Bulletin 132, pp. 273-300. See Swanton 1942.

EWERS, JOHN C.
1962 The Horse Complex in Plains Indian History. In The North American Indians: A Sourcebook. R. C. Owen, J. Deetz, and A. Fisher, eds. New York

FENNEMAN, N. M.
1938 Physiography of Eastern United States, McGraw-Hill Book Company.

FERGUSON, MAYME
1973 Report on Site 3WA217. NWASS, The Arkansas Amateur, Vol. 12, No. 6. Fayetteville.

FINNEGAN, MICHAEL
1978 Human Skeletal Remains from Bradford House III: Site 5JF52, Jefferson County, Colorado. Plains Anthropologist, Vol. 23, No. 81. Lincoln.

FINNEGAN, MICHAEL and TOM WITTY
1977 A Seated Burial and Associated Boatstone from Northwestern Kansas. Plains Anthropologist, Vol. 22, No. 75. Lincoln.

FINKELSTEIN, J. JOE
1940 The Norman Site Excavations near Wagoner, Oklahoma. The Oklahoma Prehistorian, Vol. 3, No. 3, pp. 2-15. Tulsa.

FISK, H. N.
1938 Geology of Grant and LaSalle Parishes. Louisiana Department of Conservation Geological Bulletin No. 10.

1944 Geological Investigation of the Alluvial Valley of the Lower Mississippi River. U.S. Army Corps of Engineers, Vicksburg, Mississippi.

FLANNERY, KENT V. AND MICHAEL D. COE
1968 Social and Economic Systems in Formative Mesoamerica. In New Perspectives in Archeology. Sally R. Binford and Lewis R. Binford (eds). Aldine. Chicago.

FLAYHARTY, R. and E. A. MORRIS
1974 T. W. Diamond: A Stone Ringe Site in Northern Colorado. Plains Anthropologist, Vol. 19, No. 65. Lincoln.

FORBIS, RICHARD G., WILLIAM DUNCAN STRONG and MAURICE E. KIRKBY
n.d. Signal Butte and McHaffie: Two Stratified Sites on the Northern Plains. Unpublished manuscript.

FORD, JAMES A.
1935 An Introduction to Louisiana Archeology. Louisiana Conservation Review, Vol. 4, No. 5.

1936 Analysis of Indian Village Site Collections from Louisiana and Mississippi. Anthropological Study No. 2. Department of Conservation, Louisiana State Geological Survey, New Orleans.

1963 Hopewell Culture Burial Mounds Near Helena, Arkansas. Anthropological Papers of the American Museum of Natural History, Vol. 50, Pt. 1. New York.

FORD, JAMES A., PHILIP PHILLIPS and WILLIAM G. HAAG
1955 The Jaketown Site in West-Central Mississippi. Anthropological Papers, Vol. 45. American Museum of Natural History.

FORD, JAMES A. and GEORGE I. QUIMBY, JR.
1945 The Tchefuncte Culture - An Early Occupation of the Lower Mississippi Valley. Memoirs of the Society for American Archeology, No. 2, Menasha.

FORD, JAMES A. and CLARENCE H. WEBB
1956 Poverty Point, A Late Archaic Site in Louisiana. Anthropological Papers, Vol. 46. American Museum of Natural History.

FORD, JAMES A. and GORDON R. WILLEY
1940 Crooks Site, a Marksville Period Burial Mound in LaSalle Parish, Louisiana. Department of Conservation, Louisiana Geological Survey, Anthropological Report 3.

1941 An Interpretation of the Prehistory of the Eastern United States. American Anthropologist, Vol. 43, No. 3, pp. 325-363.

FOWKE, GERARD
1927 Archeological Work in Louisiana. Smithsonian Miscellaneous Collections, Vol. 78. No. 7, pp. 254-259.

1928 Archeological Investigations II. 44th Annual Report of the Bureau of American Ethnology, pp. 405-540. Washington, D.C.

FRANK, JOSEPH
1976 The Bel Site (16CU127): Urban Archeology in Lake Charles, Louisiana. Louisiana Archeology No. 3. Louisiana Archeological Society. Lafayette.

FRANKFORTER, W. D.
1959 A Preceramic Site in Western Iowa. Journal of the Iowa Archeological Society, Vol. 8, No. 4.

FRANKFORTER, W. D. and GEORGE A. AGOGINO
1960 The Simonson Site: Report for the Summer of 1959. Plains Anthropologist, Vol. 5, No. 10. Lincoln.

FRIES, HOWARD B.
1971 The Koelliker Site (14DP25). Plains Anthropologist, Vol. 16, No. 53. Topeka.

FRISON, GEORGE C.
1962 Wedding of the Waters Cave: A Stratified Site in the Big Horn Basin of Northern Wyoming. Plains Anthropologist, Vol. 7, No. 18. Lincoln.

1967 Archeological Evidence of the Crow Indians in Northern Wyoming: A Study of a Late Prehistoric Buffalo Economy. Ph.D. dissertation, University of Michigan, Ann Arbor.

1967 The Piney Creek Sites, Wyoming. University of Wyoming Publications, Vol. 33, No. 1. Laramie.

1970 The Glenrock Buffalo Jump, 48CO304: Late Prehistoric Period Buffalo Procurement and Butchering. Plains Anthropologist Memoir, No. 7. Topeka.

1971 The Buffalo Pound in Northwestern Plains Prehistory: Site 48CA302, Wyoming. American Antiquity, Vol. 36, No. 1. Salt Lake City.

1973 The Plains. In The Development of North American Archeology, edited by James E. Fitting. Anchor Books, New York.

1976 Crow Pottery in Northern Wyoming. Plains Anthropologist, Vol. 21, No. 71. Lincoln.

1978 Prehistoric Hunters of the High Plains. Academic Press, New York.

FRISON, GEORGE C. and MARION HUSEAS
1968 Leigh Cave, Wyoming, Site 48CA304. Wyoming Archeologist, Vol. 11, No. 3.

FRISON, GEORGE C., MICHAEL WILSON and DIANE WILSON
1974 The Holocene Stratigraphic Archeology of Wyoming. Geological Survey of Wyoming, Report of Investigations, No. 10. Laramie.

1976 Fossil Bison and Artifacts from an Early Altithermal Period Arroyo Trap in Wyoming. American Antiquity, Vol. 41, No. 1. Washington, D. C.

FRITZ, GAYLE J.
1979 Mounds in the Ozarks of Northwest Arkansas. Unpublished paper on file at the Arkansas Archeological Survey.

GAGLIANO, SHERWOOD M.
1967c Occupation Sequence at Avery Island. Louisiana State University Press. Baton Rouge.

1968 Late Archaic-Early Formative Relationships in South Louisiana. Coastal Studies Institute, Louisiana State University.

GAGLIANO, SHERWOOD M. and HIRAM F. GREGORY, JR.
1965 A Preliminary Survey of Paleo-Indian Points from Louisiana. Louisiana Studies, Vol. 4, No. 1, pp. 62-77.

GAGLIANO, SHERWOOD M. and ROGER T. SAUCIER
1963 Povery Point Sites in Southeastern Louisiana. American Antiquity, Vol. 28, pp. 320-327.

GALLATIN, ALBERT
1836 A Synopsis of the Indian Tribes in North America. Transactions of the American Antiquarian Society, Archaeologia Americana, Vol. 2. Cambridge, Massachusetts.

GALLOWAY, EUGENE and GEORGE A. AGOGINO
1961 The Johnson Site: A Folsom Campsite. Plains Anthropologist, Vol. 6, No. 13. Lincoln.

GANT, ROBERT and WESLEY HURT
1965 The Sturgis Archeological Project: An Archeological Survey of the Northern Black Hills. South Dakota Museum News, No. 26. Vermillion.

GARCILASO DE LA VEGA (EL INCA)
1723 La Florida del Inca. Historia del Adelantado, Hernando de Soto, Governador, y Capitan General del Reino de la Florida y de Otros Heroicos Caballeros, Espanoles, e Indios. 2d ed. Madrid.

GIARDINO, MARCO JOSEPH
1977 An Osteological Analysis of the Human Population from the Mount Nebo Site, Madison Parish, Louisiana. Unpublished masters thesis, Tulane University, New Orleans.

GIBSON, JON L.
1966 Archeology of the Lower Valley of the Ouachita River in Louisiana. A manuscript submitted to the graduate faculty in the department of Geography and Anthropology at LSU.

GIBSON, JON L.

1968 Russell Landing: A North Louisiana Phase of the Tchefuncte Period. Unpublished master's thesis, Louisiana State University, Baton Rouge.

1970 The Hopewellian Phenomenon in the Lower Mississippi Valley. Louisiana Studies, Vol. 9, No. 3, p. 176-192.

1973 Social Systems at Poverty Point, an Analysis of Intersite and Intrasite Variability. Unpublished Ph.D. dissertation, Southern Methodist University, Dallas.

1974a The Rise and Decline of Poverty Point. Louisiana Archeology, Vol 1, pp. 8-36.

1974b Poverty Point: The First North American Chiefdom. Archeology, Vol. 27, pp. 96-105.

1975 Fire Pits at Mound Bayou (16CT35), Catahoula Parish, Louisiana. Louisiana Archeology, Vol. 2, pp. 201-218.

1976a Archeological Survey of the Mermentau River and Bayous Nezpique and Des Cannes, Southwest Louisiana. The University of Southwestern Louisiana, Center for Archeological Studies, Report 1.

1976b Inspection of Archaeological Site 16CU126, Calcasieu Parish, Louisiana. Correspondence on file at the U. S. Army Corps of Engineers, New Orleans District.

1977 Archeological Survey of Portions of Little River, Boeuf River, and Big Creek, East-Central and Northeastern Louisiana. Unpublished manuscript submitted to U.S. Army Corps of Engineers, Vicksburg District.

1978 An Archeological Reconnaissance of the Lower Sabine River Valley, Toledo Bend Dam to Gulf Intercoastal Waterway, Louisiana and Texas. The University of Southwestern Louisiana, Lafayette.

GILL, GEORGE W. and RHODA OWEN LEWIS

1977 A Plains Woodland Burial from the Badlands of Western Nebraska. Plains Anthropologist, Vol. 22, No. 75. Lincoln.

GILMORE, MELVIN R.

1930 Ozark Bluff-Dweller Agriculture. El Placio, Vol. 28, No. 26, pp. 182-184.

1931 Vegetal Remains of the Ozark Bluff-Dweller Culture. Papers of the Michigan Academy of Sciences, Arts and Letters, Vol. 14, pp. 83-102.

GLEASON, H. A.
1923 The Vegetational History of the Midwest. Annals of the Association of American Geographers, Vol. 12, pp. 39-85.

GOODYEAR, ALBERT C.
1974 The Brand Site: A Techno-fuctional Study of a Dalton Site in Northeast Arkansas. Arkansas Archeological Survey Research Survey No. 7.

GORMAN, FRANK
1972 The Clovis Hunters: An Alternative View of Their Environment and Ecology. In Contemporary Archeology, edited by Mark P. Leone, pp. 206-291.

GRADWOHL, DAVID MAYER
1969 Prehistoric Villages in Eastern Nebraska. Nebraska State Historical Society Publications in Anthropology No. 4. Lincoln.

GRANGE, ROGERT T., JR.
1968 Pawnee and Lower Loup Pottery. Nebraska State Historical Society Publications in Anthropology No. 3. Lincoln.

GRANT, MARCUS P.
1979 Archeological Investigations at Bayou Gulch. Abstracts, Meeting of the Thirty-Seventh Plains Conference. Kansas City.

GREENGO, ROBERT E.
1964 Issaquena: An Archeological Phase in the Yazoo River Basin of the Lower Mississippi Valley. The Society for American Archeology, Memoirs, No. 18.

GREGORY, H.F. and H.K. CURRY
Archeological Reconnaissance Lower Bushley Bayou Project. Submitted to the Vicksburg Office of the U. S. Army Corps of Engineers.

GREGORY, HIRAM F.
1973 Eighteenth Century Caddoan Archeology: A Study in Models and Interpretations. Ph.D. dissertation, Southern Methodist University.

GREGORY, HIRAM F., JR., LESTER C. DAVIS and DONALD G. HUNTER
1970 The Terral Lewis Site: A Poverty Point Activity Facies in Madison Parish, Louisiana. In the Poverty Point Culture edited by Bettye J. Broyles and Clarence H. Webb, Southeastern Archeological Conference Bulletin Vol. 12, pp. 35-46.

GREY, DONALD
1962 The Bentzen-Kaufmann Cave 48SH301. Plains Anthropologist, Vol. 7, No. 18. Lincoln.

GRIFFIN, HARRY LEWIS
1959 The Attakapas Country: A History of Lafayette Parishu, Louisiana. Pelican Publishing Company, New Orleans.

GROSSER, ROGER
1973 A Tentative Cultural Sequence for the Snyder Site, Kansas. Plains Anthropologist, Vol. 18, No. 61. Topeka.

GUNN, JOEL
1978 Archeology and Troubled Times: Cultures Astride Shifting Climates and Sliding Resources. In Papers in Applied Archeology. Joel Gunn (ed). Center for Archeological Research, University of Texas at San Antonio. San Antonio.

GUNNERSON, J. H.
1956 Plains-Promontory Relationships. American Antiquity, Vol. 22, No. 1. Menasha.

1960 An Introduction to Plains Apache Archeology-The Dismal River Aspect. Bureau of American Ethnology, Anthropological Papers, No. 58. Washington, D. C.

1968 Plains Apache Archeology: A Review. Plains Anthropologist, Vol. 13, No. 41. Lawrence.

1969 A Human Skeleton from an Apache Baking Pit. Plains Anthropologist, Vol. 14, No. 43. Topeka.

HAAG, WILLIAM G.
1971 Louisiana in North American Prehistory. Melanges, No. 1, pp. 1-45. Museum of Geoscience, Louisiana State University, Baton Rouge.

1975 An Archeological Survey of the Union Carbide Corporation Pipeline Route. Manuscript on file in the Louisiana Section, Louisiana State Library. Baton Rouge.

HAAG, WILLIAM G. and CLARENCE H. WEBB
1953 Microblades at Poverty Point Sites. American Antiquity, Vol. 18, No. 3, pp. 245-248.

HADLEY, LEWIS F.
1882 A Quapaw Vocabulary and the Quapaw and Ponca Compared. Manuscript #918 on file with Bureau of American Ethnology, Smithsonian Institution, Washington, D.C.

HAINES, FRANCIS
1966a Where Did the Plains Indians Get Their Horses? In Readings In Anthropology. E. A. Hoebel and J. D. Jennings, eds. (2nd edition). McGraw-Hill. New York.

HAINES, FRANCIS
1966b The Northward Spread of Horses Among the Plains Indians. In Readings in Anthropology. E. A. Hoebel and J. D. Jennings, eds. (2nd edition). McGraw-Hill. New York.

HALEY, B. R.
1961 Geology of the Pris Quadrangle, Logan County, Arkansas. Arkansas Geological Commission Information Circular 20-B.

HALL, ROLAND S.
1954 CK-44: A Bluff-Shelter Site from Northeastern Oklahoma. Bulletin of the Oklahoma Anthropological Society, Vol. 2, pp. 49-67.

HALLY, DAVID J.
1972 The Plaquemine and Mississippian Occupations of the Upper Tensas Basin, Louisiana. Unpublished Ph.D. dissertation, Harvard University, Cambridge.

HARDEN, PATRICK and DAVID ROBINSON
1975 A Descriptive Report of the Vanderpool Site, CK-32, Cherokee County, Oklahoma. Bulletin of the Oklahoma Anthropological Society, Vol. 23, pp. 91-168.

HARDESTY, DONALD L.
1977 Ecological Anthropology. John Wiley and Sons. New York.

HARRINGTON, MARK R.
1920 Certain Caddo Sites in Arkansas. Museum of the American Indian, Heye Foundation, Indian Notes and Monographs, Miscellaneous Series, No. 10. New York.

1924 The Ozark Bluff-Dwellers. American Anthropologist, Vol. 27, No. 1, pp. 1-21.

1960 The Ozark Bluff-Dwellers. Museum of the American Indian, Heye Foundation, Indian Notes and Monographs, No. 12. New York.

HARRIS, MARVIN
1968 The Rise of Anthropological Theory. Crowell. New York.

HARSHBERGER, J. W.
1958 Phytogeographic Survey of North America. Hafner Publishing Company. New York.

HAYNES, C. V.
1966 Elephant Hunting in North America. Scientific American, Vol. 214, No. 6, pp. 104-122.

HAYNES, C. VANCE, JR.
1965 Preliminary Palynological Investigations of the Sister's Hill Site, Wyoming. Plains Anthropologist, Vol. 10, No. 21. Lincoln.

1968 Geochronology of the Late Quaternary Alluvium. Means of Correlation of Quaternary Successions. University of Utah Press. Salt Lake.

HAYNES, C. VANCE, JR. and DONALD C. GREY
1965 The Sister's Hill Site and Its Bearing on the Wyoming Postglacial Alluvial Chronology. Plains Anthropologist, Vol. 10, No. 29. Lincoln.

HAYNES, C. VANCE, JR. , PAUL E. DAMON and DONALD GREY
1966 Arizona Radiocarbon Dates VII. Radiocarbon, Vol. 9, New Haven.

HEARTFIELD, LORRAINE and H. L. CLENDENON
1975 An Archeological Assessment Along Certain Proposed Alternates of the Louisiana North-South Expressway. Prepared for Howard, Needles, Tammen and Bergendoff, Baton Rouge.

HEARTFIELD, PRICE AND GREENE, INC.
1979 Phase I of the Cultural Resources of the Chicot-Pollux Lignite Prospect, Bienville and Red River Parishes, Louisiana. Prepared for Espey, Huston and Associates, Inc., Austin.

HEAVIN, CANDICE G.
1970 Two Nebraska Culture Storage Pits from Doniphan County, Kansas. Plains Anthropologist, Vol. 15, No. 47. Topeka.

HELFERT, NINA, DWAIN KIRKHAM, RECA JONES and WOODROW DUKE
1979 The Gold Mine Site, Northern Louisiana. Paper presented at the Caddo Conference. Arkadelphia, Arkansas.

HENNING, DARREL D.
1965 The Alkire Mound (32SI200). Plains Anthropologist, Vol. 10, No. 29. Lincoln.

HEWES, GORDON W.
1949 Burial Mounds in the Badhill Area, North Dakota. American Antiquity, Vol. 14, No. 4. Menasha.

HIDORE, J. J.
1974 Physical Geography: Earth Systems. Scott, Foresman and Company, Glenview, Illinois.

HILALGO, FRAY FRANCISCO
1927 Description of the Tejas or Asinai Indians, 1691-1722. Translated from the Spanish by Mattie Austin Hatcher. III, Fray Francisco Hidalgo to the Viceroy, November 4, 1716. Southwestern Historical Quarterly, Vol. 31, pp. 50-62.

HILL, A. T. and MARVIN F. KIVETT
1941 Woodland-Like Manifestations in Nebraska. Nebraska History Magazine, Vol. 21, No. 3. Lincoln.

HODGE, FREDERICK WEBB
1907 Handbook of American Indians North of Mexico. Bureau of American Ethnology Bulletin No. 30, Part 1. Washington, D.C.

HOEBEL, E. ADAMSON
1960 The Cheyennes: Indians of the Great Plains. Holt, Rinehart and Winston. New York.

HOFFMAN, MICHAEL P.
1967 Prehistoric Developments in Southwestern Arkansas. In Arkansas Archeological Survey, Vol. 10, Nos. 1, 2, 3.

1970 Archeological and Historical Assessment of the Red River Basin in Arkansas. Archeologial and Historical Resources of the Red River Basin, ed. by H. A. Davis. Arkansas Archeological Survey, Publications on Archeology, Research Series, No. 1, pp. 135-194.

1977 An Archeological Survey of the Ozark Reservoir in West-Central Arkansas. In Ozark Reservoir Papers: Archeology in West-Central Arkansas 1965-1970. Arkansas Archeological Survey Research Series, Vol. 10, pp. 1-44.

HOFFMAN, J. J.
1953 Comments on the Use and Distribution of Tipi Rings in Montana, North Dakota and Wyoming. Anthropology and Sociology Papers, No. 14. Montana State University.

1963 Prehistoric Houses Along the Middle Missouri River. Progress, Interior Missouri Basin Field Committee. Billings, Montana.

HOLDER, PRESTON and JOYCE WIKE
1949 The Frontier Culture Complex: A Preliminary Report on a Prehistoric Hunters' Camp in Southwestern Nebraska. American Antiquity, Vol. 14, No. 4. Menasha.

HOWARD JAMES H. and ROBERT GANT
1965 Report of Archeological Salvage Investigations in the Gavin's Point Area, Lewis and Clark Lake, Nebraska and South Dakota. South Dakota Museum, Archeological Studies Circular, No. 11. Pierre.

HOWARD, LYNN
1940 Preliminary Report on Cherokee County Archeology. Society for American Archeology Notebook, Vol. 1, pp. 107-108. Ann Arbor.

HOWE, W. B. and J. W. KOENIG
1961 The Stratigraphic Succession of Missouri. Missouri Division of Geological Survey and Water Resources Bulletin No. 40.

HUGHES, JACK T.
1949 Investigations in Western South Dakota and Northeastern Wyoming. American Antiquity, Vol. 14, No. 4. Menasha.

HUNTER, DONALD G.
1970 The Catahoula Phase of the Poverty Point Complex in East-Central Louisiana. In The Poverty Point Culture, edited by Bettye J. Broyles and Clarence H. Webb. Southeastern Archeological Conference Bulletin 12, pp. 73-89.

HURT, WESLEY R., JR.
1952 Report of the Investigations of the Scalp Creek Site and The Ellis Creek Site, Gregory County, South Dakota. Archeological Commission, Archeological Studies Circular No. 4.

HUSTED, WILFRED M.
1965 Early Occupation of the Colorado Front Range. American Antiquity, Vol. 30, No. 4. Salt Lake City.

IRWIN, C. and H. IRWIN
1957 Archeology of the Agate Bluff Area. Plains Anthropologist, No. 8. Lincoln.

1959 Excavations at the Lo Dais Ka Site. Proceedings No. 8, Denver Museum of Natural History. Denver.

IRWIN-WILLIAMS, C. and H. IRWIN
1966 Excavations at Magic Mountain. Proceedings No. 12, Denver Museum of Natural History. Denver.

IRWIN-WILLIAMS, CYNTHIA, HENRY IRWIN, GEORGE AGOGINO and C. VANCE HAYNES, JR.
1973 Hell Gap: A Paleo-Indian Occupation on the High Plains. Plains Anthropologist, Vol. 18, No. 59. Topeka.

ISRAEL, STEPHEN
1979 Re-Examination of the Cookson Site and Prehistory of Tenkiller Locale in Northeastern Oklahoma. Oklahoma Archeological Survey 4. Norman.

JABLOW, J.
1951 The Cheyenne In Plains Indians Trade Relations, 1795 - 1840. Monographs of American Ethnological Society. No.19.

JACKSON, A. T.
1934 Types of East Texas Pottery. Bulletin of the Texas Archeological and Paleontological Society, Vol. 6, pp. 48-57.

JACOBSON, DANIEL
1960 The Origin of the Koasati Community of Louisiana. Ethnohistory, Vol. 7, No. 2, pp. 97-120.

JAMESON, J. FRANKLIN (ed.)
1907 Original Narratives of Early American History. Spanish Explorers in the Southern United States 1528-1543. Charles Scribner's Sons, New York.

JEFFERSON, THOMAS and WILLIAM DUNBAR
1804 Documents Relating to the Purchase and Exploration of Louisiana. Boston.

JENNINGS, JESSE D.
1974 Prehistory of North America. McGraw-Hill Book Company, New York.

1978 Ancient Native Americans. W. H. Freeman, San Franciso.

JENSEN, HARALD P., JR.
1968a Arheological Investigations in the Toledo Bend Reservoir: 1966-1967. Unpublished manuscript submitted to the National Park Service.

1968b Coral Snake Mound (x16SA48). Texas Archeological Society Bulletin 39, Vol. 9, No. 44.

JOHNSON, ALFRED E.
1973 Archeological Investigations at the Budenbender Site, Tuttle Creek Reservoir, North-Central Kansas, 1957. Plains Anthropologist, Vol. 18, No. 62. Topeka.

JOHNSON, ALFRED E.(ed.)
1977 Hopewellian Archeology in the Lower Missouri River Valley. University of Kansas, Publications in Anthropology, No. 8. Lawrence.

JOHNSON, ALFRED E., DENNIS D. YAPLE and LAWRENCE E. BRADLEY
1972 Systemic Change and Lithic Debris: The Nine Mile Creek Survey. Plains Anthropologist, Vol. 17, No. 58. Topeka.

JOHNSON, BOBBY H.
1976 The Coushatta People. Indian Tribal Series. Phoenix, Arizona.

JOLLY, FLETCHER III
1973 A Catlinite Disk Pipe and Associated Vessels from Lowland Eastern Arkansas. Arkansas Archeological Survey Bulletin Vol. 14, No. 1.

KAPLAN, DAVID and ROBERT A. MANNERS
1972 Culture Theory. Prentice Hall. Englewood Cliffs, New Jersey.

KATZ, PAUL R.
1969 An Analysis of Archeological Data from the Kelley Site, Northeastern Kansas. Masters thesis, University of Kansas. Lawrence.

1973 Radiocarbon Dates from the Sutter Site, Northeastern Kansas. Plains Anthropologist, Vol. 18, No. 60. Topeka.

KEEL, BENNIE
1979 A View from Inside. American Antiquity, Vol. 44, No. 1. Washington.

KENTON, EDNA (ed.)
1927 The Indians of North America, from The Jesuit Relations and Allied Documents. 2 vols. New York, New York. Harcourt, Brace.

KLEPINGER, LINDA and WILLIAM M. BASS
1971 Human Skeletal Material from Taylor Mound (14DP3), Doniphan County, Kansas. Plains Anthropologist, Vol. 20, No. 70. Topeka.

KEHOE, THOMAS F.
1960 Stone Tipi Rings in North-Central Montana and the Adjacent Portion of Alberta, Canada. Bureau of American Ethnology, Bulletin 173. Washington, D.C.

1972 Stone Medicine Wheel Monuments in the Northern Plains of North America. Atti del XL Congresso Internazionale degli Americanisti, Vol. 2. Rome.

KERR, HENRY P. III and DON G. WYCKOFF
1964 Two Prehistoric Sites, MY-72 and MY-79, in the Markham Ferry Reservoir Area, Mayes County, Oklahoma. Bulletin of the Oklahoma Anthropological Society, Vol. 12, pp. 55-86.

KING, P. G.
1951 The Tectonics of Middle North America. Princeton University Press, Princeton.

KIVETT, MARVIN F.
1949 Archeological Investigations in the Medicine Creek Reservoir, Nebraska. American Antiquity, Vol. 14, No. 4. Menasha.

1952 Woodland Sites in Nebraska. Nebraska State Historical Society Publications in Anthropology No. 1. Lincoln.

1953 The Woodruff Ossuary, A Prehistoric Burial Site in Phillips County, Nebraska. Bureau of American Ethnology, Bulletin 158. Washington, D. C.

KLINGER, TIMOTHY C.
1975, 1976, 1977 Parkin Archeology: A Report on the 1966 Field School Test Excavations at the Parkin Site, Arkansas Archeological Society Bulletin, Vol. 16, 17, 18, pp. 45-80.

KNIFFEN, FRED B.
1936 A Preliminary Report on the Indian Mounds of Plaquemines and St. Bernard Parishes in Richard Joel Russell, H. V. Howe, J. H. McGuirt, C. F. Dohm, W. Hadley, F. B. Kniffen, and Clair A. Brown, Lower Mississippi River Delta, Reports on the Geology of Plaquemines and St. Bernard Parishes. Louisiana Department of Conservation Geological Bulletin No. 8. New Orleans.

KRIEGER, ALEX D.
1946 Culture Complexes and Chronology in Northern Texas. University of Texas Publication No. 4640. Austin.

1949 Viking Fund Grant for Battle Mound Excavations, Lafayette County, Arkansas. Typescript submitted to the Viking Fund on Activities and Expenditures as of January 31, 1949.

KROEBER, A. L.
1953 Cultural and Natural Areas of Native America. University of California Press, Berkeley.

KUCHLER, A. W.
1974 A New Vegetation Map of Kansas. Ecology Vol. 55, pp. 586-604.

KUSCMA, P.
1978 Geology of the NE 1/4 of the Booneville Quadrangle, Local County, Arkansas. Masters thesis, Northeast Louisiana University.

KUTTRUFF, CARL
1975 The Poverty Point Site: North Sector Test Excavations. Louisiana Archeology No. 2. Louisiana Archeological Society.

LAPORTE, L. F.
1975 Encounter With the Earth Resources. Canfield Press, San Francisco.

LEACH, L. L.
1966 Excavations at Willowbrook: A Stratified Site Near Morrison. Southwestern Lore, Vol. 32, No. 2. Boulder.

LEET, L. D.
1971 Physical Geology. Prentice-Hall, Inc., Englewood Cliffs, New Jersey.

LEHMER, DONALD J.
1954 Archeological Investigations in the Oahe Dam Area, South Dakota, 1950-1951. River Basin Surveys Paper No. 7. Smithsonian Institution Bureau of American Ethnology Bulletin No. 158: Washington D. C.

1971 Introduction to Middle Missouri Archeology. Anthropological Papers No. 1. National Park Service, U.S. Department of the Interior. Washington, D. C.

LEHMER, D. J. and DAVID T. JONES
1966 Horizon and Tradition in the Northern Plains. American Antiquity, Vol. 31, No. 4. Salt Lake City.

LEWIS, G. E.
1970 New Discoveries of Pleistocene Bisons and Peccaries in Colorado. U.S. Geological Survey Professional Papers, 700-B: B137-B140.

LEWIS, THEODORE H. (ed.)
1907 The Narrative of the Expedition of Hernando de Soto by the Gentleman of Elva. In Spanish Explorers in the Southern United States 1528-1543. Charles Scribner's Sons, New York.

LORRAIN, DESSAMAE
1974 The Glass Site. In Wichita Indians: Wichita Indian Archeology and Ethnology; A Pilot Study. Robert E. Bell, E. B. Jelks, and W. W. Newcomb, eds. Garland. New York.

LOWIE, ROBERT H.
1954 Indians of the Plains. American Museum of Natural History. New York.

LUGN, A. L.
1935 The Pleistocene Geology of Nebraska. Nebraska Geology Survey Bulletin No. 10.

MCCLURKAN, BURNEY B.
1971 A Brief Test at the Baytown Site (3M01). Field Notes No. 73. Arkansas Archeological Society.

MCCLURKAN, BURNEY B., W. T. FIELD, and J. NED WOODALL
1966 Excavations in Toledo Bend Reservoir, 1964-1965. Papers of the Texas Archeological Salvage Project 8.

MCGIMSEY, CHARLES R. III
1959 An Archeological Survey of the Greers Ferry Reservoir in North-Central Arkansas. Manuscript on file at the National Park Service, Southeast Region, and the University of Arkansas Museum.

1963 Arkansas Archeology: 1962 In Review. In Arkansas Archeology, 1962. Arkansas Archeological Society, pp. 99-103.

MCGIMSEY, CHARLES R. III
1969 Indians of Arkansas. Popular Series No. 1, Arkansas Archeological Survey.

MCGREW, PAUL O.
1961 The Rawlins Mammoth. Wyoming Geological Association. Sixteenth Annual Field Conference Guidebook: 315-317.

MCINTIRE, WILLIAM G.
1958 Prehistoric Indian Settlements of the Changing Mississippi River Delta. Louisiana State University Studies, Coastal Studies Series, No. 1. Baton Rouge.

1959 Prehistoric Indian Settlements of the Changing Mississippi River Delta. Louisiana State University Studies, Coastal Studies Series 1. Baton Rouge.

MCKUSICK, MARSHALL
1964 Men of Ancient Iowa. Iowa State University Press. Ames.

MC NAIR, CHARLES W.
1960a A Report on the Moore's Creek Site (3WA20). Arkansas Archeological Society Newsletter 1 (10):1-10.

MALOUF, CARLING
1961 Three Pottery Types from the Dismal River Aspect. Proceedings fo the Fifth Plains Conference for Archeology, Laboratory of Anthropology, Note Book No. 1, University of Nebraska. Lincoln.

MARGRY, PIERRE
1875-1886 Decouvertes et establissements des Francais dans l'Ouest et dans le Sud de l'Amerique septentrionale (1614-1754). Memoires et documents originaux recueilli et publies par Pierre Margry. 6 vols. Paris.

MARQUETTE, PERE JEAN
1673 Autograph map of 1673. Reproduced in U.S. Bureau of Indian Affairs...The Osage People and Their Trust Property.

MARRIOTT, ALICE
1974 Osage Indians II. Garland Publishing Inc., New York.

MARSHALL, RICHARD A.
1958 The Use of Table Rock Reservoir Projectile Points in the Delineation of Cultural Complexes and Their Distribution. Masters thesis, Department of Archeology, University of Missouri, Columbia.

MATTES, MERRILL J.
1965 Archeology of the Bisterfeldt Potato Cellar Site. Southwestern Lore, Vol. 31, No. 3. Boulder.

MEDLOCK, RAYMOND C.
1975 Faunal Analysis. In The Cache River Archeological Project: An Experiment in Contract Archeology, pp. 223-242. Assembled by Michael B. Schiffer and John H. House. Arkansas Archeological Survey Research Series 8.

1978 Ten Mile Rock: Pigs, Peccaries, and People. Arkansas Archeologist, Vol. 19, pp. 1-24.

MEINZER, O. E.
1923 The Occurrence of Ground Water in the United States. United States Geological Survey Water Supply Paper, No. 489.

METCALF, GEORGE
1949 Three Pottery Types from the Dismal River Aspect. Proceedings of the Fifth Plains Conference for Archeology, Laboratory of Anthropology, No. 1. University of Nebraska, Lincoln.

METCALF, MICHAEL D.
1973 Archeology at Big Dipper: An Archaic Campsite, Logan County, Colorado. Masters thesis, Colorado State University, Fort Collins.

MEYER, ROY W.
1977 The Village Indians of the Upper Missouri. University of Nebraska Press, Lincoln.

MEYERS, THOMAS P.
1979 Clary Ranch. A Late Paleo-Indian Site in Western Nebraska. Abstracts, Thirty-Seventh Plains Conference. Kansas City.

MOORE, CLARENCE B.
1908 Certain Mounds of Arkansas and Mississippi. Journal of the Academy of Natural Sciences of Philadelphia, Vol. 13. Philadelphia.

1909 The Antiquities of the Ouachita Valley. Journal of the Academy of Natural Sciences of Philadelphia, Vol. 14, pp. 1-170. Philadelphia.

1911 Some Aboriginal Sites on Mississippi River. Journal of the Academy of Natural Sciences of Philadelphia, Vol. 14, pp. 246-480. Philadelphia.

1912 Some Aboriginal Mounds on Red River. Journal of the Academy of Natural Sciences of Philadelphia, Vol. 14, pp. 481-644. Philadelphia.

1913 Some Aboriginal Sites in Louisiana and Arkansas. Journal of the Academy of Natural Sciences of Philadelphia, Vol. 16, pp. 7-99. Philadelphia.

MOOREHEAD, WARREN K.
1931 Archeology of the Arkansas River Valley. Yale University Press, New Haven.

MORFI, FRAY JUAN AGUSTIN DE
1932 Excerpts from the memorias for the History of the Province of Texas, being a translation of those parts of the memorias which particularly concern the various Indians of the Province of Texas; their tribal divisions, characteristics, customs, traditions, superstitions, and all else of interest concerning them. With a prolog, appendix, and notes by Frederick M. Chabot. Privately printed.

1935 History of Texas, 1673-1779. Translated, with Biographical Introduction and Annotations, by Carlos Eduardo Castaneda. 2 pts. Quivira Soc. Albuquerque.

MORRIS, E. A. and R. E. KAINER
1978 Summary of Northeastern Colorado Prehistory. Abstracts, Thirty-Sixth Annual Plains Conference. Denver.

MORSE, DAN F.
1969 Introducting Northeast Arkansas Prehistory. Arkansas Archeological Survey Bulletin Vol. 10, No. 1, 2, 3.

1971 The Hawkins Cache: A Significant Dalton Find in Northeastern Arkansas. Arkansas Archeological Society Bulletin Vol. 12, No. 1, pp. 9-20.

1973 Nodena--An Account of 75 Years of Archeological Investigation in Southeast Mississippi County, Arkansas. Editor. Arkansas Archeological Society Research Series No. 4.

1975 A Preliminary Report of the Zebree Project. Arkansas Archeological Report No. 8.

1975a Paleo-Indian in the Land of Opportunity: Preliminary Report on the Excavations at "Dalton Hill" (3Ge94). In: M.B. Schiffer and J. H. House, assemblers, "The Cache River Project: An Experiment in Contract Archeology." Arkansas Archeological Survey, Research Series, No. 8.

MORSE, DAN F. and SAM SMITH
1973 Archeological Salvage During the Construction of Route 308. Arkansas Archeological Survey Bulletin Vol. 14, No. 2-4.

MOSSIMAN, J. E. and P. S. MARTIN
1975 Simulating Overkill by Paleo-Indians. American Scientist, Vol. 63, pp. 304-313.

MULLOY, WILLIAM T.
1942 The Hagen Site. Publications in the Social Sciences, No. 1. University of Montana.

MULLOY, WILLIAM T.
1954 The McKean Site in Northeastern Wyoming. Southwestern Journal of Anthropology, Vol. 10, No. 4. Albuquerque.

1958 A Preliminary Historical Outline for the Northwesten Plains. Univeristy of Wyoming Publications in Science, Vol. 22, No. 1. Laramie.

1959 The James Allen Site Near Laramie, Wyoming. American Antiquity, Vol. 25, No. 1. Menasha.

1965 Archeological Investigations Along the North Platte River in Eastern Wyoming. University of Wyoming Publications in Science, Vol. 31, No. 2. Laramie.

MULLOY, WILLIAM T. and LOUIS C. STEEGE
1967 Continued Archeological Investigations Along the North Platte River in Eastern Wyoming. University of Wyoming Publications in Science, Vol. 33. Laramie.

MUN, JULES DEW
1913 Journals, edited by Thomas Maitland Marshall; translated by Mrs. Nettie H. Beauregard. In Missouri Historical Society Collections, Vol. V, No. 2. St. Louis, Missouri. Missouri Historical Society.

MURRAY, G. E.
1960 Geologic Framework of Gulf Coastal Province of United States. Reprinted from Recent Sediments, Northwest Gulf of Mexico, American Association of Petroleum Geologists. Tulsa.

NASATIR, A.P. ed.
1952 Before Lewis and Clark; Documents Illustrating the History of the Missouri, 1785-1804. 2 volumes. St. Louis, Missouri, St. Louis Historical Documents Foundation.

NEITZEL, ROBERT S. and J. STEPHEN PERRY
1978 Prehistoric Indians. In A Cultural Resources Survey and Evaluation of the Proposed Alignment for the North-South Expressway: Phases I and II. Report prepared for Howard, Needles, Tammen and Bergendoff, Baton Rouge by the Research Institute, Northeast Louisiana University, Monroe.

NELSON, CHARLES E.
1967 The Archeology of the Hall-Woodland Cave. Southwestern Lore, Vol 33, No. 1. Boulder.

NEUMAN, ROBERT W.
1960a Indian Burial Mounds in the Missouri River Basin. Progress, Interior Missouri Basin Field Committee. Millings.

1960b The Truman Mound Site, Big Bend Reservoir Area, South Dakota. American Antiquity, Vol. 26, No. 1. Salt Lake City.

NEUMAN, ROBERT W.

1961 Excavations at Four Mound Sites in the Oahe Reservoir. Plains Anthropologist, Vol. 6, No. 12. Lincoln.

1962 Another Tipi Ring Reference. Plains Anthropologist, Vol. 7, No. 18. Lincoln.

1964 The Good Soldier Site (39LM238), Big Bend Reservoir, Lyman County, South Dakota. Bureau of American Ethnology, Bulletin 189. Washington, D. C.

1964 Projectile Points from Perceramic Occupations Near Fort Thompson, South Dakota. A Preliminary Report. Plains Anthropologist, Vol. 9, N. 25. Lincoln.

1967 Radiocarbon-Dated Archeological Remains on the Northern and Central Great Plains. American Antiquity, Vol. 32, No. 4. Salt Lake City.

1968 Additional Annotated References: An Archaeological Bibliography of the Central and Northern Great Plains prior to 1930. Plains Anthropologist, Vol. 13, No. 40. Lawrence.

1974 Historic Location of Certain Caddoan Tribes. In Caddoan Indians Vol. II. Gaylord Publishing Inc., New York.

1975 The Sonota Complex and Associted Sites on the Northern Great Plains. Nebraska State Historical Society Publications in Anthropology, 6. Lincoln.

1977 An Archeological Assessment of Coastal Louisiana. Melanges No. 11. Museum of Geoscience, Louisiana State University, Baton Rouge.

In Press The Buffalo in Southeastern United States Post-Pleistocene Prehistory.

NEUMAN, ROBERT W., EARL E. KENDLE and LARRY A. WITT

1964 Prehistoric Artifacts from the Little Nemaha River Drainage, Otoe County, Nebraska. Plains Anthropologist, Vol. 9, No. 23.

NEUMAN, ROBERT W. and LANIER A. SIMMONS

1969 A Bibliography Relative to Indians of the State of Louisiana. Department of Conservation, Louisiana Geological Survey, Anthropological Study No. 4. Baton Rouge.

NEWCOMB, W.W.

1961 The Indians of Texas, University of Texas Press, Austin.

NEWCOMB, W. W. AND W. J. FIELD
1974 An Ethnohistoric Investigation of the Wichita Indians in the Southern Plains. In Wichita Indians: Wichita Indian Archeology and Ethnology; A Pilot Study. Robert E. Bell, E. B. Jelks, and W. W. Newcomb. Garland. New York.

NEWTON, JOHN P.
1971 Two Fluted Lanceolate Projectile Points from Boone County. Field Notes of the Arkansas Archeological Society, No. 81, pp. 6-7. Fayetteville.

1975, 1976, 1977 Paleo-Indians in the Arkansas Ozarks: A Preliminary Statement. Arkansas Archeologist, Vol. 16, No. 18, pp. 85-92.

NORTHEAST LOUISIANA GEOLOGICAL SOCIETY
1966 Ouachita Mountain Guidebook -- Second Annual Field Trip of Northeast Louisiana Geological Society.

NUTTALL, THOMAS
1905 Nuttall's Travels Into the Arkansa Territory, 1819. Early Western Travels, Vol. 13. Rueben G. Thwaites, ed. Arthur H. Clark Co., Cleveland, Ohio.

O'BRIEN, PATRICIA J.
1971 Valley Focus Mortuary Practices. Plains Anthropologist, Vol. 16, No. 53. Topeka.

ORR, K. G.
1946 The Archeological Situation at Spiro, Oklahoma: A Preliminary Report. American Antiquity, Vol. 11, No. 4, pp. 228-256. Menasha.

1952 Survey of Caddoan Area Archeology. In Archeology of Eastern United States, ed. J. B. Griffin, pp. 239-255. University of Chicago Press, Chicago.

OSBORN, H. F.
1909 Cenozoic Mammal Horizons of Western North America. U. S. Geological Survey Bulletin, Vol. 361.

OVER, WILLIAM H.
1936 The Archeology of Ludlow Cave and Its Significance. American Antiquity, Vol. 2. Menasha.

PARSONS, ELSIE CLEWS
1941 Notes on the Caddo. Memoirs of the American Anthropological Association, No. 57.

PEABODY, CHARLES
1903 Cave-deposits in the Ozark Mountains. In Anthropologic Miscellania, American Anthropologist, Vol. 5, No. 2, pp. 579-580.

PEABODY, CHARLES
1904 Exploration of Mounds, Coahoma County, Mississippi. Papers of the Peabody Museum, Harvard University, Vol. 3, No. 2.

PEEBLES, CHRISTOPHER S. and SUSAN M. KUS
1977 Some Archeological Correlates of Ranked Societies. American Antiquity, Vol. 42, pp. 421-448.

PERINO, GREGORY
1967a The Cherry Valley Mounds and Banks Mound 3. Central States Archeological Societies, Inc., Memoir, No. 1.

PERRY, JEAN SHIPLEY
1978 Historic Indians. In A Cultural Resource Survey and Evaluation of the Opelousas to Shreveport Portion of the Proposed North-South Expressway: Phases I and II. Report submitted to Howard, Needles, Tammen and Bergendoff, Baton Rouge, Louisiana, by the Research Institute, Northeast Louisiana University, Lorraine Heartfield, ed.

PETSCHE, JEROME E.
1968 Bibliography of Salvage Archeology in the United States. Smithsonian Institution, River Basin Surveys, Publication in Salvage Archaeology, No. 10. Lincoln.

PHENICE, TERREL W.
1969 An Analysis of the Human Skeletal Material from Burial Mounds in North Central Kansas. University of Kansas Publications in Anthropology No. 1. Lawrence.

PHILLIPS, ROBERT E.
1963 Four Woodland Sites in South Central Nebraska. Plains Anthropologist, Vol. 8, No. 21. Lincoln.

PHILLIPS, PHILIP
1970 Archeological Survey of the Lower Yazoo Basin, Missouri, 1949-1955. Harvard University, Peabody Museum of Archaeology and Ethnology, Papers 60.

PHILLIPS, PHILIP and JAMES A. BROWN
1978 Pre-Columbian Shell Engravings From the Craig Mound at Spiro, Oklahoma, Part 1. Peabody Museum Press, Cambridge.

PHILLIPS, PHILIP, JAMES A. FORD, and JAMES D. GRIFFIN
1951 Archeological Survey In the Lower Mississippi Alluvial Valley, 1940-1947. Papers of the Peabody Museum, Harvard University, Vol. 25. Cambridge.

POWELL, J. W.
1888 Sixth Annual Report of the Bureau of Ethnology to the Secretary of the Smithsonian Institution, 1884-85. U. S. Government Printing Office, Washington, D. C.

POWELL, J. W.
1891 Indian Linguistic Families of America North of Mexico. 7th Annual Report, Bureau of American Ethnology, 1885-1886, pp. 1-142.

POWERS, WILLIAM K.
1971 Indians of the Southern Plains. Capricorn Books, New York.

1973 Indians of the Northern Plains. Capricorn Books, New York.

PRICE, G. R. DENNIS and LORRAINE HEARTFIELD
1977c Archeological Test Excavation of Site 16OU15, Located on the Monroe to Sandy Bayou Levee, Ouachita River Levees, Ouachita Parish, Louisiana. The Research Institute, College of Pure and Applied Sciences, Northeast Louisiana University, Monroe.

PURSER, JOYCE
1964 The Administration of Indian Affairs in Louisiana, 1803-1820. Louisiana History, Vol. 5, No. 4, pp. 401-419.

QUIMBY, GEORGE I. JR.
1951 The Medora Site, West Baton Rouge Parish, Louisiana. Anthropological Series, Field Museum of Natural History, Vol. 24, No.2.

1957 The Bayou Goula Site, Iberville Parish, Louisiana. Fieldiana:Anthropology, Vol. 37, No. 2. Chicago Natural History Museum.

RAAB, L. MARK
1976 Pine Mountain: A Study of Prehistoric Ecology in the Arkansas Ozarks. Arkansas Archeological Survey, Research Report 7.

RAAB, L. MARK, GAYLE FRITZ, DANIEL WOLFMAN, and ROBERT H. RAY
1979 Archeological Study Units of A State Historic Preservation Plan, or the Brady Mountain Report. State Region 4, The Ozarks. Fayetteville and Russellville Stations of the Arkansas Archeological Survey.

RAPPAPORT, ROY A.
1968 Pigs for the Ancestors: Ritual in the Ecology of a New Guinea People. Yale. New Haven.

READ, WILLIAM A.
1927 Louisiana Place-Names of Indian Origin. Louisiana State University and Agricultural and Mechanical College Bulletin, Vol. 19, No. 2.

REDFIELD, ALDEN and JOHN MOSELAGE
1970 The Lace Place, A Dalton Project Site in the Western Lowland in Eastern Arkansas, Bulletin of the Arkansas Archeological Survey, Vol. 11, No. 2.

REDFIELD, ALDEN and JOHN MOSELAGE
1971 Dalton Forms From the Lower Mississippi Alluvial Valley. Southeastern Archeological Conference Bulletin. No. 13, pp. 99-106.

REED, E. C. and DREEZEN
1965 Revision of the Classification of the Pleistocene Deposits of Nebraska. Nebraska Geological Survey Bulletin No. 23.

REEVES, BRIAN O. K.
1973 The Concept of an Altithermal Cultural Hiatus in Northern Plains Prehistory. American Anthropologist, Vol. 75, No. 5. Washington, D. C.

REHER, CHARLES A.
1971 A Survey of Ceramic Sites in Southeastern Wyoming. Master's thesis, University of Wyoming. Laramie.

REHER, CHARLES A. and G. C. FRISON
n.d. The Vore Site 48CK302: A Stratified Buffalo Jump in the Black Hills of Northeastern Wyoming. Plains Anthropologist (in press).

RESEARCH INSTITUTE
1979 A Cultural Resources Reocnnaissance of the White River National Wildlife Refuge, Arkansas. Vol. I. Report prepared for Interagency Archeological Services-Atlanta by the Research Institute, Northeast Louisiana University, Monroe.

REYNOLDS, JOHN D.
1979 The Grasshopper Falls Phase of the Plains Woodland. Kansas State Historical Society, Anthropological Series No. 7. Topeka.

RIEGEL, ROBERT AND ROBERT ATHEARN
1971 American Moves West. Holt, Rinehart, and Winston. New York.

RIVET, PHILIP G.
1973 Tchefuncte Ceramic Typlogy: A Reappraisal. Master's thesis. Louisiana State University. Baton Rouge.

ROBERTS, FRANK H. H.
1935 A Folsom Complex: A Preliminary Report on Investigations at the Lindenmeir Site in Northern Colorado. Smithsonian Miscellaneous Collections, Vol. 94. Washington, D. C.

1936 Additional Information on the Folsom Complex. Smithsonian Miscellaneous Collections, Vol. 95. Washington, D. C.

1940 Excavations at the Lindenmeir Site Contribute New Information on the Folsom Complex. Explortion and Field Work of the Smithsonian Institution for 1939. Washington, D. C.

ROBERTS, FRANK H. H.
1951 The Early Americans. Scientific American, Vol. 184, No. 2. Washington, D. C.

1952 River Basin Surveys, The First 5 Years of the Interagency Archeological and Paleontological Salvage Program. Smithsonian Institution. Annual Report for the Year 1951. Washington, D. C.

1961 The Agate Basin Complex. In Homenaje a Pablo Martinez del Rio. Instituto Nacional de Antropologia y Historia. Mexico.

ROGERS, RICHARD and LARRY MARTIN
1979 Radiocarbon Dates on the Twelve Mile Creek Site, A Paleo-Indian Kill Site in Western Kansas. Abstracts, Thirty-Seventh Plains Conference, Kansas City.

ROHRBAUGH, CHARLES L.
1968 The W. H. Baldwin Site, Mc-84 of McCurtain County, Southwestern Oklahoma. Bulletin of the Oklahoma Anthropological Society, Vo. 16, pp. 95-124. Oklahoma City. Report on salvage work at the Baldwin Site, Pine Creek reservoir, a mixed Gibson and Fulton occupation.

ROLINGSON, MARTHA A.
1972 Preliminary Report on the Test Excavation at the Coon Island Site. Field Notes, Vol. 88, pp. 4-5. Arkansas Archeological Society, Fayetteville.

1976 The Bartholomew Phase: An Example of Plaquemine Adaptation in the Mississippi Valley. In Cultural Change and Continuity, edited by Charles E. Cleland. Academic Press, New York.

ROTHROCK, E. P.
1943 A Geology of South Dakata: Part 1-The Surface. South Dakota Geological Survey Bulletin No. 13.

ROWLAND, MRS. DUNBAR
1930 Life, Letters and Papers of William Dunbar of Elgin, Morayshire, Scotland, and Natchez, Mississippi: Pioneer Scientist of the Southern United States. Press of the Mississippi Historical Society, Jackson, Mississippi.

RUBEY, W. H.
1930 Lithologic Studies of Fine-grained Upper Cretaceous Sedimentary Rocks of the Black Hills Region. United States Geological Survey Professional Paper 165-A.

RUBIN, M. and H. E. SUESS
1954 United States Geological Survey Radiocarbon Dates III. Science, Vol. 123, No. 3194. Washington, D. C.

RUBIN, M. and C. ALEXANDER
1960 United States Geological Survey Radiocarbon Dates V. Radiocarbon, Vol. 2, New Haven.

RUSCO, MARY K.
1960 The White Rock Aspect. University of Nebraska, Laboratory of Anthropology Note Book No. 4, Lincoln.

SAHLINS, MARSHALL D.
1968 Tribesmen. Prentice-Hall. Englewood Cliffs, New Jersey.

SAUCIER, ROGER T.
1963 Recent Geographic History of the Pontchatrain Basin. Louisiana State University Studies, Coastal Studies Series 9.

1974 Quaternary Geology of the Lower Mississippi Valley. Arkansas Archeological Survey Research Series No. 6.

SCHAMBACH, FRANK
1971 An Archeological Appraisal of Portions of the Mid-Ouachita and Little Missouri Drainage, South Central Arkansas. Manuscript on file with the Arkansas Archeological Survey, Fayetteville.

1979 Summary of Local and Regional Archeology. In Hampton, Timothy C. Klinger, assembler. Arkansas Archeological Survey Research Report No. 19. Fayetteville.

SCHIFFER, MICHAEL B. and JOHN H. HOUSE
1975 The Cache River Archeological Project. Arkansas Archeological Survey Research Series No. 8. Fayetteville.

SCHMITS, L. J.
1978 Williamson: A Late Archaic Occupation in East-Central Kansas. Abstracts of the Thirty-Sixth Annual Plains Conference. Denver.

SCHOLTZ, JAMES A.
1967 A Summary of Prehistory in Northwest Arkansas. In Bulletin of the Arkansas Archeological Society, Vol. 10, No. 123.

1969 A Summary of Prehistory in Northwest Arkansas. Arkansas Archeologist 10:51-60.

SCHOLTZ, SANDRA CLEMENTS
1975 Prehistoric Plies: A Structural and Comparative Analysis of Cordage, Netting, Basketry and Fabric from Ozark Bluff Shelters. Arkansas Archeological Survey, Research Series 9.

SCHULTZ, C. BERTRAND and LOREN C. EISELEY
1939 Paleontological Evidence for the Antiquity of the Scottsbluff Bison Quarry and Its Associated Artifacts. American Anthropologist, Vol. 37. Menasha.

SCHULTZ, C. BERTRAND, GILBERT E. LUENINGHOENE, and W. D. FRANKFORTER
1948 Preliminary Geomorphological Studies of the Lime Creek Area. Bulletin of the University of Nebraska State Museums, Vol. 3, No. 4. Lincoln.

SECOY, F. R.
1953 Changing Military Patterns of the Great Plains. Monograph of American Ethnological Society.

SELLARDS, E. H., GLEN L. EVANS, GRAYSON E. MEADE
1947 Fossil Bison and Associated Artifacts from Plainview, Texas. Bulletin of the Geological Society of America, Vol. 58.

SELLARDS, E. H.
1952 Early Man in America. University of Texas Press, Austin.

1955 Fossil Bison and Associated Artifacts from Milnesand, New Mexico. American Antiquity, Vol. 20, No. 4. Menasha.

SERVICE, ELMAN R.
1963 Profiles in Ethnology. Harper and Row. New York.

1966 The Hunters. Prentice-Hall. Englewood Cliffs, New Jersey.

SHAW, LESLIE C. and GEORGE C. FRISON
1979 The Sheaman Site: A Clovis Campsite in Eastern Wyoming. Abstracts, Thrity-Seventh Plains Conference. Kansas City.

SHEANS, DANIEL J.
1962 The Archaeology of the Battle-Porcupine Creek area, Oahe Reservoir, North Dakota. Manuscript on file at the Smithsonian Institution. Wash.

SHENKEL, J. RICHARD
1974a Big Oak and Little Oak Islands: Excavations and Interpretations. Louisiana Archeology No. 1, pp. 37-65. Lafayette.

SHENKEL, J. RICHARD and RICHARD HOLLEY
1975 A Tchefuncte House. Southeastern Archeological Conference Bulletin, Vol. 18, pp. 226-242.

SHEPPARD, D. G.
1978 Geology of the NW 1/4 of the Booneville Quadrangle, Logan County, Arkansas. Masters thesis, Northeast Louisiana University.

SHIPPE, J. M.
1948 Nebo Hill, A Lithic Complex in Western Missouri. American Antiquity, Vol. 14, No. 1. Menasha.

1962 Transriver Variations in Artifacts of Nebo Hill Complex Sites. Missouri Archaeological Society Newsletter, No. 162.

SHREVEPORT GEOLOGICAL SOCIETY
1953 Upper and Lower Cretaceous of Southwestern Arkansas, Cambrian-Pennsylvanian of the Ouachita Mountains and Magnet Cove. Guidebook - 19th Annual Field Trip.

SIBLEY, JOHN
1832 Historical Sketches of the Several Indian Tribes in Louisiana, South of the Arkansas River, and Between the Mississippi and River Grande. American State Papers, Class II, Indian Affairs, Vol. I.

SIMPSON, G. G.
1941 Large Pleistocene Felines of North America. American Museum Novitates, No. 1136:19-27.

1945 Notes on Pleistocene and Recent Tapirs. Bulletin of the American Museum of Natural History, Vol. 86121:52-81.

SKINNER, S. A., R. K. HARRIS and K. M. ANDERSON, EDITORS
1969 Archeological Investigations at the Sam Kaufman Site, Red River County, Texas. Southern Methodist University, Contributions in Anthropology, No. 5. Dallas.

SMITH, C. L.
1958 Additional Pleistocene Fishes from Kansas and Oklahoma. Copeia No. 3: 176-180.

SMITH, CARLYLE S.
1949 Archaeological Investigations in Ellsworth and Rice Counties, Kansas. American Antiquity Vol. 14, No. 1. Menasha.

SOIL CONSERVATION SERVICE
1967 Soil Classification, A Comprehensive System, Seventh Approximation. U.S. Department of Agriculture.

SOLIS, FRAY GASPAR JOSE de
1931 Diary of a visit of inspection of the Texas missions made by Fray Gaspar Jose de Solis in the year 1767-1768. Translated by Margaret Kenney Kress with introductory note by Mattie Austin Hatcher. Southwestern Historical Quarterly, Vol. 35, pp. 28-76.

SPENCER, ROBERT F., J. D. JENNINGS, et al
1965 The Native Americans. Harper and Row. New York.

SPRINGER, JAMES W.
1973 The Prehistory and Cultural Geography of Coastal Louisiana. Ph.D. dissertation, Yale University, New Haven.

1974 The Bruly St. Martin Site and Its Implications for Coastal Settlement in Louisiana. Louisiana Archeology Vol. 1, pp. 75-80.

SQUIER, EPHRAIM G. and EDWIN DAVIS
1848 Ancient Monuments of the Mississippi Valley. Smithsonian Institution Contributions to Knowledge, Vol. 1. Washington, D. C.

STANFORD, DENNIS
1974 Preliminary Report of the Excavation of the Jones-Miller Hell Gap Site, Yuma County, Colorado. Southwestern Lore, Vol. 40. Boulder.

STEWARD, JULIAN
1955 Theory of Culture Change, Urbana: University of Illinois Press. Cited in Marvin Harris, Rise of Anthropological Theory. Crowell (1968). New York.

STEWART, T. D.
1943 Skeletal Remains from Platte and Clay Counties, Missouri. U. S. National Museum Bulletin 183. Wash.

STEPHENS, J. J.
1960 Stratigraphy and Paleontology of a Late Pleistocene Basin, Harper County, Oklahoma. Bulletin of the Geologic Society of America, Vol. 71:1675-1702.

STEWARD, T. D.
1943 Skeletal Remains from Platte and Clay Counties, Missouri. U.S. National Museum Bulletin 183. Washington, D. C.

STEZLER, FRANK M.
1933a Hopewell Type Pottery from Louisiana. Journal of the Washington Academy of Sciences, Vol. 23, No. 3. Washington, D. C.

1933b Pottery of the Hopewell Type from Louisiana. Proceedings, United States National Museum, Vol. 82, pp. 121. Washington, D. C.

1934 A Phase of the Hopewell Mound Builders in Louisiana. Explorations and Field Work of the Smithsonian Institution in 1933. Publication No. 3235. Washington, D. C.

STORY, D. A.
1978 Some Comments on Anthropological Studies Concerning the Caddo. In Texas Archeology, Kurt D. House, editor. Southern Methodist University Press, Dallas.

STRAHLER, A. N.
1973 Introduction to Physical Geography. John Wiley and Sons, Inc., New York.

STRONG, WILLIAM D.
1935 An Introduction to Nebraska Archeology. Smithsonian Miscellaneous Collections, Vol. 93, No. 10. Washington, D. C.

STRONG, WILLIAM D.
1940 From History to Prehistory in the Northern Great Plains. Smithsonian Miscellaneous Collections, Vol. 100. Washington, D. C.

STREUVER, STUART
1968 Woodland Subsistence - Settlement Systems in the Lower Illinois Valley. In New Perspectives In Archeology. Sally R. Binford and Lewis R. Binford (eds). Aldine. Chicago.

1979 New Discoveries--Kimmswick Bone Beds. Early Man, No. 1, 25.

STRUEVER, STUART and K. D. VICKERY
1973 The Beginnings of Cultivation in the Midwest-Riverine Area of the United States. American Anthropologist, No. 74, pp. 1197-1220.

SWANTON, JOHN R.
1911 Indian Tribes of the Lower Mississippi Valley and Adjacent Coast of the Gulf of Mexico. Smithsonian Institution, Bureau of American Ethnology Bulletin 43. U. S. Government Printing Office, Washington, D. C.

1918 An Early Account of the Choctaw Indians. Memoir of the American Anthropology Association, Vol. 5, No. 2.

1919 A Structural and Lexical Comparison of the tunica, Chitimacha, and Atakapa Languages. Bureau of American Ethnology Bulletin 68. U. S. Government Printing Office, Washington, D. C.

1928 Social and Religious Beliefs and Usages of the Chickasaw Indians. 44th Annual Report of the Bureau of American Ethnology, 1926-1927, pp. 169-273. U. S. Government Printing Office, Washington, D. C.

1931 Source Material for the Social and Ceremonial Life of the Choctaw Indians. Bureau of American Ethnology Bulletin 103. U. S. Government Printing Office, Washington, D. C.

SWANTON, JOHN R.
1932a Choctaw Moities. American Anthropology, Vol. 34, No. 2.

1932b Ethnological Value of the De Soto Narratives. American Anthropology, Vol. 34, No. 4, pp. 570-590.

1939 Final Report of the United States De Soto Expedition Commission. House Document No. 71, 76th Congress, 1st Session. Washignton, D. C.

1942 Source Material on the History and Ethnology of the Caddo Indians. Bureau of American Ethnology Bulletin No. 132.

SWANTON, JOHN R.
1946 The Indians of the Southeastern United States. Bureau of American Ethnology Bulletin 137. U. S. Government Printing Office, Washington, D. C. Reprinted in 1969 by Greenwood Press, Publishers, New York.

1952 Hernando De Soto's Route Through Arkansas. American Antiquity, Vol. 18, No. 2, pp. 156-162. Salt Lake City.

1953 The Indian Tribes of North American. Bureau of American Ethnology Bulletin 145. U. S. Government Printing Office, Washington, D. C.

SWEDLUND, ALAN and LINDA GOODMAN
1966 The Witkin Burial. Southwestern Lore, Vol. 32, No. 3. Boulder.

TALLEY, THOMAS
1978 An Osteological Report on the Burial Remains at the Goldmine Site (16RI13), Richland Parish, Louisiana. Unpublished thesis, Northeast Louisiana University, Monroe, Louisiana.

TERRELL, JOHN U.
1971 American Indian Almanac. World. New York.

THIESSEN, THOMAS D.
1976 A Tentative Radiocarbon Chronology for the Middle Missouri Tradition. Manuscript on file with the National Park Service in Stanton, North Dakota.

THOMAS, ALFRED BARNABY
1928 Spanish Exploration of Oklahoma. In Chronicles of Oklahoma, Vol. 6, No. 2. Oklahoma City, Oklahoma. Oklahoma Historical Society,

THOMAS, CYRUS
1894 Report on the Mound Explorations of the Bureau of Ethnology. Twelfth Annual Report of the Bureau of Ethnology to the Secretary of the Smithsonian Institution. 1890-1891, ppp. 1-742. Washington, D.C.

THOMAS, PRENTICE M. and JANICE CAMPBELL
1978 A Multi-component Site on the Happyville Bend of the Little River (16LA37). The Whatly Site. New World Research, Report Investigations, No. 11.

THOMAS, RONALD A.
1962 Projectile Point Sequence at Breckenridge Shelter. The Arkansas Archeologist, Vol. III, No. 10, pp. 1-3. Fayetteville.

THORNBURN, JOSEPH B.
1916 A Standard History of Oklahoma. American Historical Society, Chicago, Illinois.

1926 Oklahoma Archaeological Explorations in 1925-1926. The Chronicles of Oklahoma, Vol. 4, No. 2, pp. 143-148. Oklahoma City.

THORNBURY, W. D.
1965 Regional Geomorphology of the United States. John Wiley and Sons, Inc., New York.

THORP, J. and H. SMITH
1952 Pleistocene Eolian Deposits of the United States, Alaska and Parts of Canada. Geological Society of America.

TIPTON, RICHARD B.
1967 A Burial from the Chubbuck-Oman Site. Southwestern Lore. Vol. 33, No. 1. Boulder.

TIXLER, VICTOR
1940 Travels on the Osage Prairies. John Francis McDermott (ed.) Norman, Oklahoma. University of Oklahoma Press.

TOTH, ALAN
1973 Statistical Analysis of Marksville Ceramics. Unpublished manuscript, Department of Anthropology, Harvard University.

1974a Archeology and Ceramics at the Marksville Site. Museum of Anthropology, University of Michigan, Anthropological Papers, No. 56. Ann Arbor.

TOTH, ALAN
1974b Marksville Period Ceramics. Masters thesis, Department of Geography and Anthropology, Louisiana State University. Baton Rouge.

1976 The Chronological Implications of Early Marksville Ceramics. Paper presented at the Symposium on New Developments in the Lower Mississippi Valley Ceramic Chronology, Southwestern Archaeological Conference. Tuscaloosa.

1977 Early Marksville Phases in the Lower Mississippi Valley: A Study of Culture Contact Dynamics. Ph.D. dissertation, Harvard University, Cambridge.

UBELAKER, DOUGLAS H.
1976 The Sources and Methodology for Mooney's Estimates of North American Indian Population. In The Native Population of the Americas in 1492. William M. Denevas, (ed):243-288. University of Wisconsin Press. Madison, Wisconsin.

VESCELIUS, G.S.
1957 Mound Two at Marksville. American Antiquity, Vol. 22, No. 4, pp. 416-420.

VOGET, FRED W.
1974 Osage Indians, Volume One. Garland Publishing Company, Inc. New York.

WADE, W.D.
1966 The Hutcheson Burial Site. Southwestern Lore, Vol. 31, No. 4. Boulder, Colorado.

WAKEFIELD, ELMER G., SAMUEL C. DELLINGER and JOHN D. CAMP
1937 Study of the Osseous Remains of a Primitive Race Who Once Inhabited the Shelters of the Bluffs of the Ozark Mountains. American Journal of the Medical Sciences, Vol. 193, No.2, pp. 223-231.

WALKER, WINSLOW M.
1932 A Reconnaissance of Northern Louisiana Mounds. Explorations and Fieldwork of the Smithsonian Institution in 1931. Washington.

1935 A Caddo Burial Site at Natchitoches, Louisiana. Smithsonian Miscellaneous Collections, Vol. 94, No. 14.

1936 The Troyville Mounds, Catahoula Parish, Louisiana. Bureau of Americn Ethnology Bulletin 113, Washington, D.C.

WEAVER, J. E.
1954 North American Prairie. Johnsen Publishing Company, Lincoln, Nebraska.

WEAVER, J.E. and F.W. ALBERTSON
1956 Grasslands of the Great Plains. Johnsen Publishing Company, Lincoln, Nebraska.

WEAKLY, WARD FREDERICK
1961 Tree Rings and Archaeology in the Central Plains. Masters thesis, University of Nebraska. Lincoln.

WEBB, CLARENCE H.
1945 A Second Historic Caddo Site at Natchitoches, Louisiana. Bulletin of the Texas Archaeological and Paleontological Society, Vol. 16, pp. 52-83. Abilene.

1948a Caddoan Prehistory: The Bossier Focus. Bulletin of the Texas Archeological and Paleontological Society, Vol. 19, pp. 100-143, Abilene.

1948b Evidence of Pre-pottery Cultures in Louisiana. American Antiquity, Vol. 33, pp. 297-321.

WEBB, CLARENCE H.

1959 The Belcher Mound, A Stratified Caddoan Site in Caddo Parish, Louisiana. Memoirs of the Society for American Archeology, No. 16. Salt Lake City.

1961 Relationships Between the Caddoan and Central Louisiana Culture Sequences. Bulletin of the Texas Archeological Society, Vol. 31, pp. 11-35. Austin, Texas.

1963 The Smithport Landing Site: An Alto Focus Component in DeSoto Parish, Louisiana. Bulletin of the Texas Archeological Society, Vol. 34, pp. 144-187. Austin.

1968 The Extent and Content of the Poverty Point Culture. American Antiquity, Vol. 33, pp. 297-321.

WEBB, CLARENCE H. and MONROE DODD, JR.

1939 Further Excavations of the Gahagan Mound: Connections with a Florida Culture. Bulletin of the Texas Archeological and Paleontological Society. Vol. 11, pp. 92-128. Abilene.

WEBB, CLARENCE HICKS and R. R. McKINNEY

1975 Mounds Plantation (16CD12), Caddo Parish, Louisiana. Bulletin of the Louisiana Archeological Society, Louisiana Archeology No. 2. Lafayette.

WEBB, CLARENCE H., JOEL L. SHINER and E. WAYNE ROBERTS

1971 The John Pearce Site (16CD56): A San Patrice Site in Caddo Parish, Louisiana. Bulletin of the Texas Archeological Society, Vol. 42, pp. 1-49.

1977 The Poverty Point Culture. Geoscience and Man, Vol. XVII. School of Geoscience, Louisiana State University, Baton Rouge.

WEDEL, WALDO R.

1936 An Introduction to Pawnee Archeology. Bureau of American Ethnology, Bulletin 112. Washington.

1938 The Direct-Historical Approach in Pawnee Archaeology. Smithsonian Miscellaneous Collections, Vol. 97, No. 7. Washington.

1940 Culture Sequence in the Central Great Plains. Smithsonian Miscellaneous Collections, Vol. 100. Washington.

1942 Archaeological Remains in Central Kansas and Their Possible Bearing on the Location of Quivira. Smithsonian Miscellaneous Collections, Vol. 101, No. 7. Washington.

1943 Archaeological Investigations in Platte and Clay Counties, Missouri. United States National Museum Bulletin 183. Washington.

WEDEL, WALDO R.
1947 Culture Chronology in the Central Great Plains. American Antiquity, Vol. 12, No. 3. Menasha.

1954 Earthenware and Steatite Vessels from Northwestern Wyoming. American Antiquity, Vol. 19, NO. 4. Menasha.

1959 An Introduction to Kansas Archaeology. Bureau of American Ethnology, Bulletin 174. Washington, D.C.

1961a Prehistoric Man on the Great Plains. University of Oklahoma Press. Norman.

1961b Some Aspects of Human Ecology in the Central Plains. In Studies in Human Ecology. George A. Theodorson. Harper and Row. New York.

1964 The Great Plains. In Prehistoric Man In The New World. J. D. Jennings and E. Norbeck, eds. University of Chicago Press. Chicago.

1979 House Floors and Native Settlement Populations in the Central Plains. Plains Anthropologist, Vol. 24, No. 84. Lincoln.

WEDEL, WALDO R.; WILFRED HUSTED and JOHN MOSS
1968 Mummy Cave: Prehistoric Record from the Rocky Mountains of Wyoming. Science, Vol. 160. Washington, D.C.

WEINER, M.A.
1972 Earth Medicine-Earth Foods. McMillan Co.

WEINSTEIN, RICHARD A. and PHILIP G. RIVET
1978 Beau Mire: A Late Tchula Period Site of the Tchefuncte Culture, Ascension Parish, Louisiana. Department of Culture, Recreation, and Trourism. Anthropological Report No. 1. Baton Rouge, Louisiana.

WELLS, P. V.
1970 Postglacial Vegetational History of the Great Plains. Science, Vol. 167, No. 3925.

WESOLOWSKI, A.B.
1974 Investigation at Two Sites in Southwest Arkansas. Bulletin of the Arkansas Archeological Society, Vol. 15.

WETTLAUFER, BOUD
1955 The Mortlach Site in the Besant Valley of Central Saskatchewan. Saskatchewan Museum of Natural History, Anthropological Series No. 1.

WHEAT, JOE BEN
1972 The Olsen-Chubbuck Site: A Paleo Indian Bison Kill. Society for American Archaeology, Memoir 15. Salt Lake.

WHEAT, JOE BEN
1979 The Jurgens Site. Plains Anthropologist Memoir 15. Lincoln.

WHEELER, RICHARD P.
1954 Two New Projectile Point Types: Duncan and Hanna Points. Plains Anthropologist, No. 1. Lincoln.

n.d. Archaeological Remains in Three Reservoirs in South Dakota and Wyoming. Manuscript on file at the Smithsonian Institution. Washington.

WILBERT. L.J.
1953 The Jacksonian Stage in Southeastern Arkansas. Arkansas Geological Survey Bulletin 19.

WILL, GEORGE F. and THAD C. HECKER
1944 The Upper Missouri River Aboriginal Culture in North Dakota. North Dakota Historical Quarterly, Vol. 11. Bismarck.

WILLIAMS, N.F.
1959 Mineral Resources of Arkansas. Arkansas Geological and Conservation Commission, Bulletin No. 6.

WILLIAMS, STEPHEN
1954 An Archeological Study of the Mississippian Culture in Southeast Missouri. Unpublished doctoral dissertation, Department of Anthropology, Yale University.

1963 The Eastern United States. In William G. Haag, ed., Early Indian Farmers and Villages and Communities, National Survey of Historic Sites and Buildings, National Park Service, U. S. Department of the Interior, pp. 267-325.

1964 The Aboriginal Location of the Kadohadacho and Related Tribes. Explorations in Cultural Anthropology, edited by W. H. Goodenough. McGraw-Hill Book Co., New York.

WILLIAMS, STEPHEN and J. STOLTMAN
1965 An Outline of the Southeastern United States Prehistory With Particular Emphasis On the Paleo-Indian Period. In The Quaternary of the United States, ed. by H.E. Wright, Jr. and D.G. Frey, pp. 669-683.

WILLY, GORDON R. and PHILIP PHILLIPS
1958 Method and Theory in American Archeology. University of Chicago Press, Chicago.

WILMSEN, EDWIN N.
1965 An Outline of Early Man Studies in the United States. American Antiquity, Vol. 31. Salt Lake.

1974 Lindenmeier: A Pleistocene Hunting Society. Harper and Row, New York.

WISSLER, CLARK
1955 The Influence of the Horse in the Development of Plains Culture. In Readings in Anthropology. E. A. Hoebel, J. D. Jennings and E. R. Smith, eds. (1st edition). McGraw-Hill. New York.

WITKIND, MAX
1971 An Archaeological Interpretation of the Roberts Buffalo Jump, Larimer County, Colorado. Master's thesis, Colorado State University, Fort Collins.

WITTY, THOMAS A.
1967 1966 Excavations at the Kansas Monument Site, 14RP1. Plains Anthropology, Vol. 12, No. 36. Lincoln.

WOLFMAN, DANIEL
1979 Archeological Assessment of the Buffalo National River. Arkansas Archeological Survey Research Report 18. Fayetteville.

WOOD, J.J.
1967 Archaeological Investigations in Northeastern Colorado. Doctoral dissertation, University of Colorado, Boulder.

1971 Excavations at Two Woodland Sites in Arapahoe County, Colorado. Plains Anthropologist, Vol. 16, No. 54. Topeka.

WOOD, W. RAYMOND
1956a The Redbird Focus. Master's thesis, University of Nebraska. Lincoln.

1956b A Woodland Site Near Willistone, North Dakota. Plains Anthropologist, No. 6. Lincoln.

1959 Notes on Ponca Prehistory, 1785-1804. Ethnohistory, Vol. 6, No. 1. Bloomington.

1960 The Boundary Mound Group (32LSI1): An Eastern Woodland Mound Complex in North Dakota. Plains Anthropologist, Vol. 5, No. 10. Lincoln.

1963 Breckenridge Shelter-23CR2: an archeological chronicle in the Beaver Reservoir area. In Arkansas Archeology, edited by Charles R. McGimsey, pp. 67-96. Arkansas Archeological Society, Fayetteville.

1965a The Middle Missouri Tradition: The Late Stage. Plains Anthropologist, Vol. 10, NO. 30. Lincoln.

1965b The Redbird Focus and the Problem of Ponca Prehistory. Plains Anthropologist, Memoir 2. Lincoln.

WOOD, W. RAYMOND

1969a The Middle Missouri Region: Typology and Concepts. Plains Anthropologist, Vol. 14, No. 44. Topeka.

1969b Two House Sites in the Central Plains: An Experiment in Archaeology. Plains Anthropologist, Vol. 14, No. 44. Topeka.

1971 A Pottery Find Near Ludlow Cave. Plains Anthropologist, Vol. 16, No. 52. Topeka.

1978 Upper Republican Archaeology in Colorado. Abstracts, Thirty-Sixth Plains Conference. Denver.

WOOD, W. RAYMOND and ALAN S. DOWNER

1977 Notes on the Crow-Hidatsa Schism. Plains Anthropologist, Memoir 13. Lincoln.

WORMINGTON, H.M.

1957 Ancient Man in North America. Denver Museum of Natural History, Popular Series, No. 4. Denver.

WYCOFF, DON G.

1964 The Jug Hill Site, My18, Mayes County, Oklahoma. Bulletin of the Oklahoma Anthropolical Society, Vol. 12, pp. 1-53, Oklahoma City.

1968 The Beaver Site and Archaeology of the Broken Bow Reservoir Areas, McCurtain County, Oklahoma. Oklahoma River Basin Survey, Archaeological Site Report No. 9, pp. 1-202, Norman.

WYCOFF, DON G. and THOMAS P. BARR

1964 1963 Archeological Activity in the Markham Ferry Reservoir Area, Mayes County, Oklahoma. Oklahoma River Basin Survey Project, General Survey Report No. pp. 1-83. Norman.

1968 The Bell and Gregory Sites: Archaeologial Chronicles of Prehistory in the Pine Creek Reservoir Area, Southeast Oklahoma. Oklahoma River Basin Survey Project, Archaeological Site Report No. 11, pp. 1-249. Norman.

1971 The Caddoan Cultural Area, An Archaeological Perspective. Unpublished manuscript on file at the Oklahoma Archeological Survey, Norman.

1974 The Caddoan Cultural Area, An Archaeological Perspective. In Caddoan Indiana I, American Indian Ethnohistory, Plains Indians. A Garland Series. pp. 25-279.

YOUNG, K.

1975 Geology: The Paradox of Earth and Man. Houghton-Mifflin Co., Boston.

ZEIMENS, G.
1975 48AB301: A Late Prehistoric Period Site in the Shirley Basin of Wyoming. Masters thesis, University of Wyoming, Laramie.

ZEIMENS, G. and D. N. WALKER, eds.
1977 Archeology of Eastern Powder River Basin. Manuscript on file with the Department of Anthropology, University of Wyoming, Laramie.

HISTORY

ABSTRACT

This report has collected and synthesized the historical data regarding the historical resources located within a study area for the proposed and alternate routes. Literature surveys, archival research, file searches, interviews and other sources have provided information necessary to define and summarize important substantive historical themes within the project area.

CONTENTS

CHAPTER 1

INTRODUCTION

Western Interpretive Services of Sheridan, Wyoming, was contracted by Woodward-Clyde Consultants of San Francisco, California, to prepare a Cultural Resource Synthesis following the procedures outined in BLM Manual 8111. The study pertains to lands adjacent to the proposed and alternative routes of a proposed coal slurry pipeline system to be constructed by Energy Transport Systems Inc. This volume provides a synthesis of the history of the project area and is intended to provide a context for evaluating cultural resources that may be potentially impacted.

This study is the first step in placing the project in compliance with both federal and state regulations regarding cultural resources. The study should provide a base from which to develop subsequent studies that will provide for the cost-effective and timely acquisition of all necessary permits and clearances for construction of the project.

PROJECT DESCRIPTION

One may refer to the environmental impact statement for a formal description of the proposed and alternative routes. However, it is appropriate in this introduction to describe informally the location of the project routes (Figure 1-1).

Proposed Route

The proposed route begins in Gillette, Wyoming, and traverses portions of six states: Wyoming, Nebraska, Kansas, Oklahoma, Arkansas, and Louisiana. A breakdown of counties and parishes passed through by the proposed route and ancillary facilities is presented in Table 1-1.

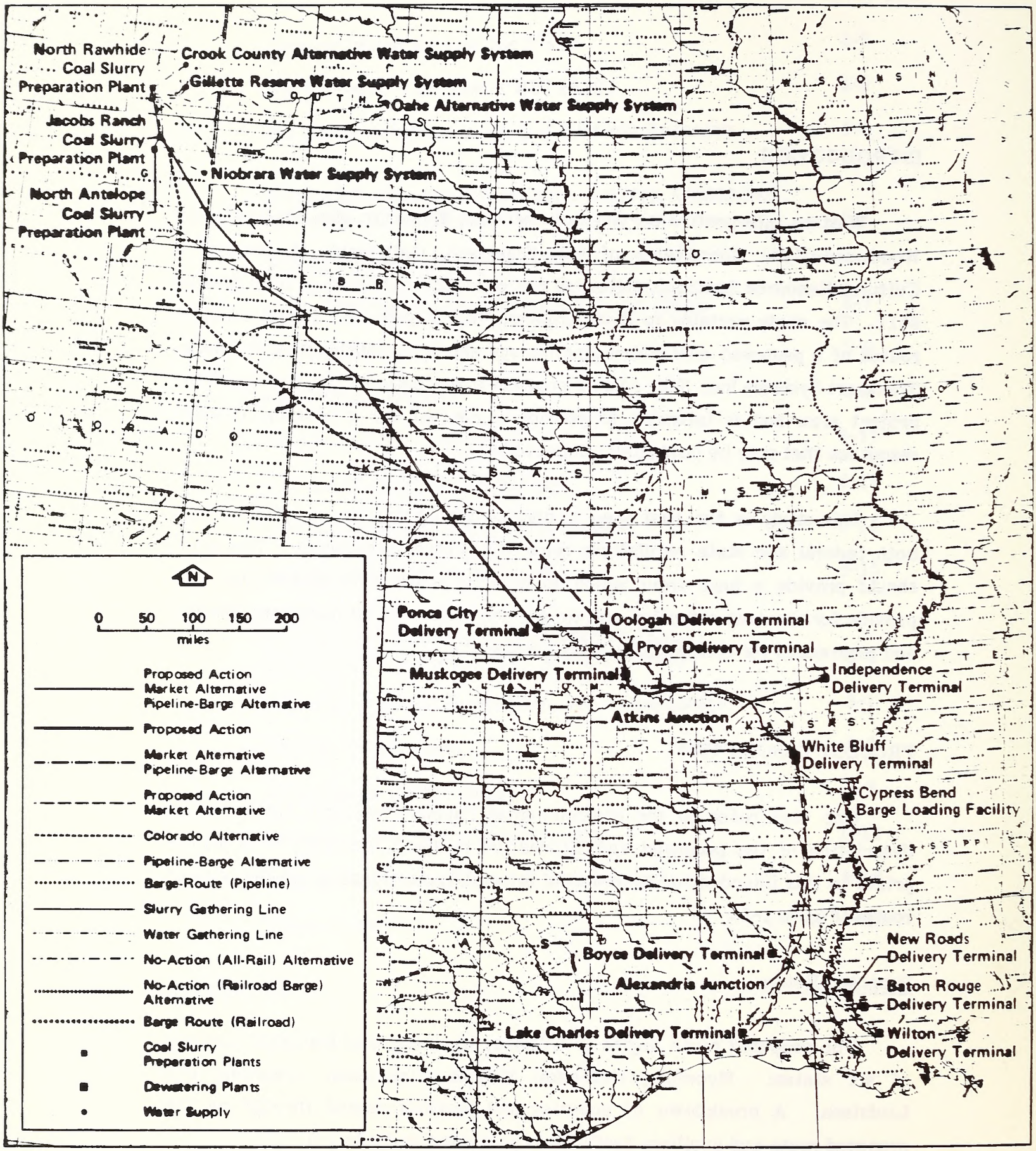


FIGURE 1-1. LOCATION AND GENERAL ARRANGEMENT OF PROPOSED COAL SLURRY TRANSPORTATION PROJECT AND ALTERNATIVES

Alternate Actions

Several alternative routes and ancillary facilities have been proposed for this project. The areas to be affected by these alternative actions are described below.

Market Alternate. The market alternative differs in the exclusion of the Ponca City and Muskogee delivery terminals. The route therefore differs within the states of Kansas and Oklahoma. Counties lying within the market alternative route within Kansas and Oklahoma include:

Kansas	Oklahoma
Decatur	Osage
Norton	Washington
Phillips	Rogers
Rooks	Mayes
Osborne	Cherokee
Russell	Adair
Ellsworth	Sequoyah
Rice	
McPherson	
Harvey	
Sedgwick	
Butler	
Cowley	
Chautauqua	

Barge Alternative. The barge alternative route is identical to the market alternative from Gillette, Wyoming, to Jefferson County, Arkansas. There it turns eastward and passes through Lincoln and Desha counties to the Mississippi River.

Colorado Alternative. The Colorado alternate runs from Wyoming to Kansas through northeastern Colorado, bypassing the state of Nebraska. The Colorado alternative route could terminate either by joining the proposed route in Ellis County, Kansas, or the market/barge alternatives in Rice County, Kansas. Counties traversed by the Colorado alternative include:

Wyoming
Cambell
Converse
Niobrara
Weston
Goshen
Laramie

Colorado
Weld
Logan
Washington
Yuma

Kansas
Rice
McPherson
Harvey
Sedgwick
Butler
Cowley
Chautauqua
Cheyenne
Sherman
Thomas
Sheraton
Gove

Oahe Alternative Water Supply System. This water supply alternative is the only of both the proposed action and alternative actions water supplies which traverses counties not already listed under the proposed action. The Oahe alternative begins in Pierre, South Dakota, and terminates in Gillette, Wyoming. Counties traversed include:

Wyoming
Crook
Campbell

South Dakota
Lawrence
Meade
Pennington
Haakon
Stanley

STUDY METHODOLOGY

This study provides a general summary of the history of the regions that may be traversed by the proposed and alternate routes. All reasonably available bibliographies, documents, published literature, manuscript and archival sources and reports pertaining to the history of the study area were searched. All state historic preservation offices and many historical societies were contacted for additional materials as well as site-specific information. The information gained was synthesized and presented using the thematic approach suggested by BLM Manual 8111 for Class I Inventory.

UTILITY OF THE CULTURAL RESOURCES SYNTHESIS

This Cultural Resource Synthesis is designed to provide the information necessary to make effective decisions in the cultural resource management process. In addition, it is intended to provide both the private sector and concerned citizens with a sufficient understanding of the cultural history of the project area to make the decisions of the cultural resource managing agencies comprehensible.

The primary objective of the synthesis is to provide a framework for cost effective and time efficient project management throughout subsequent cultural resource compliance procedures. The synthesis provides a consistent body of data that spans the entire length of the proposed and alternate routes. This facilitates development of a comprehensive and programmatic cultural resources management plan. It should also obviate the need for preparation of various regionally specific overviews. These are often conflicting and/or overlapping and difficult if not impossible to use for comparative purposes.

The synthesis provides useful data that can be applied to:

1) definition and determination of the significance of cultural resource sites along the proposed and alternative routes

2) interpret the meaning of those cultural resources identified within the area impacted by the proposed and alternative routes

3) identification and determination of the kinds and extent of impact of the proposed construction on significant cultural resources

4) provide background data on historic periods that will be useful in fulfilling subsequent compliance procedures

D# 4-44/1-1

CHAPTER 2
EXPLORATION AND EARLY SETTLEMENT TO THE 1840s

Spanish Exploration during the Sixteenth Century

In 1519 Alonso de Pineda set out from a Spanish base in Jamaica and explored the entire Gulf coast. Pineda was the first European to discover the mouth of the Mississippi River, but it was 20 years later before another Spanish expedition—Hernando DeSoto's—returned to venture upriver. After landing on the Florida coast, DeSoto and his party traveled by boat up the Mississippi River as far north as Memphis, Tennessee. De Soto's force traveled by land through the Ozark Mountains in Arkansas, and spent the winter of 1541-42 near the confluence of the Arkansas and Canadian rivers. In the spring, on their return to the Mississippi, De Soto died but survivors of the expedition eventually reached the Spanish-occupied portion of the Mexican coast.

Francisco Vasquez de Coronado, who led the first large-scale Spanish explorations of the Southwest, left New Mexico in 1539 for the central Great Plains in search of an Indian civilization rumored to be rich in gold and silver resources. Coronado's expedition traveled through portions of Texas and Oklahoma occupied by the Apache and Comanche to the westernmost settlement of the Taovaya (Wichita) near present-day Lindsborg, Kansas. Confronted with the grass huts and simple farming culture of these Native Americans, Coronado returned to Mexico with the legend of the seven cities of gold unrealized. Sixty years later the Spaniards returned to Kansas under the leadership of Juan de Onate and again visited the Taovaya villages along the Arkansas River.

French Exploration and Early Settlement

French traders from the St. Lawrence Valley and Great Lakes region were the first to travel the length of the Mississippi River from near its source to the Gulf coast. La Salle led the first such voyage in 1682, laying the basis for the French claim to the entire river basin. La Salle returned in 1684 with 400

colonists and founded Fort St. Louis at Matagorda Bay on the Texas coast. After three years of hostilities with the Karankawa, the French abandoned the colony. La Salle was murdered by one of his own party on the Broncos River during their return to Canada.

Two sons of a prominent early settler of Montreal, Charles le Moyne, were responsible for founding two important Gulf coast settlements for the French. Pierre, Sieur de Iberville, sailed from Brest in command of an expedition in 1698 and with his brother, Jean Baptista, Sieur de Bienville, explored the lower reaches of the Mississippi River and constructed a fort near the entrance to Biloxi Bay. Iberville and Bienville returned on another voyage in 1701 and established a settlement on Mobile Bay. Bienville directed the building of Fort Louis on the Mobile River in 1702 and after the original town site was flooded in 1710, reestablished the town at the mouth of the river.[1]

In 1699 an expedition under Pierre le Moyne arrived at the mouth of the Mississippi to secure France's claim to the area and began construction of Fort de la Boulaye to protect against English and Spanish invasion. Hostile Native Americans forced the abandonment of the wooden blockhouse near present-day Phoenix in 1707. The first permanent settlement in Louisiana was established on the Red River at Natchitoches, where Louis Juchereau de St. Denis built a fort to take advantage of the Spanish trade in Texas.[2]

New Orleans was also the product of Bienville, who had always favored a city on the Mississippi. His interests were renewed by the promotional activities of John Law, a Scottish financier, who had received a charter from the French government for his Western Company, a speculative real estate promotion. "Law's enterprise received wide publicity in France as he advanced extravagant claims for Louisiana's fertility, ease of settlement, and potential wealth. As early as 1718 Bienville sent a few emigrants from Canada to clear the site and to erect temporary buildings, but it was not until 1722 that actual planning and town building began."[3]

"As the capital city, New Orleans became the favored spot for French settlers and it enjoyed a mild prosperity. Above and below the city on both sides

of the Mississippi plantations were developed, laid out on the typical French pattern with relatively narrow river frontages and stretching back from the river for great distances."[4] Settlers pressed up the Mississippi and into the delta and began the production of sugar cane, rice, indigo, and ultimately cotton, in a plantation culture remarkably similar to that of the English colonies the east. Initially they used Native American slaves but later imported black slaves from Africa and from the West Indies.[5]

An exception to the rule that settlers in a new land do their best to reproduce the houses of their country of birth is seen in the houses built by the French in the Mississippi Valley. The Louisiana plantation house of the eighteenth and early nineteenth centuries and (on a smaller scale) the New Orleans "raised cottage" are not found in France. It may be that the West Indies contributed the full-length porch or gallerie (what the English called the piazza). The main rooms were insulated from the damp earth by a full-height ground story and from the sun by an ample hipped roof, which extended over the gallerie to provide cool and dry outdoor space, and were ventilated by tall French windows.[6]

After 1764, displaced Acadians from Nova Scotia came to Louisiana.[7] Many of them carved out small subsistence farms on the edges of the settlement. The Acadians probably had more to do with the evolution of a regional architecture than did other settlers. When they could accumulate the resources with which to do so, they built substantial plantation homes. Starting with the basic Norman French farm cottage, they added galleries front and rear to provide a cool, shaded work and recreational area useful in both sunny and rainy weather. They began to support their cottages on brick piers, to reduce the danger of flooding and to minimize insect and moisture damage to the wood structure above.

French Trading Ventures

The French had established permanent settlements along the Gulf coast by the beginning of the eighteenth century. From Mobile and Biloxi, French traders began to explore the region and establish trade with the Native Americans. In 1712 the French government granted the business of the Louisiana colony to

Antoine Crozat. Crozat appointed Antoine de la Mothe Cadillac governor, with a directive to expand trade with both Native Americans in the region and the Spanish outposts in New Mexico and Texas.

While Henri de Tonti and a detachment of La Salle's men built a temporary Arkansas Post in 1686, it was not until the 1700s, after several relocations, that this post became a main rival of Natchitoches as a center for trade with Native Americans to the west.[8]

Following an exchange of letters with Spanish missionaries, Cadillac sent Louis Juchereau de St. Denis with a small party in search of the Spanish missions, with the primary purpose of establishing a profitable trade with them and their parishioners. St. Denis traveled up the Mississippi to the Tunica villages, where he purchased supplies and enlisted additional men.

Early in 1714, the St. Denis party set out for the West, traveling up the Red River. At Natchitoches, St. Denis set up a small trading warehouse guarded by a few men. Over the next year, his party shuttled back to the Natchez country for more supplies and then journeyed westward to visit Spanish settlements in present-day Mexico.

Unsuccessful in obtaining Spanish permission to open a licensed trade between French and Spanish settlements, St. Denis broke with France and obtained a Spanish commission. He enlisted as a guide for a Spanish expedition that was intended to protect existing missions and support new missions in the region west of the Louisiana boundary. There is considerable evidence of collusion between French and Spanish officials in the development of mutually profitable smuggling activities.

Bernard de la Harpe set out from Natchitoches in 1719 and opened up trade with tribes as far west as the Taovaya (Wichita) on the lower Canadian River. That same year, Claude du Tisne journeyed from Illinois through Osage country, visited the same Wichita villages, and continued on to visit the Comanche.[10]

In 1724, Etienne Veniard de Bourgmont traveled up the Missouri River as far as the Kansas villages. There he negotiated a peace settlement between some of the Plains tribes and the Comanche, the effect of which was to open a trade route to the Comanche. Armed with French guns, these tribesmen began to prey upon the Apache, whom they sold as slaves to tribes further east.[11]

Pierre and Paul Mallet traveled from Illinois to Santa Fe in 1739 and returned east following a route down the Arkansas River into Louisiana. In 1747, the French finally arranged a peace treaty between the Comanche and the Wichita; henceforth, trade flowed more smoothly through the region. The Wichita profited greatly as participants in the intertribal trade that was linked to the work of French traders. By 1752, the Comanche had made peace with the Pawnee, and the French controlled the trade north of the Red River and west of the Missouri.[12]

Spanish officials in Texas were becoming increasingly concerned because of the attacks of well-armed Wichita, Comanche, and their allies on the missions and presidios of Texas. The Spanish moved slowly, but finally in the late summer of 1759, Parilla set out with a strong expedition to attack the northern tribes. After several small skirmishes, Parilla attempted to lay seige to the Wichita villages on the Red River. The Native Americans were well armed with French guns, and the fortified villages flew the French flag. The defenders harrassed Parilla's troops badly, drove off many of his Native American allies, and captured his cannon.[13] By 1763, the French trading system had given its traders effective control of the commerce with Native Americans over a vast area that reached west from Arkansas Post, Natchitoches, and the French settlements on the Mississippi in Illinois to the foot of the Rocky Mountains.

By offering the Native Americans guns, and a broader range of European manufactured goods, and through the judicious use of liquor, the French easily outtraded the more restrictive and less commercially oriented Spaniards. French traders mixed freely with Native Americans, encouraged them to maintain their way of life, and a number married Native American women. The Spanish, in contrast, tried to change the Native American's way of life, encouraging them to settle permanently near the Spanish missions and presidios and imposing

numerous trade restrictions and burdensome sales taxes. The Spanish also worried constantly because they could not prevent the spread of French influence among the tribes.[14]

The Advance of Settlement

At the conclusion of the Seven Years War in 1763, France ceded its Louisiana lands west of the Mississippi to Spain rather than lose them to England. Under Spanish control, the Louisiana settlements of predominantly French citizens were enlarged by immigrants from the Illinois French settlements, many of whom moved across the Mississippi and settled around St. Louis and St. Charles, where they farmed and traded with the Native Americans. Increasingly, St. Louis became a major center for trade across the prairies of Kansas and Oklahoma.

Louisiana. For the Louisiana settlements, the period of Spanish control brought more rapid growth. Norman-French Acadian farmers displaced by the British from Nova Scotia were drifting into Louisiana by the mid-1760s. Soon there were more than 4000 Acadians in Louisiana, making them a distinctive element in the population of the colony. The Acadians tended to settle beyond the large plantations, developing small farming operations further up rivers and on isolated tracts of high ground above the swamps that fringed the back of the plantation belt along the streams and larger bayous. With Spanish encouragement, settlers from the Canary Islands came to Louisiana and located in the salt-marsh fringe along the Gulf.

As a part of the Seven Years War peace settlement in 1763, Baton Rouge and the parishes to the east went to the British as part of West Florida. During the years when Spain controlled western Louisiana, many English and Scottish veterans of the Seven Years War received land grants in this area, especially in the Feliciana parishes.

With the outbreak of the French Revolution in 1793, and subsequent civil war between factions in the new republic, more French settlers (both Royalist and Republican factions) came to Louisiana.

The last ten years of Spanish rule in Louisiana saw the beginnings of extensive agricultural change. Development in 1793 of a process for quantity production of granulated sugar from cane and the introduction of the cotton gin (which made short-staple, upland cotton marketable) encouraged the upstream expansion of the plantation belt along the rivers. Cotton farming was extended to some of the higher and drier lands farther north in the territory and to lands not directly on the banks of the major rivers.

Arkansas and Oklahoma. There were few settlements away from the plantation country; one of these was Hopefield, in present-day Arkansas, founded late in the Spanish period (1762-1802) by Benjamin Foy. The best-known settlement in the country above the plantation belt was Arkansas Post. Often rebuilt, several times relocated, a post by this name had served the Native American trade intermittently since the time of Tonti's expedition well over a hundred years before.

In 1804, a small force of United States troops was stationed at the old trading post; they joined the few settlers and traders who were there at the time. In 1819, when the Arkansas Territory was organized, the post was named its official capital.

But the course of settlement was already bypassing the post. For some years a small number of French had traded and subsistence-farmed at points along the Arkansas River. In the years just after the War of 1812, they were joined by more settlers and by the ever-present frontier land speculators .

In 1818, the Quawpaw ceded the land between the Arkansas and Red rivers to the United States and withdrew to a point near the Caddo on Red River. In 1819, the Osage ceded the northwestern part of Arkansas to the United States.

Cherokee who inhabited parts of northern Georgia, eastern Tennessee, and western North Carolina were being crowded out by white settlers in the early 1800s. Many of the Cherokee had become highly acculturated, had developed commercial agriculture, and had acquired substantial numbers of black slaves. Whites of the time called such tribes "civilized," as they had the ways of the

white man. Increasing pressure from white settlers had convinced some of the Cherokee that the only solution was amalgamation with white society. Others who opposed the acculturation decided to move west where they believed they would not be disturbed.

Soon after the War of 1812, about 300 Cherokee led by Talonteskee moved to what is now Arkansas. More Cherokee followed, settling along the Arkansas River.

After the purchase of northwestern Arkansas from the Osage in 1817, a treaty was signed with the Cherokee living in Tennessee. Under its terms, they exchanged their holdings in Tennessee for equivalent lands in present-day Arkansas. Several thousand more Cherokee emigrated to western Arkansas under the terms of that treaty.[15]

While many of the Cherokee settled and prospered in Arkansas, most of the tribe remained in their homelands, where they were subjected to increasing harassment from their white neighbors. In 1828, the U.S. government negotiated a new treaty with the western bands of Cherokee, who had come into conflict with white settlers and with the Osage, who still ranged into western Arkansas. In this document, the Cherokee were to receive some 7,000,000 acres in what is now eastern Oklahoma in addition to an outlet strip connecting that territory to the then-western limits of United States territory. Eastern Cherokee who wished to move to these new lands with their western tribesmen were to be able to do so.

By 1834, some 5800 Cherokee had reached the new lands assigned to them. In the meantime the situation of the remaining Georgia Cherokee worsened. Gold was discovered there in 1829 and white prospectors crowded into the area. The state of Georgia declared the Cherokee tribal government without authority, and extensive litigation ensued. Under mounting pressure from both the state of Georgia and the Andrew Jackson administration in Washington, some of the Cherokee signed a new treaty in late 1835, ceding all of their lands east of the Mississippi. They were to move west by the spring of 1838.

The Army was sent in to gather all the remaining Cherokee and escort them west. Haste, and lack of preparation caused the first parties who moved to suffer greatly; hundreds died on a journey that was later called the Trail of Tears.

During those same years, others of the Five Civilized Tribes (Chickasaw, Creek, Choctaw, Seminole, and Cherokee) were forcibly removed to portions of what is now Oklahoma south of the Arkansas River.

While there was considerable political unrest among Cherokee factions in their new homeland, and continued friction with the Osage to the north, the Cherokee began the process of pioneering an agricultural society in the Oklahoma woodlands and prairies. As had their white neighbors to the east, the Cherokee came from wooded, hilly regions with a climate similar to that of their new homeland. Both groups were already adept at log construction, at raising livestock, and at growing corn, cotton, and vegetables. Although both groups were possessed of essentially the same material culture, the capital resources, education, and economic and political skills of individuals within each of the groups were diverse.

Once the initial shock of removal had passed the Cherokee progressed at least as quickly as their white Arkansas neighbors. In both areas the wealthier, more experienced planters founded new plantations along the bottomlands. The middle class developed small farms in the valleys. The least advanced in education or in agricultural skills settled the upland areas where they depended for a bare subsistence on stock raising, gardening, foraging, and hunting.

Settlement of the areas near the major rivers in Louisiana—especially the Mississippi, the Arkansas, and the Red—was made more commercially attractive by the development of steamboat transportation. The first steamboat began operation on the Mississippi in 1812; numerous boats of various sizes plied the waters of the main rivers and a few tributaries. Such transportation made the hardwood lumber of the hills and the cotton of the river bottom plantations marketable commodities. And the steamboat made it possible for the planters to acquire the material goods to reproduce, if on a slightly less grandiose scale, the plantation homes and outbuildings of the areas from which they had come.

Accounts by travelers from 1803 to the 1850s trace the development and expansion of cotton farming. Many of the immigrants to northern Louisiana and Arkansas came from other cotton-raising areas. Small planters would move west with a few slaves. They would clear land and plant cotton and raise enough bare subsistence crops for themselves and their slaves. They often invested their profits in more land and continued the process until their holdings had grown substantially.

Steadily the society of the region stratified into two basic rural classes: the lowland planters, whose economy tied them to commerce, to slavery as an economic institution, and therefore to the political leanings of the cotton-belt South, and the small farmers who subsistence-farmed, raised stock, and made whiskey in the upland areas. These farmers were fiercely independent and had no ties to the economic or social institutions of the planters. The displaced Native Americans were represented in both classes, but their politics were further complicated by tribal feuds dating to the days before removal.

Rural Architecture. Rural architecture of the settlement period in these three jurisdictions derived from several designs that were closely allied to the basic economic divisions of society outlined above. Each evolved in the movement west.

American woodsmen who drifted across the Mississippi in the years just before the Louisiana Purchase, along with the thousands who came afterward, brought with them a high level of practical rough-construction skills, notably skill with the axe. Log construction was standard and these settlers had developed extensive construction skills. Those from the hill country of Kentucky and Tennessee favored simple gable-roofed, rectangular houses.

Pioneer farmers who advanced across Georgia, Alabama, and Mississippi in the early nineteenth century brought with them another basic building form: the use of two rectangular log rooms under a single roof, with a passage between them. In hot areas, the passage might be left open as a well-ventilated work area. In cooler regions it might be closed off to make a central hallway. Depending on the setting, such a two-pens-and-a-passage cabin might be raised on piers.

As the cotton, rice, and indigo plantations prospered, and as Americans from older plantation country appeared in greater numbers in Louisiana and Arkansas, the large-scale plantation complex became important on the lowlands from the Gulf coast well up the streams into Arkansas. The displaced Cherokee, Creek, and Choctaw, whenever they became sufficiently affluent, developed plantations much on the model of their former white neighbors in the Southeast.

Beyond early log construction and the adapted Acadian styles, plantation architecture across this region, like that of the rest of the cottonbelt, went through several basic stages. From 1820 into the 1840s Greek Revival architecture dominated plantation building design. After 1850, increasingly ornate Victorian ornamentation was incorporated into a number of plantation houses.

Slave quarters developed rapidly from the log cabin to board-and-batten houses not essentially different from those of the back-country Acadian hunters and small farmers. A distinctive Louisiana adaptation of plantation house construction was the use of brick, plastered-over, for the ubiquitous columns that fronted the galleries of the Greek Revival and later houses.

As one moves upstream along the Mississippi and its tributaries, with a few notable exceptions, the economics of inland plantations forced a scaling-down of structural appurtenances. Houses tended to be smaller and less ornate, while incorporating the basic elements of plantation house design.

Similar construction techniques were used to build rural churches and roadside trading posts as well as the schools, missions, and tribal government buildings of the Indian Nation.

American Trading Ventures in the early 1800s

When Louisiana became a United States territory in 1803, it had a functioning pattern of Native American trade centered around the market for beaver and other furs.[16] Beyond this, there was an extensive pattern of intertribal trade, enabling European and American goods to flow in small quantities to the furthest corners of the new territory and beyond.

The Louisiana Territory had many experienced traders; most were French, a few were Spanish, and substantial numbers were American and Scottish. The new territorial status brought about several major changes. It turned New Orleans into a reliable port of export for the eastern half of the Mississippi basin; it also broke down the weak Spanish barrier with its multitude of trade restrictions, making it more attractive for firms in the eastern United States to develop trading connections in the region. It excluded Canadian trading companies from the region, theoretically reducing competition from the Canadians for American firms that wished to tap the bounty of the upper Missouri and upper Mississippi country.

Fur Trade. Manuel Lisa's Missouri Fur Company launched a major effort to capture the upper Missouri trade. In 1807, Lisa built Fort Raymond at the mouth of the Big Horn, and soon afterward built another post at the three forks of the Missouri. Blackfoot raiders made trade in the Crow country hazardous. Long supply lines, coupled with low productivity in the higher priced furs on the part of Native Americans in the northern Great Plains, added to the general dislocation of trade that attended the outbreak of the War of 1812, and Lisa withdrew for a time from the upper Missouri country.

In this same period, John Jacob Astor's American Fur Company established fur trading operations in the Rocky Mountains and the Pacific Northwest. Astor sent a force by sea to build a major trading post (Astoria) at the mouth of the Columbia and in 1811 an overland expedition, led by William Price Hunt, from the Missouri River to scout a good land route to the Northwest. Hunt's party left the Missouri, traveled north of the Black Hills, and then headed southwest along a route that took them not far northwest of present-day Gillette, Wyoming.

The following year, Robert Stuart led a small party eastward from Astoria, scouting for additional trade routes. They entered Wyoming in the fall of 1812, and found a broad, easy-gradient route over South Pass and down the Sweetwater to the Platte. They moved downriver to a point not far southeast of present-day Torrington, Wyoming, where they spent the winter of 1812-13. In the spring, they journeyed down the Platte and returned to St. Louis.[17]

Many of the participants in the Hunt and Stuart expeditions remained active in the fur trade and helped establish permanent trapping operations in the region. The North Platte/Sweetwater/South Pass route across the continental divide discovered by Stuart in 1812 was used extensively by fur traders, and after 1840 became the primary route of westward migration.

At the western fringe of the settlers' frontier, trade with Native Americans and with white hunters and trappers was an important business; however, to a large extent the retail fur trade had already moved farther west. The government recognized this with the creation of the trading-factory system in 1795. The trading-factory system set up outposts where furs could be brought for shipment east. Prior to shipping, the operator would undertake a primary level of preparation of the furs, such as cleaning or preserving. Fort Osage (near present-day Independence, Missouri) functioned in this role from 1808 to 1819, as did the Arkansas Post from 1805 to 1810. The volume of business at these government outlets was not significant, however, since most trading was conducted directly from small posts on the fringes of settlement and by pack trains ranging deep into Native American lands.

Traders ranging across the Great Plains were attracted not only by the Native American trade, but by the prospect of profitable trade with Spain's isolated northern outposts in New Mexico. In 1807, Manuel Lisa and Jacques Clamorgan sent a trading expedition to Santa Fe.[18] Auguste Choteau and Jules de Mun journeyed up the Arkansas River in 1815 and made their way over Sangre de Cristo Pass into New Mexico, where Spanish officials confiscated their pack train. A second trip in 1817 brought the traders only more trouble.

In 1822, Andrew Henry took a trading party to the Upper Missouri, where they encountered the same hostility from the Blackfoot that had plagued Lisa a decade before. Then in the spring of 1823, Henry enlisted in a business venture organized by William Henry Ashley, a prominent St. Louis merchant. They recruited a sizable force of Missouri trappers, who they believed could harvest furs such as beaver more efficiently and reliably than could the Native Americans in the northern Rocky Mountains. Their initial expedition pushed up the Missouri, but when it was unable to pass the Arikara villages, Ashley decided to send the trappers overland to the fur country.

Some of their party traveled up Grand River in South Dakota and north of the Black Hills to the Yellowstone River. Jedidiah Smith took seventeen men up the Cheyenne River to the edge of the Black Hills and then followed the south fork of the Cheyenne into Wyoming. The Smith party descended the Powder to the Yellowstone and explored the Big Horns before settling down to winter on the upper Wind River. Another party under John Weber came up the Powder from the Yellowstone and then headed for the winter camps on the Wind River.[19] They sent their furs down the Platte valley in the summer of 1824.

Ashley returned to Missouri from the Arikara blockade and organized a supply expedition that traveled up the Platte and South Platte to the Cache la Poudre in early 1825. From here, he found a way into the Laramie Plain and headed out across the deserts to meet his men on the Green River in the first big fur trade rendezvous.

This set the pattern for trade in the northern Great Plains and northern Rocky Mountains for the next decade. Each year, trading partnerships would send out caravans to meet the assembled trappers in summer somewhere on the Wind or Green rivers. Native Americans also drifted in to trade, for the rendezvous system approximated their own summer trading fairs that had been going on for perhaps a century or more.

At the rendezvous trappers received advances of supplies and equipment to last them into the next year and sold their furs to settle the previous year's account. Often the trading partnerships reorganized or changed hands at these meetings. Then the caravans made their way east laden with beaver pelts, buffalo robes, and other furs.

In the northern Great Plains, the primary impacts of the fur trade rendezvous traffic were the cultural changes it brought to Native Americans by progressively commercializing their economy and the publicity it gave to good routes to and through the mountains. Most of the fur trade traffic of this period followed the Platte-Sweetwater-South Pass route pioneered by Stuart in 1812.

Santa Fe Trade. In 1819, Captain Stephen H. Long took a well-staffed mapping and scientific expedition up the Platte to the South Platte, up that stream to the Denver area, and south to the Arkansas. Long then sent a Captain Bell down the Arkansas to Fort Smith, while Long's main party explored the area around Pike's Peak, ranged southeast along the foot of the mountains, and journeyed down the north fork of the Canadian River and then the Canadian to Fort Smith.

In August 1821, Mexico overthrew her Spanish rulers. Betting on a relaxation of trade restrictions, in the fall William Becknell set out across the Great Plains with a pack train. In January 1822, New Mexico officials announced the opening of trade and Becknell brought out a second party. Other traders followed.[20]

Most Santa Fe traffic ranged southwest from Independence, Missouri, over the prairies of Kansas, to the Big Bend of the Arkansas. After following the Arkansas for some distance the trail divided. One branch, the Cimmaron Cutoff, which was a fairly direct route southwest to the Cimmaron and then to Santa Fe, became well known for its many waterless miles. The other route followed the Arkansas to the Purgatoire and then crossed Raton Pass to Taos.

One of the 1822 expeditions encountered a blizzard along the Arkansas, buried its trade goods there (near present-day Cimarron, Kansas), and went on to Taos for more pack mules. This location, marked by the pits they had used, became a landmark called the Caches. Each year saw an increase in this highly profitable trade between Missouri and New Mexico. Mexican silver, mules, and horses moved east, while American hardware and textiles constituted the bulk of the westbound trade.

By 1822, the Missouri settlements were recovering from the general dislocation of trade associated with the War of 1812 and the financial panic of 1817. The Santa Fe trade after 1822 provided the capital and the leadership to launch new trading ventures that would affect much of the study area.

During the 1830s several firms tried a new system of maintaining contact with the Native Americans and the "mountain men" trappers and traders. In

1833, William Bent built an adobe trading fort on the Arkansas River along the mountain branch of the Santa Fe Trail. In 1834, the firm of Sublette and Campbell built a log fort, Fort William, on the Laramie River not far above its mouth. That same year, Antonio Montero built a similar post on Powder River that became known as the Portugese Houses.

For eight years, these and other large, fixed trading posts dominated the fur trade of the region. At the best localities, competing firms built other posts. One main concentration of this kind was around Fort William at the Laramie and the North Platte, where Fort Bernard and Fort Platte competed with Fort John, the successor to Fort William. Another was on the South Platte in Colorado, where Fort Lupton, Fort Vasquez, and other posts strived to attract the trade.

This level of competition soon led to the wholesale use of liquor in trade with Native Americans. While the Missouri traders started the practice, they soon found stiff competition when John Richard and other traders started to bring up "Taos Lightning" from Simeon Turley's New Mexico distillery over a trail that approximates the route of present-day Interstate 25 from New Mexico to Wyoming.

For most fur trading parties, the Great Plains were simply a lengthy stretch of geography to be crossed; few historic incidents are associated with these crossings. Fur trade sites on the main trails would soon be overrun by emigrant traffic as a new phase of western development began.

And, colorful as it was, the Rocky Mountain fur trade formed only a small portion of the commerce passing through such centers as St. Louis and New Orleans. Those communities derived most of their business from the expanding economic activity involved in opening up and settling the farmlands of Missouri, Arkansas, and Louisiana.

On the Great Plains, the nature of trading operations began to change as the major westward emigration started. The small-scale traders developed close relations with particular tribes. In some cases they built small trading posts along major trails or at main stream crossings. More and more, they carried on a

wagon trade directly with Native American settlements during appropriate seasons, making the large and costly trading forts largely obsolete.

CHAPTER 3
POLITICAL, DIPLOMATIC, AND MILITARY AFFAIRS TO 1867

French Louisiana

After 1718, New Orleans grew to rival Quebec and Montreal as a major center of French settlement and trade. The capital of French Louisiana was transferred from Mobile to New Orleans in 1723, and by 1762, New Orleans had become one of the six largest cities in North America. French traders and explorers ranged throughout the territory and established friendly and lucrative trading operations with Native Americans, as discussed in Chapter 1.

Spanish Louisiana

At the end of the Seven Years War in 1763, France transferred its Louisiana lands west of the Mississippi to Spain, rather than lose them to England. The Louisiana lands east of the Mississippi became part of British West Florida.

From 1763 to 1769, the administration of the region was still basically French, but in response to an abortive revolt by some influential French leaders in New Orleans in 1768, Spain sent in Don Alexandro O'Reilly, a Spanish field marshall, with a strong contingent of Spanish regulars who took firm control of the government. However, O'Reilly did retain many loyal French officials and appointed others.

The shift in policy control that occurred when Field Marshall O'Reilly suppressed the New Orleans rebellion had a widespread effect on the frontier. First, Spain did not have the military force available to control Native Americans along its extended frontier. Second, Spain was now preoccupied with the menace of the English, who occupied the east bank of the Mississippi for

much of its length. She had only recently lost territory in Georgia and Florida to advancing English colonials, and feared what might happen along the Mississippi. The situation was further complicated when Louisiana became part of the administrative responsibility of the Spanish West Indies, governed from Havana, while Texas remained a province of New Spain, responsible to Mexico City.[21]

At first there was an attempt to enforce Spanish trade restrictions, licensing, and taxation uniformly on both sides of the former frontier. But it was soon evident that the commerce of Louisiana depended upon trade with the Native Americans, and that they liked the French mode of doing business better than the Spanish system.[22]

Only when the Spanish began to appoint former French citizens with some trading experience to military and civil positions on the frontier was the situation ameliorated to any degree. Even then, at key points such as Natchitoches, the traders were forbidden to buy livestock from some of their major customers (for the Spanish assumed such stock had been stolen from Texas and New Mexico). The Spanish still attempted to enforce the prohibition against trading guns and ammunition to Native Americans.[23]

These restrictions led to a greater portion of the trade going to traders operating from Arkansas Post and from St. Louis, where Spanish control was less effective because of small forces and distance from major headquarters. Furthermore, English traders now began to cross the Mississippi and carry on an extensive contraband trade with tribes to the west on the Great Plains. This made Spanish officials a bit more lax in administering the restrictions against some of the distant tribes, since they assumed if the Native Americans could not get guns from traders at least partially under their control, they would become dependent on the English.

The effect was to undermine the former middleman position of the Wichita and their relatives in the trade, and to strengthen the Osage and other tribes of the Missouri frontier through whom much trade continued to flow to the Comanche on the Great Plains. The Osage now pushed southwestward to control more of present-day Kansas and Oklahoma.

The American Revolution

The entry of both Spain and France into the war that developed out of the American Revolution had an impact in the region. Britain in 1763 had gained control of much of the east bank of the Mississippi, and had built fortifications at several points, such as Fort Butte and Baton Rouge. In 1779, Bernardo de Galvez led a force of Spanish regulars augmented by Louisiana militia and Native American allies up the Mississippi, and with considerable tactical skill, captured the British posts.

At the end of the Revolutionary War, the United States was in control of much of the east bank of the Mississippi, except in the lower reaches of the river. American frontiersmen rapidly poured over the Applalachian passes pioneered by traders and a few adventurous settlers before and during the Revolution. These new settlers were farmers who quickly surpassed mere subsistence farming in Kentucky, Tennessee, Ohio, and Indiana.

The farms and hardwood forests of the Ohio Valley produced many resources that Louisiana at this stage did not grow, as well as many commodities that were marketable overseas. Beginning in 1795, Spanish authorities let Americans ship their goods to New Orleans and on to foreign ports without paying Spanish duties, an action that dramatically expanded commercial activity in Louisiana. In five year, by 1800, ship loadings at New Orleans doubled.[24]

The opening of trade in 1795 reduced the demand by American frontiersmen either to separate from the United States and join Louisiana or to take Louisiana by force, but conflict between Spanish officials in 1802 led to uncertainties on the frontier. By the early nineteenth century, even eastern opponents to the acquisition of territory beyond the Mississippi were afraid of western secession.

The Louisiana Purchase

At this time, the French Revolution and the Napoleonic Wars changed the international context of the colonial world. Napoleon sought to make France an imperial power and retrieved Louisiana from Spain in exchange for a principality in southern Europe. But Napoleon's colonial ambitions were dampened when he

lost an entire army in an attempt to suppress a revolt in Haiti.

Faced with the possibility that Britain might take advantage of its relative strength at this distance, and knowing in the United States wanted Louisiana and could probably take it by force should she desire to, after extensive negotiations, Napoleon sold all of Louisiana to the United States in 1803, opening a new era in its development.

Directly after the United States purchased Louisiana in 1803, the government launched the first formal exploration and mapping of the region. In 1804, an expedition jointly led by Meriwether Lewis and William Clark pushed up the Missouri to the Mandan villages. The following spring, they completed their journey up the Missouri, crossed the continental divide to the drainage of the Columbia, and followed it to the sea. In 1806, they returned, with Lewis descending the Missouri and Clark traveling down the Yellowstone.[25]

While Lewis and Clark were making their epic journey, President Thomas Jefferson set in motion a similar exploration of the southern part of the new territory. William Dunbar and Dr. George Hunter left Natchez in October 1804 with a small military escort. In the next four months, they journeyed to the mouth of the Red River, traveled up that stream to the Ouachita and then up the Ouachita to its source near Hot Springs, and returned along the same route.

In 1806 Captain Jared Sparks escorted a surveyor, Thomas Freeman, and a botanist, Dr. Peter Custis, up the Red River for 635 miles. There, where the Red River served as the international boundary, they were turned back by a Spanish patrol.

At about the same time, Lt. Zebulon Pike traveled up the Missouri and the Osage rivers to the Osage villages. His expedition then turned northwest, to the Republican River, and then south to the Arkansas, which it followed to the mountains. Commissioned to search for the headwaters of the Red River, Pike became lost in the mountains of southern Colorado, descended to the upper Rio Grande, and built a small fortification. He and his party were arrested by a Spanish expedition early in 1807 and taken to Mexico for interrogation. Before

moving into the Rockies, however, Pike had detached a small party under Lieutenant James Wilkinson that descended the Arkansas River.

Each of these early expeditions brought back much data on the geography of the areas they traversed. Their reports showed that future explorations by parties representing a broader range of scientific disciplines were needed, however.

The War of 1812

The War of 1812 was the result of two basic disagreements between Britain and the United States. First, and probably most important in what was then the West, Britain had never given up its frontier posts on the American portions of the Great Lakes. Eastern support for the war was the result of British interference with American commerce on the high seas. The war might have gone badly for the United States but for the fact that Britain was fully engaged in the Napoleonic Wars and could divert only limited amounts of her considerable military and naval power to operations in the Americas.

Most combat actions of the war occurred along the Great Lakes, in eastern Canada, and around Chesapeake Bay. But one campaign, the Battle of New Orleans, drew considerable attention to Louisiana. Anticipating a British move to take New Orleans and bottle up the commerce of the western United States, American regular troops and volunteer militia from Kentucky, Tennessee, and other points upriver came to New Orleans in 1814. Some units fought indecisive skirmishes on the Gulf coast with British troops operating out of their naval base at Pensacola in British East Florida. Then, more than 8000 seasoned British regulars landed downstream from New Orleans and advanced toward the city.

General Andrew Jackson assembled a force of about 5000 men, comprised of a few regulars, many militiamen, and assorted volunteers ranging from Choctaw to Gulf coast pirates. Jackson's men selected a position on a canal bank that lay in the British line of march, where they improvised fortifications and placed their artillery. When the British attacked in tight infantry formation, Jackson's men poured a deadly fire upon them from their field positions. The American force suffered 62 casualties, while the British lost 700 men and

suffered 1900 other casualties in the engagement. Ironically, the Battle of New Orleans occurred on January 8, 1815, before news of the treaty ending the war had reached the area. Now U.S. occupation of the Mississippi basin was unchallenged.

By the 1850s the bottomlands of the Mississippi, the Gulf coastal plain, and the bottomlands along the Arkansas and Red rivers and a few of their major tributaries had developed a plantation-based agricultural economy that in most of its features resembled the plantation economy of other portions of the Gulf and South Atlantic coastal plains. The issues of free trade and slavery and the problems of credit and exchange aligned this region with the seceding states in 1861. Northern Arkansas and those portions of Louisiana far from the great plantations tended to be Union in sentiment, but were outnumbered by the plantation population.[26]

In the Indian Territory, particularly among the Cherokee, the national issues helped to further splinter a tribe with a long-standing division between those who had agreed willingly to removal from their eastern homelands and those who had been forcibly removed. Other tribes, such as the Choctaw and the Seminole, were sufficiently involved in slavery and the economics of southern agriculture to side with the South on that issue.[27]

American Civil War

While the major campaigns of the Civil War were fought in areas further east, significant combat activity occurred within Arkansas, Louisiana, and the Indian Territory (present-day Oklahoma). Union forces perceived early the need to cut off Confederate access to the Mississippi, a move that would not only have a major economic impact on a number of southern states, but that would divide the Confederacy into two segments. Union forces moved swiftly to attempt this, and at the same time, exploited the divided loyalties of much of the population of Missouri, Arkansas, and the Indian Territory by striking south through the area. They then attempted to gain control of the productive lower valley of the Red River. After the fall of Vicksburg, Union operations west of the river were largely "mopping up" operations, ending in the spring of 1866 with "reconstruction."

The Civil War in Louisiana. Louisiana was, through its economy and its politics, more strongly attached to the Confederacy than Arkansas or the Indian Territory. Of the states and territories crossed by the proposed action and alternatives, only Louisiana failed to field organized military units for the Union Army. And Louisiana's position on the Mississippi kept the Union from using the river for military operations and as a commercial outlet for its midwestern segments.

Once a substantial Union army had been created, Louisiana was one of the points chosen for a large-scale attack. On December 3, 1861, while Confederate forces anticipated an attack at Pensacola or Mobile, Union troops landed at Ship Island on the approaches to Lake Pontchartrain. There they assembled a land force of more than 15,000 men under the command of General Benjamin Butler.

Admiral David Farragut, with two dozen ships of the Union navy, then bombarded the Confederate posts of Fort Jackson and Fort St. Phillip, on the banks of the Mississippi above its mouth. Early on the morning of April 24, 1862, Farragut ran his fleet past the two lightly manned forts. Confederate forces withdrew before the Union fleet, and civilian city officials surrendered New Orleans on April 29. Union forces continued northward and occupied Baton Rouge on May 12, 1862.

Farragut then sent his gunboats up the Mississippi to bombard Vicksburg from mid-May to late July 1862. Confederate forces began to build up in the area, however, and Farragut withdrew downriver. In November 1862, a few Union gunboats penetrated the Bayou Teche and briefly engaged Confederate troops on its banks.[28] Confederate forces then built a stronghold at Port Hudson, Louisiana, to oppose further northward thrust by the Union troops, now under the command of General Nathaniel P. Banks.

Vicksburg and Port Hudson, 1863. By 1863 Union troops in much greater strength had begun to press down the Mississippi from the north. By late December, General William T. Sherman and more than 30,000 men were within a few miles of Vicksburg, where strong Confederate opposition at Chickasaw Bluffs stopped them. In the face of widespread and determined Confederate opposition,

General Ulysses S. Grant pressed south in Mississippi, and then turned his forces toward Confederate reinforcements at Jackson. By this time, Sherman had brought his troops down the west bank of the Mississippi, landed below the city, and moved rapidly eastward to drive the Confederate forces out of Jackson. Turning back, Sherman then lay siege to Vicksburg.

At the same time, Banks, supported by Farragut's boats,was working his way up the Mississippi. He fought a brief engagement on the Bayou Sara road near Port Hudson on May 26, and from May 27 until its surrender on July 9, Banks held Port Hudson under siege.

Grant and Sherman continued the siege of Vicksburg, which surrendered after much hardship on July 4, 1863.[29] The loss of these two strongholds, the operations of the Union Navy on the river, and the large number of Union troops along its margins now gave the Union complete control of the river, cutting the Confederacy in two.

Banks' Red River Campaign, 1863. Now Union forces set about planning the conquest of the rest of Louisiana. Strong Confederate units remained operational in western Louisiana, in southern Arkansas, and in eastern Texas. Officials in Washington, D.C., believed that a show of force against these forces would act as a deterrent to any collaboration between Maximilian's French army in Mexico and the western units of the Confederacy. Banks was to bring 17,000 men north along Bayou Teche. Frederick Steele was to come from Arkansas, from the northwest, with about 15,000 men, and Sherman sent A.J. Smith up the Red River with 10,000 men.

Although Banks and Steele were too late to participate in the campaign, Smith, with strong naval support, moved up the Red River early in March, took Fort DeRussy near Simmsport on March 14, and continued on, winning a few minor skirmishes and capturing a Confederate force at Henderson's Hill near Alexandria.

Banks arrived at Alexandria on March 24, and despite the withdrawal of Smith's important force east of the Mississippi, Banks pressed up the Red River,

winning a number of engagements well outside the study area. Confederate forces routed lead elements of Banks' column at the Battle of Sabine Crossroads on April 8, 1863. Banks then fought a defensive action at Pleasant Hill on April 9 and began his retreat down the Red River.

Constantly harassed by Confederate units and hampered by low water in the river, Banks' forces withdrew below Alexandria and then fought delaying actions at Wilson's Landing, Marksville, and Mansura. On May 18, they fought their last action against their Confederate pursuers.[30] The Confederates broke off the action and regrouped, to face a greater threat from Union troops operating in Arkansas.

War on the Western Border. While Banks was occupied in Louisiana, Confederate General Sterling Price made his famous raid deep into Missouri. This was for all practical purposes the "last gasp" of Confederate forces west of the Mississippi. Its most lasting effect was to stir up a new wave of guerilla activity in Missouri, Kansas, Arkansas, and the Indian Territory.[31]

From 1862 to 1864, smaller Union and Confederate forces, augmented by guerilla units that were little more than armed outlaw bands, seesawed back and forth over much of the Kansas-Oklahoma-Missouri-Arkansas border country.

Reconstruction

From 1865 to 1877, Union agents dominated the state governments of Arkansas and Louisiana. Pro-Union factions were reinstated to control in the Indian Territory. In both cases, Union troops were stationed at key points to keep the reconstruction-period state and Indian governments in power. The last federal occupation troops were withdrawn from the South in 1877, but the bitterness engendered by their stay lingered.

CHAPTER 4

OVERLAND MIGRATION AND SETTLEMENT TO 1869

The proposed and alternate pipeline routes cross many of the transcontinental trails over which emigrants traveled to the West in the mid-nineteenth century. The pipeline routes also cross a number of lesser known trails that led to the Colorado gold fields, the Black Hills, and other points.

Most of these trails followed routes first used by the fur traders. The main period of use for these trails was from 1841, when the first small parties went to Oregon and California, to 1869, when the Union Pacific Railroad joined the Central Pacific in Utah, the final link in transcontinental rail transportation.

Stagecoach lines used these trails to provide long-distance communication in the 1850s and 1860s, and along several of them major telegraph lines were constructed in the 1860s.

While many of the trails have been covered by modern highways or destroyed by farming, significant portions of relic-condition trail exist in Kansas, Nebraska, Colorado, Wyoming, and the Dakotas.

During the fur trade era, the frontier steadily advanced across the Ohio Valley and the South and pushed across the Mississippi into Missouri, Arkansas, and northern and western Louisiana. The white settlements in the woodlands of east Texas and the displaced Native American settlements in Oklahoma formed the western frontier.

By 1840, much of the best land in the area east of the frontier had already been claimed. For three generations the settlers near the leading edge of the frontier had developed a highly specialized woodland culture. Facing the prairies

of Iowa, northern Illinois, Kansas, and Oklahoma, they hesitated, for their technology was not designed for exploitation of grasslands. But beyond these prairies, in the Pacific Northwest, lay another woodland frontier. The missionaries who had accompanied the fur trade caravans to the Rocky Mountains after 1836 had continued overland to the Oregon Country, at that time open to both British and American citizens under an 1818 treaty.[32] Their communications, along with those from travelers to California, offered a picture of a region attractive to them and amenable to their way of life. Some missionaries--among them, Marcus Whitman—openly advocated a substantial American emigration to the region.[33]

The fur traders had already proved the major trails suitable for wagon traffic.[34] The Bidwell-Bartleson party passed through the study area as a single unit, dividing at Fort Hall; part of the group went on to Oregon, the other segment, to California. One hundred people went west the following year; more than 100 wagons journeyed to Oregon alone in 1843; and by 1845, some 1800 American settlers had passed over the Oregon Trail.[35]

Exploring and Mapping the Trails

The federal government was not long in mounting support for the westward migration. In 1842, the Navy sent Lieutenant Charles Wildes inland from the Pacific as far as Walla Walla to explore and map the emigrant route. The same year, Lieutenant John C. Fremont led a scientific and mapping expedition across the Plains to South Pass.

Fremont's party followed the Oregon Trail to the forks of the Platte. There he sent a guide, Clement Lambert, with the main column up the North Platte to Fort Laramie (then called Fort John), while Fremont and five others followed the South Platte to Fort St. Vrain and then proceeded north over the Great Plains to rejoin the main force at Fort Laramie. From that point the column followed the trail to South Pass and explored for a short time in the Wind River range. On the return trip, they followed the main trail until well down the Platte and then followed that river to the Missouri.[36]

In the spring of 1843, Fremont organized another expedition; while his main column took the Oregon Trail, he and a small party journeyed some distance up

the Kansas and then moved onto the Great Plains through the basin of the Republican River to Fort St. Vrain. From that point they explored the Cache la Poudre country and crossed the Laramie Plain to rejoin the main body of the expedition on the Sweetwater.

After extensive explorations in Oregon and California, Fremont returned in 1844 to southwestern Wyoming, turned south through the Colorado mountains, and continued to Bent's Old Fort on the Arkansas. From this point he angled northeasterly to the headwaters of the Smoky Hill, and descended that river and the Kansas to the settlements.

Fremont's reports, along with the excellent maps prepared by Charles Preuss, the expedition's topographer, were rushed into print by the government and helped arouse widespread interest in settlement of the West. The maps formed the basis for much of the later exploration of the region and served as the framework for later emigrant trail variants.[37] The Westbound settlers increased; by 1847 an estimated 4500 persons had followed this route through Nebraska and Wyoming to California, while larger numbers went to Oregon.[38]

Early in 1845, Congress authorized the annexation of Texas to the United States. Tension between the United States and Mexico mounted in the months before congressional approval of the annexation late in the that spring. The possibility of warfare along the border helped to shape the explorations of 1845.

Fremont was again sent west to the Great Plains with instructions to secure the upper Red River and upper Arkansas segments of the boundary with Mexico. Lieutenant James W. Abert was sent to explore the Canadian River country, and Colonel Stephen Watts Kearny was dispatched with a sizable force from his Dragoon regiment to follow the emigrant traffic as far as South Pass and, on his return, to pass south along the Front Range to Bent's Fort.[39]

From Bent's Fort, Abert explored the country south to the headwaters of the Canadian River and followed generally south of that river to the Cimmaron, on to the Arkansas, and from there to Fort Gibson. Kearny followed the Santa Fe Trail back to the Missouri and his base at Fort Leavenworth. Fremont, however, struck out through the mountains to California, and expanded his

previous explorations of that country, despite the fact that most of his route took him through Mexican territory. While these exploring parties were on the move, war with Mexico began.

In June and July of 1846, Kearny led a series of columns west from Fort Leavenworth over the Santa Fe Trail to a staging camp near Bent's Old Fort. When his entire force was assembled there, Kearny crossed Raton Pass and defeated Mexican forces at Santa Fe, forcing them to withdraw down the Rio Grande. After this easy conquest of New Mexico, Kearny pressed on toward California.[40]

By late summer 1847, U.S. forces had taken not only California and northern Mexico, but had occupied Mexico City itself. Mexico signed a treaty in February 1848, ceding to the United States not only the disputed Texas border country, but California and most of the U.S. Southwest.

The California Gold Rush

With the close of the Mexican War, the Santa Fe Trail of the traders became a military and emigrant route to the Southwest. Less than a year after the end of the war, the context of western expansion along the old trails changed. The discovery of gold in California attracted worldwide attention, and brought a massive flow of traffic over the old trails in 1849. The popular appeal of the gold rush brought new kinds of emigrants to the western trails. People from all walks of life, little prepared for the overland experience, joined the seasoned frontiersmen of the past.

Most of these travelers passed through the region of interest over the classic Platte Valley route. About 25,000 persons used this route in 1849, and more than 50,000 persons used it in each of the three years that followed.[41]

The Main Transcontinental Trail System

Through the portions of western Nebraska and eastern Wyoming of interest to this study, the major transcontinental emigrant trail and its several variants developed into a broad, interbraided corridor of trails.

Perhaps the largest number of early emigrants traveled along the south

side of the Platte River valley west from Fort Kearny in Nebraska. They usually followed the South Platte, on its southern bank, for some miles and then crossed that river and headed northwest toward the North Platte. The main access to the North Platte Valley from the high plain between the rivers took the settlers down Windlass Hill into Ash Hollow, which with its supplies of wood and drinking water, was a favorite emigrant camping ground. These emigrants were joined at Ash Hollow by others who had crossed the South Platte near its mouth and followed the south side of the North Platte to the lower end of Ash Hollow.

These travelers then continued along the south side of the North Platte, leaving what is now the state of Nebraska and continuing upstream to Fort Laramie, which the army purchased from Pierre Choteau, Jr., and Company in the summer of 1849 to serve the emigrant traffic.

Another emigrant trail ran along the north side of the Platte, parallel to the one on the south side. When this trail reached the North Platte, it continued on the north side of the river. From 1847, this trail was often used by Mormon emigrants who had begun the Nebraska portion of their journey north of the Platte at Florence, and it became known as the Mormon Trail. In the vicinity of Fort Laramie there was much switching of sides of the river, depending on what information the travelers believed about the country ahead.

These pioneers followed two basic routes, one on the north side and the other on the south side of the North Platte, to the Casper, Wyoming, area. And, of course, individual parties chose to digress some from the routes for such reasons as availability of wood and water, grades, and mud or sand on the trails. The result is an interbraided trail system that is up to 25 miles wide in places, a broad corridor for transcontinental traffic.

To supplement Fremont's earlier mapping efforts, the army sent out Captain Howard Stansbury in the spring of 1849, to move with the main tide of emigrant traffic over the trail to the Salt Lake area. He spent late 1849 and early 1850 exploring and mapping the Salt Lake Valley, where Mormon settlements were spreading. In the summer of 1850, Stansbury returned east over a different route, guided by the famous mountain man Jim Bridger.[42]

The Cherokee Trail

Stansbury and Bridger crossed western Wyoming on a trail that was for the most part that of a series of 1849 gold rush parties. This was the famous Cherokee Trail, best known for its later use as a stage route. Captain Louis Evans led a party of Cherokee gold prospectors out of the Indian Territory in 1849, following the Arkansas to Bent's Old Fort, where they turned north near of Pueblo, Colorado, and paralleled the Front Range to the Wyoming border. Entering the Laramie Plain they turned west across the deserts to rejoin other California travelers at Fort Bridger. At least five other Cherokee parties followed Evans' route in the ensuing two years.[43]

Stansbury left the Cherokee Route on the eastern part of the Laramie Plain, and crossed the Laramie Range to Fort Laramie. Late in the summer of 1849, Captain Langdon C. Easton of the Quartermaster Corps took a party from Fort Laramie southeast across the plains, crossed Lodgepole Creek and the South Platte, and followed the drainages of the Republican and Kansas rivers back to Fort Leavenworth.[44]

Southern Routes to the Far West

At this time, efforts were underway to map more southerly routes to the California gold fields. Senator Borland of Arkansas influenced the Secretary of War to send out a reconnaissance force to accompany westbound emigrants gathering at Fort Smith. Captain Randolph Marcy commanded an escort that consisted of two companies of dragoons and two companies of infantry. The party included Lieutenant James H. Simpson of the Corps of Topographical Engineers.

Marcy's column accompanied the emigrant trains from Fort Smith to Choteau's Fort, a trading post near the site of the army's abandoned Fort Holmes. Then they continued west along the divide between the Washita and Canadian rivers, finding the trail easy going for their wagons. Beyond the headwaters of these streams, they crossed the Staked Plains to the New Mexican village of Anton Chico on the Pecos River.

After reaching Santa Fe, Simpson remained in New Mexico; Marcy expanded the army reconnaissance by traveling down the Rio Grande to Dona

Ana and pioneering a new trail northeast across Texas to Preston on the Red River.[45] In 1853, Marcy and Captain George B. McClellan explored the upper reaches of the Red River in an effort to secure the boundary between Texas and the Indian Territory.

Bryan's Trail

Wagon transporation was such a costly proposition that the army sought to shorten its western supply lines. In 1856, Lieutenant F.T. Bryan pioneered a wagon road along the north side of the Republican, reaching the Platte near Fort Kearny. He and his party then followed the usual route along the South Platte to the mouth of Lodgepole Creek, but turned up the Lodgepole and followed its course to Cheyenne Pass in the Laramie Range. Over the next several years, working parties under Bryan's direction made improvements on the route and extended it west as far as Bridger's Pass on the Stansbury-Cherokee route.[46]

Growing Importance of the Trails

Their work was given impetus by the army's 1857-58 expedition to Utah to impress Mormon leaders who had come into conflict with federal territorial officials with the power of the military. Logistic support for that expedition led to further refinement and improvement of trails. Perhaps of equal importance, it resulted in the publication of a number of new maps and emigrant guidebooks that were circulated widely. Captain Marcy wrote one of these; Obidiah Allen, chief guide to the expedition, published another. These books helped shift some of the emigrant traffic from the North Platte-South Pass Route to Bryan's Trail and the Cherokee Trail.[47]

But by 1860, the route across western Nebraska and eastern Wyoming had become the "main street" of the continent, and the Santa Fe Trail and the Texas Road through Indian Territory were the most important routes to the developing Southwest.

From 1857 to 1859, the Interior Department used contract surveyors and work crews to make some improvements to the main emigrant trail through the Platte Valley. This was the Fort Kearny, South Pass, and Honey Lake Wagon Road expedition under the direction of F.W. Lander. In the region of interest, their main work was the development of a new route into Ash Hollow from the

southeast; the grade cut by Lander and his men still survives in part near Ash Hollow State Park.[48]

The Colorado Gold Rush

In the summer of 1858 placer gold discoveries in the South Platte tributaries of the Front Range in Colorado brought a wave of emigration to that area. Many of the gold seekers were experienced prospectors from earlier gold discoveries such as California, Idaho, and other points to the west. But the fact that less than 600 miles of grassland separated the settlements of Missouri and eastern Kansas from the Front Range also brought a flood of gold seekers, merchants, and speculators to Colorado from the East.[49]

Gold seekers from the West came to Colorado over the Cherokee Trail. Most of easterners journeyed up the Kansas River and then fanned out according to preference to follow the Smoky Hill River, the Republican River, or the easy gradient between those drainages. The literature for the most part labels all these routes the Smoky Hill Trail.[50]

Some travelers followed the Arkansas upstream and then traveled along the Cherokee Trail from the Pueblo area to the gold fields. Others came from Nebraska City, Brownsville, or Omaha, intersected the Oregon Trail, and followed it to its upper crossing of the South Platte, where they continued on up the river to the foot of the mountains.[51]

While the gold discoveries were modest in scope, the prospecting attendant to their exploitation brought discoveries of silver, lead, and other metals that fostered permanent settlement in Colorado and made these trails of continuing importance in the settlement and development of the region.

Old Trails, a Different Kind of Historic Resource

Many people think of a historic trail as a single set of wheel tracks; this is true only where the constraints of topography forced the traffic into a single line. More frequently, different wagon trains, traveling under different weather conditions, different leadership, and with different loads, took various minor (and sometimes major) variations of route, creating new segments of trail. For example, the complex Oregon-California-Mormon Trail near Fort Laramie

became a broad corridor of trails and variations, resulting in an interbraided trail system 25 or more miles wide at places in Nebraska and Wyoming.

Cattle trails such as the Chisholm and the Goodnight were even wider, for the great herds northbound from Texas grazed on the move. Cattle trails give little evidence of their identity, except at key river crossings and in areas marked by other topographic constraints.

Today, the condition of these trails varies greatly. Many segments of the historic trails have been covered by modern highways, particularly in Arkansas, (the Springfield-Van Buren trail and the Memphis-Fort Smith trail) and in Louisiana, where soil and moisture conditions led road builders in many cases to follow the old trails. In Nebraska, Interstate 80 and U.S. 26 as well as county roads have overrun many miles of the emigrant trails.

In the farm country of Kansas, Oklahoma, and Nebraska, segments of old trail that were abandoned when more modern routes bypassed them have usually been planted with wheat or other crops. After a hundred years or more of farming, not much evidence of a trail remains.

In a very few places in western Kansas, western Nebraska, eastern Wyoming, and eastern Colorado, generally on grazing land, relic-condition segments of trail have been preserved by the regrowth of grass cover after their abandonment. Such sites can be of considerable interest to the public and should be preserved.

In still other areas, trails have been preserved through contined use by wagons and automobiles, and now serve as back-country access roads for four-wheel-drive vehicles. These trails, away from the main highways, form a basis for special off-road treks by history buffs and continue to serve many other kinds of users as well. But they are not pristine, relic-condition trails, and they undergo continual change, much as did the historic trails when they were formed.

CHAPTER 5

MILITARY GOVERNMENT AND NATIVE AMERICAN AFFAIRS: 1840s TO 1910

During the 1840s, garrisons at Fort Kearny and Fort Laramie were small house-keeping forces that showed the flag, furnished material aid and services to the least well-prepared travelers, and spent much of their time attending to their own subsistence. At Fort Laramie, the soldiers tended a small farm some miles from the post, where they grew much of their own food.

In 1851, the army built Fort Arbuckle on the Washita River to better screen the friendly Native American settlements, and established Fort Atkinson where the Santa Fe Trail crossed the Arkansas River. In 1853 Fort Riley was built at the confluence of the Kansas and the Republican rivers. In this same period a chain of posts was extended across the Texas frontier.

Following the Horse Creek (Fort Laramie) Treaty of 1851, each year thousands of Sioux camped along the North Platte to await the arrival of annuity goods under the treaty. In 1853, Native Americans from one of these bands skirmished with soldiers guarding a ferry boat near Fort Laramie. The following year a Sioux appropriated a lame cow trailing a column of Mormon emigrants. Brevet 2nd Lt. John L. Grattan took a small force from Fort Laramie to arrest the thief. His interpreter was a trader, nursing a grudge over the loss of some mail-company mules in his care. In the confrontation at the Sioux camp, shooting broke out and Grattan's party was killed.[52]

In the months that followed, the Sioux detroyed a mail station at Ash Hollow, burned the buildings at Fort Laramie's "Government Farm," and committed other depredations up and down the Platte.[53]

In the summer of 1855, the army planned a major punitive campaign against the Sioux. Gen. William S. Harney took a strong column up the Platte,

deliberately seeking a confrontation with the Native Americans. He found it at Blue Water, a few miles from Ash Hollow, in September. In a well-planned series of maneuvers, Harney surrounded and destroyed most of a large Brule Sioux encampment. After reinforcing the garrison at Fort Laramie, he marched across the plains to Fort Pierre, on the Missouri in Dakota. Most of the Sioux restricted their activities along the trail through the rest of the decade.[54]

To the south, the Comanche and their allies (who ranged between the Arkansas and the headwaters of the Red River in the western portion of the Indian Territory) conducted raids into Texas and Mexico, to maintain their economy. Persistent campaigns against them and the building of new posts in the Indian Territory in the late 1850s failed to bring them fully under military control.

Intensification of travel along the Smoky Hill and Republican River routes to Colorado during the late 1850s Colorado gold rush brought conflict with the Cheyenne who ranged in that area. In 1856 at Richard's Bridge near present Evansville, Wyoming, in a dispute between traders and Cheyenne over a horse, one Cheyenne had been killed by soldiers. Other Cheyenne killed a traveler near Fort Kearny and became involved in a brief skirmish with the garrison. In retaliation for Cheyenne harassment of a stage coach and travelers in the area, troops raided a Cheyenne camp.[55]

So the Cheyenne were regarded as dangerous to white travelers, though Colonel Edwin V. Sumner in a sharp fight on the Solomon River taught them to beware of the Regulars.[56]

Expansion of freighter activities on the Great Plains in support of the army's Utah Expedition and the Colorado gold rush, increased travel on the trails, and expansion of stagecoach mail service increased the potential for conflict with Native Americans. But there was little conflict until 1862, when major changes in the composition of troops and the Civil War laid the groundwork for new conflicts on the Great Plains.

The Volunteer Campaigns: 1862 to 1865

In 1861 the federal government began to withdraw regular army units from the West to serve as the nucleus for a national army with which to defend the Union. Throughout the West, individual commissioned officers in substantial numbers resigned their commissions to go home and serve the Confederacy.

This withdrawal of troops from the West left only housekeeping details at most posts. To fill the gap and keep communication lines open, some short-term militiamen were rushed in along the trails from Utah, and the 2nd Battalion, 6th Ohio Volunteer Calvary was rushed West to meet them and secure the trails from Fort Kearny to Green River.

Colorado faced a new threat when Confederate troops pushed into the Rio Grande Valley and forced the handful of regulars still there to surrender. The mining settlements quickly organized sizable units of volunteer troops and rushed them south to meet the Confederates in New Mexico.

Whites in Nevada and California, faced with conflicts with Native Americans on segments of the emigrant trails, organized their own troops. When the threat from Native Americans had been reduced, the volunteers moved eastward to keep communication lines open to the East.

A series of raids in western Wyoming by the Shoshoni and the Ute, and trouble in Colorado and Nebraska with the Sioux, Cheyenne, and Arapaho demonstrated the vulnerability of the isolated and lightly manned stage and telegraph stations along the trails. The volunteer units, reversing the regulars' approach of large units at major posts and sizable shows-of-force on the plains, dispersed their men in handfuls at the major stage and telegraph stations.

Most of the Ohio men were totally without frontier combat experience. Many of the Coloradans were not much more seasoned, except for their brief campaign in New Mexico with the Confederates. Their dispersed garrisons became tempting targets to Native Americans seeking horses, guns, ammunition, and other supplies. A new wave of depredations occurred along the stage and telegraph lines and was described by the western press as a major new Indian War of collossal proportions, with suspected Confederate complicity.

The volunteers raced up and down the trails in hectic response to the hit-and-run tactics of the raiders. Only the Coloradans really had the concentration of manpower needed to retaliate. Col. John M. Chivington in Colorado sent substantial forces to strike the Cheyenne wherever they could be found. In response to this series of raids on their camps, the Cheyenne raided the frontier settlements of Kansas and Nebraska, reaching as far east as the Little Blue River. They also attacked along the trails to Colorado.

Troops in eastern Kansas and along the Oregon Trail as far into Nebraska as Fort Kearny were frequently sent to the Kansas settlements in response to pressures of Confederate raids in Missouri, Arkansas, and eastern Kansas. But in July 1864, Confederate General S.R. Curtis pushed west with a strong force of Kansas troops and met one of Chivington's columns at Fort Larned. The Cheyenne stayed out of their way.

The troops reinforced Fort Larned and Fort Lyon; built two new posts, Fort Zarah and Fort Ellsworth; and fortified key stage stations and ranches along the trails. Meanwhile, in the District of Nebraska General R.B. Mitchell took a column up the trail to the west and built Fort Cottonwood on the Platte. During Mitchell's absence, Cheyenne raiders again struck the farms on the Little Blue. Mitchell took another regiment of Iowa and Nebraska troops upcountry, but found no one to fight.

Colorado troops found more Cheyenne than they anticipated on September 25, when Major Scott J. Anthony with two calvary companies encountered a large Cheyenne and Arapaho camp on upper Walnut Creek; Anthony's troops fought desperately until Major James G. Blunt came to the rescue with a strong force.[57]

Confederate troops pushed up into Missouri at this time and the Kansas and Nebraska men were drawn down to stop them. In the interim, the territorial government of Colorado began negotiations in an effort to classify the Cheyenne factions as "friendly" or "hostile" and to settle the friendly factions where they could be controlled.

In the 1860s military engagements became more frequent between Native Americans and whites in eastern Colorado. In 1864 a group of Cheyenne and Arapaho surrendered at Fort Lyon in response to the government's plea for an end to the hostilities. After several days the army ordered these Native Americans to resettle near Sand Creek 40 miles from Fort Lyon. On November 27, 1864, Colonel Chivington and a force of 900 men attacked the Native American camp at Sand Creek, killing 131 men, women, and children and losing 50 of their own men. General Sanborn and a presidential commission met in council in October 1865 with Kiowa, Comanche, Arapahoe, and Cheyenne at Bluff Creek, 40 miles south of the Little Arkansas River. Treaties were signed and the United States agreed to pay $39,050 in reparations for injuries at Sand Creek. The Cheyenne and Arapaho conceded to be moved to the Indian Territory and the government agreed to pay them $112,000 annually for forty years.[58]

During this time, Colonel Kit Carson with a column of New Mexico volunteers struck a hard blow at the Kiowa and Comanche in the Texas Panhandle, who had raided the Santa Fe Trail into southern Kansas a few months before.[59]

In response to the military's actions at Sand Creek, scattered bands of Cheyenne assembled. Inflamed by reports from the survivors, they vowed vengeance, and in January and February 1865, carried out this vow. Within a period of six weeks they sacked the little stageline settlement of Julesburg twice, burned eleven other stage stations, tore up miles of telegraph line, and burned a few telegraph stations. Then they moved north to join the bands of hostile Sioux on the Powder River.[60]

While the Cheyenne raids were in progress, the Secretary of Interior called the attention of the Secretary of War to the fact that surveying and construction parties of the Union Pacific Railroad would soon be moving into the hostile zone and emphasized the importance of protection for this great costruction venture. Colonel Collins suggested sending a strong force into the heart of the hostile country on the Powder River and the Little Missouri to build and hold forts; the strategy was that these actions would draw the attention of the Native Americans away from the rail line.

The army then brought Brigadier General Patrick E. Connor east, fresh from successes against the Shoshoni and the Ute, to command the newly organized District of the Plains. Connor stated that with 20,000 men he could clear the Plains of hostiles; however, his plan ran into several obstacles.

With the end of the Civil War, tens of thousands of volunteers politicked to be mustered out. Most of the army's ordnance, transportation equipment, and supplies were stored at depots 1500 to 2000 miles from the Great Plains. The army's effective command structure began to break down during demobilization. In addition, details of the military's actions at Sand Creek fostered a new peace movement that hampered the army's campaign planning in the West.

Connor received renewed support when Cheyenne and Sioux raiders attacked the stage and telegraph lines again in the late spring and early summer, particularly when they wiped out a small detachment of troops within sight of Fort Caspar. Among the casualties was Lt. Caspar Collins, son of a well-known Ohio colonel. Connor took the field in late summer with three columns totaling about 2000 men. Connor himself went up the Bozeman Trail, while Colonel Samuel Walker took a pack-train column north from Fort Laramie to the Little Missouri, and Colonel Nelson Cole took the third column around the north side of the Black Hills to meet Walker.

The Walker column passed through the study area without incident. In southern Montana, Cole and Walker engaged in what was probably the largest battle on the Great Plains against Native Americans. Connor's column built Fort Connor (later renamed Fort Reno) on the Powder River and continued along the trail to strike a hard blow at the Arapaho near present-day Ranchester, Wyoming.

Connor soon received word to withdraw and bring his expedition to a close, for the transportation costs for supplies alone were exceeding $1 million per month. Plans for a similar campaign along the Santa Fe Trail were halted twice by the congressional peace faction. Just as a strong campaign was ready to enter the field in August, it too was called off in favor of a negotiated settlement. In October meetings were held with Native American leaders known to be friendly; few of the hostile northern bands were represented.[61] During the fall, the peace faction gained strength and the volunteer units were further

dismantled, while westerners wondered how the communication lines would be kept open in 1866.

Post-Civil War Campaigns on the Great Plains

The close of the Civil War began a new period of government-Native American relations on the Great Plains. With most of the state volunteer units withdrawn from the West by mid-1866, the burden of frontier defense fell on the 40,000-man regular army, which could devote only a part of its force to the task. Some units were committed to defense of the Mexican border, others to manning coastal defenses at key positions, and still more to the occupation of the South. General William T. Sherman assumed command of the army's frontier operations.

Uniforms and leather goods were abundant in the government storehouses, and sizable stocks of Civil War contract salt pork, hardtack, and flour were available as field rations. Most infantry units came west in 1866 armed with the Model 1863 Rifle Musket, a .58 caliber muzzle-loading weapon. Cavalry units had a mixture of arms, since dozens of different kinds of carbines had been issued during the conflict. The best were probably the two rimfire cartridge rifles -- the Spencer (a seven-shot repeater) and the Starr. The first few years on the Great Plains saw much experimentation and change in individual arms.

Artillery was in plentiful supply, but few officers or men were experienced in its use, nor was adequate transportation available to move it to the field.[62] As the volunteer units discovered during the Indian Wars, the vast distances over which troops had to move to reach hostile camps in the Great Plains made transportation the main problem. Where steamboats could travel on the Red, Arkansas, Missouri, and Yellowstone rivers, supplies could be brought from St. Louis and other Mississippi River points for less than ten cents per pound.

However, a vast area was not accessible by water transportation. There, the army's six-mule wagons and the ox-drawn freight wagons of the contractor had to haul every box of hardtack, side of bacon, barrel of flour, cartridge, and horseshoe the troops required. The fodder needed for these draft animals limited the range of a fast-moving army column to no more than three weeks from a substantial base of supplies.[63]

The Oregon-California-Mormon Trail crosses the study area in western Nebraska and Colorado. Its Colorado branch, which served as the overland mail route, crosses the study area in northern Colorado. The Santa Fe Trail still served as the main route of travel to New Mexico, and the Texas Road in the Indian Territory still served as a main route to northern Texas. In western Kansas, various branches of the Smoky Hill Trail led to Colorado.

By 1866 the Union Pacific was building west within the corridor of the main transcontinental emigrant trail. The Kansas Pacific was running out toward the Smoky Hill route. Many of the emigrants, freighters, and railway construction workers were Civil War veterans, generally very well-armed and perhaps better skilled at self-defense than the gold seekers of the 1840s.

Native Americans, except for being better armed themselves, had changed their strategy little. They continued to avoid pitched battle and concentrated on striking out at isolated targets. General Sherman perceived that his troops could not absolutely protect all the areas in his charge from attack by Native Americans. He placed the highest priority on protecting the communications of the region and launched campaigns against individual tribes only in response to extreme provocation or in conjunction with efforts to consign more Native Americans to reservations.

Only a few sites related to the Indian Wars fall within the study area. The northern portion of the study area was within the Department of the Platte, headquartered in Omaha. This department controlled Nebraska, Wyoming, and for all practical purposes the portion of Colorado that contained the main Overland Mail Route from Fort Sedgwick through Fort Morgan and Fort Collins to Virginia Dale. Initially Fort Laramie was the most important post in the department.

At the time Wyoming had no significant settlement except those associated with its military posts. But branch trails to regions such as Montana led to a dispersal of military effort away from the main trails. Most significant was the Bozeman Trail.

The Bozeman Trail

Under orders to end his large-scale campaign in 1865, Brigadier General Patrick E. Connor left a small garrison of volunteer troops at Fort Connor on the Powder River. In 1866 the army replaced the volunteers at the fort with regulars when Colonel Henry B. Carrington brought the 18th United States Infantry to garrison the posts in Wyoming and western Nebraska.

Carrington built Fort Phil Kearny and Fort C.F. Smith on the Bozeman Trail. The operation was designed to keep hostile Native Americans occupied well away from the lines of Union Pacific construction. The strategy was fairly successful, and also kept the portion of our study area north of Fort Laramie free of any significant action until the 1870s. But Fort Laramie and its environs teemed with activity. Added to the military preparations to screen the rail line from hostiles were negotiations by civilian and military commissioners.

Hancock's Campaign

Farther south, Kansas and Colorado were a part of the Department of Missouri, with headquarters at Jefferson Barracks near St. Louis. Commanding the department was the active Brigadier General Winfield S. Hancock, who spent much time at the posts under his command. Hancock's main concern was with the southern Cheyenne, who still occupied most of the plains of eastern Colorado. The stage lines, the proposed rail line, and the Smoky Hill and Santa Fe trails ran through their territory. The Cheyenne were still eager to avenge the destruction at Sand Creek in 1864. In addition, they maintained long-standing hostilities with the friendly Kansas and Pawnee, and their war parties moving to attack those tribes posed a hazard to travelers.

In 1866 there were few depredations in the area; most were isolated incidents in which Cheyenne war parties encountered stragglers or lone travelers along the trails. But in 1867 the area became one of the most active theaters of war in the West. Hancock moved a force of more than 1400 men toward the Cheyenne camps and encountered a large concentration of Cheyenne on the Pawnee fork of the Arkansas. While Hancock was in conference with them, the Cheyenne received word that one of their detached bands had destroyed the Lookout Station on the stage line.

The Cheyenne panicked and abandoned their large camp. When Hancock learned of the attack on Lookout Station and other depredations along the line, he destroyed the Cheyenne camp and supplies. On April 19 one of Hancock's patrols overran a small Cheyenne war party at the Cimarron Crossing on the Santa Fe Trail. Early the next month, Cheyenne killed six whites on the Republican River and sizable war parties ranged up and down the trails and streams in the region.

In late May and June hostilities increased rapidly. It was reported that all the stations on the stage line west of Fort Riley had been attacked at least four times. There were frequent attacks on work details, herds of stock, and other small parties outside the forts in the region.

In July 1867 the Seventh Cavalry set up a camp on the Republican; the Cheyenne immediately attempted to run off their horses. Sharp skirmishes between military patrols and supply trains and the Cheyenne followed. Lt. Lyman S. Kidder and a small party carrying dispatches were surrounded and killed by a mixed party of Cheyenne and Brule Sioux, who also frequented the Republican Valley. Other units engaged in a series of small skirmishes that summer.[64]

Then, the peace commission that had been authorized to negotiate with the Plains Indians went into action. After much preliminary discussion by small parties of emissaries on both sides, a major treaty-making session was held at Medicine Lodge Creek, about 60 miles south of Fort Larned. Late in October the Cheyenne and Arapaho agreed to accept a reservation lying south of the Kansas line between the Cimmaron and the Arkansas rivers, and not to harm travelers on the emigrant trails. The Cheyenne and Arapaho remained peaceful until the following spring.

Southern Plains Campaigns

Determined to resume their intertribal warfare with the Kansas tribe, the Cheyenne and Arapaho moved north of the Arkansas in some force. On May 19, 1868, a Cheyenne party burned a trader's store near Fort Zarah, and a week later they attacked a civilian wagon train near Coyote Station. Soon afterward, they attacked the Kansas (Kaw) camp near the town of Council Grove, taking supplies from the townspeople.

There was additional trouble during the summer of 1868. Just after receiving an issue of annuity goods under the terms of the Medicine Lodge Treaty, Cheyenne war parties armed with new guns and ammunition swept down the Saline and Solomon valleys, killing more than a dozen settlers and capturing some women and children. Additional raids were made in September as far west as the Purgatoire River in Colorado.[65]

An army scouting party led by Major George A. Forsyth followed the Cheyenne's trail to the Arickaree Fork on the Republican. Here in mid-September they were attacked by a force of several hundred Cheyenne and Brule Sioux. Forsyth's men dug rifle pits in the sand of Beecher's Island and stood off their attackers for a week until a rescue column arrived.[66]

General Phillip Sheridan, now in command in the department, launched an active pursuit of all hostile bands that could be located. One of his columns under Major Eugene A. Carr had a six-hour fight on Beaver Creek on October 17. Carr pursued the Cheyenne again and fought another large engagement, capturing many horses and destroying Cheyenne supplies near the Solomon River on October 25.[67]

As fall wore on, army scouts determined that the hostile bands were drifting south to the reservation and to camps to the west in the Indian Territory. Sheridan made extensive preparations for a winter campaign against the hostile bands; his main striking force was the Seventh Calvary under Lieutenant Colonel George Armstrong Custer. Custer moved out of Camp Supply on November 23, traveling through a foot of new snow.

Custer's Osage scouts, moving ahead of his column, found a large Cheyenne camp on the Washita River, not far from a major concentration of Comanche, Kiowa, and Prairie Apache. Custer surrounded the camp and launched a surprise dawn attack. The troops drove off the Cheyenne warriors, who suffered heavy losses. They captured many Cheyenne and systematically destroyed their teepees, supplies, and horses. Faced with the gathering might of the other tribes downstream, Custer's men withdrew to their base at Camp Supply and received a warm welcome from Sheridan.

Despite continued pursuit and extensive negotiations, many Cheyenne remained hostile. In the spring of 1869 they killed 13 whites in Kansas and destroyed two miles of Kansas-Pacific track. Sent in pursuit, Major E.A. Carr moved out of Fort McPherson early in June and followed the Cheyenne to Summit Springs between the Republican and Platte drainages in northeastern Colorado. Carr's men attacked and destroyed the Cheyenne camp on July 11 and then pursued scattered bands of survivors. This campaign substantially ended Cheyenne use of the country between the Arkansas and the Platte.

As these campaigns drew to a close, railway construction crews pushed ahead with their work. The Union Pacific reached Cheyenne, Wyoming, late in 1867, was extended most of the way across Wyoming the next year, and was linked with the Central Pacific in Utah in 1869. The Kansas-Pacific brought direct rail service to Denver, and the Santa Fe Railroad had pushed west as far as the Colorado line by 1873. This new rail service substantially improved troop movements and helped to keep western Kansas and eastern Colorado free of Native American depredations after 1869.

South of Kansas, hostilities continued between whites and the Comanche, Kiowa, Prairie Apache, and southern Cheyenne. Hostile bands roamed the Texas panhandle and struck at the Indian Territory and the Texas frontier. Extensive campaigns between 1873 and 1875 subdered those tribes.

The Northern Plains Campaigns

Far to the north the Sioux pushed the Crow up the Yellowstone Valley in the early 1870s and threatened settlements on Montana's eastern frontier. The Sioux continued small-scale depredations along the North Platte and had frequent confrontations with agents at the new Red Cloud Agency in northwest Nebraska.

In response, the army sent in Colonel Jonathan E. Smith with a strong force to establish Fort Robinson a short distance from the Red Cloud Agency in 1874. Fort Laramie and Fort Fetterman were strengthened as advance bases on the southern boundary of the Sioux country.

Gold discoveries in the Black Hills in the summer of 1874 triggered a new gold rush. Gold seekers poured into the area from several directions; the government was unable to keep them out. Some came overland from the Missouri River; others left the Union Pacific at Cheyenne or Sidney, Nebraska, and headed north or came overland from the Montana mining towns to the northern Black Hills.

Three important routes of travel to the hills developed in this period. One was the Fort Laramie-Red Cloud Agency Trail, with a branch to Cheyenne. The second was the Sidney-Black Hills Trail; and the third, the Cheyenne-Deadwood Stage line, which passed through Fort Laramie. All these routes cross the study area.

Following an interagency conference in Washington, D.C., in November 1865, the government issued an ultimatum to the Sioux that they remain on their reservation (in present-day South Dakota west of the Missouri River). The Sioux did not comply and a sizable military campaign was planned to enforce the ultimatum.

Only the operations of Brigadier General George Crook, then commanding the Department of the Platte, are of primary consequence in the study area. In March 1876 Crook took a strong column up the Bozeman Trail. One contingent fought a sharp engagement in southern Montana on the Powder River on March 17, 1876. Then Crook withdrew to his bases at Fort Fetterman and Fort Laramie. In June 1876, Crook moved north with a larger force. Simultaneously, two columns of troops of the Department of Dakota pushed into eastern Montana from the east and west, with the hope that one of the three forces would encounter the Sioux.

Crook's men were attacked along the trail on Rosebud Creek in Montana on the morning of June 17, 1876. They fought throughout the day and afterward

made their way back to a base camp near present-day Sheridan, Wyoming, to await supplies and reinforcements.

While they waited, Lieutenant Colonel Custer encountered one of the largest Native American encampments ever assembled on the northern Great Plains; he and five companies of his regiment were killed during the famous Battle of the Little Big Horn. The shocking news of the Custer disaster brought swift reinforcements to the troops on the Plains. That summer, Crook swept through southern Montana and south through the Black Hills.

In the fall Crook sent a strong force to Red Cloud Agency to capture the Sioux horses. Soon he took another strong column up the Bozeman Trail to a new post, Cantonment Reno. From this base, he sent a column to attack the Cheyenne on the Red fork of the Powder River. Then he swept over into the Belle Fourche country and back to Fort Fetterman. That fall the army began construction of additional forts from which to patrol the region recently opened to settlement. By the spring of 1877, the war to control the hostile Sioux and the northern Cheyenne was won.

Cheyenne captives at Fort Keogh, Montana, and other points were sent south to the Indian Territory. They did not find the conditions there satisfactory and in the fall of 1878 a large number left the territory and headed north across Kansas and Nebraska. These Cheyenne were captured in northern Nebraska and incarcerated at Fort Robinson. In early 1879 they escaped and fought a number of skirmishes with pursuing troops. Many of them fled to Montana, where the army enlisted the men as scouts to prevent their deportation south again.

The Ghost Dance Campaign in Dakota

Trouble broke out with the Sioux in Dakota in 1890. Persistent dissatisfaction with conditions on their reservation and the weakening of their tribal society in the absence of the migratory hunting patterns that had formed its principal foundations made the Sioux vulnerable to anyone who would promise a panacea.

During this period a new religious cult was formed on other reservations and soon spread to the Sioux country. A curious blend of Christian and primitive

concepts, it was essentially a peaceful cult that believed that if the Native Americans would dress and behave in a prescribed manner and dance according to a certain ritual, then the white people would disappear and the buffalo would return.

In the Sioux country this prospect held a high degree of appeal. The promised return of old conditions aroused the Sioux warriors' fighting spirit, which had been suppressed for more than a dozen years, and resulted in a great deal of visible unrest at the camps near the Sioux agencies.

Responding to pressures from nearby settlers, troops gathered on the borders of the Sioux reservation. Tensions heightened between the Sioux and the army, resulting in a number of incidents including the murder of Sitting Bull. Several large bands of Sioux broke away from the northern reservation and drifted toward Pine Ridge into the lands of the Oglala, which the army considered to be one of the most dangerous of the Sioux bands.

The fleeing band, led by Big Foot, was captured by the army and encamped at Wounded Knee Creek in December 1890. Troops began to search the camp for hidden weapons, shooting broke out, and in the melee large numbers of Native Americans and some soldiers were killed. As a result of this incident, some of the Oglala bands clashed with troops at White Clay Creek, Drexel Mission, and Pine Ridge Agency.

Overwhelmed by the massive army force in the area, most of the Sioux remained quiet, and dissidents were quickly silenced. This is generally accepted as the end of the Indian Wars, though in reality it might be more accurately described as a police action on the reservations, differing from incidents at other agencies in the 1880s, 1890s, and into the early 1900s only in scale.

Native American Land Cessions

The transfer of lands from Native Americans to the United States government was extremely complex. The United States, like its European predecessors, assumed that it possessed full sovereignty over all Native Americans, whatever their tribe, location, or landholding systems. Chief Justice John Marshall of the United States Supreme Court described the tribes as

"domestic, dependent nations," laying the foundation for both legal and popular debate over their personal and property rights.

There was also a vast difference in the views of Native Americans toward the land and its ownership. More acculturated members of the Five Civilized Tribes had accepted the concept of individual land ownership and were practicing individual proprietorship before their removal West. Some of the semisedentary agricultural and hunting tribes understood community ownership of village sites and customary gardening or farming sites, but did not have a concept of ownership of vast stretches of woodland and prairie. The mobile, equestrian Plains tribes did not think of land as something that could be owned; instead, they likened it to the air, to be used temporarily by anyone in a given locality.

Federal negotiators assumed that Native Americans understood the concept of land ownership. They also assumed that Native Americans had a functioning government that could acquire and dispose of land in a fashion binding upon all tribe members. This was seldom the case, however, as violence among even the Cherokee and Creek proved repeatedly.

During the same period in which the Five Civilized Tribes were forced to give up their eastern homes for tracts in the Indian Territory, many of the less organized Plains tribes were also relocated. Among these, the Osage, Kansas, Iowa, Otoe, Missouri, and other smaller tribes were assigned sizable tracts in eastern Kansas. At their western fringe, these Kansas and Oklahoma tracts extended into the Plains in to lands occupied or used by the nomadic Plains tribes.

Beginning in the 1850s, government negotiators bought land from some of the tribes in Kansas and opened it for white settlement. This wedge of white settlement along the lower Kansas and its tributaries became the basis of the Kansas Territory. In the late 1850s and 1860s, these settlers actively campaigned for further land cessions. Most of the small tribes ultimately were relocated to the Indian Territory, the lands purchased by the government from the Five Civilized Tribes.

At several treaty negotiations in the 1850s and early 1860s, much of the tribal territory in western Kansas and Nebraska and eastern Colorado was ceded to the United States. Native Americans were sufficiently mobile at this time to make their assigned range rather meaningless. Gold seekers rushing into Colorado overran much of the Native American land at the foot of the Front Range in Colorado and occupied many sites along trails that led from Kansas and Nebraska into the new territory.

The Medicine Lodge Treaty of 1867 cleared eastern Colorado and western Kansas of Native American titles and effectively opened these areas to settlement under the Homestead Act passed during the Civil War. The Laramie Treaty of 1868 opened up the southeastern corner of Wyoming (south of the North Platte River) and all of northwest Nebraska to settlement. The language of the treaty restricted the Sioux, Cheyenne, and Arapaho to their reservations (the Sioux in western Dakota; the Cheyenne and Arapaho in Indian Territory) with the exception that for some indefinite period ("so long as there were buffalo thereon in sufficient numbers to justify the chase"), they might also range in the country east of the Big Horn and the Crow Reservation north of the North Platte and south of the Yellowstone.

In the 1860s and 1870s the southern Plains tribes (southern Cheyenne, southern Arapaho, Kiowa, Comanche, Prairie Apache) were placed on reservations created from lands purchased by the government from the Five Civilized Tribes in western Oklahoma.

The Indian Wars in 1876-77 opened the unceded hunting lands of the Sioux, Cheyenne, and Arapaho in northeastern Wyoming to settlement. Treaties with these tribes opened the Black Hills (which had been settled illegally as a result of the gold rush) and some connecting routes in western Dakota to white settlements.

After 1887 the government attemped to force Native Americans to accept individual land allotments and then to sell their surplus lands to the government for disposition to white settlers. This process was particularly important from 1887 to 1907 in the Dakotas and Oklahoma. By 1907 Native American

reservations were checkerboarded with white and Native American landownership, with a confused pattern of state, federal, and tribal jurisdiction that persists today.

CHAPTER 6
ECONOMIC, SOCIAL, AND COMMERCIAL DEVELOPMENT HISTORY: 1840s TO 1920s

Farming, Frontier Settlement, and Development

At the close of the Civil War, the frontier of agricultural settlement in the study area lay well to the east of the proposed northern pipeline corridors. A thinly settled belt of farming and stock-raising country in the valley of the Big Sioux River in the Dakotas and in eastern Nebraska was gradually expanding through an influx of homesteaders. In Kansas, settlement extended west to the mouth of the Republican River on the Kansas River and into the partially wooded hill country of the southeastern corner of the state. South of Kansas, settlement had reached the western edge of the Indian Territory in eastern Oklahoma.

Settlement of the frontier was not a uniform process. It was inhibited by government restrictions on white settlement of Native American lands, by hostilities, and by the comparative productivity of various tracts. Permanent settlement was speeded by railroad extensions and the availability of special local markets, such as military posts or mining camps.

In the Great Plains, the major barrier was hostile Native American activity. As the tribes were progressively brought under white control in the 1860s and 1870s, those areas went through several stages of development: (1) commercial buffalo hunting, cattle driving, and open range ranching; (2) development of limited irrigated areas in the valleys on the western fringe of the Plains; (3) extension of homestead settlement up the streamcourses from the east; and finally (4) a wave of dry farming settlement as that technology spread into the region. Except for dry farming, all of these developments occurred before 1890; at that time the U.S. Census Bureau concluded that a settlement frontier no longer existed.

The railroads improved their overall profits from land transactions conducted by townsite companies who surveyed, developed, and marketed town

lots on lands adjacent to station sites. In the first phase of the expansion of settlement, several railroads oversold their townsite holdings and many promoters followed suit. As a result, many early villages adjacent to the railroad in western Kansas and Nebraska declined rapidly in importance, while some died out entirely.

As farmers began to adapt techniques to prairie conditions, farming became more productive, and a period of steady growth ensued. The low point in expansion of farming was 1873 to 1876, when drought, grasshopper plagues, and hard winters combined with the nationwide financial panic of 1873 caused widespread hardship in the newly settled lands of the Great Plains.[68]

The limitations of eastern farming technology for cultivation on the Plains became more evident as settlers approached the 20-inch rainfall line. While much land passed into private hands in the 1870s and 1880s in western Kansas and Nebraska, a great deal of it remained grassland because stock raising was at its economic peak in those decades. Barbed wire fencing and the windmill (to pump water) made farming possible where it could not have been attempted before, but it would take a broadly based revolution in farming techniques to set in motion intensive agricultural development of the Great Plains.

The Oklahoma Land Openings. By 1865 the plantation system and subsistence farming of the Cherokee and others of the Five Civilized Tribes in the Indian Territory of eastern Oklahoma and Arkansas had suffered considerable physical damage and economic dislocation. Factional feuds within the tribes complicated the reconstruction era politics and economics of the territory. But by the mid-1870s the demand for more farmland was so strong in neighboring states that Native American landowners brought in substantial numbers of white farmers to till their fields. They could not at this time legally lease land to whites outright, but they could employ whites to work the land for them on shares. By 1882 more than 12,000 white tenant farmers were working in the Indian Territory, most of whom were growing cotton.[69]

The central part of present-day Oklahoma lay outside the designated Indian Territory and the reservations of other western tribes. This no-man's land was of considerable interest to potential settlers on the Kansas frontier, who employed both legal and illegal means to settle there. Finally in 1889, the tract

employed both legal and illegal means to settle there. Finally in 1889, the tract was opened to homesteaders in a great land rush. By 1901 most of the surplus lands in the western part of the territory were acquired by the government from the Plains tribes and opened to settlement. In addition, significant amounts of land in the Indian Territory were opened to white settlement when Native Americans began to accept individual land allotments.[70]

The Dry Farming Boom. Much of the drier plains of western Kansas, Nebraska, South Dakota, and eastern Wyoming remained thinly settled ranch country until after the turn of the century. The dry farming movement, which began a few years earlier elsewhere, spread to the Pand lured thousands of new homesteaders. Dry farming is the process of using two years' precipitation to raise one crop of grain, usually wheat. Dry farming of wheat was practiced in at least one small area of southeastern Wyoming as early as the late 1870s.

Most emigrants to the Plains in the late 1800's were from more humid regions. It took some time for them to develop cultivation techniques that conserved moisture in the summer in fallowed strips or blocks for use in germinating the next year's wheat crop. The best known tillage system was the Campbell system of dry farming, intensively promoted by Hardy W. Campbell of Nebraska. As this practice grew and spread in the 1890s, more and more businessmen and politicians in the Plains states assisted with its promotion. Some publications made it look as if the entire High Plains was prime wheat country.[71]

East of the 20-inch rainfall line which crosses the central portion of the United States from North to South, dry farming rapidly achieved a high rate of success through the introduction of new varieties of hard winter wheat by Russian emigrants to Kansas in the 1880s. As dry farming techniques spread over the Plains, homesteaders quickly laid claim to lands suited to farming, putting a rapid end to the open-range grazing of cattle over vast areas. Much of this settlement occurred in the 1890s and the first few years of this century, on quarter-section homesteads and on land purchased from the railroads. In the early 1900s more and more farmers pushed into the drier lands of western Oklahoma, Kansas, Nebraska, and the Dakotas, and into the dry High Plains of Colorado and Wyoming.[72]

This movement was encouraged by several developments. First, in 1909 Congress passed an enlarged homestead law providing for 320-acre homesteads. In 1912, another act of Congress reduced the residence requirements from five to three years and permitted the homesteader to be absent from his holdings for up to five months of a year. The Kincaide Act allowed 640-acre homesteads in certain portions of western Nebraska.

By 1914 other factors encouraged the continued development of dry farming. Years of greater than average precipitation combined with rising wheat prices brought on by the outbreak of World War I created a boom in the dry farming industry. Crossroads cattle towns bustled with activity as they blossomed into major trading centers for the homesteaders. New villages spread out across the Plains between the rail lines. Some railroads built extensive branch lines into the Plains to handle wheat shipments.[73]

The survival of Montana homesteaders was threatened in 1918 and 1919 when drought spread south across the state. In Wyoming only 1919 was especially dry, but it caused homesteaders of the region around Gillette to dip deeply into their limited reserves to plant the next year's crop. Many were able to keep their homesteads because $2.20-a-bushel wheat could still be raised with $2.00-a-day labor. But in 1921 disaster struck the dry-farming belt of the High Plains; grain and livestock prices dropped in six months to one-quarter of their wartime highs, setting in motion drastic changes in the economy of the Great Plains.

Homestead Sites. Most of the area north of Oklahoma--Kansas, western Nebraska, eastern Colorado, eastern Wyoming, and western South Dakota--was settled by homesteaders between 1870 and 1920. In the areas settled initially the density of settlement was about four dwelling units per square mile. In the drier zones and on rougher ground, such as in eastern Wyoming, most settlement occurred when half-section homesteads were commonplace. In these areas only the most attractive sites were occupied. Generally the most successful homestead locations have become the highly developed farmsteads of today.

Regional Architecture. Two major architectural traditions were brought to the central prairies and the High Plains during the fur trade era. These were the corner-notched cabin in its several minor variations, derived from Appalachian experience, and the French Canadian log-in-panel system, brought to the northern prairies, the Illinois country, and Missouri by the Canadians who staffed the fur company boats, forts, and trading warehouses.

The log-in-panel system was common in the French settlements of Missouri. The style moved quickly along the trails into the Plains as small trading posts replaced the larger trading forts when emigrants became numerous on the main trails to the West. In this system, relatively short (8- to 10 foot) logs were cut uniform lengths, leaving a tenon on each end of the log. Mortised posts were then set in the ground at intervals, and the tenoned logs dropped down in the mortises. In its most advanced form, the logs might be hewn square all around, but more often they were hewn flat only on the horizontal touching surfaces.

The system was more adaptable than the corner-notched cabin since it made use of short and excessively tapered logs, and could be used to construct buildings of considerable length. With hewn trusses resting on the wall posts, it could support a substantial roof structure covered with dirt, shakes, or shingles. Settlers and the army continued to use log-in-panel construction wherever logs were available throughout the nineteenth century in the High Plains.

In the 1830s, traders operating at the western edge of the High Plains included many men of New Mexican ancestry, as well as many American frontiersmen who had spent some time in the New Mexico settlements. From 1833 to 1849, these traders often built their trading posts of adobe. For large projects, such as Fort Platte and Fort John, near the study area in eastern Wyoming, crews of Mexican workmen were brought north from Taos and Santa Fe.

With the coming of the cattlemen from Texas between 1866 and 1886, headquarters and satellite camps of the open-range cattle outfits became scattered across much of the Plains. At the outset, their buildings were likely to

be of adobe or log-in-panel construction. The two-pens-and-a-passage construction of the southern frontier was used to a limited extent as far north as Wyoming and Montana.

While settlers moving into the Great Plains used logs when they were available, they soon found the supply inadequate and too far removed. Blocks of prairie sod laid like adobe blocks became the expedient way to construct houses and outbuildings. Even roofs were constructed of sod over willow poles or boards.

With the building of railroads across the Great Plains, homesteaders began to use boards and tarpaper for their houses. Until recently many of these homestead-period frame houses in western Oklahoma remained unfinished inside. Further north, winter winds required tight construction; therefore, lath and plaster interiors were common.

After construction of the railroads through the region, Plains architecture began to reflect mainstream Victorian architecture, although the economics of life on the Plains kept gingerbread trim at a minimum except on the most affluent farms and in the growing towns. In a few select locations, such as the post rock country of western Kansas, stone construction became the norm. Elsewhere in the region it was used only by the upper class. By the turn of the century, the large, square Victorian house was practically a trademark of the Plains; within a few years, the simple cabin, sod house, or frame shack of the traders, the homesteaders, and the early stage-line keepers had begun to fade from the scene.

Buffalo Exploitation

The primary utilization of the buffalo (bison) in commerce was in the form of Indian-tanned buffalo robes. This continued until after the Civil War, when commercially tanned robes began to compete with the Native American products. An expanding population in the post-Civil War era demanded more leather, and buffalo hides were a potential source. Shoes, boots, luggage, and especially leather belting for the line-shafting that ran most manufacturing machinery, increased in demand.[74]

When emigrants first started to move across the Great Plains, the buffalo were present in apparently inexhaustible numbers. But hunting by the Native Americans, by parties attached to emigrant caravans, and by traders residing along the trails all reduced the numbers of these animals by 1866. Impact was heaviest along the main trails across the Great Plains, and this impact was one of the Native Americans' objections to such travel.[75]

Railroad construction crews moving across Nebraska and Kansas from 1865 through 1868 required great quantities of provisions. Contractors sought to cut costs by hiring hunters to bring in buffalo meat. The incidential marketing of uncured hides from this hunting may have been the stimulus to a broader market for such hides, and certainly the railroad made transportation to market less costly.[76]

Commercial buffalo hunting peaked in Kansas in 1872; by 1874 most of the hide hunters were moving south through the Indian Teritory and into the panhandle and high plains of Texas. During this period the greatest buffalo kill in western Nebraska occurred. The demands of the Colorado mining camps reduced the numbers of buffalo in that territory.

In Wyoming, intensive hunting in areas near the military posts and the main trails through the southern part of the territory was coupled with the hunting pressure of increased numbers of Sioux, Cheyenne, and Arapaho who had come to the country north of the North Platte after 1860. So, Wyoming's buffalo population was already well on the wane when the army campaigns of 1876-77 cleared the area of hostile Native Americans so that white hunters could move safely into the Powder Basin.

Most of the commercial hide hunting in northern Wyoming was based in two camps on the Powder River -- one near the mouth of Salt Creek, operated by the Freund Brothers of Cheyenne, and one about four miles below the old Fort Reno site. The last of the commercial-sized herds had been killed by the autumn of 1878, and hunters such as Jim White and O.P. Hanna relocated to the Goose Creek country, where they hunted elk and deer to supply the garrison at Fort McKinney near Buffalo.

Open Range Cattle Industry

The range cattle industry in the study area involved two interrelated facets: first, there had always been a stock-raising belt at the edge of the westward-moving settlers' frontier. Then after the Civil War the movement of Texas cattle north to market began. Both of these movements contributed to the rapid stocking of the range from Kansas and Colorado north into Nebraska, Wyoming, and the Dakotas during the 1870s.

Cattle Drives. Early settlers in Texas received lands from the Mexican government under terms that were much more favorable to the stockman than to the farmer. Grants of 4251 acres were available for stock raising , while only 177 acres constituted a grant for a farm; therefore, most of the early settlers filed as stock raisers. As the Texas frontier expanded, people grazed their stock on adjacent unoccupied lands. Both the Republic of Texas and the subsequent state government tolerated this practice. By 1842, Texas was exporting significant numbers of cattle. Most were driven either to New Orleans or to Shreveport and then shipped down the Red River to New Orleans. Some were shipped out of Gulf ports.[77]

In 1846, a herd of Texas cattle were driven to Ohio to be fed before being marketed. In 1850, cattlemen began to drive stock to California to meet the gold rush demand and to expand ranching operations in that state. By 1856 considerable numbers of Texas cattle were being driven to northern Illinois, but the outbreak of Texas fever in herds in Missouri and Illinois caused a public furor that interrupted this movement for a time. During the Civil War, some Texas cattle were driven east to furnish beef for the Confederate forces, but Union control of the Mississippi by 1863 ended that practice. With distance markets cut off, the Texas cattle increased sharply in numbers; by 1866, there were estimated to be between 3 and 5 million head.[78]

The demand for beef in the industrial Northeast grew after the Civil War. Both Texas cattlemen and northern cattle buyers recognized the potential profits in a situation where beef brought as much as five to ten cents a pound on the hoof in eastern cities, and cattle could be bought for $1 to $6 per head. About 260,000 head were driven north in 1866. As in the prewar years, most of these

cattle were moved along the Texas Road through the Indian Territory in eastern Oklahoma, and then across Missouri on well-established trails, but the drovers encountered much interference and opposition from settlers along the way.[79]

With the Kansas Pacific Railway building west up the Kansas River valley, it was only a matter of time until a shipping point further west along the rail lines was established. Joseph C. McCoy built stockyards at Abilene, Kansas, in the summer of 1867. Cattle driven to Abilene largely followed what became known as the Chisholm Trail, but some destined for Junction City a few miles to the east on the rail line followed the old Texas Road into the Indian Territory and then branched off on the West Shawnee Trail, virtually directly north to their destination.

Settlement moving west up the river valley of Kansas cut off access to Abilene before long, and drovers began to ship from points further west, such as Fort Hayes. Then, the Santa Fe Railroad angled southwest across Kansas, and Newton and Dodge City became important shipping points. In the 1870s, many cattle were moved north to stock ranges in western Kansas, western Nebraska, and southeastern Wyoming. Many of these cattle were driven past Dodge City north to Ogalalla, Nebraska, or further west to Cheyenne.

Still others took the Goodnight Trail up the Pecos, over low passes into Colorado near Trinidad and La Junta and north over the Colorado ranges. The volume of this northern cattle drive traffic increased from 75,000 head in 1868 to 600,000 head in 1871. By then the ranges south of the hostile Native American country were filling up and shipments dropped to just over 150,000 head in 1875. But in 1876 as a result of major campaigns against the northern Plains tribes, shipments jumped to more than 300,000 and stayed generally above one-quarter million head per year through 1885.

<u>The Northward Expansion of Ranching</u>. For a time, hostile Native American activity south of the Cimarron in western Oklahoma and the Texas panhandle deterred the development of a ranching economy. Actually, the ranching industry moved into the Plains at the foot of the Front Range in Colorado earlier than it did to southwestern Kansas or western Oklahoma.

The demand for beef occasioned by the Colorado gold rush brought the first ranchers to the upper South Platte and the Cache la Poudre country during the early Civil War years. As the hostilities abated in the late 1860s, ranchers pushed eastward down the South Platte and the Arkansas. By 1870, most of eastern Colorado was utilized by the open-range cattle industry.

Mackenzie's and Miles' campaigns against the Comanche, Kiowa, and Prairie Apache in 1873-74 cleared the Texas panhandle for white settlement and made the transporation of range stock across western Oklahoma much safer. Initially, western Oklahoma was allotted to the newly conquered Plains tribes. Some stockmen ranged their herds into the area although this was hazardous. More frequently, grazing associations leased large blocks of land from Native Americans and subdivided it among their members.[80]

Most of the early cattle drives were destined for specialized markets north of the Union Pacific Railroad. Except for the Black Hills gold camps, the biggest markets of the 1870s and 1880s were the Native American agencies, such as Pine Ridge, Rosebud, and other Sioux agencies in Dakota and the Crow agency in Montana. Military posts such as Forts D.A. Russell, Laramie, Fetterman, Robinson, McKinney, Keogh and smaller installations consumed a good deal of contract beef. Drovers developed branches of the earlier cattle trails to serve those points of sale. The Texas Trail through eastern Wyoming was a broad corridor from Cheyenne to Ogallala, Nebraska, where it fanned out to markets further north. Cattle drives over these trails expanded in volume as stockmen began to fill the ranges of the northern Great Plains. In this period, large numbers of cattle bound for Montana and for the prairies of Canada moved north through the Power Basin west of the Black Hills.

Following the pattern developed on the plains of Kansas and Colorado, stockmen located their headquarters along watercourses and built low-cost log, sod, adobe, or lime-concrete buildings. They often fenced a horse pasture, but filing a homestead claim on the tract was unusual. In Wyoming, very few outfits sought to own land in the 1870s and the early part of the 1880s. East of the Black Hills in the Sioux reservations, practically all ranching was carried on by large firms who leased grazing rights from Native Americans.[81]

In Nebraska and Wyoming along the main transcontinental trails (which were previously discussed in Chapter 4), some stock ranching was conducted by the traders as early as the 1840s. The most common practice was to buy trail-worn oxen from passing travelers, graze them through the winter and spring, and trade off a fresh animal in good condition for two trail-worn ones, adding steadily to the herds. Freighters providing logistic support for the Utah Expedition wintered many thousand cattle in Wyoming, Nebraska, and Colorado in 1858-59.[82]

So, the grazing potential of these northern ranges was thoroughly proven. The Colorado ranchers along the South Platte let their stock range as far north as the rail line by 1869. In that year, A.H. "Heck" Reel, a prominent freighter, brought 148 head of Texas cattle north of the Union Pacific railroad and grazed them on Pole Creek north of Hillsdale. Large herds of cattle were brought into the country between the rail line and the North Platte in 1870. Sheep were brought in by the Durbin Brothers and others that same year. The railroads actively promoted the development of the livestock industry, since it promised to increase their eastbound traffic.[83]

The Great Range Cattle Boom. In 1871 Dr. Hiram Latham, a Union Pacific surgeon, wrote The Pasture Lands of North America, in which he described the range lands of the region along the Union Pacific and projected possible profits from stock-raising ventures. Newspapers of the region also promoted the early expansion of stock raising in Wyoming and western Nebraska. By 1875 the country south of the North Platte was reported to be full of range cattle. Cattlemen were stalled by the Sioux, Cheyenne, and Arapaho, to whom the country was an unceded hunting ground under the 1868 treaties. However, by spring of 1877 Native Americans had been driven from the region, and the cattlemen began to move in.

R.S. Van Tassell took the J.A. Moore herds from the South Platte in Colorado to the Running Water (Niobrara) in 1877. The Carey Brothers moved their main herd from Horse Creek to the north side of the Platte, C.F. Coffee brought a herd to Hat Creek, and Frank Lusk took a herd to the upper Niobrara. Two young Englishmen, Moreton and Richard Frewen, built a large headquarters just below the confluence of the north and middle forks of the Powder River in

the spring of 1879 and brought in 10,000 head of cattle from Montana and another 7,000 from Texas. Ranches were established on public lands in the Black Hills region in 1878 and 1879.

With the stocking of the northern ranges came the beginnings of a boom in the range cattle industry. Colonel James S. Brisbin's book, The Beef Bonanza, or How to Get Rich on the Plains, expanded upon Latham's calculations and projections about the business. He cited many instances of high profits from the late 1870s. Attracted by such publications and by the promotional efforts of people like the Frewens, eastern and foreign businessmen began to invest in the industry. Most of this capital was invested in herds of cattle. Throughout the Great Plains, large corporate cattle companies dominated the industry from 1880 to 1887. The cattle changed hands on the basis of a book count, rather than an actual physical inventory. Many speculators bought and sold book count herds that they had never seen. Basic range stock was not counted, even at the periodic roundups. Taking the book-count at time of purchase, a certain natural increase was assumed by rule of thumb. Rough estimates of losses by winter kill, predation, and theft were applied to update the book count yearly.

By 1885 ranges were stocked to or beyond their natural carrying capacity. The country south of the Arkansas River that year saw a severe drought and many cattle died. Survivors were sent into an already saturated market. The next year on the northern Great Plains, a dry year in combination with overstocking by both the native herds and by Texas cattle driven north in 1885 to escape the drought set the stage for disaster.

From Montana and the Dakotas south to the Arkansas River, the winter of 1886-87 was the worst the cattlemen had seen. With cattle dispersed over the range without provision for any kind of winter feed, losses were high. Only the best financed and managed companies survived the next few years of retrenchment and reorganization by developing new management techniques that were less speculative and more realistic. The companies that could afford to do so now tied down water sources and some even bought up key blocks of grazing land as others had been doing in Colorado and in Texas for some years. Railroads sold off large land-grant holding in this period, many of which went to expand the

more solidly financed ranching operations. Ranchers began to acquire well-watered tracts that could be fenced off and used for winter pastures. In some areas they began streamside irrigation projects to increase hay production, but still the greatest changes in ranching lay ahead.

Transportation and Communication

Early Mail Service. On March 3, 1847, Congress authorized the first regular U.S. Post Office mail shipments to the Pacific Coast. The first mail in the system sailed by navy ship from Charleston, South Carolina, to Panama in the fall of 1848, where it was carried across the isthmus to other ships, which carried it on to California and Oregon. Time in transit was about four weeks. In 1850 the post office issued its first account for overland service. The segment across Wyoming went to Samuel M. Woodson of Independence, Missouri, who transported the mail by pack mules.[84] Woodson took the contract to deliver mail monthly from Independence to Salt Lake City, by way of Fort Kearny, Fort Laramie, and South Pass.

In 1854, W.M.F. McGraw secured a contract when Woodson's contract expired, providing for monthly service with four-horse coaches. He held the contract for two years, and the next contractor was Hiram Kimball of Utah, acting as agent for the Brigham Young Express Company. Kimball built a series of stations along the way; widely spaced, they served not only as mail stations, but as repair and supply points for Mormon emigrants and as trading posts for the general traffic on the trails. With the coming of conflict between the Mormons and the federal government, the Kimball organization abandoned its stations and destroyed most of them during the retreat to Utah. As an interim measure, S.B. Miles contracted to carry the mail until a new contract could be planned.

The Kansas Pacific Railroad (originally called the Union Pacific, Eastern Division), built across Kansas to Denver between 1866 and 1868, brought an end to the transcontinental covered-wagon migration and to stagecoach operations. Both of the older means of transportation were now relegated to service as feeder lines from the railroad.

Butterfield Stage. On March 3, 1857, Congress authorized expanded mail service to California. The Postmaster General advertised for bids to be opened on July 1 of that year. Reviewing the bids, the Department selected one of the three proposals submitted by John Butterfield.

Influenced by the probability that milder weather along a southern route would ensure more regular service, the Postmaster General selected Butterfield's proposal for service from Memphis and St. Louis to Fort Smith, Arkansas, and thence by one of Marcy's trails to Colbert's Ferry, across Texas, New Mexico, and Arizona to California. In the portion of the route of significance to this study, the line followed established trails already used to supply the settlements that were by now well developed, and farmers along the way stabled the stage horses to augment their own income.

The coaches began to run on a twice-weekly basis on September 15, 1858. The Butterfield line was generally regarded as the main service to the far West until the outbreak of the Civil War, when the department cancelled the contract and transferred the West Coast mail to a central route.[85]

Stage Lines on the Central Route. On a central overland route, S.B. Miles had received a contract extension to June 25, 1858.[86] In May 1858, the department issued a contract to John Hockaday for service on a regular basis over the central route. Hockaday built a few widely spaced stations along the route and made extensive use of existing trading posts as stations as well.[87] The demand for mail service to the Colorado settlements in the winter of 1858-59 led veteran mountain man Charles "Big Phil" Gardiner to run a private pack-horse mail service from Fort Laramie to Denver.[88]

At this time, William H. Russell, of the freighting firm of Russell, Majors and Waddell, in association with John S. Jones formed the Leavenworth and Pike's Peak Express Company (L&PP). They built some stations along the northernmost (Republican River) route from the Kansas River to Colorado. After a month's operation, they abandoned this route and ran their stages over the Oregon Trail in order to combine their main line with the Hockaday line, whose contract they bought. They served Denver with a shorter branch line up the South Platte.[89]

The L&PP Express Company went bankrupt in late 1859, and Russell and Jones and their associates organized the Central Overland California and Pike's Peak Express (COCPP). The new firm built more and better stations along the line, which ran northwest from the California Crossing on the South Platte to Mud Springs Station and thence northwest to Fort Mitchell and on to Fort Laramie.

In the spring of 1860, the COCPP launched Pony Express service along this line as a temporary fast message service pending completion of the Pacific Telegraph, then under construction. The telegraph line was built along the stage route, utilizing the same structural complex as the stage stations, and was completed by October 1861.[90]

With the suspension of the Butterfield contract in 1861, all the mail of that line was transferred to the COCPP. The COCPP suffered from losses absorbed from the Pony Express operations and from overinvestment in its freighting stock and equipment. Its cash flow problem became progressively worse, and by the spring of 1862 it was bankrupt. Finally, Ben Holladay, already well known for his stage coach operations on the West Coast, bought out the COCPP and reorganized daily service through the region.[91]

Because of Native American depredations along the North Platte and Sweetwater route in the spring of 1862 and to make the stage more efficient, Holladay secured permission to change the route.

With troops of the 6th Ohio Volunteer Cavalry, the 4th United States Infantry, and the Utah Militia as escorts, Holladay moved his personnel, stock, and equipment to the new line and went into operation on July 21, 1862. This route followed the South Platte (as did the old Denver Branch Line) to a point called Junction Station, just west of present-day Fort Morgan. There the main line continued west to Fort Collins, turned northwest through Virginia Dale to the Laramie Plain, and continued west over Bridger's Pass and across the desert using the Cherokee Route.[92] Most of the transcontinental traffic after 1862 used the same trail as the new stage route. Branch emigrant traffic to Montana still went by way of Fort Laramie to reach the Bozeman Trail and the Bridger Trail

farther up the Platte. Traffic for Colorado left the route at Junction Station and followed the South Platte to Denver.[93]

Stage Stations and Roadside Sites. Along the main trails taken by emigrants going west, there are numerous places where there were once stations for the stage, mails, and Pony Express line. Sometimes these were combined with trading posts that housed a country store, an eating and almost surely a drinking establishment, and sometimes other amenities. Most of these stations and ranches are now gone. Some of the sites themselves have seen such a colorful range of historic activity that they have considerable interpretive potential as roadside informational points. The mail station site at Ash Hollow, Nebraska, is an example of this kind of site.

Railroad Construction. Construction of the two Union Pacific lines across the study region is described by one recent writer as the "major human effort since at least the building of the pyramids." Intensive survey and engineering work, grading and track laying, and the construction of stations proceeded at a rapid rate, with many small historic incidents of local interest along the way. Most of these involved conflicts between hostile Native Americans and the crews and the soldiers stationed along the line for its protection.

Once the first transcontinental railroad line was completed in 1869, railroad promoters and builders planned and began to build other lines. The Atchison, Topeka and Santa Fe Railroad had hopes of becoming the second transcontinental line. As fast as right-of-way and capital could be secured, the line was built southwesterly across Kansas to reach the Colorado border by 1873. Lines stretched southwesterly from Missouri and Kansas to cross the Indian Territory. Branch lines pushed out from Denver to Cheyenne, from points along the Kansas-Pacific and the Santa Fe, and north from Texas to the Indian Territory.

In Louisiana and Arkansas there was a 30-year period of almost constant railroad building to develop a network that would serve the region's farms,

forests, and mines. The arrival of these lines stimulated coal mining in central Arkansas and in Indian Territory. In Nebraska, the Northwestern was built up the Elkhorn Valley from Omaha and crossed the northern edge of the Sand Hills to reach the High Plains. This line moved into Wyoming past Van Tassell, Lusk and Manville in the late 1880s and reached Casper in 1888. The Denver and Rio Grande pushed south to New Mexico in the 1870s and the Colorado and Southern extended its line north to the copper and iron deposits at Hartville in the late 1880s.

By 1890 a substantial network of rail lines was in place, stimulating the opening of vast areas of new farmland in Oklahoma, Kansas, Nebraska, Colorado, Wyoming, and the Dakotas. And a comparable, even more dense network served Arkansas and Louisiana. In the late 1800s those areas not adjacent to the railroads were still served by stage and freight lines, but the routes were much shorter and less expensive than their long-distance predecessors.

Transportation, 1890 to 1920. While a few new branch rail lines were built in the early part of this era, the basic rail network was complete throughout the study area by the 1890s. After 1905 the automobile began to play an effective role in transporation over much of the region.

The automobile was most important in the prairie and plains country, since it brought fast transporation to many farming and ranching communities beyond the reach of the railroads. But its widespread use depended on its low cost. The introduction of the Model-T Ford in 1907 revolutionized large-scale automotive production. By the end of World War I, the "T" was the basic transportation over most of the Plains country.[94] World War I brought rapid expansion in the quantity and quality of trucks, four-wheel-drive vehicles, and tracked vehicles. All these played a role in opening up the new oil fields in that same period.

In Oklahoma and Kansas there were a number of experiments in interurban electric rail transportation in the more densely settled portions of these states in this period, but most of these were very short lived, unable to compete in cost or popularity with the cheap and efficient automobile.

Mining Frontier and Mineral Development

The Black Hills Gold Rush. An important factor in the settlement of western South Dakota, northwestern Nebraska, and northeastern Wyoming was the discovery of gold in the Black Hills by prospectors accompanying a government expedition in 1874. More prospectors flocked to the hills in 1875, helping to precipitate the Indian Wars of 1876-77.

Stage coach service to the hills followed routes from Cheyenne, Wyoming, Sidney, Nebraska, and Bismarck, South Dakota. Later, a branch of the Rock Creek Stage Line was built from a station near Pumpkin Buttes northeast to Deadwood. The gold rush population of the hills offered a good market for beef and farm produce, hastening the growth of ranching in the surrounding area.

The shift from placering to hard-rock mining operations in the 1880s increased the demand for rail service into the hills, and a number of lines were built into the area, which in turn stimulated further settlement.

Oil and Natural Gas. Pioneers moving west across the study area usually found the first evidence of oil deposits in the form of oil seeps or springs. Fur traders noted one such spring in west-central Wyoming in the 1820s. Another provided wagon grease to Oregon Trail emigrants in the 1840s and 1850s. A number of oil seeps were found in eastern Oklahoma when the Five Civilized Tribes began to settle there.

The first producing oil well was an accidental discovery made during drilling of a water well near Salina, in what is now Mayes County, Oklahoma, in 1859. The first commercial production from most of the major fields came in the 1890s. Until then, inadequate branch-line rail service deterred exploration because of the high costs of marketing the product.

The sensational large-volume oil discoveries of the Spindletop Field on the Texas coast in 1901 touched off a widespread boom in large-scale oil field exploration. Most of the major fields in the study area were opened in the two decades before 1920. The Gulf Coast Field was found to extend across into Louisiana's salt-domes region, while the east Texas Field reached out into

western Louisiana and southwestern Arkansas. Nearer the study area, Glenn Pool began production near Bartlesville, Oklahoma, in 1905 and the Burbank Field opened in 1920.

Exploration moved north into southern Kansas, with important discoveries there before 1915. While some limited oil development occurred in Wyoming in the late 1880s, using equipment and technology derived from Pennsylvania experience, widespread exploration began only in the early 1900s. The concentrated resources of the major oil companies, plus technology and trained manpower from the southern oil fields, were brought to bear in Wyoming by World War I.[95]

Coincident with this exploration and that in the South came a revolution in refining technology. In 1913 expanded use of the automobile had brought about a worldwide gasoline shortage. Standard Oil Company at that time developed the Burton Still. This equipment increased markedly the amount of gasoline that could be obtained from a barrel of oil. The first such plant in the West was located at Casper, Wyoming, in 1915. Known reserves of lightweight, high-grade crude were available in the Salt Creek Oil Field near Casper. From this start the Burton process spread to the Midcontinent Field in Oklahoma and Kansas and to other fields where the necessary grade of oil was available.[96]

Growing use of automobiles, trucks, and military equipment kept the petroleum industry in all these areas in a state of rapid expansion into the early 1920s. Natural gas was used near the major fields in these decades, but its main development was after 1920.

Coal. The Western Interior Coal Field underlies much of eastern Kansas, eastern Oklahoma, and western Arkansas. Mining on a small scale began in the 1870s but expanded railroad and industrial use brought these coal fields to a high level of production in the early 1900s. Expanding demand during World War I brought production in these southern coal fields to a peak in 1920.

Early explorers noted coal outcrops with some frequency in the country west of the Black Hills. Members of the Sawyers Wagon Road Expedition in 1865

made some crude burning-tests of coal southeast of present-day Gillette. The coming of the Burlington Railroad to Wyoming by way of Newcastle and Gillette in the period between 1889 and 1892 expanded coal production. First, population growth in the area increased the domestic demand and a number of small-scale mines filled it. Then the needs of the railroad encouraged coal-prospecting. A major deposit near Newcastle was opened for locomotive and domestic fuel in the early 1890s, centered around the company town of Cambria. It continued to produce large amounts of coal until the end of World War I.[97]

Other Minerals

The most important metallic mineral deposit in the study area is the bauxite of Arkansas. Aluminum was simply a scientific curiosity until experiments in the mid-1880s paved the way for its production electrolytically in Europe. Limited production began in the United States in the early 1900s, and by 1920 production was 69,000 tons annually, with most of the ore coming from Arkansas.

Sulfur, salt, and iodine production from the salt-domes of southern Louisiana began in the first two decades of this century. In Wyoming a few miles west of the study area near Hartville, limited production of iron ore began in the late 1890s, but this quickly increased with the development of the Sunrise Mine and the expansion of its output in the 1900 to 1920 period. Underground mining of salt in Kansas became a widespread activity in this period.

The quarrying of building stone for local use has been a distinctive activity in many segments of the study area. Some notable deposits receiving large-scale architectural use are in the post-rock country of western Kansas, in much of eastern Oklahoma, and northern Arkansas.

NOTES AND REFERENCES

1. John W. Reps, Town Planning in Frontier America, (Princeton: Princeton University Press, 1971), pp. 97-98.

2. National Register of Historic Places, Vol. I, (Washington, D.C., Department of Interior, National Park Service, 1976), pp. 272-281.

3. Reps, Frontier America, p. 98.

4. Reps, Frontier America, p. 101.

5. Charles Gayarre, "Historical Notes on the Commerce and Agriculture of Louisiana, 1720-1766," Louisiana Historical Quarterly 2:286-291.

6. Marcus Whiffen, American Architecture Since 1780: A Guide to the Styles, (Cambridge: Massachusetts Institute of Technology Press, 1969), pp. 14-15.

7. Corrine L. Sancier, "A Historical Sketch of the Acadians," Louisiana Historical Quarterly, 34:63-89.

8. Norman W. Caldwell, "Tonti and the Beginning of the Arkansas Post," Arkansas Historical Quarterly 8:189-205.

9. Charmion C. Shelby, "St. Denis' Second Expedition to the Rio Grande, 1716-1719," Southwestern Historical Quarterly 28:190-216.

10. Elizabeth A. Harper, "The Trade and Diplomacy of the Taovayas Indians on the Northern Frontier of New Spain, 1719-1835," Master's Thesis, University of Oklahoma, 1951.

11. Henri Folmer, "Etienne Veniard de Bourgmond in the Missouri County," Missouri Historical Review 36:279-298.

12. Harper, "Trade and Diplomacy," pp. 16-19.

13. Henry E. Allen, "The Parilla Expedition to the Red River in 1759," Southwestern Historical Quarterly 43:53-71.

14. Athanase de Mezieres and the Louisiana-Texas Frontier, vol. I, Herbert E. Bolton, ed., (Cleveland: Arthur H. Clark Co., 1914).

15. Works dealing with Cherokee Settlement and relocation west of the Mississippi include Thomas Nuttall, Journal of Travels into the Arkansas Territory, 1819 (Cleveland: Arthur H. Clark Co., 1905), Herbert Kappler, Indian Laws and Treaties, (Washington, D.C.: Government Printing Office, 1903), Grant Foreman, Indian Removal (Norman: University of Oklahoma Press, 1932) and Grant Foreman, Indians and Pioneers (New Haven: Yale University Press, 1930).

16. The best overall synthesis of the fur trade era is provided in Paul C. Phillips, The Fur Trade, 2 vols., (Norman: University of Oklahoma Press, 1961).

17. For an account of Stuart's travels, see Robert Stuart, On The Oregon Trail, Kenneth Spaulding, ed. (Norman: University of Oklahoma Press, 1953).

18. David Lavender, Bent's Fort, (New York: Doubleday and Co., 1954) p. 52.

19. Dale L. Morgan, Jedediah Smith and the Opening of the West, (Lincoln: University of Nebraska Press, 1967), pp. 26-41.

20. Isaac J. Cox, "Opening the Santa Fe Trail," Missouri Historical Review, 25:30-66.

21. Herbert E. Bolton, Athanase de Mezieres and the Louisiana-Texas Frontier, vol. 1 (Cleveland: Arthur H. Clark Co., 1914), pp. 66-67.

22. Bolton, Athanase de Mezieres, vol. 1, pp. 66-67.

23. Bolton, Athanase de Mezieres, vol. 1, pp. 71-72.

24. W.R. Shepherd, "Wilkinson and the Beginnings of the Spanish Conspiracy," American Historical Review 9:490-506.

25. For a more detailed account of the Lewis and Clark expedition, see Ruben Gold Thwaite, Original Journals of the Lewis and Clark Expedition, 1804-1806 (New York: Dodd, Mead, and Company, 1905).

26. James K. Greer "Louisiana Politics, 1845-1861," Louisiana Historical Quarterly 12:381-425, 555-610, 13:67-118, 257-303, 444-483, 617-654. Jack B. Scroggs, "Arkansas and the Secession Crisis," Arkansas Historical Quarterly 12:179-224.

27. Jessie Randolph Moore, "The Five Great Nations and the Part They Played in the War Between the States," Chronicles of Oklahoma, 29:324-336.

28. Fletcher Pratt, A Short History of the Civil War (New York: Cardinal Publishers, 1952), pp. 127-136, 208-217.

29. Fred V. Harrington, "Arkansas Defends the Mississippi," Arkansas Historical Quarterly 4:109-117.

30. Richard H. Williams, "General Bank's Red River Campaign," Louisiana Historical Quarterly 32:103-144.

31. George Walton, Sentinel of the Plains, (Englewood Cliffs, New Jersey: Prentice-Hall, 1973), pp. 136-137.

32. Oscar O. Winther, The Great Northwest, (New York: Knopf Publishers, 1964), pp. 127-141.

33. David Lavender, Westward Vision: The Story of the Oregon Trail (New York: McGraw-Hill, 1963), p. 381.

34. Donald M. Frost, Notes on General Ashley (Barre, Massachusetts: Barre Gazette, 1960) pp. 134-136.

35. Merrill J. Mattes, The Great Platte River Road (Lincoln, Nebraska: Nebraska State Historical Society, 1969), pp. 22-23.

36. John C. Fremont, "Report of the Exploring Expedition to the Rocky Mountains in the year 1842 and to Oregon and North California in the years 1843-1844" (Buffalo, New York: Perby Publishers, 1851).

37. Charles Preuss, "Map of the Route from Independence to Walla Walla," (Washington, D.C. Government Printing Office, 1845).

38. Mattes, Platte River Road, p. 23.

39. Stephen W. Kearny, "Report of a Summer Campaign to the Rocky Mountains in 1845," United States Senate, Executive Document 1 (29th Congress, 1st Session, 1846).

40. Thomas Kearny, General Philip Kearny, Battle Soldier of Five Wars, Including the Conquest of the west by General Stephen Watts Kearny (New York: Putnam Publishers, 1937), pp. 113-135.

41. Mattes, Platte River Road, p. 23.

42. Howard Stansbury, "Exploration and Survey of the Great Salt Lake," United States Senate, Executive Document 3 (32nd Congress, Special Session, 1851).

43. John Brown, "Diary: Journal of the Cherokee Nation," Chronicles of Oklahoma, pp. 190-198.

44. Merrill J. Mattes, "Captain L.C. Easton's Report: Fort Laramie to Fort Leavenworth via the Republican River in 1849," Kansas Historical Quarterly, May 1953, p. 91.

45. James H. Simpson, "Report and Map of the Route from Fort Smith, Arkansas to Sante Fe, New Mexico," United States Senate, Executive Document 12 (31st Congress, 1st Session, 1850).

46. F.T. Bryan, "Report on the Road from Fort Riley to Bridger's Pass," United States House of Representatives, Executive Document 2 (35th Congress, 1st Session, 1857).

47. "Report of the Secretary of War," United States Senate, Executive Document 1 (35th Congress, 2nd Session, 1858).

48. M.M. Long, "Journal from Independence, Missouri to Fort Thompson," Fort Kearny, South Pass and Honey Lake Wagon Road Papers (Washington, D.C.: National Archives, Department of Interior Records, undated).

49. Calvin W. Gower, "The Pike's Peak Gold Rush and the Smoky Hill Route," Kansas Historical Quarterly 25:158-171.

50. For more detailed information, see Margaret Long, The Smoky Hill Trail (Denver: Kistler Stationary, 1947).

51. William E. Lass, From the Missouri to the Great Salt Lake (Lincoln, Nebraska: Nebraska State Historical Society, 1972) pp. 79-113.

52. Lloyd E. McCann, "The Grattan Massacre," Nebraska History 37:1-26.

53. "The Battle of Blue Water," United States Senate, Executive Document 58 (34th Congress, 3rd Session, 1857).

54. John B.S. Todd, "The Harney Expedition Against the Sioux," Nebraska History 43:110-125.

55. "Annual Report of the Secretary of War for 1856," United States Senate, Executive Document 5 (34th Congress, 3rd Session) vol. 3, pp. 32, 106-116.

56. Relations with the Indians of the Plains, 1857-1861, Leroy R. and Ann W. Hafen, eds., (Glendale: Arthur H. Clark Company, 1959), pp. 21-48.

57. James G. Blunt, "General Blunt's Account of His Civil War Experiences," Kansas Historical Quarterly 1:211-265.

58. Hubert Howe Bancroft, History of Nevada, Colorado, and Wyoming, 1540-1888 (San Francisco: History Co. Publishers, 1890) pp. 466-4700.

59. Robert M. Utley, "Kit Carson and the Adobe Walls Campaign," American West 2:4-11, 73-75.

60. George Hyde and Savoie Lottinville, The Life of George Bent (Norman: University of Oklahoma Press, 1968), pp. 137-223.

61. Charles J. Kappler, Indian Affairs, Laws, and Treaties, vol. 2, (Washington, D.C.: Government Printing Office, 1904), pp. 887-895.

62. Robert G. Athearn, William T. Sherman and the Settlement of the West, (Norman: University of Oklahoma Press, 1956), pp. 3-44.

63. Robert A. Murray, "Wagons on the Plains," By Valor and Arms 2:37-39.

64. Theodore Davis, "A Summer on the Plains," Harper's New Montly Magazine, 36 (February 1868): 292-307.

65. Donald J. Berthrong, The Southern Cheyenne, (Norman: University of Oklahoma press, 1963), pp. 306-308.

66. George A. Forsyth, "A Frontier Fight," Harper's New Monthly Magazine, 91 (June 1895): 41-44.

67. Berthrong, Southern Cheyenne, pp. 315-316.

68. J.R. Johnson, "Nebraska in the Seventies," Nebraska History 37:79-102.

69. Gilbert C. Fite, "Development of the Cotton Industry by the Five Civilized Tribes in the Indian Territory," Journal of Southern History 15 (August 1949): 345.

70. Solon J. Buck, "The Settlement of Oklahoma," Transactions of the Wisconsin Academy of Sciences, Arts, and Letters 15:372-374.

71. For more detailed information on the dry farming boom, see Mary W.M. Hargreaves, Dry Farming on the Northern Great Plains, 1900-1925 (Cambridge: Harvard University Press, 1957).

72. Vance Johnson Heaven's Tableland (New York: Farrar-Strauss Publishers, 1947), pp. 119-230.

73. A.B. Genung, "Agriculture in the World War Period," Yearbook of Agriculture, 1940 (Washington, D.C.: United States Department of Agriculture, 1941) pp. 277-295. Lloyd P. Jorgenson, "Agricultural Expansion into the Semiarid Lands of the West North Central States during the First World War," Agriculture History 23 (January 1949): 30-41.

74. Merrill Burlingame, "The Buffalo in Trade and Commerce," North Dakota Historical Quarterly 3:262-271.

75. Virtually all of the major complaints of the Indians at treaty conferences such as those at Horse Creek in 1851, at Medicine Lodge in 1867, at Fort Laramie and other points in 1868 relate to the competition for game in the country through which the trails passed. For example, B. Gratz Brown, letters in the Missouri Republican, for October 6, 17, and 22-26, and November 2, 9 and 30, 1851. "Report of the Indian Peace Commission, "January 7, 1868, United States House of Representatives Executive Document 97, (40th Congress, 2nd Session).

76. Theodore H. Davis, "The Buffalo Range," Harper's Monthly 38:147-163.

77. Leroy P. Graff, "Colonizing Projects in Texas South of the Nueces, 1820-1845," Southwestern Historical Quarterly 50:431-438. Edward E. Dale, The Range Cattle Industry (Norman: University of Oklahoma Press, 1960), pp. 3-6.

78. Dale, Range Cattle Industry, pp. 6-12.

79. Joseph Nimmo, "The Range and Ranch Cattle Business of the United States," United States House of Representatives, Executive Document 7 (48th Congress, 2nd Session, 1885), p. 28.

80. Martha Buntin, "Beginning of the Leasing of the Surplus Grazing Lands on the Kiowa and Comanche Reservation," Chronicles of Oklahoma 10:369-382.

81. Lewis Atherton The Cattle Kings (Lincoln: University of Nebraska Press, 1972), pp. 171-192.

82. "Report of the Commissioner of Agriculture," (Washington, D.C.: Government Printing Office, 1870), pp. 303-309.

83. John M. Kuykendall, "The First Cattle North of the Union Pacific Railroad," Colorado Magazine 7:69-74.

84. Robert A. Murray, "Class I Historic Resources Inventory for the Rock Springs District, Bureau of Land Management," (Sheridan, Wyoming: Western Interpretive Services, 1979), pp. 59-60.

85. For more detailed information, see Roscoe P. and Margaret B. Conkling, The Butterfield Overland Mail (Glendale: Arthur H. Clark Company, 1946).

86. Leroy R. Hafen, The Overland Mail (Cleveland: Arthur H. Clark Company, 1926) pp. 109-110.

87. New York Times, May 13, 1858.

88. New York Tribune, February 7, 1859.

89. Raymond W. and Mary L. Settle, Empire on Wheels (Stanford: Stanford University Press, 1949), pp. 42-44.

90. P. Raymond Nielson, "Edward Creighton and the Pacific Telegraph," Mid-America 24:61-74. Carlyle N. Klise, "The First Transcontinental Telegraph," Master's thesis, University of Iowa, 1937.

91. Hafen, Overland Mail, pp. 220-225.

92. David Street testimony, "United States Senate, Miscellaneous Document 19" (46th Congress, 1880), pp. 51-53.

93. John P. Gibson letter, Rocky Mountain News, February 1, 1863.

94. The writer (Robert A. Murray) has examined hundreds of manuscripts in WPA files, and has personally discussed the coming of the Model T era with many old timers. In addition, he had his first few years rides in one.

95. William T. Sullens, "The History of the Salt Creek Oil Field," Master's Thesis, University of Wyoming, Laramie, 1954.

96. Paul H. Giddens, Standard Oil Company of Indiana (New York: Appleton-Century-Crofts, 1955), pp. 140-171.

97. Edward C. Gillette, The Iron Trail (Boston: Christoper Publishing House, 1925), pp. 70-77.