Human Adaptation in the Ozark and Ouachita Mountains

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ABSTRACT

This overview provides a synthesis of the current state of knowledge concerning archeological resources in the Ozark Mountain—Arkansas River—Ouachita Mountain subregion of the U.S. Army Corps of Engineers, Southwest Division. Basic information on the environment of the study area is provided, followed by a review of the history of archeological research in the region. Prehistoric culture history is then reviewed according to the conventional framework of Paleo-Indian, Archaic, Woodland, and Mississippi time periods. Historic Native American, European, and American settlement history is also considered. The history of bioarcheological research in the region is summarized, and a suggested framework for future bioarcheological investigations is provided. Bioarcheological data pertaining to the Archaic, Woodland, and Mississippi periods are then reviewed and several interpretations are made. The overview concludes with a synthesis of the archeological and bioarcheological data and interpretations in terms of four prehistoric and five historic period adaptation types. The basic features of each adaptation are identified, along with specification of important data gaps and significant research questions.

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ACKNOWLEDGMENTS

Any attempt by a small group of writers to systematically review the evidence of prehistory and historic settlement throughout an area as large as the Ozark—Arkansas River—Ouachita region depends upon the aid of a large number of people for whatever level of success is ultimately achieved. While we were collecting reports and checking site files, staff members of archeological repositories in Missouri, Oklahoma, Kansas, and Arkansas provided valuable information and assistance. In particular, Robert L. Brooks, Oklahoma State Archeologist, and Don G. Wyckoff, Director of the Oklahoma Archaeological Survey, provided access to the Oklahoma Archaeological Survey library and discussed the status of research in northeast Oklahoma. Michael Weichman and his staff at the Missouri Office of Historic Preservation provided access to their report files for southwest Missouri, and graciously permitted us to copy relevant portions of their draft state plan. Michael O'Brien, Director of the Archaeological Survey of Missouri at the University of Missouri—Columbia also provided advice and access to reports in the Survey's files.

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Finally, we would be remiss to not thank Larry Banks and Fred Limp for providing us the opportunity to undertake this adventurous, if sometimes exasperating, literary excursion into the past.

INTRODUCTION

George Sabo III, Ann M. Early

This overview provides a synthesis of the current state of knowledge concerning archeological resources in the Ozark Mountain—Arkansas River—Ouachita Mountain subregion (Figure 1; hereafter referred to as the OAO study area) of the U.S. Army Corps of Engineers, Southwest Division. This is the first volume of a multiple unit cultural resource overview prepared for the Corps of Engineers by a number of regional specialists, coordinated through the Sponsored Research Program of the Arkansas Archeological Survey. Each overview has been prepared following a standardized format, described below.

The northern boundary of our study area was delineated primarily in relation to the northeastern terminus of the U.S. Army Corps of Engineers Southwestern Division. The eastern, southern, and western boundaries were delineated with respect to major environmental zones in this part of the country. In general, we attempted to reconcile major river drainages with modern political boundaries (i.e., counties). While there are some adventitious correspondences between our boundaries and the known or suspected extent of various prehistoric and historic cultural complexes in the region, in many instances such correspondences do not exist owing to the ever-changing distributions of past populations. Since no single study area could possibly coincide neatly with the extent of every cultural complex identified for this region, we have attempted to overcome discrepancies by including in our discussions data and interpretations from adjacent areas whenever it seemed prudent and worthwhile to do so. In a few instances, we admittedly have given short shrift to peripheral manifestations. In these cases fuller treatment will be found in the companion overviews prepared for the Southern Plains and Arkansas—Louisiana subregions of the Southwestern Division.

Basic information on the environment of the OAO study area is provided in Chapter 2 by Vogele. The history of archeological research in this region is reviewed in Chapter 3 by Early and Sabo. Chapter 4, by Sabo and Early, discusses the prehistoric culture history of the area using the conventional temporal framework of Paleo-Indian, Archaic, Woodland, and Mississippi periods. Historic period Native Americans

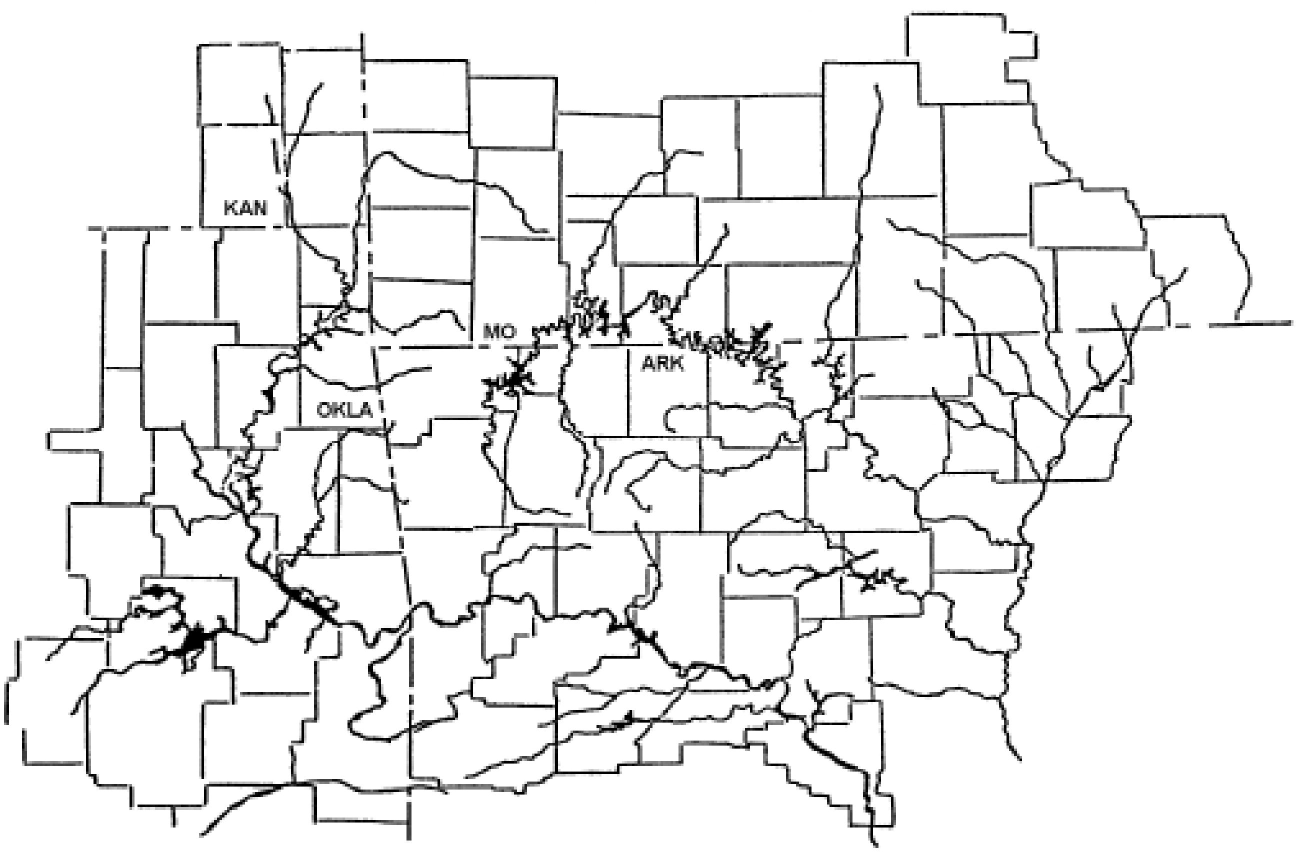

Figure 1. Map of the Ozark Mountains—Arkansas River Valley—Ouachita Mountain study area

are discussed in Chapter 5 by Sabo, and a sketch of European and American settlement history is presented in Chapter 6, also by Sabo. The history of bioarcheological research in the region and a suggested framework for future bioarcheological investigation is presented in Chapter 7 by Rose, Harcourt, and Burnett. Bioarcheological data and interpretations are discussed in Chapter 8 by Burnett. Chapter 9 by Sabo, Early, Rose, and Burnett attempts to synthesize the archeological and bioarcheological data and interpretations for the OAO study area in terms of a series of "adaptation types."

Use of the adaptation type concept is specifically intended to facilitate comparison of the state of archeological and bioarcheological knowledge throughout the Southwest Division and to provide an overall framework for the development of cultural resource management recommendations on a Division-wide basis. Fitzhugh (1972, 1975) defines the adaptation type as a generalizing construct that integrates regional environmental parameters with related aspects of technological and socioeconomic organization exhibited in past or present human cultural systems. As such the adaptation type is similar, though more general in scope as well as in data requirements, to the subsistence-settlement system construct (Struever 1971) more often employed by archeologists.

Adaptation type models combine salient features of specific human adaptive systems (e.g., hunting and gathering, agriculture, etc.) with the corresponding environmental parameters of those systems in a specific region (or type of region). Change through time in the cultural and/or environmental context may also be incorporated into these models, as necessary. When this approach is used to summarize the culture history of a specific region, the result is a series of models depicting each discrete human ecosystem type that can be abstracted from the available data. Usually these models transcend several locally defined archeological phases, foci, complexes, etc., thereby eliminating differences in cultural units that reflect only local stylistic patterns, or minor variations in adaptive organization (cf. Stoltman and Baerreis 1983).

In this synthesis of archeological and bioarcheological information for the OAO study area, we have preferred to use only those data which have been derived from well understood archeological contexts, and preferably dated by radiocarbon or other direct methods. Data and interpretations from poorly documented or poorly understood contexts are not used insofar as this is practical. A number of archeological studies are currently underway or have been recently completed in the OAO study area, and while some of these studies may provide significant new information on the region's culture history, we have tried to restrict our data base to research that has been completed, undergone the review process, and is available in published form to the archeological community and the general public. In some cases, we have bent this rule to incorporate recently generated information that supports important new interpretations of the past, but in general we have tried to use only information that is available in the public domain. Otherwise, project reports undergoing the review process at the time of writing were inspected and incorporated into the annotated bibliography which will supplement this overview. This approach will inevitably result in overlooking a few sites or references that some will consider important, but we believe the overall result of our approach is a more reliable, better supported set of interpretations than otherwise would be produced.

Additionally, we did not feel that it was necessary or desirable to review in detail the history and conceptual orientations of earlier syntheses of archeological data produced for this region. The main purpose of this narrative is to inform our readers, particularly the nonarcheologists in the audience, about current interpretations of past cultural activities and how these may be represented in archeological contexts. A careful, point-by-point review of the intricacies of changing culture historical reconstructions is inappropriate with respect to the purposes for which this overview has been prepared, and in any case would interest only a small handful of readers. For those with such interests, the earlier synthetic studies are cited in the bibliography.

A final point that we would like to make concerns the lack of information on prehistoric and historic sites for many specific localities within our study area. Owing to the history and vagaries of archeological research, the archeological and bioarcheological data base for the OAO study area is very unevenly distributed. The northern Ouachita Mountains and the central portion of the Arkansas River Valley between the Spiro and Toltec localities, as well as the central Ozark interior and eastern fringe areas, are all areas for which archeological data are very poorly known. In light of this circumstance, our overview of prehistoric and historic culture history and adaptations must be regarded as a general portrayal only, based specifically upon the best records wherever they might exist within (or adjacent to) our study area. Anyone using this overview for management purposes must therefore be mindful of the possibility that in many places within the OAO study area, patterns of cultural development — and consequently the nature of the archeological record — may be substantially different from those in areas which have been intensively studied. Most of the data we have relied on to produce this overview have come from the western portion of our study area, where environmental circumstances are markedly different from those found in the central and eastern portions. Even within the data-rich western portion of our study area, much of the information we have had to rely on was generated decades ago in the context of now-outmoded archeological practices. This even further limits the trust we should place in the interpretations offered in this study.

With these cautions in mind, we nonetheless feel that the synthesis of archeological and bioarcheological data using the adaptation type approach has yielded a revised and probably more accurate picture of prehistoric and historic settlement in the OAO area, which has been put in terms that should facilitate improved cultural resource management efforts. We like to believe, furthermore, that the results of our efforts here will be meaningful beyond merely pragmatic concerns, and will stimulate additional intellectual interest in and concern for the area's valuable cultural resources.

ENVIRONMENTAL SETTING

Louis E. Vogele, Jr.

Environment does not determine culture, but human ecosystems do provide one context in which the expression of culture may be assessed. For archeologists, an ecological approach is especially useful for studying the interaction between past human groups and their environments, and for delineating and interpreting the resulting cultural landscapes. In this chapter we review primary aspects of recent environments in the OAO study area. An understanding of the modern environmental context can serve as a baseline from which to extrapolate past environmental characteristics. Ecological relationships identified in modern contexts may also sometimes be used as analogs of past relationships.

THE ENVIRONMENT OF THE STUDY AREA

PHYSIOGRAPHY

The OAO study area is located within the Ozark Plateau and Ouachita physiographic provinces of the Interior Highlands and southeastern Central Lowlands divisions of the midcontinental United States (Figure 2). These physiographic divisions differ in terms of their geology and topography.

The Ozark Plateau is characterized by mildly folded and faulted structures that have produced a dissected landscape of deeply entrenched river valleys and gently sloping, plateaulike uplands. Carbonate limestones and dolomite are the most common rocks except in the Boston Mountains, where sandstones and shales are characteristic. The Ouachita province exhibits strongly folded and faulted structures resulting in parallel ridges and valleys, comprised predominantly of sandstones and shales (Thornbury 1965:263). West of these provinces in the Central Lowlands, the topography is characterized by strips of nearly level plain composed of shale bedrock alternating with hilly escarpments of limestone and sandstone (Fenneman 1938).

The Ozark Plateau province is a very old bedrock dome that has undergone repeated uplift and erosional episodes. The dome is elliptical in shape and has its highest point in the St. Francois Mountains of Missouri near its eastern end. The dome slopes gently to the west but abuts sharply with the Boston Mountains to the south. Bretz (1963:12) uses the analogy of an island (the St. Francois Mountains) rising above a sea of Paleozoic marine sediments to describe the Ozark Plateau province. The variegated landforms and relief of the Ozark Plateau is the result of several factors. These include differential resistance of bedrock to weathering and erosion, the structure of various bedrock types and their porosity, and erosion caused by streams (Rafferty 1980). Within the study area the Ozark Plateau province is divided into three subdivisions: the Salem Plateau, the Springfield Plateau, and the Boston Mountains (Figure 2).

The Salem Plateau is the largest subdivision. Though called a plateau, the region is highly dissected and eroded. It lies at an elevation of 1,100 to 1,300 feet above mean sea level (amsl), with valley floors 100 to 500 feet below the upland surface. Formerly, plateau top to valley floor distances were even greater, but through weathering and erosion upland surfaces

Figure 2. Physiography of the OAO study area

have been reduced. The resulting sediments have been redeposited on the valley floors, burying earlier surfaces and providing a base for more recent alluvial development.

The Springfield Plateau, found on the western border of the Ozarks, is a gently rolling plain with upland elevations of between 1,250 and 1,500 feet. It is an area with less relief and better soils than any other Ozark subdivision (Rafferty 1980). Karst topography, with features such as caves, sinkholes, and solution valleys, is common to the limestone portions of this region.

The third subdivision of the Ozark Plateau is the Boston Mountains. The southernmost subdivision of the province, they are also the highest and most eroded (Foti 1974). Upland surfaces in places exceed 2,200 feet, while local relief can be as great as 1,500 feet. The Boston Mountains consist largely of Pennsylvanian shale and sandstone, sharply contrasting with the limestone and dolomite bedrock of the Salem and Springfield plateaus (Bretz 1965; Foti 1974).

The Ouachita province occurs in central western Arkansas and eastern Oklahoma, between the Ozark Plateau and the Gulf Coastal Plain (Fenneman 1938). It too is divided into various subdivisions on the basis of differences in topography and physiography. For our purposes we need only be concerned with two of these subdivisions, the Arkansas River Valley and the Fourche Mountains (Figure 2).

The Arkansas River Valley is a narrow 18 to 24 km wide zone between the two major mountain systems of the region. The area is primarily rolling bottomland, yet it also contains areas of asymmetrical ridges and synclinal mountains, including the highest in the region. Also found within this subdivision is the Arkansas River alluvial plain, a distinctive feature in itself. The transitional nature of the subdivision is reflected in its gradual merging with the Ozark uplands to the north and the Ouachita ridges to the south (Foti 1974).

The Fourche Mountains occupy a narrow belt south of the Arkansas River Valley and north of the novaculite uplift of the central Ouachita Mountains. They are parallel ridges with maximum elevation and topographic relief toward their western end. Crests of these ridges are often over 2,000 feet amsl, and their general orientation is in an east-west direction (Foti 1974).

A small portion of the study area extends into the Osage Plains section of the Central Lowlands province. This is an unglaciated region of low relief that is interrupted at intervals by east-facing escarpments of limestones and sandstones. One of the more distinctive features of the Osage Plains is the Cherokee Lowland, a narrow strip of rolling grassland that gradually merges with the Springfield Plateau to the east, and is sharply bounded on the west by a high limestone escarpment near the Neosho River in eastern Kansas and Oklahoma (Fenneman 1938).

HYDROLOGY

The major drainages of the region are the Arkansas and White rivers. The western portion of the region is drained by the Neosho, Verdigris, Caney, Spring, Illinois, and Elk rivers that flow to the south, and the Canadian, Poteau, and Fourche Maline rivers that flow to the north and east. All these rivers empty into the Arkansas River. Within the Ozarks, the northern portion of the study area is drained by the the Kings, Buffalo, White, James, Current, Eleven Point, and Spring rivers, all of which are part of the White River drainage. The southern portion of the study area is drained by the Arkansas, Mulberry, Fourche La Fave, Petit Jean, and Maumelle rivers, and by the Frog and Illinois bayous, which form portions of the Arkansas River drainage. The Black and Little Red rivers are the eastern drainages of the region, both of which empty into the lower reaches of the White River.

Streams of the region generally have fairly deeply cut valleys from which a complex, dendritic pattern of tributaries extends. Toward the heads of northward flowing streams, valleys tend to be shallow and wide due to small stream size and distance from a major river. In contrast, streams flowing from the western and southern portions of the region generally exhibit deep, narrow gorges at the heads of their valleys (Rafferty 1980). Throughout most of the Ozarks, stream channels are filled with chert gravel from the surrounding bedrock. The substrata are usually a combination of these chert gravels and limestone bedrock exposures.

Ozark streams are distinctive in that their deeply entrenched river valleys tend to follow meandering courses. It is thought that this is because the stream courses were established at a time when the drainage area was a lowlying plain. Entrenchment occurred over millennia as the region was uplifted, until the rivers had successively worn away at the softer sedimentary rock and formed their present courses. Cutoff meander loops are common features in these stream valleys, as is the occurrence of “lost hills,” isolated hills of rock detached from the uplands (Rafferty 1980).

In the valleys of some of the larger streams such as the Arkansas and lower White and Black rivers, typical floodplain features such as meander scars, oxbow lakes, sandbars, and backwater swamps and lakes are found. Such lowland areas were important resource locations for aboriginal and later inhabitants, and were some of the earliest areas settled during the historic period.

A large portion of the southern Ozarks exhibits a poorly developed karst topography. Karst terrain is found on both dolomitic (calcium-magnesium carbonate) and limestone (calcium carbonate) bedrock. Karst forms in these rocks because they are relatively easily dissolved by natural water containing small amounts of carbon dioxide and humic acids.

According to Tryon (1980:16),

> the most distinctive characteristics of relief and drainage which characterize the Missouri Ozark karst include caves, sinkholes, springs, often dry flowing and abruptly disappearing surface streams, rapid interbasin groundwater movement through solutionally enlarged bedrock voids and conduits, and relatively unhindered vertical movement

of water back and forth between the earth's surface and subsurface.

Another feature of karst terrain is the solution valley. When large sinks form close together, a solution valley results. Solution valleys can be quite large, up to five or more miles in length, and are often cut into the bedrock several hundred feet (Rafferty 1980). Considering the extensive deposits of limestone and dolomite found within the region, it is surprising that karst terrain is not more widespread and better developed. Thornbury (1965) attributes this to the presence of a thick chert detritus mantle in the region, which prohibits much of the percolating rain water from reaching the underlying sedimentary bedrock.

SOILS

Soils within the OAO study area generally belong to one of four soil orders: Ultisols, Alfisols, Mollisols, and Entisols (Albert and Wyckoff 1984; Allgood and Persinger 1979; Soil Conservation Service 1975). Descriptions of these soil orders have been taken from Donahue et al. (1977) and the Soil Conservation Service (1975).

Ultisols occur throughout the Ozark and Ouachita mountains and are the most common order of soils found there. Ultisols are common in latitudes with warm humid climates but limited precipitation. They generally are intensively weathered soils ("ultimate soils") formed on Pleistocene or older surfaces and are commonly associated with forest or savannah vegetation.

Alfisols are found in regions with sufficient precipitation to move clay downward to form a horizon of accumulation (argillic horizon). Alfisols occur throughout the study area, but are especially common in areas of forest and savannah vegetation on Holocene landforms and in the Arkansas River Valley. In areas of favorable relief and climate, Alfisols produce well when converted to cropland.

Mollisols are found in the prairie and savannah areas of the region. These are soils with a deep, dark colored surface horizon (molic epipedon). Most of these soils supported grass vegetation at some time in their development, though many were forested at an earlier time. Mollisols are some of the most inherently fertile soils in the region, and many were placed under cultivation soon after European settlement and have remained so to this day.

Entisols are younger soils that exhibit only slight development. They are identified by the absence of distinct pedogenic horizons within the soil profile. In the study area entisols are usually found in river. valleys and on steep slopes and ridges. Entisol formation has occurred in three ways in the OAO study area.

1. In limestone that has dissolved almost completely, leaving very little residue.

2. In recently deposited river alluvium.

3. On steep slopes where the rate of surface erosion equals or exceeds the rate of soil profile development.

As the preceding descriptions indicate, soil orders roughly correlate with landforms of varying types and ages in the OAO study area, and they are also associated with different vegetation communities. Each soil order also has a distinctive land use potential, and therefore may be expected to exhibit particular archeological site associations (Sabo et al. 1982: 150–188).

CLIMATE

The OAO study area generally falls within the Cfa-Humid Subtropical classification of the Koppen system. However, this classification is somewhat misleading, since the region can best be thought of as lying in a transitional zone between the rather severe continental climate to the north and the comparatively temperate subtropical climate to the south (Peebles 1975).

In general, the region is characterized by warm to hot summers, cool dry winters, and variable annual precipitation. Normal temperature characteristics of the region, summarized in Figures 3 through 7, fail to indicate the variable nature of the climate. Seasonal variations in magnitude, frequency, and type of temperature departures are typical. In general, extreme temperature departures are more frequent during the winter and may be either positive or negative. Summer temperature patterns contrast with those of winter, with both magnitude and frequency of departures being notably less.

In addition, summer temperature extremes are more likely to be positive than negative (Peebles 1975). As a rule, frosts occur in the valleys several weeks later in the spring and earlier in the fall than they do on the uplands. This is especially true in the larger valleys (Sauer 1920).

Precipitation falls largely in the form of rain. Normal yearly totals vary from 40 to 52 inches, with the south portion of the region usually receiving the greatest amount (Figure 8). These amounts are usually quite adequate for farming, especially since the majority of the rainfall takes place in the spring and summer (Peebles 1975; Rafferty 1980; Sauer 1920).

Like temperature, precipitation totals vary from year to year in response to other climatic factors (cf. Peebles 1975). Figure 9 shows the changes in annual precipitation totals experienced by the Missouri Ozarks in the period 1920–1970. During this time the maximum annual precipitation was over 60 inches; while the minimum was under 25 inches. In addition to the yearly fluctuations, it is important to note that a great deal of variability can exist in precipitation totals from area to area within a single year, or even within a single storm episode. It is fairly common during the summer for certain areas to record excessive or deficient precipitation amounts while the region as a whole records a normal precipitation total (Peebles 1975).

In addition to the normal climatic variability experienced by the region, anomalous weather conditions sometimes occur, and these can have a pronounced effect on human populations (Sabo et al. 1982). Periods of excessive rainfall

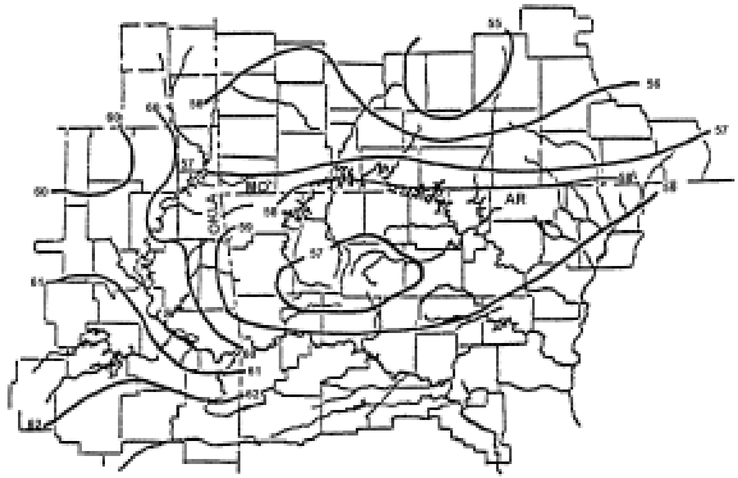

Figure 3. Mean annual temperature values from Arkansas, Missouri, and Oklahoma

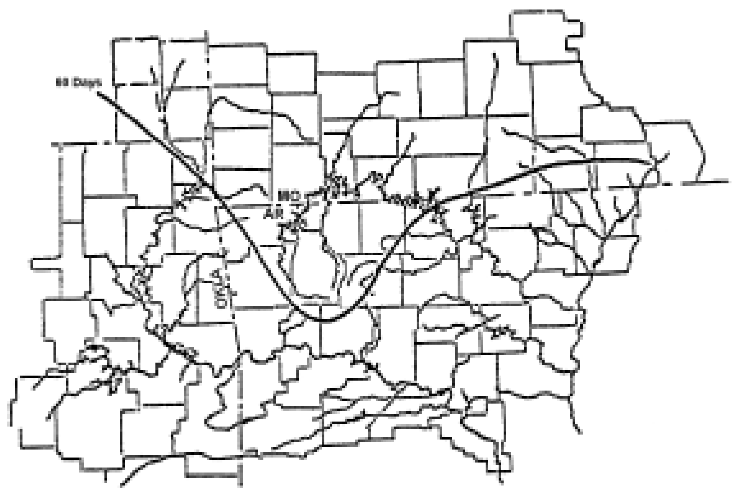

Figure 4. Mean annual number of days with maximum temperatures of 90°F and above

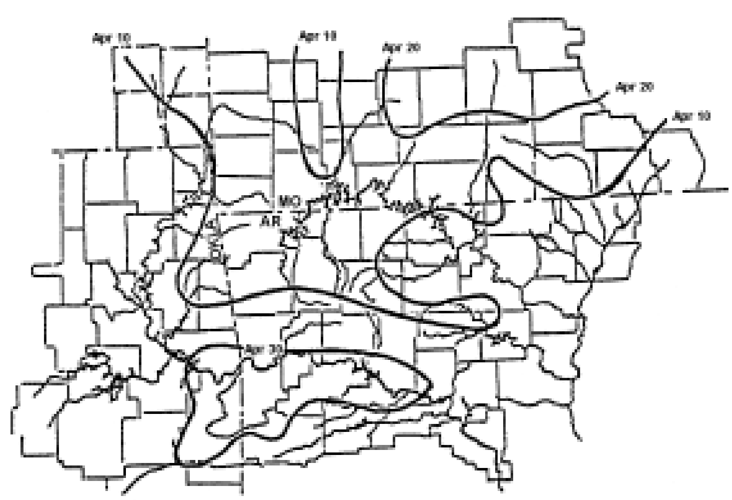

Figure 5. Mean date of last 32°F temperature in spring

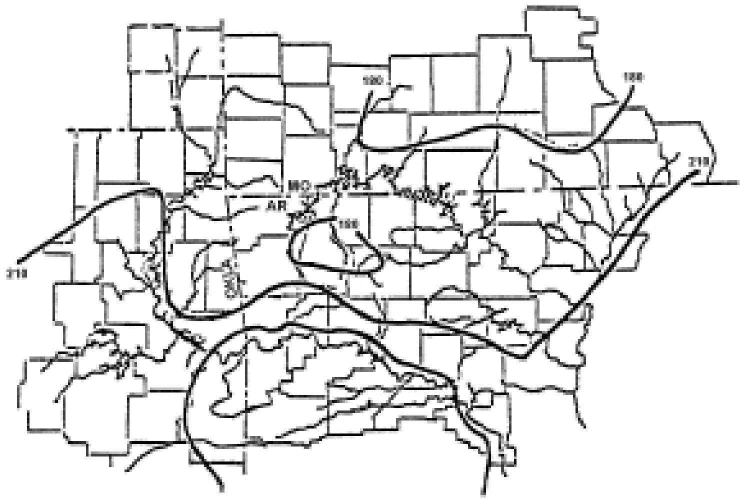

Figure 6. Mean length of freeze-free days

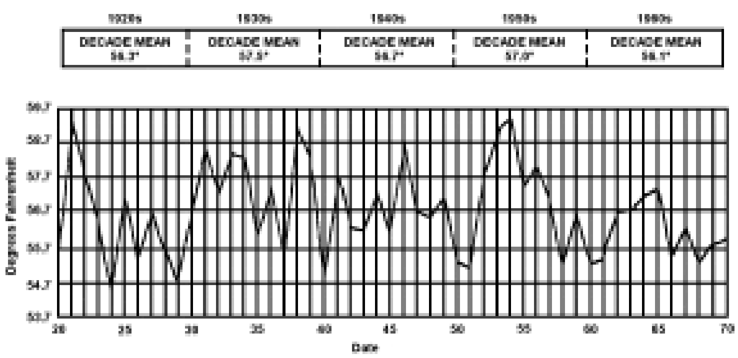

Figure 7. Annual temperature variations in the Missouri Ozarks 1920-1970

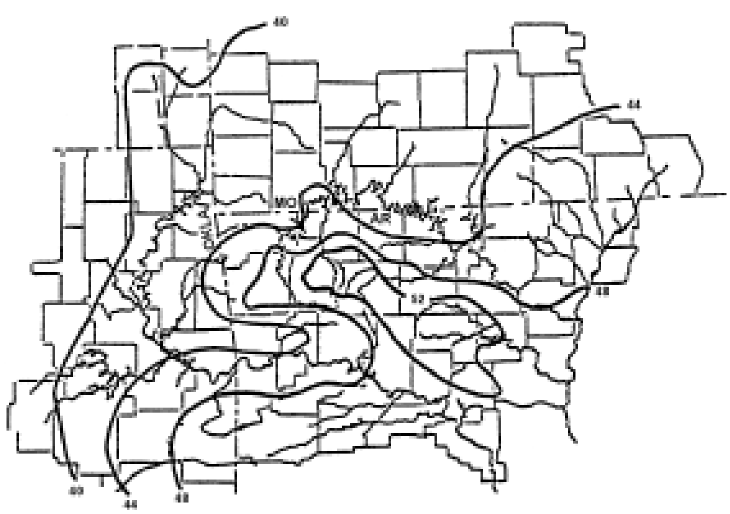

Figure 8. Normal annual precipitation in inches

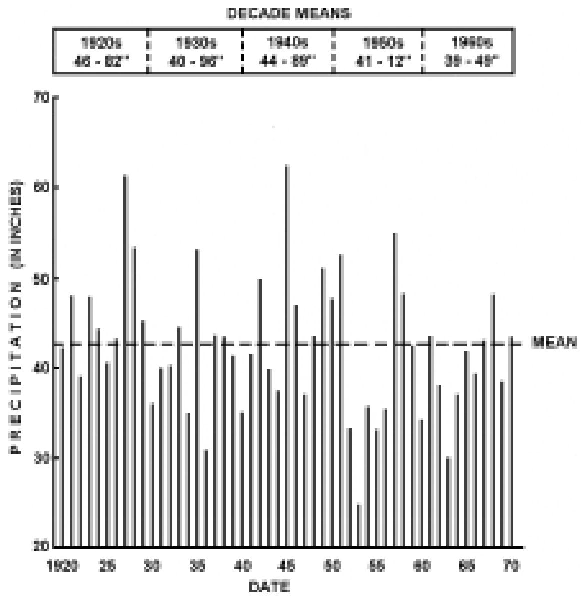

Figure 9. Variations in annual precipitation in the Missouri Ozarks, 1920-1970

and drought may occur on an irregular basis. In general, periods of drought are much more harmful than periods of excessive rain. Droughts usually cover a larger geographical area and are more prolonged, affect both uplands and river bottomlands, cause permanent injury to field crops during any part of the growth cycle, and deplete water supplies in the region (Rafferty 1980; Sauer 1920). Drought can also affect the resource potential of forest vegetation. According to King (1982b:45), in cases of extreme drought "the nuts and fruits of many species would shrivel and be dropped prematurely from the trees as a moisture conservation measure, and herbaceous plants would die or fail to even sprout since many require a minimum of soil moisture content before germination takes place."

While drought is most noticeable during the summer due to its adverse effect on agriculture, the region is fortunate in that it has fewer droughts in summer than for any other season except spring (Peebles 1975). Tornadoes are also an annual occurrence in the region, though the likelihood of impact in any one locality is very slight. Most of the storms enter the region from Oklahoma and Kansas, so the western border of the study area experiences these conditions most often (Rafferty 1980).

Despite these occasional anomalous weather conditions, the climate of the region is generally mild and conducive to agriculture. Sauer's (1920:35) observations on the general climate of the Missouri Ozarks may be applied to the region as a whole:

> These [anomalous weather events] are exceptional conditions. The area, being midcontinental, is subject to large variations of weather. In most years, however, the rainfall is ample. The losses from droughts are less than in the states adjoining Missouri on the west and no greater than in many other parts of the Middle West. The damage from excessively wet seasons is less than in the Great Lakes region and the more southerly states. All things considered, the Ozarks have a very desirable well moderated climate of the continental type, pleasant and healthful, and very well suited to a large variety of crops.

VEGETATION

The vegetation of the OAO study area consists primarily of the oak–hickory forest type, with local interruptions in forest cover by prairies, glades, and savannah (Braun 1950). Further subdivision of the oak–hickory forest reveals the existence of five potential natural vegetation types in this region: upland deciduous forest, lowland deciduous forest, oak savannah, cedar glade, and prairie. Potential natural vegetation is defined as "the vegetation that would exist today if man were removed from the scene and if the resulting plant succession were telescoped into a single moment" (Kuchler 1964).

The potential natural vegetation types described below have been derived from sources that are based on information generally gathered before large scale timber management and production techniques were employed in the region. Each vegetation type is known historically, and all types are in existence today in various modified and controlled forms.

Upland Deciduous Forest

Upland forest communities can be divided into three different climax vegetation types. Table 1 lists the food bearing plants in the upland deciduous forest, while Figure 10 shows generalized vegetation cross sections through portions of the study area.

One of the more common and widespread types of upland forest is the black oak–black hickory association. This is found on drier and more acidic ridges, uplands, and east and west facing slopes. Black oak and black hickory are the dominant species, with black oak predominating and sometimes being found in almost pure stands. Secondary trees include American elm, slippery elm, post oak, blackjack oak, and mockernut hickory. Understory species include flowering dogwood, huckleberry, rusty blackhaw, and hophornbeam. Under improved conditions, this forest grades into the sugar maple–white oak–northern red oak type (Borengasser 1968; Braun 1950; Garrison et al. 1976; Moore 1981; Turner 1935).

The sugar maple–white oak–northern red oak association is found in situations such as north and east-facing slopes, protected ravines and gullies, and areas with groundwater

Table 1. Food bearing plants in the upland deciduous forest (compiled from Eickmeier 1976; Geier 1975, Miller 1972)

Common Name	Latin Name	Part Used	Manner Used	Seasonal Availability
Hawthorn	*Crataegus sp.*	fruit	eaten	September-October
Slippery elm	*Ulmus rubra*	bark	chewed. cooked with fat	Spring
Shumard oak	*Quercus shumardii*	acorns	boiled and eaten	September-October
Tall bellflower	*Campanula americana*	young sprouts	cooked and eaten	May-June
Blackjack oak	*Quercus Marilandica*	acorns	boiled and eaten	September-November
Post oak	*Quercus stellata*	acorns	boiled and eaten	September-November
Black oak	*Quercus velutina*	acorns	boiled and eaten	September-November
Black hickory	*Carya texana*	nuts	eaten	September-October
Huckleberry	*Vaccinium arboreum*	fruit	eaten	June-September
Summer grape	*Vitis aestivale*	fruit	eaten	July-October
Shagbark hickory	*Carya ovata*	(a) nuts (b) sap	(a) eaten (b) syrup	October/ ---
Mockernut hickory	*Carya tomentosa*	nuts	fresh or stored	September-October
Serviceberry	*Amelanchier arborea*	berries	dried, eaten	July-August
White oak	*Quercus alba*	acorns	boiled and made into meal	September-October
Northern red oak	*Quercus rubra*	acorns	boiled and eaten	---
Chinquapin oak	*Quercus muehlenbergii*	acorns	boiled and eaten	September-November
Sassafras	*Sassafras albidum*	(a) twigs (b) rootbark	(a) chewed (b) tea	year round
Pawpaw	*Asiminia triloba*	fruit	eaten	September-October
Raspberry	*Rubus spp.*	berries	fresh eaten	July-August

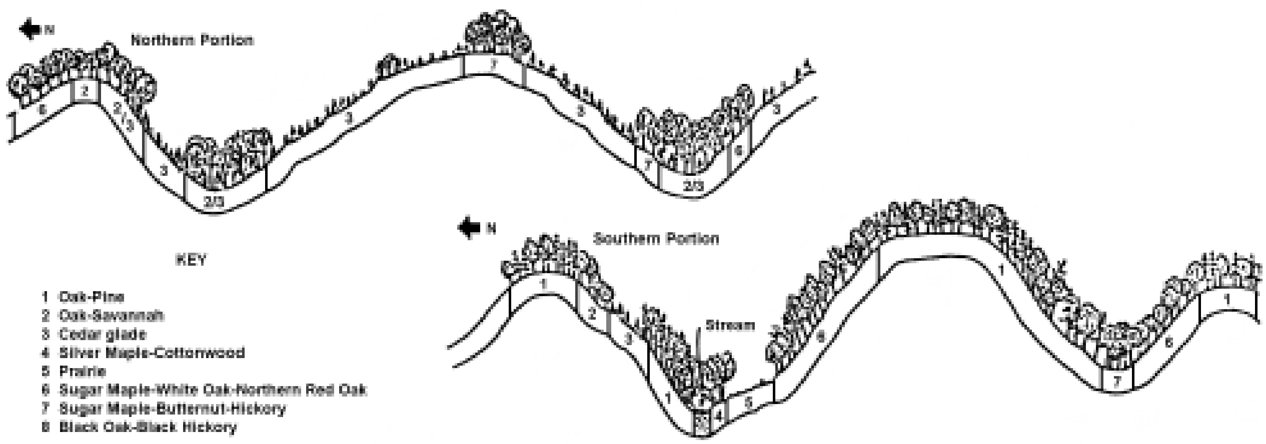

Figure 10. Generalized cross section through southern portion of the study area showing typical vegetation types and distributions

seepage. Also found in the floodplains of small mountain streams, this association is characteristically located on areas of premium soil which have an adequate but not excessive drainage. This forest type may contain pure stands of any of the listed dominant species, or a combination of any of the three, plus shagbark hickory. Other overstory species commonly found in this association include chinquapin oak, red maple, American basswood, and bitternut hickory. Understory species are varied, the most common being flowering dogwood, eastern redbud, sassafras, and pawpaw (Blair and Hubbell 1938; Braun 1950; Garrison et al. 1976; Turner 1935).

The final vegetation type in the upland deciduous forest is the oak–pine forest. The oak–pine forest association is the most widespread type of the Ouachita Mountains, and it is found scattered throughout the overview area on the poor, acidic soil of narrow ridges and heavily dissected uplands. The pine species is always shortleaf pine, but the associated hardwoods may be any of several species: post oak, blackjack oak, black oak, white oak, black hickory, or mockernut hickory. The understory is dominated by huckleberry, and various grasses and sedges are common on the forest floor (Blair and Hubbell 1938; Braun 1950; Garrison et al. 1976; Palmer 1921; Stroud and Hanson 1981).

Lowland Deciduous Forest

The lowland deciduous forest type is found along streams and rivers and is the richest food zone of the identified vegetation types (Table 2). Along the small, swift flowing streams which drain the region, an association of Ward's willow, black willow, and sycamore is found on the more stable sand and gravel bars. Occupying the shallow alluvial deposits adjacent to these streams are trees of the silver maple–cottonwood association. This stream bank community is composed of silver maple and cottonwood, with river birch, button bush, and swamp privet also present. In some places, large areas of switch cane are found scattered along the floodplain (Garrison et al. 1976; Geier 1975; Moore 1954).

Table 2. Food bearing plants in the lowland deciduous forest (compiled from Eickmeier 1976; Geier 1975, Miller 1972)

Common Name	Latin Name	Part Used	Manner Used	Seasonal Availability
Smartweed	*Polygonum lapthifolium*	seeds	flour	September-November
Heartseed	*Polygonum punctatum*	seeds	flour	September-November
Silver maple	*Acer saccharinum*	(a) sap (b) bark	syrup/pounded for bread	March-April/yrround
Green ash	*Fraxinus pennsylvanica*	cambium	cooked and eaten	Spring
Water oak	*Quercus shumardii*	acorns	boiled and eaten	August-September
Bur oak	*Quercus macrocarpa*	acorns	boiled and eaten	August-September
Box elder	*Acer negundo*	sap	syrup	yearround
Sugar maple	*Acer saccharum*	(a) sap (b) bark	syrup/pounded for bread	March-April/yrround
Bitternut hickory	*Carya cordiformis*	nuts	eaten fresh or stored	September-October
Pawpaw	*Asiminia triloba*	fruit	eaten	September-October
American hornbeam	*Carpinus caroliniana*	nuts	eaten	---
Greenbrier	*Smilax tamnoides*	tuberous root stock	soup, bread. jelly	June-August
Black walnut	*Juglans nigra*	(a) nuts (b) sap	eaten-soup/syrup	Sept-0ct/spring
Chinquapin oak	*Quercus muhlenbergii*	acorns	boiled and eaten	September-November
White oak	*Quercus alba*	acorns	boiled, made into meal	September-October
Hazelnut	*Corylus americana*	nuts	eaten, ground into meal	August-September
Butternut	*Juglans cinerea*	(a) nuts (b) sap	eaten, stored/syrup	October/ ---
Red mulberry	*Morus rubra*	fruit	eaten	June-July
Shingle oak	*Quercus imbricaria*	acorns	boiled and eaten	September-October
American basswood	*Tilia americana*	(a) flowers (b) sap	tea/syrup	May-July/spring
Northern red oak	*Quercus rubra*	acorns	boiled and eaten	September-October
Honey locust	*Glenditsia triacanthos*	pods	sugar and beer	---
Bladdernut	*Staphylea trifolia*	seeds	eaten	---
Elderberry	*Sambicus canadensis*	(a) fruit (b) flowers	eaten/tea, food	---
Blackhaw	*Viburnum prunifolium*	fruit	eaten	September-October
Black cherry	*Prunus serotina*	fruit	eaten	July-September
Shagbark hickory	*Carya ovata*	(a) nuts (b) sap	eaten/syrup	October/ ---
Giant ragweed	*Ambrosia trifida*	seeds	---	---
Pecan	*Carya illinoensis*	nuts	fresh or stored	September-October
Lambsquarter	*Chenopodium spp.*	(a) plants (b) seeds	raw, boiled/pounded for bread	June-July/Sept-Nov
Jerusalem artichoke	*Helianthus tuberosus*	tuber	raw, boiled, roasted	November-December
Marshelder	*Iva ciliata*	seeds	---	September-November
Pokeweed	*Phytolacca americana*	leaves, stalks	potherb	April-June
Wild plum	*Prunus americana*	fruit	eaten	August-September
Blackberries	*Rubus spp.*	berries	fresh, dried	September-November
Arrowhead	*Sagittaria latifolia*	tuber	boiled, roasted	September-November
Cattail	*Typha latifolia*	(a) roots (b) shoots (c) pollen	ground/potherb/bread	Sept-Nov/Apr-June/May

In areas of less frequent inundation and better soil development, an association of American elm, red maple, and green ash is found. Secondary species in this association are black walnut and American basswood. Understory growth is often quite dense, and is commonly composed of trumpet creeper, buckbrush, and poison ivy (Foti 1974; Garrison et al. 1976; Geier 1975).

The climax forest of the bottomlands is the sugar maple–bitternut hickory association, with southern red oak and sycamore also occurring: Pawpaw, American hornbeam, and flowering dogwood are the principal understory species, and often form dense, almost impenetrable stands (Foti 1974; Garrison et al. 1976; Geier 1975).

Forest associations in the Arkansas River Valley are similar to those listed above, with the addition of a baldcypress–water tupelo association along the riverbank and oxbow lakes of the region (Foti 1974).

Oak Savannah

The oak savannah vegetation type is found throughout the western portion of the study area and into the Arkansas and Missouri Ozarks. The oak savannah association is characterized by the presence of short, full crowned, widely spaced trees with an understory of native prairie grasses and other herbaceous vegetation (Allred and Mitchell 1935). Generally, oak savannahs are found on dry ridgetops, steep southerly slopes, and thin sandy soil hills. However, extensive tracts of this association are also found in the broad flat valleys and rolling uplands of the area, usually due to the presence of shallow claypans or other soil factors that promote poor soil moisture conditions (Allred and Mitchell 1935; Rafferty 1983; Rice and Penfound 1959).

The oak savannah is composed largely of blackjack oak and post oak, either of which may dominate locally. Other species commonly present are black hickory, winged elm, black oak, persimmon, and hawthorn (Blair and Hubbell 1938; Braun 1950; Turner 1935). Shrubs and grasses found in this association are similar to those of the prairie and cedar glade types, with sideoats grama and various Andropogon species being common (Blair and Hubbell 1938; Borengasser 1968). A list of food bearing plants of the oak savannah is found in Table 3.

Cedar Glade

Representing the most xerophytic, or dry-tolerant, plant community within the study area, cedar glades are found throughout the Ozarks and northern Ouachita mountains

(Braun 1950; Foti 1974). Cedar glades are usually restricted to the shallow, rocky soils found on bluffs, hills, barrens, knobs, and southern slopes in the region, and are most extensively located along the White River in the Missouri Ozarks (Kucera and Martin 1957). Red cedar and ash juniper are usually both found in this association, with red cedar nearly always being the dominant species (Foil 1974; Moore 1954). Other important species are shortleaf pine, post oak, blackjack oak, winged elm, gum bumelia, and various xerophytic herbaceous plants (Braun 1950; Foti 1974; Turner 1935). In hillside glades these herbaceous plants often predominate, with species including Japanese clover, annual three awn, little bluestem, bald grass, big bluestem, sideoats grama, and switchgrass being common (Dale and Fullerton n.d., Kucera and Martin 1957). Table 4 lists important food plant species found in the cedar glade vegetation type.

Prairie

Tracts of prairie vegetation occur throughout the study area, usually in upland and river terrace situations where fragipans or other impervious subsoil horizons are present, or on shallow rocky soils with seasonally poor moisture resources (Allred and Mitchell 1955; Foti 1974; Rafferty 1983).

Plant species common in the prairie vegetation type are characteristic of those found in the tall grass prairie formation. Big bluestem, Indiangrass, switchgrass, little bluestem, and sideoats grama are most frequent, along with various flowering herbaceous plants and other grasses and forbs (Albert and Wyckoff 1984; Foti 1974; Miller 1972; Ruby 1953). A list of food bearing plants commonly found in the prairie association is shown in Table 5.

Table 3. Food bearing plants in the oak savannah (compiled from Eickmeier 1976; Geier 1975, Miller 1972)

Common Name	Latin Name	Part Used	Manner Used	Seasonal Availability
Blackjack oak	*Quercus marilandica*	acorns	boiled and eaten	September-November
Post oak	*Quercus stellata*	acorns	boiled and eaten	September-November
Black hickory	*Carya texana*	nuts	eaten	September-October
Black oak	*Quercus velutina*	acorns	boiled and eaten	September-November
Persimmon	*Diospyros virginiana*	(a) fruit (b) seeds	eaten/roasted	September-October
Hawthorn	*Crataegus sp.*	fruit	eaten	September-October
Black locust	*Robinia pseudoacacia*	seeds	boiled	September-October
Smooth sumac	*Rhus glabra*	(a) fruit (b) shoots	beverage/peeled and eaten	Sept-Oct/Apr-May

Table 4. Food bearing plants in the cedar glades (compiled from Eickmeier 1976; Geier 1975; Miller 1972)

Common Name	Latin Name	Part Used	Manner Used	Seasonal Availability
Wild hyacinth	*Camassia scilloides*	bulb	eaten	---
Wild onion	*Allium stellatum*	bulb	eaten, soup	late spring
Persimmon	*Diospyros virginiana*	(a) fruit (b) seeds	eaten, dried, ground/roasted	September-October
Sassafras	*Sassafras albidium*	(a) twigs (b) rootbark	chewed/tea	yearround
Hawthorn	*Crataenus sp*.	fruit	eaten	September-October
Post oak	*Quercus stellata*	acorns	boiled and eaten	September-November
Blackjack oak	*Quercus marilandica*	acorns	boiled and eaten	September-November

Table 5. Food bearing plants in the hardpan prairie (compiled from Eickmeier 1976; Geier 1975; Miller 1972)

Common Name	Latin Name	Part Used	Manner Used	Seasonal Availability
Wild hyacinth	*Camassia scilloides*	bulb	eaten	---
Smooth sumac	*Rhus glabra*	(a) fruit (b) shoots	beverage/peeled and eaten	Sept-Oct/Apr-May
Common milkweed	*Asclepias syriaca*	shts-buds, flowers/pods	greens/dried, stored/boiled	April-September
Amaranth	*Amaranthus spp.*	seeds	bread	September-November
Sedge	*Carex spp.*	stems and tubers	---	---
Lambsquarter	*Chenopodium spp*.	(a) plants (b) seeds	raw, boiled/used in bread	June-July/Sept-Oct
Jerusalem artichoke	*Helianthus tuberosus*	tuber	raw, boiled, roasted	November-December
Marsheider	*Iva ciliata*	seeds	---	September-November
Smartweed	*Polygonum spp.*	seeds	flour	September-November
Arrowhead	*Sagittaria latifolia*	tuber	boiled, roasted	September-November
Ground plum	*Astragalus spp*.	seed pods	raw, cooked	July-August
Prairie turnip	*Psorales esculenta*	tuber	---	September-November

FAUNA

The diverse topography and plant associations found in the study area form the habitats for an equally diverse fauna. Table 6 lists some of the important animal species used as food during the historic period, along with their preferred habitat location. Many other potentially important animals occur throughout the forests, prairies, and waterways of the region. For a more complete list of the animal species found in the region see Albert and Wyckoff (1984) and McMillan (1976b).

Table 6. Selected list of fauna know historically in the OAO study area (taken after Albert and Wyckoff 1984; Geier 1975; McMillan 1976b; Miller 1972)

Common Name	Latin Name	1	2	3	4
Common snapping turtle	*Chelydra serpentina*	–	–	–	x
Missouri slider	*Pseudemys floridana*	–	–	–	x
Red-eared turtle	*Pseudemys scripta*	–	–	–	x
Three-toed box turtle	*Terrapene carolina*	–	x	–	–
Ornate box turtle	*Terrapene ornate*	–	–	x	–
Mississippi mud turtle	*Kinosternon subrubrum*	–	–	–	x
Mourning dove	*Zenaidura macroura*	–	x	–	–
Wild turkey	*Meleagris gallopavo*	x	–	–	–
Bobwhite quail	*Colinus virginianus*	–	x	–	–
Greater prairie chicken	*Tympanuchus cupido*	–	–	x	–
Bison	*Bison bison*	–	o	x	–
Coyote	*Canis latrans*	o	–	x	–
Gray wolf	*Canis lupus*	x	–	–	–
Gray fox	*Urocyon cinereoargentcus*	x	–	–	o
Red fox	*Vulpes fulva*	–	x	–	o
Beaver	*Castor canadensis*	–	–	–	x
Elk	*Cervus merriami*	–	x	o	–
Va. white tail deer	*Odocoileus virginianus*	o	x	–	–
Pine Vole	*Microtus pinetorum*	–	x	–	–
Eastern woodrat	*Neotoma floridana*	–	–	–	x
Common muskrat	*Ondatra zibethicus*	–	–	–	x
Deer mouse	*Peromyscus maniculatus*	–	o	x	–
Oppossum	*Didelphis virginiana*	o	o	–	–
Bobcat	*Lynx rufus*	x	o	–	o
Plains pocket gopher	*Geomys bursarius*	–	o	x	–
Est. cottontail rabbit	*Sylvilagus floridanus*	–	x	–	–
Striped skunk	*Mephitis mephitis*	o	x	–	–
Otter	*Lutra canadensis*	–	–	–	x
Common mink	*Mustela vison*	o	–	–	o
Raccoon	*Procyon lotor*	x	o	–	–
13-lined grd squirrel	*Citellus tridecemlineatus*	–	o	x	–
So. flying squirrel	*Glaucomys volans*	x	o	–	–
Fox squirrel	*Sciurus niger*	o	x	–	–
Eastern chipmunk	*Tiamias striatus*	x	–	–	–
Black bear	*Ursus americanus*	x	–	–	o
Woodchuck	*Marmota monax*	x	o	–	o
So. gray squirrel	*Sciurus carolinensis*	x	–	–	–

1 = deciduous forest
2 = forest edge
3 = prairie
4 = riverine
x = primary occurrence
o = secondary occurrence

ENVIRONMENTAL CHANGES

HISTORIC

Soon after European settlement, many changes began to take place in the environment of the region. These changes generally resulted from the effects of pronounced human intervention on established vegetation types and animal populations in the area. Probably the biggest environmental change since European settlement has been in the distribution of vegetation throughout the region. While the major vegetation types previously described are still present, species composition and distribution have been radically altered since the time of early settlement.

Forest distribution and composition has changed in several ways. Sauer (1920:59) notes three major changes in the character of the forest since settlement: (1) a greater density of stands and more undergrowth, both as a result of logging operations and the cessation of annual burning, (2) a great decrease in the amount of lowland forest, and (3) a relative increase in those species that have the most efficient means of propagation. In the uplands these are the oaks and elms, while in the bottoms these species are the sycamore and cottonwood.

In addition to those noted by Sauer for the deciduous forest, changes have taken place in the distribution and composition of prairies and cedar glades. Numerous sources (Albert and Wyckoff 1984; Braun 1950; Palmer 1921; Steyermark 1959) cite early historic accounts which describe the encroachment of forest vegetation into areas which previously supported prairie or glade vegetation. Apparently, many of these grassy openings were maintained, at least in part, due to the annual burning they received from aboriginal or early European populations in the area. With cessation of annual burning, many of these areas were grown over with timber by the late nineteeth century (Rafferty 1983). In addition, the more fertile portions of these natural clearings were attractive to later settlers. If not too remote from a natural water source, many of these areas were converted to agricultural land or pasture at an early date (Allred and Mitchell 1955; Palmer 1921; Ruby 1953). As a result, the prairie flora of the area have been preserved only in small, isolated tracts, and only rarely in a natural state.

Though today generally quite small (usually no more than 2 or 3 ha) cedar glades were once the focus of a fairly large lumber industry (Rafferty 1983). Extensive stands of red cedar were formerly located throughout major stream valleys, some so large that Lackey (1960:362) recalls that “a crew of thirty men worked for 7 months cutting the Simmon’s tract and few adjoining lands before moving to another location.” From this account and others it is apparent that large stands of cedar vegetation were more common and widespread historically than they are today, and as such may have represented a more important forest association for aboriginal groups.

Changes have also taken place in the fauna found within the region. As Albert and Wyckoff (1984) have noted, habitat destruction and introduction of competing domestic or exotic species — such as starlings, house sparrows, European rodents, and carp — during the historic period have caused population changes in many native animal species. Some species, such as elk and bison, are no longer found. Other species, such as the passenger pigeon, were hunted to the point of extinction.

Overall, the OAO study area generally retains the major floral and faunal communities which existed at the time of historic settlement. However, these communities have been subject to a great deal of direct and indirect human impact, and, as a result, their distribution and importance have undergone extensive change in the past 200 years.

PREHISTORIC

Just as human and natural processes have altered the environment of the region in recent times, so too have these processes brought about prehistoric environment change. Prehistoric aboriginal groups depended on native plants and animals for food, shelter, and tools. They also found within nature a system of relationships which they could sometimes manipulate to their own advantage. The ecological approach developed in this overview holds neither human population nor environment constant. Both are suspended in a dynamic relationship in which change is always possible. A primary goal of this overview, therefore, is to provide a reconstruction of the extent of the regions' past human populations and the manner in which they interacted with their environments. The character of changing environments and the responses of human groups to these environments as reflected in presently available data are detailed in the following chapters of this overview. By way of introduction, a brief discussion of the potential for archeological sites to contribute information on past environments and environmental changes concludes this chapter.

ARCHEOLOGICAL SITES AND ENVIRONMENTAL RECONSTRUCTION

Archeological sites are the products of a complex interaction between natural and cultural processes working together over time. While cultural aspects of site formation are usually recognized by archeologists as dynamic and time responsive, sometimes related environmental variables are held constant. The result is a static, classificatory approach to evaluating environmental factors, even when human variables are considered as part of a dynamic system (Butzer 1982). Three examples of archeological research in the OAO study area are briefly discussed below. Each of these has contributed to our understanding of the dynamic relationships between past human populations and changing environmental contexts.

In the Lee Creek–Little Lee Creek drainages of eastern Oklahoma, an interdisciplinary study of environmental and cultural changes was conducted as part of work at the Parris Mound site (Muto et al. 1980). Investigations were undertaken to determine the distribution, relative age, and importance of alluvial and colluvial deposits in the Lee Creek and Little Lee Creek valleys (Leonhardy 1980; Nials 1980). It was found that both valleys have undergone considerable change in the last 10,000 years. Along with four flood-free Pleistocene terraces, at least seven episodes of channel migration and terrace development were identified dating to the Holocene period. In addition to determining that the active river channel at the time of the Parris Mound occupations would have been .25 km nearer the site than at present, it was found that Dalton period occupations were present in the drainage on the earliest Holocene terrace, and part of this terrace was also used as the location of the Mississippi period Parris Mound site.

A similar program of study was conducted as part of a cultural resources survey within the Wedington Unit of the Ozark–St. Francis National Forests of Arkansas (Kay and Sabo 1983). Here a series of backhoe trenches were excavated across portions of a small tributary of the Illinois River in hopes of finding buried archeological sites. Though no sites were found, the trenching did reveal a series of alluvial and colluvial stream valley deposits. Analysis of these excavations led Kay and Sabo (1983:118) to state that

> relative to site quality, we should anticipate that debris concentrations located on the slopes of the major terraces may well have eroded from what were previously more extensive or deep Holocene fills. Also the upland contexts of sites in most cases should be interpreted or judged as near surface remains which would have little depth but may span a considerable interval of time. Floodplain sites, or those on deposits beneath the 10 m terrace, have potential multilayered units, perhaps extending to bedrock.

The work undertaken by Kay (1982a) within the lower Pomme de Terre River valley represents a major contribution to the study of prehistoric human ecology in the Ozark region. Employing mechanical and chemical analyses on sediment and natural rock samples from the river terrace near Rogers Shelter, Kay was able to reconstruct environmental changes in the area from differences in depositional regimes at the site. Additional analyses included larger scale investigations of river valley geomorphology, and specialized studies of plant and animal remains collected during stratigraphic excavations of the shelter. Integration of these data sets within a multidisciplinary ecological perspective permitted a detailed reconstruction of human adaptations to changing landscapes and environments in the Pomme de Terre valley over a 10,000 year period.

These examples illustrate some of the kinds of paleoenvironmental data produced in the context of archeological research. Much of what we know about past environments, however, comes from other scientific disciplines such as geology, geomorphology, palynology, and paleoclimatology (Evans 1978; Butzer 1982). For example, Paul and Hazel Delcourt recently have begun a palynological study to reconstruct the paleoenvironmental history of the Mississippi River Valley and adjacent regions to the west. As part of a contract with the National Park Service, work has begun to obtain pollen cores from suitable sites in southeast Missouri which span the past 20,000 to 40,000 years. At present two sites have been sampled, and pollen profiles were successfully recovered from these sites. Though preliminary in nature, analysis of these pollen records indicated significant vegetation changes within the region over the last 25,000 years and accompanying changes in sedimentation rates corresponding to major vegetation shifts (Delcourt et al. 1984).

The importance of understanding past environments and their effects is well summarized in Leonhardy's (1960) statement on the Lee Creek valley:

> To assume that we can understand the past in the context of the present environment would be foolish. A photograph taken from near Parris Mound to the west across Lee Creek Valley when the mound was being built would show a scene we could recognize. The major difference would be in vegetation. These would be woodland or parkland where there are now fields. Some 3,000 years ago what are now productive fields and pastures would be the active floodplain of Lee Creek. A photo taken 8000 years ago would present a scene barely recognizable. The outlines of the hills would be the same but the valley bottom would be completely different.

PREVIOUS ARCHEOLOGICAL INVESTIGATIONS

Ann M. Early, George Sabo III

The history of archeological investigations in the Ozark–Arkansas–Ouachita study area is a story which begins late in the nineteenth century. In tracing the attempts of archeologists to learn about the region's past, this review will emphasize important changes in orientation, technique, and philosophy as the discipline of archeology has grown and developed, and as new concerns have emerged regarding interpretation of the archeological record.

Until the early decades of the twentieth century, few people took an active interest in the archeological remains of the Arkansas River Valley upstream from Little Rock. The impressive mounds and rich cemeteries of the Mississippi and Red River valleys captured investigators' interests instead; C. B. Moore explored the Arkansas River only as far as Natural Steps a few miles above Little Rock and dug only as far upstream as the Greer site near Pine Bluff (Moore 1908). Twenty years earlier, Edward Palmer had explored the same route for the Bureau of Ethnology, stopping to map and test the Toltec site (then known as the Knapp Mounds) near Little Rock and to collect samples of pottery and other artifacts from sites in the Toltec vicinity (Thomas 1894; Palmer 1917; Rolingson 1982a). For these and other early archeologists, pottery vessels and other objects from graves were the evidence needed to identify and describe aboriginal civilizations. Suitable sites above Little Rock were unknown, and prospects were more favorable elsewhere in the alluvial lowlands.

The Ouachita Mountains also drew few pioneer archeologists except for those interested in prehistoric stone tool manufacturing. Aboriginal quarries in the novaculite deposits near Hot Springs were visited by W. H. Holmes (1891, 1919) and W. P. Jenney (1891) (see also Baker 1982), but these sites and the novaculite outcrops lie along the southern edge of the Ouachita Mountains, and none are known on the northern ridges drained by the Arkansas River and its tributaries. The first archeological investigations undertaken in the Ozarks were, expectably, focused on the region's numerous rockshelter sites. Perhaps due to the relative infrequency of Ozark mound sites and their generally small size in comparison to mounds in other parts of the southeast, little attention initially was directed toward them. Local histories produced during this era sometimes mention mounds; the Huntsville site in Madison County, Arkansas, for example, was described in one such early reference (Goodspeed 1889).

Intermittently, prehistoric Indian sites were noted in these areas (cf. Buckner 1878), but few people made an attempt to seek them out or evaluate the cultures responsible for them. One notable exception was J. B. Thoburn. First under the auspices of the University of Oklahoma, and later with the Oklahoma Historical Society, he explored numerous prehistoric sites and formulated the first general identification of prehistoric cultures in that state (Thoburn 1926, 1931; Wright 1946). In the Arkansas River Valley, Thoburn visited and later tested one of the mounds at the Spiro site near Fort Smith, thereby beginning nearly a century of intermittent investigations at this site (Rogers et al. 1980). He also led Oklahoma Historical Society work at the Reed and Big Spring Cave sites in Delaware County in 1926 (Wyckoff and Brooks 1983:46).

At the turn of the century, archeologists began to investigate dry rockshelter sites in the Ozarks, from which an impressively wide range of Native American artifacts — including many perishable remains — could be obtained. Most of the professional archeologists who first worked in Ozark rockshelters came from museums in the east, such as the Phillips Academy of Andover, Massachusetts and the United States National Museum in Washington, D.C (e.g., Peabody 1903, 1909, 1917; Peabody and Moorehead 1904; Bushnell 1904, 1915; see also Anonymous 1908, 1931). These early excavations were undertaken primarily to acquire examples of perishable remains, such as basketry and bone tools, which could be displayed in museums as relics of America's past Indian tribes. Excavation techniques were extremely crude by modern standards, and undesired materials found while searching through rockshelter deposits were, more often than not, thrown into the backdirt. It was not until the 1920s that more systematic studies were undertaken to learn something about the culture and lifeways of the early Americans who left these remains.

Also at this time William H. Holmes of the Bureau of American Ethnology (then a unit within the United States National Museum, later to become the Smithsonian Institution) excavated a site at a sulphur spring near Afton, Oklahoma, which produced thousands of chipped stone artifacts (Holmes 1894, 1903). Found nearby were the bones of extinct mammoth and mastodon. The artifacts, representing types we now know date to more recent prehistoric eras, were not directly associated with these bones, however. The antiquity of early Native Americans was, nevertheless, an important question during this period toward which much archeological investigation was directed.

An interesting example of early endeavors to ascertain the antiquity of the first Indians in the Ozark region is represented in the work done by Charles Peabody and Warren K. Moorehead (1904) at Jacobs Cavern in Missouri and the debates this work subsequently sparked. Peabody and Moorehead claimed to have found a stalagmite which had grown on top of prehistoric remains in the cave. Subsequent excavations by

Vernon C. Allison (1926) reported the discovery of a mineralized deer bone fragment upon which a figure — thought to represent a mastodon — had been inscribed. Allison suggested on the basis of the fossilized bone and the stalagmite's growth rings that the artifact-bearing deposits in the cave must have been about 14,000 years old. This estimate was doubted by some, however, and a short debate regarding the merits of alternative interpretations was carried on in the pages of the journal *American Anthropologist* (Nelson 1928a, 1928b; Allison 1928). Some years later the matter was clarified by Carl Chapman (1948b), who pointed out that mineralization of animal bone in damp rockshelters may occur fairly rapidly and, therefore, need not be regarded as an indicator of great antiquity.

Systematic investigation of Ozark rockshelter sites began in the 1920s and 1930s with the work of Mark R. Harrington of the Museum of the American Indian–Heye Foundation (New York), Winslow Walker of the Smithsonian Institution, and Samuel C. Dellinger of the University of Arkansas Museum. Like their predecessors, these individuals undertook excavations in dry rockshelter sites primarily to obtain specimens for museum displays, but there was also a concern for reconstructing prehistoric cultural sequences of the Ozarks on the basis of this work.

Harrington's first venture into the Ozarks actually occurred in 1914 when he canoed down the Grand River in northeast Oklahoma. Searching for dry shelters in which perishable artifacts might be preserved, he was disappointed to find that many of the sites he encountered were damp. Even though he observed abundant evidence of prehistoric occupation in these sites, Harrington never returned to this area. However, when the Museum of the American Indian acquired a collection from the Missouri Ozarks in 1920 which did contain some perishable items, interest in the region was renewed, and in the spring of 1922 another expedition was undertaken, this time centering on the White River region of southwest Missouri and northwest Arkansas. During that and the following year, Harrington excavated at 15 sites along the White River and also investigated seven additional shelters along the Elk River in southwest Missouri, along Little Sugar Creek in Missouri and Arkansas, and along the Kings and Buffalo rivers in northwest Arkansas.

The results of Harrington's investigations were published in two brief articles appearing shortly after the conclusion of his work (Harrington 1924a, 1924b), and in a longer monograph (1960) which unfortunately did not appear in print until many years later. The bulk of the material excavated by Harrington was attributed to an Ozark Bluff-Dweller culture, representing an ancient way of life based on hunting, agriculture, the gathering of wild plants, and fishing (Harrington 1960:147). These conclusions were reached partly on the basis of extensive amounts of animal bone preserved at these sites, along with plant remains including both wild and domesticated species. Among the latter, maize, squash, pumpkins, gourds, beans, and sunflower were found. Typical artifacts of the Ozark Bluff-Dwellers included heavy chipped stone points; throwing sticks, or atlatls; bows and arrows; chipped stone axes, scrapers, and knives; grinding stones; and a wide variety of artifacts made of organic substances including bone needles and awls; fiber nets made with the help of wood and bone shuttles; and hoes, beads, and pendants made of shell. Pottery, though not found in any great abundance, was described as "typically sand or crushed-stone tempered, undecorated, usually dark in color, frequently quite thick and hard" (Harrington 1960:170). Vessels were described as having flat bottoms and were compared to coarse utilitarian pottery found in the Caddo region of southwestern Arkansas. The most outstanding materials produced by the Bluff-Dwellers were the baskets and other containers woven out of splints of wood, cane, or fiber. Harrington compared these artifacts to similar materials produced by the Basketmaker III (Anasazi) cultures of the American Southwest.

At a few of the sites he excavated, Harrington recognized a somewhat different assemblage of materials that occurred in stratified contexts above the Bluff-Dweller remains. These he attributed to a Post-Bluff-Dweller, or Top-Layer culture. In this later assemblage, small arrowpoints of chipped stone or of cane were much more prevalent than in the levels attributed to the Bluff-Dwellers, and shell-tempered pottery was also more abundant. Furthermore, it appeared as if the Post-Bluff-Dweller people, whom Harrington speculated might have been ancestral to the Kansa or Osage Indians, were more dependent upon deer hunting than their predecessors had been (Harrington 1960:177–181). At a few localities in northwest Arkansas, Harrington also found some materials he attributed to an earlier, Pre-Bluff-Dweller culture.

Winslow Walker of the Smithsonian Institution's Bureau of American Ethnology worked at a number of rockshelter sites along the Buffalo River in Arkansas in 1931. Extensive excavations were undertaken at three sites. Walker (1932) attempted to relate his findings to Harrington's Bluff-Dweller culture, but he was only partially successful in this because few perishable remains, the most critical diagnostics of the Bluff-Dweller culture, were preserved in the Buffalo River sites. However, Walker did illustrate projectile points he found at these sites, which can now be associated with more recently defined prehistoric cultural phases (Wolfman 1979:14).

Alarmed that so many of these tangible evidences of Arkansas' cultural heritage were being taken permanently out of the state by institutions such as the Smithsonian or the Museum of the American Indian, Samuel C. Dellinger, then director of the University of Arkansas Museum, organized a large scale effort in 1928 to excavate and collect specimens from rockshelter sites throughout the Ozarks. Dellinger brought Dr. Carl Guthe from the National Research Council to Arkansas that year to provide instruction in archeological methods and techniques, and for the next seven years crews working under the direction of Dellinger conducted excavations at approximately 85 sites. Unfortunately, no site reports or major summaries of these investigations have ever been published. Dellinger, along with a few collaborators, did author several articles on specific finds such as ceramics (Dellinger and Dickinson 1942), baby cradles (Dellinger 1936), and skeletal remains (Wakefield and

Dellinger 1936, 1940; Wakefield et al. 1937a, b). Some of the plant materials collected by Dellinger crews were also included in Melvin R. Gilmore's (1930) analysis of botanical remains from Ozark rockshelters. This famous work, based mostly on materials collected by Harrington, provided one of the first thorough, scientifically based reconstructions of prehistoric subsistence practices in the eastern United States.

Over the years the University of Arkansas Museum has carefully curated all of the records and artifact collections produced as a result of the Dellinger excavations. Many recent scholars have been able to make lasting contributions to our knowledge of Ozark prehistory by studying these curated materials. These studies include analyses of faunal remains (Cleland 1960, 1965), cordage, netting, basketry and fabrics (Scholtz 1970, 1975), and plant remains (Hilliard 1980; Fritz 1984, 1986a). Neal Trubowitz (1980) also incorporated some collections obtained by Dellinger crews from sites along the upper Lee Creek in Crawford County, Arkansas, in his more recent investigation of sites in that area. Gayle Fritz (1986b) has recently completed an in-depth study of a large collection of plant remains from these sites to learn more about late prehistoric Ozark subsistence strategies.

Despite the continuing importance of the collections obtained by early investigators like Harrington, Walker, and Dellinger, several aspects of their field techniques limit the kinds of analyses modern investigators may undertake using these materials. As noted above, most of these early excavations were aimed primarily at the recovery of artifacts made of organic substances, like basketry, which were unusual because they were not normally found at other kinds of sites. Nonperishable artifacts (like stone tools and manufacturing debris) found in association with these materials often were not systematically collected. When depths were reached in the excavations at which only nonperishable materials were found, the digging was usually terminated.

More recent excavations (in some cases in the very sites excavated by these early investigators; e.g., Wood 1963; Thomas 1969) have shown that these sites are often very deeply stratified, sometimes containing many series of occupation levels predating those in which perishable remains are preserved. Therefore the materials collected by these early investigators represent, for the most part, only the later stages of prehistory. Another problem of even more serious consequences to modern research possibilities lies in the fact that in most cases stratigraphic controls were either not maintained at all or, if they were, fall far short of modern standards. As a result, it is often impossible to relate excavated collections to modern cultural sequences. This problem arose in Gayle Fritz's (1984) study of cultigens identified in collections made in the 1930s at the Holman and Poole shelters, as well as in the bioarcheological analysis which forms part of the present study.

While these Ozark rockshelter investigations were underway, others directed their attention to the Arkansas River Valley. Warren K. Moorehead surveyed the entire length of the Arkansas River during this period (Moorehead 1931). Sponsored again by the Phillips Academy, he recorded archeological sites and compiled information provided by Thoburn and others to construct an outline of the prehistoric cultures along this waterway. Moorehead found abundant evidence of prehistoric occupation throughout his study area, not only along the alluvial valley of the Arkansas River itself, but also in the valleys of tributary streams draining the Ozark and Ouachita mountains. Sites appeared to be particularly abundant in the vicinity of Dardanelle and along the Petit Jean and Fourche la Fave river valleys along the frontal zone of the Ouachita Mountains, although this distribution may be due more to the energies of private collectors who shared their information with Moorehead than to the actual distribution of prehistoric settlements.

Between 1923 and 1935, two events occurred that brought the Arkansas River Valley to the attention of archeologists throughout the country and stimulated a surge of interest in the region's prehistory. In late 1923 floods exposed several late prehistoric cemeteries in the vicinity of Dardanelles Arkansas, and financially pressed local people discovered the pottery offerings in the graves were worth money. An archeological "gold rush" followed, which dispersed artifacts to museums and private collectors and brought archeologists to the scene (Harrington 1924c).

Most digging took place in an area of bottomland, known variously as Carden's Bottom or Carden Bottoms, but the number of sites explored, their contents, and the context of the diggers' discoveries remain largely unknown (Clancey 1985; Hilliard 1981). Many graves contained elaborately decorated pottery, some painted and shaped like vessels found in prehistoric and early historic cemeteries along the lower Arkansas River Valley and elsewhere in eastern Arkansas, and others similar to vessels found in prehistoric Caddoan sites in southwest Arkansas (cf. Dickinson and Dellinger 1940). Some Carden Bottoms material was acquired by the University of Arkansas Museum, and, despite the fact that it is a select and incomplete sample of artifacts from several different archeological sites, it has been used as a basis for identifying the late prehistoric Carden Bottoms complex (Hoffman 1977a:5) or phase (Hoffman 1983). University of Arkansas graduate student Phyllis Clancey studied the collection, but was unable to determine whether the artifacts are from a single local occupational episode or from several occupations (Clancey 1985).

The Carden Bottoms digging showed that the Arkoma basin section of the Arkansas River Valley was occupied in the late prehistoric period by a substantial population with cultural ties to societies along the lower Arkansas River and the Caddoan area. It also alerted archeologists to the richness of cultural resources in this part of Arkansas and the threat of information loss through uncontrolled digging and natural site destruction, and helped stimulate a program of investigative site exploration and excavation at the University of Arkansas Museum. Under the direction of Samuel C. Dellinger, the Museum began an accelerated program of investigating sites of the late prehistoric period, particularly mounds and burial sites. The Kinkead-Mainard site (3PU2) in the Arkansas River Valley near Little Rock was extensively excavated in 1932, because it seemed to be culturally similar to the Carden Bottoms cemeteries (Hoffman 1977d). Diggers hoped to clarify the relationship between Carden Bottoms sites and cultural remains elsewhere in Arkansas, drawing their information from pottery styles found in graves.

A year later the museum explored the Poteau and Fourche la Fave valleys in the northern Ouachita Mountains (Arkansas Archeological Survey files), looking particularly for mound and cemetery sites. A mound at Bluffton on the Fourche la Fave (3YE15) was tested, but most work was carried out along the Poteau where a series of sites containing large quantities of cultural debris and human burials was encountered. This material was never analyzed, although the Strickland's Island site (3SC7) was later cited as an example of pre-Caddoan culture (Dellinger and Dickinson 1942; Orr 1952; Schambach 1982a).

The second event similar to the Carden Bottoms episode was the commercial looting of the Spiro mound group near Fort Smith, Arkansas, between 1933 and 1935. Local diggers unearthed and sold an enormous quantity of artifacts, many of them made of wood and other perishable materials that had been fortuitously preserved with burials in the principal mound in the group, the Craig Mound. Some artifacts, such as embossed copper plates and engraved marine shell cups, were similar to objects unearthed at large mound centers elsewhere in the southeast. Spiro was not only a center of prehistoric cultural development along this portion of the Arkansas River Valley, but it was linked in some way with other prehistoric Mississippian cultures across the greater southeast. Artifacts were dispersed undocumented to museums and private buyers throughout the country. Only fragmentary information on their location within the mound and the prehistoric features that contained them was recorded by observers at the scene. The history of the commercial excavations at Spiro has been reconstructed by several investigators (cf. Clements 1945; Hamilton 1952; Phillips and Brown 1978; Rogers et al. 1980), but some kinds of information about events at the site will never be retrieved.

Concern over loss of both information and objects from Spiro stimulated the passage in 1936 of the Oklahoma Antiquity Law requiring permits for archeological excavations. The commercial digging was finally halted, and the University of Oklahoma, with funds from the Work Projects Administration (WPA) and other sources, dug extensively at the site and numerous other localities in the valley between 1936 and 1941 (Orr 1939, 1946). A final report of the Spiro WPA work was not produced, however, until James A. Brown undertook analysis of all records and artifacts in the 1960s. Although the work is still incomplete, the nature of some of the mounds and their contents, and the artifacts recovered in the scientific excavations have been comprehensively analyzed (Brown and Bell 1964; Brown 1966a, 1966b, 1967, 1971a, 1976a).

The Spiro locality excavations, both commercial and scientific, yielded data that are still undergoing examination. A comprehensive listing of all publications resulting from these studies is not presented here, but the references are included in the annotated bibliography. Kenneth Orr formulated a cultural historic framework for the late prehistoric cultures of this portion of the Arkansas River Valley based on preliminary analyses of the excavations (1946) and related the various components, or individual occupations, to the cultures identified elsewhere in the Caddoan area (1952). The large body of artifacts, many of them rarely found in archeological contexts, was drawn upon for numerous studies in addition to Brown's work. There are technological and stylistic studies, for instance, of basketry (Baerreis 1947), textiles (Willoughby 1952), copper objects (Hamilton et al. 1974), shell gorgets and cups (Duffield 1964; Shead 1951; Phillips and Brown 1978, 1984), pottery (Bell 1953b), and ground stone (Stone 1937).

The Spiro artifact assemblage constitutes a major corpus of prehistoric art that has been used to explore numerous questions of prehistoric southeastern ceremonialism, trade and social relationships, and iconography. Design elements, decorative motifs, and specific artifact types from the Spiro site, in addition to similar artifacts from other major ceremonial centers such as Moundville in Alabama and Etowah, Georgia, were used to define a prehistoric ceremonial complex, or "Southern Cult," that was believed to be a religious phenomenon shared by Mississippi period cultures across the southeast (cf. Waring and Holder 1945; Waring 1968; Baerreis 1957). More recently, Phillip Philips and James A. Brown (1978, 1984) undertook a detailed analysis of engraved designs on shell cups and gorgets, identifying specific art styles and iconographic themes present in the collection, and outlining similarities and differences with "cult" artifacts from other sites. One outgrowth of this work is a proposed reformulation of the notion of "Southern Cult" (Brown 1976b); another is a more comprehensive interpretation of Spiro and other Mississippi period art embodying symbolic expressions of the power and importance of social leaders and social concerns with warfare and fertility (Brown 1976b, 1985).

The principal features excavated by commercial diggers and WPA crews were a variety of elaborate burial facilities. These data have been used to explore the mortuary rituals involved with the disposal of elite members of the local culture (Brown 1966b) and to investigate the degree of social differentiation that existed within Spiroan society (Brown 1971b).

The WPA excavations at Spiro were but one of several archeological projects carried out in the study area as part of the federal government's depression relief program. The advantages and disadvantages of WPA archeology are well known. Large numbers of diggers were employed on extensive excavation projects that produced huge quantities of artifacts, field records of variable quality, and virtually no finished reports. Project research goals concerned reconstructions of local and regional cultural history through the collection of selected artifact types, and the quality of individual projects depended largely on the ability of supervisors to oversee large work gangs. Many kinds of data, however, were not collected, and records that are inadequate by today's standards limit the usefulness of some WPA work. Yet, the sheer bulk of information amassed by WPA workers created a data base used for the first syntheses of regional culture history.

In Oklahoma the WPA program was supervised by Forrest E. Clements and administered through the University of Oklahoma's Department of Anthropology (Albert 1984). Most projects were carried out in the northeastern part of the state along the Arkansas River and its tributaries, and coincided with early reservoir construction projects. Between 1937 and 1940, WPA crews excavated a number of sites along the Grand River in the area that was later to become the Grand Lake of the Cherokees (Grimes 1938). Most of these excavations were concentrated on sites known previously and suspected to be good sources for information which could be used to refine the prehistoric culture history of the region. David Baerreis (1951) studied collections from three preceramic sites along the Grand River in Delaware County and defined a sequence of developmental cultural phases which later came to be known as the Grove focus. Other sites excavated by WPA crews contained assemblages with shell-tempered ceramics, small triangular arrowpoints, and other materials which were used to identify the Neosho focus (Baerreis 1939a, 1940a; Baerreis and Freeman 1961; Freeman 1959a, 1960, 1962). In addition to these synthetic studies, a number of individual site reports based on WPA work have also been published (Baerreis 1939b, 1954, 1955; Finklestein 1940; R. L. Hall 1951; Wittry 1952; Bell and Dale 1953; Bareis 1955; Baerreis et al. 1956; McHugh 1963).

Most WPA work in southeast Oklahoma took place in the northern Ouachita Mountains, specifically in the Poteau and Fourche Maline creek valleys where a high density of known archeological sites intrigued investigators. Although at least one mound site was studied, the majority of sites were "black mounds," concentrations of dark soil containing large quantities of cultural debris and human burials. At least 24 sites were tested or extensively excavated (Galm 1978a:21). The dense midden deposits, occasionally quite deep, contained a distinct assemblage of stone tools, undecorated pottery, and other refuse as well as human remains. Although unable to detect clear stratigraphic separation of occupations in most sites, investigators noted that the pottery and some projectile point styles tended to appear at varying depths in different locations, indicating the sites were the result of long occupation of the valley by people whose culture changed only slowly through time from the Archaic through the Mississippian periods. These sites were collectively named the Fourche Maline focus. Unfortunately, detailed analysis of these sites was not undertaken until years after the fieldwork was completed and in some instances has not yet been carried out (Proctor 1957; Sharrock 1960).

Relatively little archeological work was done in the study area during the years the United States was engaged in World War II, and this situation continued (with the exception of several reservoir salvage projects discussed below) well into the following decade. However, some very useful information was gathered by amateur archeologists for a number of areas in Missouri (e.g., Lowe 1940; Adams 1941, 1950, 1958; Tong 1951a, 1951b, 1955, 1957; Haslag 1959) and Arkansas (Rogers 1954, 1957). Carl Chapman summarized what was then known of Missouri's prehistory in a series of articles (Chapman 1946, 1947, 1948a, 1948b; see also 1950), and a similar treatment of Oklahoma's prehistory was provided by Bell and Baerreis (1951). Contributions by professional archeologists working in Oklahoma include articles by Howard (1940), Baerreis (1941, 1953), Bell (1948, 1949a), and Lehmer (1952). Excavations at a northeast Oklahoma rockshelter site were reported by R. S. Hall (1954), and excavations were also begun in 1949 at the Harlan site by Robert Bell (1949b). In Arkansas, Horace Miner conducted excavations at Cave Hollow, and his report (1950) provided the first reliable stratigraphic assessment of an Ozark rockshelter site. Miner compared the Cave Hollow artifact assemblage with Harrington's Bluff-Dweller culture, but he also suggested materials from this site were comparable to Woodland and Mississippi period artifacts from the Mississippi Valley region. The following year, Howard (1951) also suggested that "Ozark Bluff Dwellers" materials actually corresponded to separate Archaic, Woodland, and Mississippian phases.

After World War II, archeological research resumed in the study area primarily in response to renewed reservoir construction along the White and Arkansas rivers and their tributaries. In the late 1940s, the U.S. Army Corps of Engineers began to construct a series of large reservoirs throughout the Ozarks authorized by the Flood Control Act of 1938. These reservoirs were meant to supply water and electrical energy to growing population centers as well as promote economic growth and create extensive areas for recreation development. Construction of these reservoirs involved damming segments of major Ozark rivers to inundate the adjacent lowlands. These rivers, which meandered through deeply entrenched valleys bordered by steep limestone bluffs, seemed particularly well suited for these purposes. In order to provide for the recovery of significant archeological data that would be lost when the dams were closed, funds for salvage operations were made available through the Smithsonian Institution's River Basin Survey program and through the National Park Service. The archeological survey and excavation projects conducted at Ozark reservoirs in Missouri, Oklahoma, and Arkansas under these programs are identified in Figure 11.

Many of these reservoir salvage projects were carried out in a series of stages. The first stage involved brief surveys to locate important sites, followed by testing or excavation of a small number of locations. Due to impending inundation, the alluvial bottomlands of major rivers and their tributaries became the focus of most archeological research, while other physiographic zones remained largely unstudied. Consequently, the known distribution of cultural remains and the kinds of sites studied are strongly biased toward habitation sites and other settlement types from only one physiographic region. The pace of reservoir construction and limited finances available for archeology also rarely permitted comprehensive surveys or extensive excavations. Sites were selected for excavation in order to block out successive periods of prehistoric occupation or to provide information on such cultural

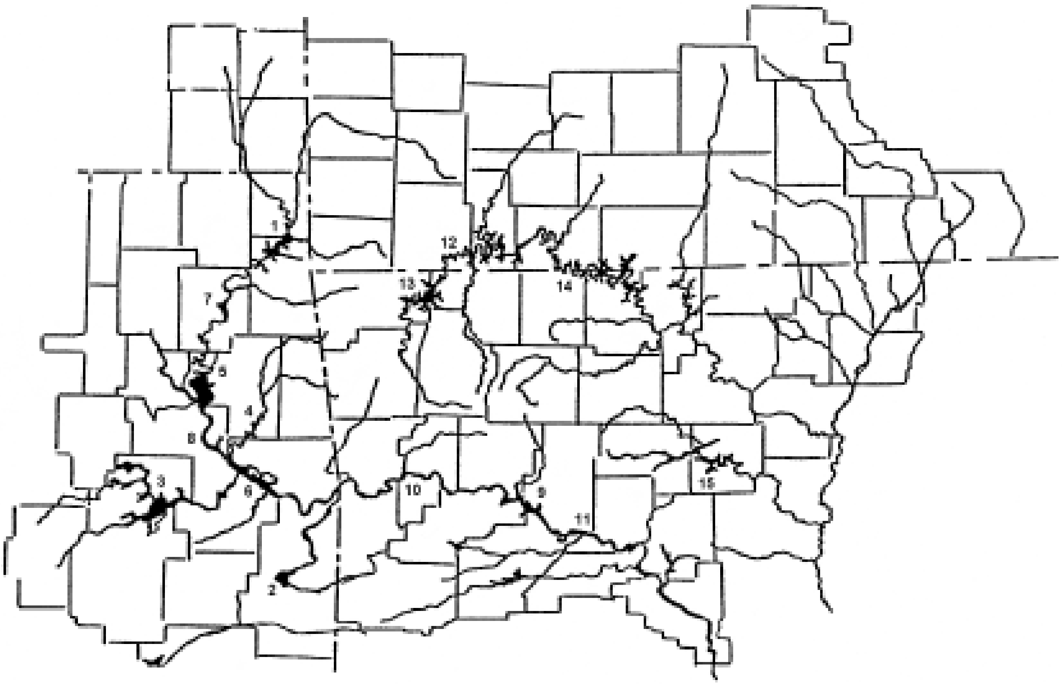

Figure 11. Reservoir salvage projects in the OAO study area.

	RESERVOIR	SPONSOR	REFERENCES
1	Grand Lake of the Cherokees	WPA	Grimes 1938; Baerreis 1954; Baerreis and Freeman 1961; Freeman 1959b, 1960; McHugh 1963; Hall 1951; Wittry 1952
2	Wister Reservoir	WPA	Watson 1947; Bell 1947b, 1949a; Newkumet 1940; Proctor 1957; Sharrock 1960; Gulinger 1971
3	Eufaula Reservoir	NPS	Wenner 1948a; Johnson 1950; Proctor 1953
4	Tenkiller Ferry Reservoir	WPA	Wenner 1948b; Lehmer 1952; Bell and Dale 1953; Hall 1954; Bareis 1955; Israel 1969, 1979; Hardin and Robinson 1975
5	Fort Gibson Reservoir	NPS	Wenner 1947; Finklestein 1940; Bell 1972
6	Robert S. Kerr Lock and Dam	NPS	Buck 1958; Bell et al. 1969; Burton et al. 1969; Burton and Stahl 1969; Burton 1971; Cartledge 1970; Eighmy 1969; Prewitt and Wood 1969; Shaeffer 1958; Wyckoff 1970a
7	Markham Ferry Reservoir	NPS	Wyckoff et al. 1963; Wyckoff and Barr 1964; Kerr and Wyckoff 1964; Wyckoff 1963, 1964a, b, 1985
8	Webber's Ferry Lock and Dam	NPS	Barr 1965; Schneider 1967; Wyckoff and Barr 1967, 1968; Wyckoff 1967a; Baugh 1970
9	Dardanelle Reservoir	NPS	Greengo 1957; W. W. Caldwell 1958
10	Ozark Reservoir	NPS	Hoffman et al. 1977
11	Arkansas River Navigation System	NPS	Scholtz and Hoffman 1968; Myer 1969; Westbury 1971
12	Table Rock Reservoir	NPS	Chapman et al. 1960; Chapman 1956, 1957; Bray 1956, 1957; Marshall 1958; Harvey 1962
13	Beaver Reservoir	NPS	Golden 1962; Wood 1963; Thomas 1969; Scholtz 1967; Thomas and Davis 1966; Howard 1963
14	Bull Shoals Reservoir	NPS	Howard 1963
15	Greer's Ferry Reservoir	NPS	McGimsey 1964

Note: WPA (Work Projects Administration); NPS (National Park Service) features as house patterns and burials. Excavation strategies were therefore oriented toward recovering a maximum amount of information in a minimum amount of time. In many instances, a short testing period was followed immediately by mechanical stripping of sites in search of features. While this strategy produced much new information, particularly on the internal arrangement of features on habitation sites, many other kinds of data were not collected.

Most reservoir salvage archeology in Oklahoma was conducted by the Department of Anthropology at the University of Oklahoma, and, after 1962, by the Oklahoma River Basin Survey, both under the direction of Robert E. Bell. Financial support came from the National Park Service, the Smithsonian Institution's River Basin Survey, the University of Oklahoma, and other sources (Albert 1984:47).

Immediately after the war, work resumed in the Fourche Maline valley where the Wister Reservoir was planned. A survey (Watson 1947) was followed by test excavations at four sites under Robert E. Bell's direction (Bell 1947b, 1949a). One of these was the Scott site, a "black mound" with a deep midden deposit encompassing the prepottery and pottery-bearing occupations of the valley, as well as features such as burials. Bell spent a second season excavating this site, and used it as a fundamental source of information in subsequent delineations of the Fourche Maline focus (Bell 1953a; Bell and Baerreis 1951).

On the lower Canadian River, David Wenner and other University of Chicago graduate students surveyed the area to be flooded by the Eufaula Reservoir (Wenner 1948a). This was followed in 1950 by a second survey (Johnson 1950). In all, 137 sites were found, ranging in time from the Archaic through the Mississippi periods. In addition, several localities with historic period Indian pottery and nineteenth century European artifacts were found and were tentatively identified as Creek Indian sites from the resettlement period. In 1951 eight sites discovered by the survey were briefly tested (Proctor 1953).

The Tenkiller Ferry Reservoir project along the Illinois River was also revived. In 1948 the Smithsonian Institution River Basin Survey explored the area, discovering 38 sites (Wenner 1948b). This was followed in 1951 by a small testing program and excavation at the Cookson site, where both Archaic and Mississippi period occupations were found (Lehmer 1952). During the same year, the University of Oklahoma Department of Anthropology, with the cooperation of several federal agencies, excavated the Morris site which had been tested briefly by the River Basin Survey, and the Vanderpool site, the location of the University's archeological field school. Robert E. Bell, director of the 1951 university work, returned to the Morris site in 1952 with the field school (Bell and Dale 1953). All of these sites were locations of repeated human occupation from the Archaic through the Mississippi periods. At the Cookson and Morris sites, the remains of buildings, storage pits, and other habitation features from the late Mississippi period were particularly notable discoveries, and 55 human burials belonging to this period were also found at Morris (Bell and Dale 1953:87). In his report on the Cookson site, Donald Lehmer (1952) proposed that the latest occupation there was distinctively different from contemporary cultural groups in the nearby Arkansas River Valley, and he named this culture the Turkey Bluff focus. In 1969, however, Stephen Israel reexamined the Cookson site materials as a master's thesis project, and concluded that cultural similarities between the two areas were more pronounced than differences (Israel 1969, 1979). The Turkey Bluff focus is no longer considered a separate cultural entity by most archeologists.

On the lower reaches of the Grand River, a survey of the Fort Gibson Reservoir locale was conducted in 1947, following earlier work by WPA investigators (Wenner 1947). Two mound groups, the Norman and Harlan sites, were subsequently excavated. The Norman site, studied previously by WPA crews (Finklestein 1940), was the site of the University of Oklahoma field school in 1948, and the Smithsonian Institution River Basin Survey continued the field school's work later that year. The Harlan site was the scene of University field schools under Robert E. Bell's direction in 1949, 1950, and 1958. Additional work at the site was sponsored by the University of Oklahoma Foundation in 1949, the U.S. Army Corps of Engineers and the Smithsonian's River Basin Survey (in 1950), and the National Park Service (in 1958). A comprehensive report on the Harlan site was completed by Bell in 1972, but the Norman site materials have not been fully analyzed. Both sites represent social and religious centers and are related culturally to the Spiro site and other mound and nonmound sites in the Arkansas valley. The Harlan site is the best documented representative of the Harlan phase, belonging to the early part of the Mississippi period between A.D. 900 and 1200 (Bell 1984b: 221, 1972). The Norman site was in use during the Harlan phase and the succeeding Spiro phase. Elaborately prepared burials and special mortuary buildings are the principal features of these sites.

In 1958, a survey of the Arkansas River Valley near the confluence of the Arkansas and Canadian rivers was conducted in advance of the construction of the Robert S. Kerr Lock and Dam and associated Short Mountain Reservoir (Buck 1958), and fourteen sites were found. Between 1966 and 1969, nine sites were tested or extensively excavated by the Oklahoma River Basin Survey with National Park Service funding. The majority were occupational sites belonging to the Mississippi period, and one goal of the salvage project was to collect information on these kinds of settlements that had hitherto not been studied in detail. Because several sites were mechanically stripped in a search for features such as houses, burials, and storage pits, information on domestic activities and settlement organization was collected, along with radiocarbon samples that helped refine the chronology of late prehistoric settlement in this portion of the valley.

Among the sites studied, Tyler (Burton et al. 1969), Sheffield (Prewitt and Wood 1969), Robinson-Solesbee (Bell et al. 1969), Tyler Rose (Cartledge 1970), Harvey (Burton 1971) and Horton (Shaeffer 1958, Wyckoff 1970a) contained features that included house patterns, storage or refuse pits, and burials, most associated with the late Mississippi period Fort Coffee phase.

In 1962 a survey and testing program began at the site of the Markham Ferry Reservoir on the Grand River, and excavations continued through 1963. Oklahoma River Basin survey archeologists, sponsored by the National Park Service, discovered 54 sites, including rockshelters and habitation locations (Wyckoff et al. 1963; Wyckoff and Barr 1964). Fifteen sites were tested or extensively excavated (Wyckoff 1985:2). One of the more notable sites investigated was the Kerr Dam site (Wyckoff 1963), where deeply stratified deposits contained Archaic period artifacts. Another deeply stratified site, the Packard site (Wyckoff 1964b, 1985) yielded a deeply buried occupation belonging to the period of Paleo-Indian–Archaic transition, and dated by a single radiocarbon sample at 9416 ± 193 B.P. (NZ-478) (Wyckoff 1985:14).

In 1964 a survey of the Webber's Falls Lock and Dam impoundment of the Arkansas River below the mouth of the Grand (Barr 1965) discovered 46 sites. Previous work in this area had been carried out by WPA crews at the Hughes Mound site (Orr 1946,1952) and the McCarter site, where an occupation belonging to the Archaic period had been investigated (Shaeffer 1957). With National Park Service funding, Oklahoma River Basin Survey personnel tested 11 sites within the impoundment area (Schneider 1967). At the Cat Smith site, Wyckoff (1967a) uncovered a small Mississippi period habitation belonging to the Spiro phase with evidence of houses, human burials, and storage facilities (Wyckoff and Barr 1967).

The Webber's Falls Reservoir inundates the Three Forks locale of the Arkansas, Verdigris and Grand rivers, an area of considerable importance during the early historic period when several Southeastern Indian tribes were resettled in eastern Oklahoma. Oklahoma River Basin Survey crews tested the Vandever–Haworth site (Schneider 1967; Baugh 1970) and the Posey site (Barr 1965; Wyckoff and Barr 1968), two possible early nineteenth century trading posts lying across from each other on the Verdigris River, and located numerous historic features such as refuse pits, architectural remains and nineteenth century European and American artifacts.

During this period, Oklahoma River Basin Survey archeologists also surveyed the Rock Creek watershed in LeFlore and Latimer counties (Barr 1966a) and, for the Grand River Dam Authority, the Chimney Rock and Little Saline Reservoirs in Mayes County (Barr 1966b).

In contrast to the level of activity in Oklahoma, Arkansas' River Basin Survey archeology was a much smaller effort. The location of the Dardanelle Reservoir, not far upstream from the Carden Bottoms digging, was surveyed in 1957 by Smithsonian River Basin Survey archeologist Robert Greengo. Sites appeared to be clustered in alluvial valleys of tributary streams (Greengo 1957). Although Greengo's data were only summarily described, occupations were identified as belonging to the Archaic through the Mississippi periods, and sites representing habitation and burial areas as well as short term activity areas were present. Of the 57 sites discovered, he recommended 21 be tested, but a year later only one of those, plus four newly reported sites, received further work from River Basin Survey archeologist Warren Caldwell. The sites, one a rockshelter and four open air sites, were located along creek valleys near the edge of the Arkansas River Valley floodplain, and contained shallow, mixed deposits (W. W. Caldwell 1958).

In 1965 a brief survey of the proposed Ozark Reservoir was conducted by University of Arkansas archeologist Michael Hoffman with the help of numerous members of the Arkansas Archeological Society and funding from the National Park Service. Fifty-nine sites were recorded, ranging in time from the Archaic period to the Mississippi period (Hoffman 1977a). Over the following three years, several projects were undertaken in the reservoir area, including intensive surface collections (Hoffman 1977b), aerial remote photography of site locales (Printup 1977; Hoffman 1977c), testing at two sites (Myer 1977) and extensive excavation at two more, the Spinach Patch site and the River Bank site (Bond 1977a). The most noteworthy result of the project was identification of a Woodland period occupation in this portion of the Arkansas valley, named the Gober complex, that resembled the pottery making occupations of the Fourche Maline valley.

Alongthe remainder of the intermontane waterway, James A. Scholtz and Michael P. Hoffman surveyed locales selected for lock and dam or public use area construction, and revisited a handful of sites that had been previously reported to the University of Arkansas Museum (Scholtz and Hoffman 1968). Four sites were later briefly tested (Myer 1969). Two had relatively shallow and mixed cultural deposits; one (the Cadron Creek site) on a high terrace at the mouth of Cadron Creek contained a series of occupations at least a meter deep, but was not tested extensively enough to determine much about them, and the fourth was the suspected location of the Pioneer period Spadra trading post. Further testing (Westbury 1971) helped strengthen the identification of the site as an early nineteenth century settlement, but did not confirm unquestionably the historic identification.

In the Ozarks of southwest Missouri, reservoir salvage work consisted of a single, large scale effort in the Table Rock Reservoir by the University of Missouri–Columbia. Directed by Carl Chapman, a team comprised mostly of graduate students and volunteers conducted an intensive reconnaissance centered in Barry and Stone counties, followed by excavations at a large number of sites. The primary goal guiding this effort was to collect data from stratified sites to refine the prehistoric cultural sequence in the area (Chapman 1956, 1957). In the course of these investigations some important site reports were published in *The Missouri Archaeologist*, including Robert Bray's reports on the well stratified Rice site (1956) and the Lander Shelter I (1957). Some of the graduate students involved in this project also wrote master's theses synthesizing the data obtained during the field investigations (e.g., Marshall 1958; Harvey 1962). The bulk of descriptive reports, analyses, and interpretations resulting from this project, however, are contained in the massive final report submitted to the National

Park Service (Chapman et al. 1960), which runs some 1,200 pages in length. As is true for northeastern Oklahoma, our current understanding of the prehistory of this portion of the Ozarks is built largely upon this reservoir salvage effort. Although this voluminous report has not been published, much of the data and the primary interpretations are summarized in two recent volumes by Chapman (1975, 1980).

In northwest Arkansas, reservoir salvage efforts were carried out in the 1950s and 1960s, in Bull Shoals Reservoir, Beaver Reservoir, and Greer's Ferry Reservoir. Only the Beaver Reservoir investigation produced data and interpretations comparable to those resulting from similar studies in Oklahoma and Missouri. Some of the more significant contributions resulting from the Beaver Lake investigations include reports by Wood (1963) and Thomas (1969) on the Breckenridge site, and by Thomas and Davis (1966) on the Prahl Shelter. Both of these stratified rockshelter sites provided important baseline data on prehistoric cultural sequences in northwest Arkansas. James Scholtz (1967) wrote his master's thesis on the Beaver Reservoir project. Data from survey and test excavations at 179 sites are presented, and diagnostic artifacts associated with cultural periods identified in the region are summarized (see also Scholtz 1969).

In southeastern Kansas, a series of surveys and test excavations were conducted by the Kansas State Historical Society in the early 1960s, prior to construction of the Elk City Reservoir in the Verdigris River basin (Witty 1962; Frantz 1964; Weakly 1965). Major excavations were undertaken at a series of sites in 1965 and 1966, resulting in the definition of two important cultural manifestations in the region, as Middle Woodland Cuesta phase, and a Mississippi period Pomona focus (J. O. Marshall 1972).

In Arkansas, members of the Arkansas Archeological Society carried out other survey and excavation projects during this period of reservoir salvage work. In 1961, Allen McCartney removed a burial feature from the McClure site in the Arkansas River alluvial valley 48 km downstream from Spiro. The small artifact assemblage, termed the McClure complex, is closely related to Spiro phase occupations upstream (McCartney 1963). Members of the Western Arkansas Chapter of the Society were particularly active in reporting site locations both in the Arkansas valley and in the Poteau, Fourche la Fave, and Petit Jean drainages in the Ouachita Mountains. They assisted with both the survey work in the Ozark Reservoir and the excavations in 1961 and 1962 at the Tom's Brook site in the southern Ozarks (Bartlett 1963).

In 1960 Charles S. Bartlett and George Staley began digging a small rockshelter (3JO1) along Tom's Brook in Crawford County. Their excavations through 1.2 m of deposits revealed four distinct, artifact-bearing strata. Examination of the artifacts at the University of Arkansas Museum confirmed a lengthy occupational history at the site extending from Late Archaic times until well into the late prehistoric, ceramic producing era (Bartlett 1960). Bartlett and Staley supervised further excavations at the site in 1961 by members of the Western Arkansas Chapter. On the basis of these excavations, further information on four artifact complexes was gained. The complexes, in relative chronological order, were identified as the early nonceramic, late nonceramic, early ceramic, and late ceramic (Bartlett 1963). Radiocarbon dates subsequently were supplied (Bartlett 1964; Scholtz and Davis 1967) which helped establish the absolute chronology of the early and late nonceramic and the late ceramic complexes. Careful excavation techniques and prompt dissemination of information through publication of this project illustrate the kinds of contributions dedicated avocational archeologists have made to the study of Ozark prehistory.

Another example of important contributions made by Society members is represented in the work of Bert and Louise Shoemaker of Mountain Home, Arkansas. In 1961 the Shoemakers brought to the attention of the University of Arkansas Museum a unique collection of artifacts they had found along the south bank of the White River in Baxter County, near the site of the old Shipp's Ferry. Included in this collection were two small shell masks, probably worn as ear ornaments, representing the "Long-Nosed God" motif known from several Early to Middle Mississippi period sites in the southeastern United States (Davis 1961). These artifacts are linked with the early development of the Southern Ceremonial Cult (Brown 1976b). The presence of these diminutive but intriguing artifacts, along with a wide variety of other materials representing Archaic to Mississippi period occupations (Shoemaker and Shoemaker 1961; Redfield 1963), encouraged additional investigation of this site. So in June, 1963, excavations were begun by Pete Shiras, Dean Hudson, and John House, all Society members from Mountain Home. A small test pit was dug in the center of what appeared to be a rich shell midden, but to their acute disappointment, only a few artifacts were found, and no discernible stratigraphy was encountered (Shires 1903).

Additional test excavations were made at the site the following spring (Davis 1964a), and this time the results were of sufficient reward for the Society to schedule its first annual dig and training program at the site later that summer (Davis 1964c). Once again, timely analysis and reporting documented the cultural and chronological significance of this site, and produced a contribution of lasting value to our understanding of Mississippian cultural developments in the Ozarks (House et al. 1969; Mullins 1975).

Several other projects by Society members have contributed valuable data on Ozark prehistory. Updated information on rockshelter sites in Newton and Searcy counties visited by Harrington and Walker has been provided by Gene Waters (1970) and Thelma and Louis Gregoire (1975). The Gregoires also reported salvage excavations undertaken at the Falling Water Falls site (3PP40) in northern Pope County, which produced information on Middle and Late Woodland occupations (Gregoire 1971). This report is especially noteworthy for the superb artifact illustrations drawn by Louis Gregoire. The late John Newton, a former long standing member of the Society, contributed much valuable information on Paleo-Indian sites in the Arkansas Ozarks (Newton

1977). John House (1965) provided a valuable analysis of Archaic campsites situated on bluff tops in the Ozarks, in addition to short articles addressing other aspects of prehistoric Ozark subsistence and settlement (House 1968,1973). These publications by Society members have contributed much significant information to our knowledge of prehistoric cultural sequences in the Ozarks.

The University of Arkansas Museum and the Arkansas Archeological Society conducted a short training dig at the Toltec site in 1966 (Davis 1966; Anderson 1977; Rolingson 1982a) in and around Mound C, and at the Point Remove Mound site near the mouth of Point Remove Creek in 1967 (Davis 1967b). Museum personnel and students from the University of Arkansas also conducted excavations at the Mill Creek site (3ST12), a small Mississippian habitation in Stone County (Baker 1974).

In the late 1960s and early 1970s, a significant change in focus in archeological research in the region occurred. Federal environmental, and historic preservation laws were enacted requiring federal agencies and other organizations to address the impact of development projects on prehistoric and historic remains. The general level of consciousness among state and local political leaders and citizens concerning the loss of cultural resources through development and other forms of destruction was on the rise. Arkansas, Oklahoma, Missouri, and Kansas instituted state programs to save and study archeological sites and to disseminate information on the past to the public. Both federal and state agencies involved with land management and development projects began identifying, evaluating, and recovering archeological information.

In Arkansas, the Arkansas Archeological Survey was formed in 1967 as a state agency involved with the identification and study of the state's archeological remains (Davis 1982). As part of that program, Survey archeologists conducted numerous field projects for federal and state agencies, particularly between 1969 and 1978. Most of the work in the northern Ouachita Mountains and Arkansas River Valley was carried out for the Soil Conservation Service, the U.S. Forest Service, and the U.S. Army Corps of Engineers. In the Ozarks, major projects have been conducted for the U.S. Army Corps of Engineers, the U.S. Forest Service, the Soil Conservation Service, and the National Park Service. Private corporate researchers have also been active working for the same agencies and other corporations and municipalities.

In Oklahoma, the Oklahoma Archaeological Survey was formed in 1968 and reorganized in 1970 to conduct research programs in that state and, later, to monitor the impact of development projects on archeological sites (Wyckoff and Brooks 1983; Albert 1984). Research under contract was shifted to the Archaeological Research and Management Center, a separate entity within the University of Oklahoma system. In the early 1970s other state agencies began their own archeological programs. The Oklahoma Conservation Commission established an archeological program in 1973 concerned with the construction of flood control and watershed projects. The Oklahoma Department of Transportation established an Oklahoma Highway Archaeological Survey in 1972 to deal with cultural resources affected by highway development. The Oklahoma Historical Society, continuing a tradition established by Thoburn, conducted archeological research on its own in the early 1970s and later sponsored work under contract with other state agencies and universities. The Society's focus of interest is archeological sites of the historic period. All of these agencies have conducted research in the project area. In addition, private corporate archeologists have also been active.

In Kansas, state legislation passed in 1967 established the Kansas Antiquities Commission. One member of this commission is the State Archeologist employed by the Kansas State Historical Society. The Center for Historical Research, housed within the Society, pursues a vigorous research program. The Kansas Anthropological Association, first organized in 1955, is composed of professional and avocational archeologists. Members of this association have contributed site location information, and they have contributed labor to professionally organized excavations. In 1975 a certification and training program was established, modeled on the Arkansas Archeological Society program. The Department of Natural Resources in Missouri reviews all compliance work in that state, and maintains a master library of contract reports. The Missouri Archaeological Society, founded in 1953, has a membership of professional and avocational archeologists. The Society coordinates with the Archeological Survey of Missouri centered at the University of Missouri–Columbia.

The number of institutions and individuals doing archeology in the region has increased dramatically since the late 1960s, and dictates of federal law and regulation have also changed the nature of much archeological work. Survey work to find archeological sites in the way of development, or on federal lands, has been the most common kind of research undertaken, particularly on Forest Service lands in the mountains and around the perimeter of U.S. Army Corps of Engineers impoundments. In contrast to the earlier emphasis on bottomlands, upland areas out of major alluvial valleys have become the focus of increasing attention.

Most survey work has centered on the discovery of archeological sites in situations where surface vegetation, particularly forest growth and pasture cover, obscures sites. Site discovery procedures such as scraping aside patches of vegetation and digging intermittent shovel holes have facilitated the discovery of surface and near-surface sites, but little information on the activities conducted at these sites or the cultures represented has been gained. Because of the multistage nature of archeological research done under cultural resource management provisions, most sites discovered during these surveys have received no more attention. This is often because the development projects scheduled to affect them have not proceeded, because the sites are not determined important enough to warrant additional attention, or because development projects were redesigned to avoid site locations. The result is that while thousands of archeological sites have been discovered in the last 15 years, very little has been learned about most of them. Only a tiny handful have been studied beyond the initial survey level.

Numerous reports have been prepared for cultural resource management projects in the study area. Some describe surveys of extremely small geographic areas such as sewer treatment plant locations and tracts of U.S. Forest Service land designated for exchange, while others are investigations of larger areas. Only a small sample of the more informative studies are mentioned here (Figure 12), although a comprehensive list is included in the Annotated Bibliography accompanying this report.

In 1967 the University of Arkansas Museum prepared a brief summary of the archeological and historical resources in the White River basin in Missouri and Arkansas for the National Park Service and the U.S. Army Corps of Engineers (Davis 1967a). This was followed by an exhaustive overview of known sites in the basin, published by the Arkansas Archeological Survey in 1975 (Spears et al. 1975). In addition to summarizing archeological data on a reach-by-reach, watershed-by-watershed basis, a few general recommendations were made concerning the treatment of cultural resources during short and long term projects, and suggestions were made concerning interpretive programs the federal government could develop.

A reconnaissance survey of the upper Strawberry River watershed was also conducted in 1975 by the Arkansas Archeological Survey for the Soil Conservation Service (Klinger 1975). Nine prehistoric sites were discovered and three of these were recommended for further testing. Documentary research was also recommended for an historic cemetery, but since the watershed flood control project did not proceed, this additional work has not been performed.

In 1974 the Arkansas Archeological Survey produced an overview and assessment of archeological sites along the Buffalo National River for the National Park Service (Wolfman 1979). This report summarized earlier syntheses of Ozark prehistory and also provided the first modern reformulation of the known data. Information on 254 sites was reviewed to define site types and assess their spatial and temporal distribution. Recommendations were made for a followup program of intensive survey and testing of sites. This program was never implemented, although the Park Service has subsequently conducted spot surveys and limited test excavations at a few sites over the years (e.g., Forney 1980; Limp 1986).

More recently, the National Park Service has performed, as well as funded, several major surveys and test excavations along portions of the Current and Eleven Point rivers in Missouri designated as the Ozark National Scenic Waterways (e.g., Born and Chapman 1972; Lynott 1982a; Price et al. 1983, 1984, 1985). These investigations are noteworthy for the comprehensive, well planned approach to regionwide cultural resource management which they represent. Both prehistoric and historic sites are accorded thorough treatment. Archeological surveys and followup test excavations have been accompanied by studies by palynologists and geomorphologists. Where possible, specialized studies of materials resulting from test excavations have been undertaken (e.g., Mick and Falk 1982), and radiocarbon and thermoluminescence dating techniques have been used to establish the absolute chronology of some of the more important sites. Complementary assessments have been made of prehistoric and historic resources for the Park Service and Soil Conservation Service along the nearby Little Black River (Price et al. 1975) and Fourche Creek watershed (Price et al. 1976; Price and Price 1981). As a result of these reports, much new and valuable information has been produced, permitting a major reassessment of cultural developments in the eastern Ozark region during prehistoric as well as historic times.

Numerous shoreline surveys of impoundments and segments of the Arkansas River Navigation System have been sponsored by the U.S. Army Corps of Engineers since 1972. One of the larger projects was a survey of federal lands along the McClellan–Kerr Arkansas River Navigation System in Oklahoma in 1976 (Miller 1977). Conducted by the Oklahoma Archaeological Survey, the project involved site discovery along the waterway and inspection of new and already recorded sites to evaluate their condition and recommend future management practices. A total of 167 sites were described, of which 54 had been newly discovered, and recommendations for nomination to the National Register, active preservation, and excavation were made. At present, most of these recommendations have yet to be carried out. More recently, Soil Systems, Inc. intensively surveyed a coal slurry pipeline route adjacent to a portion of the waterway. The 34 km long corridor lay west of the Neosho and Arkansas river valleys and traversed both dissected uplands and river floodplain topography. One of the eight sites discovered, a large multiple component site (34SQ25), with both historic and prehistoric occupations, was considered worthy of further study.

In addition to the archeological survey, Soil Systems, Inc. conducted a geomorphological study of three locations, where the pipeline route crossed stream valleys, to evaluate the potential for the existence of buried landforms that may contain cultural materials. Subsurface deposits examined in the floodplain at the confluence of the Arkansas and Verdigras rivers, and in the Arkansas River floodplain below Webber's Falls indicated that there was a good probability that deeply buried paleo-landsurfaces existed in the valley, and that these surfaces may contain archeological sites (Lees et al. 1982).

In Arkansas, a literature study of known sites along the navigation system was conducted by the Arkansas Archeological Survey for the Corps of Engineers (Keller 1977), but no fieldwork was carried out. At that time 222 sites were listed in the valley proper, about half of which could be associated with a specific cultural period or tradition. A series of recommendations for management were presented, including intensive survey of areas to be affected by waterway development, documentary research on historic locations (par ticularly those associated with the Cherokee settlements near Dardanelle), and evaluation of sites subject to wash and shoreline erosion. In the last year some work directed toward these recommendations has been initiated.

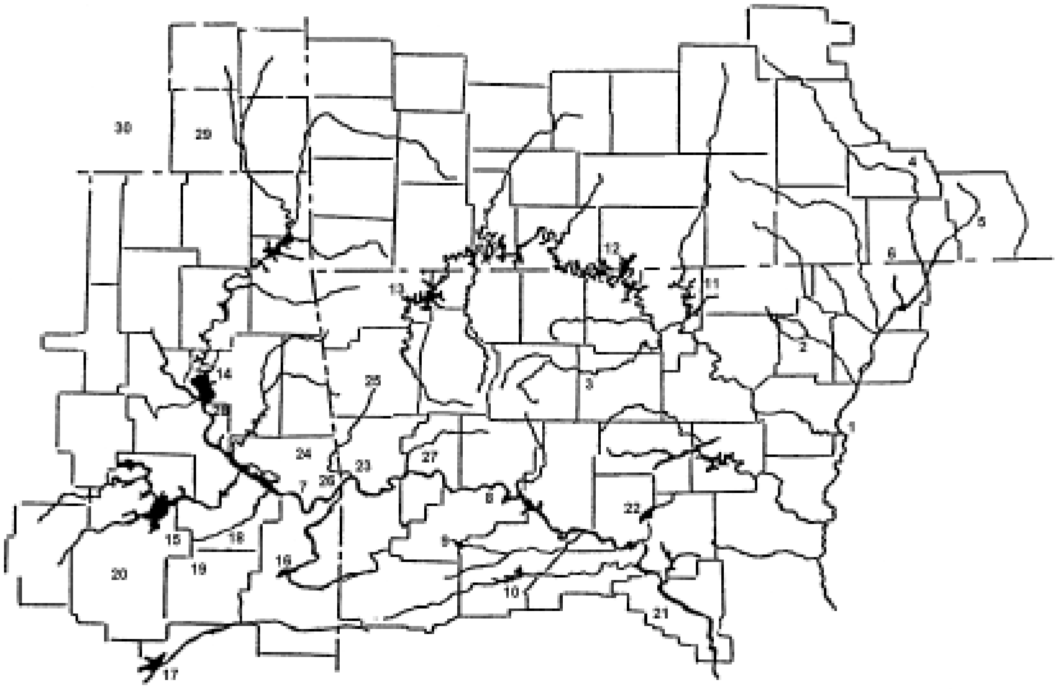

Figure 12. Selected cultural resource management projects in the OAO study area, 1967 to the present

	RESERVOIR	SPONSOR	REFERENCES
1	White River Basin	NPS, COE	Davis 1967a; Spears et al. 1975
2	Strawberry River	SCS	Klinger 1975
3	Buffalo National River	NPS	Wolfman 1979; Forney 1980; Limp 1986
4	Ozark National Scenic Waterways	NPS	Born and Chapman 1972; Lynott 1982a; Price et al. 1983, 1984, 1985; Mick and Falk 1982
5	Little Black Watershed	NPS	Price et al. 1975
6	Fourche Creek Watershed	NPS	Price et al. 1976; Price and Price 1981
7	McClellan-Kerr Navigation, Okla	COE	Miller 1977; Lees et al. 1932
8	McClellan-Kerr Navigation, Ark	COE	Keller 1977
9	Blue Mountain Lake	COE	Padgett 1980
10	Nimrod Lake	COE	Leatherman 1980
11	Norfork Lake	COE	Padgett 1979
12	Bull Shoals Lake	COE	Novick and Cantley 1979
13	Beaver Lake	COE	Bennett and Stewart-Abernathy 1981
14	Fort Gibson Reservoir	NPS	Weakly 1972a, b; Cheek and Cheek 1977; Hayes 1985
15	Lake Eufaula	COE	Perino and Caffey 1980; Gettys 1980
16	Wister Lake	COE	Neal and Mayo 1974; Mayo 1975; Galm 1978a, b; Galm and Flynn 1978
17	Sardis-Clayton Reservoir	COE	Neal 1972; Bobalik 1977, 1978
18	Sans Bois Creek Watershed	Kerr-McGee	Lintz 1978
19	Latimer to Rogers Mills	Arkla	Saunders et al. 1972; Neal 1974a, b; Saunders 1974; Wallis 1974; Hofman 1974; Wyckoff 1974b; Heartfield, Price and Greene, Inc. 1985
20	Brushy-Peacable Creek	SCS	Saunders 1976; Hughes 1978a, b, c; Gelburd et al. 1984; Ferring and Porter 1982
21	Fourche Creek	AAS	House 1972a; Lafferty and Otinger 1980
22	Cypress Creek Basin	COE, SCS	Toney 1974; Brooks and Brooks 1975; Santeford and Martin 1980; Santeford and Quin 1980; Santeford et al. 1985; Hemmings and House 1985
23	Lee Creek, Ark	Fort Smith	Flenniken and Taylor 1977; Spears 1984a, b; Klinger and Imhoff 1985
24	Lee Creek, Okla	OHS, OAS	Muto 1978; Muto et al. 1980
25	Pine Mountain	COE	Raab 1976; Trubowitz 1980
26	Garrison Creek	OCC	Wallis 1983
27	Mulberry Creek	COE	House 1972b
28	Bayou Manard	OAS	Drass 1981
29	Big Hill Lake	COE	Marshall 1966; Rowlinson 1977, 1980; Thies 1982
30	Elk City Lake	COE	Marshall 1972; Brogan 1980

Note: NPS (National Park Service); COE (U.S. Army Corp of Engineers); SCS (Soil Conservation Service); AAS (Arkansas Archeological Survey); OAS (Oklahoma Archaeological Survey); OHS (Oklahoma Historical Society); OCC (Oklahoma Conservation Commission)

In 1977, the Arkansas Archeological Survey inspected the shoreline of Blue Mountain Lake, an impoundment on the upper Petit Jean River that had not been surveyed before its construction (Padgett 1978). In this survey 39 sites were discovered, most suffering damage from shoreline erosion and artifact loss through collecting activity. An experimental archeological deposit was constructed as part of this project for a long term study of the effects of site inundation. The following year, the Survey conducted another shoreline survey for the Corps of Engineers at Nimrod Lake on the Fourche la Fave River, another lake that had not been surveyed before its construction (Leatherman 1980). Here 187 sites in the same general condition as those found at Blue Mountain Lake were recorded, ranging in age from the Archaic to the Historic periods. Numerous recommendations for future survey, testing, and protection of sites were made but none has been implemented.

Two shoreline surveys were conducted by the Survey in the Ozark area for the Corps of Engineers in 1977. A sample survey of the Norfolk Lake shoreline by Tom Padgett (1979) located 28 sites exposed on the modern ground surface. Only a few were historic, and many of the prehistoric sites produced too few artifacts to be attributed to any particular cultural period. Of those that could be identified, most were assigned to the Archaic and Woodland periods. Padgett used the information on site locations to test hypotheses about where sites reflecting hunting and gathering adaptations should tend to be located. On the basis of this analysis, he determined that larger sites (interpreted as base camps or villages) were found on lower river terraces, whereas small sites (thought to represent specialized activity sites) were more often found in adjacent upland settings. Padgett also recommended that six sites be tested to determine their eligibility for inclusion on the National Register, but this has never been done. Lee Novick and Charles Cantley (1979) conducted a similar survey along portions of the Bull Shoals Lake shoreline in Arkansas and Missouri. They located 64 new sites dating from the Archaic through the Historic periods, and they also estimated on the basis of their sampling design that as many as 6,200 sites might exist along the entire lake shore. At the time of their survey only 263 of these had been recorded. The focus of their investigations was on the effects of shoreline changes upon archeological sites. They noted that most of the sites they found were periodically inundated, and processes such as erosion, redeposition, and sedimentation were actively disturbing these sites. Geomorphological studies were recommended to further assess these impacts. Six sites were also recommended for testing and evaluation of National Register significance, but neither of these recommendations were ever followed up.

In 1980 a shoreline survey was conducted by Archeological Assessments, Inc. along portions of Beaver Lake in northwest Arkansas (Bennett and Stewart-Abernathy 1981). A total of 103 prehistoric and historic sites were visited, and brief surface examination revealed that these sites were being damaged primarily by wave action and unauthorized surface collecting. The report recommended that conservation measures be undertaken along with the development of a research design to guide further work in the area. Another survey of Beaver Lake shoreline segments was undertaken in 1984 by Archeological Assessments, Inc., and this time 31 sites were visited and quickly assessed. Most sites were found to have been deflated by shoreline erosion, but a few areas possibly containing buried sites were identified, and a program of large scale data recovery was recommended for those areas (Bennett and Swanda 1985). Unfortunately, these surveys adhered to no particular sampling strategy or research design, making these results extremely limited in value.

In Oklahoma, numerous shoreline surveys have been conducted. The Fort Gibson Reservoir shoreline was surveyed in 1968-1970 by the University of Tulsa for the National Park Service (Weakly 1972a). This work led to salvage excavations at the Martin-Vincent site (Weakly 1972a, 1972b) which contained both Archaic and late prehistoric period occupations, but was found to be severely damaged by wave action. Another shoreline survey was conducted in 1977 by Archeological Research Associates (Cheek and Cheek 1977), and twelve sites being damaged by shoreline erosion were subsequently tested by Gilbert Commonwealth, Inc. archeologists (Hayes 1985).

The Lake Eufaula shoreline was surveyed by the Museum of the Red River in the late 1970s. Although the exact number of sites found during this project is not mentioned in the report, it appears that Greg Perino and his associates found cultural material eroding out of the lake's shoreline in several hundred locations in all parts of the reservoir (Perino and Caffey 1980). The sites represent all cultural periods. Particularly noteworthy were places where Paleo-Indian and Dalton artifacts were found, locations where extensive deposits of burned rock had washed out of rich prehistoric middens, and sites containing a mixture of Native American and European artifacts that are identified as settlements belonging to the time when a number of Southeastern Indian groups such as the Creek and Cherokee were resettled in Oklahoma territory. One noteworthy feature belonging to this nineteenth century resettlement period, a refuse pit containing trash from domestic activities, was salvaged from the shoreline (Gettys 1980).

In 1974 a shoreline survey along Wister Lake was made by the Oklahoma River Basin Survey in advance of planned pool level increase (Neal and Mayo 1974; Mayo 1975). Forty-eight sites were recorded, some of which appeared to be locations investigated by WPA crews. A program of testing was carried out by the Archaeological Research and Management Center between 1976 and 1978. In the first phase of work 13 sites and four localities were tested, several of which were "black mound" sites (Galm 1978a). Further excavations were undertaken at 3 of these sites, Curtis Lake (Galm 1978b), and the Scott and Wann sites (Galm and Flynn 1978), the latter two locales of previous excavations (Bell 1953a; Sharrock 1960).

At the same time, the Oklahoma Anthropological Society and the University of Oklahoma Department of Anthropology jointly undertook excavations at the McCutchen-

McLaughlin site, another "black mound" location upstream from Wister Lake in the Fourche Maline valley (Wyckoff 1976,1979; Wyckoff and Woody 1977; Clark 1980; Powell and Rogers 1980; Baugh 1982), where numerous human burial features were uncovered. The area around the McCutchen-McLaughlin site was also briefly surveyed (Rogers 1979).

This was only one of several projects undertaken in the Wister Lake area by the Oklahoma Anthropological Society. Previously, test excavations had been conducted at the Evans site in 1967, the Holson Creek site in 1968, and the Runner site in 1968 and 1969. The Scott site, the location of Robert E. Bell's work in the 1940s, was also tested in 1977.

The Wister valley projects were designed to answer many questions raised by work in the valley in the 1940s. By using more modern excavation techniques, investigators were able to identify individual occupations within the mound sites and to distinguish more clearly the sequence of cultures present at each site. Information on food collecting activities, burial practices, and tool manufacturing and use was collected and numerous radiocarbon dates became available. The projects led to a re-evaluation of the culture history of the valley and the identification of a late Archaic Wister phase and subsequent Woodland period Fourche Maline phase as the dominant occupation periods for the "black mound" sites (Galm 1981; Bell 1980; Galm 1984).

South of the Wister valley, construction of the Sardis/Clayton Reservoir in the valley of Jackfork Creek initiated another major program of archeological investigation. Although Jackfork Creek is a tributary of the Kiamichi River and, therefore, in the Red River drainage rather than in the Arkansas River watershed, the projects are of interest because the cultural remains are similar to those in the Wister valley. Survey and testing projects undertaken by the Oklahoma River Basin Survey and the Archaeological Research and Management Center in 1972 and 1976 (Neal 1972; Bobalik 1977a; Drass 1977; Bobalik 1978) were followed by a two phase excavation program. In the first phase, eight sites were tested (Vehik and Galm 1979). Three of these, and three more, received more extensive excavations in 1979 (Vehik 1982a, b). The sites represented occupations belonging to the Archaic through the Historic periods. The most notable occupations, however, were "black mound" sites similar to those found in the Wister valley. In particular, the Bug Hill site contained a dense accumulation of cultural materials from the Archaic and Woodland periods and was extensively excavated by the New World Research, Inc., following the 1979 tests (Altschul 1983). The results of the Bug Hill research are compatible with work in the Wister valley and indicate the sites in the former area are culturally related to occupations further north.

Numerous projects have been carried out in the uplands along creeks draining into Lake Eufaula. In the Sans Bois Creek watershed the Archeological Research and Management Center conducted a survey of the Kerr-McGee Choctaw Coal Mine Facility, inspecting 51 archeological sites with occupations ranging from the Early Archaic to the Historic periods. One site, 34Hs-11, contained a deeply buried cultural deposit exposed in the bank of an abandoned channel of Sans Bois Creek, and the principal occupations at the site were during the Late Archaic and Early Mississippi periods (Lintz 1978).

An Arkla gas pipeline right-of-way extending from Latimer to Rogers Mills counties was surveyed by the Oklahoma Archaeological Survey (Saunders et al. 1972). Eleven of the 191 sites discovered were subsequently investigated, three of them in the project area in the Gaines Creek valley. The most notable of the three was the Tucker's Knob site, a "rock mound" containing dark soil and large quantities of both sandstone rocks (Hofman 1974) and cultural materials (Neal 1974a, 1974b; Saunders 1974; Wallis 1974; Wyckoff 1974b). The site, which has occupations belonging to both the Archaic and Historic periods, seems to have been a location for extensive stone tool making activity. Subsequent work at the site was conducted by Heartfield, Price, and Greene, Inc. (1985), when a new right-of-way was planned across it.

The Brushy-Peacable Creek valley has been investigated during Soil Conservation Service development. Surveys by Environmental Associates, Inc. in 1975 and 1976 found 14 sites in the location of planned floodwater retarding structures (Saunders 1976). Subsequent excavation focused on two sites; one, the Dyer or Glasscock site, received extensive attention. Initial tests were conducted by the Oklahoma Conservation Commission (Hughes 1978a, 1978b, 1978c; Gelburd et al. 1985), and the final excavations at Glasscock were undertaken by the Institute of Applied Sciences, North Texas State University (Ferring and Porter 1982).

Two of the most significant sites along the Arkansas River waterway were acquired for state parks during this period, initiating long term research projects at both locations. The Spiro site, which had come under U.S. Army Corps of Engineers control, became Oklahoma's first archeological park under a cooperative agreement between the Corps and the Oklahoma Department of Tourism. Then State Archeologist Don G. Wyckoff prepared a plan for site development (Wyckoff 1968), and tested the former area of the Craig Mound in advance of reconstruction of this feature (Wyckoff 1970b). In 1979 a long range research and interpretive development program was initiated that focused on exploring areas of the site not studied by WPA workers. These included small mounds and the nonmound or "plaza" area between mounds on the site. Among the specific goals of the research were understanding the internal layout of the site at different periods in its history, and determining the use of various mounds (Rogers et al. 1980; Rogers 1982; Rogers et al. 1982). Project results indicated space between mounds in the group was used for public functions rather than normal domestic activities, and that the mound group achieved its maximum size early in its history, during the Harlan phase.

At the other end of the intermontane valley, the Toltec site was acquired by the state of Arkansas in 1975. Although the site lies downstream from the boundary of the study area, it was the nucleus of a culture that dominated an unspecified part of central Arkansas. Related settlements exist in the

Arkansas River Valley and adjacent uplands. Beginning in 1976, numerous survey and excavation projects at the site were conducted in a long term multistage program of research and development directed by the Arkansas Archeological Survey in cooperation with the Division of Parks of the Arkansas Department of Parks and Tourism (Rolingson 1982a, 1982b). The site is a religious and political center with 18 mounds and an encircling earthen embankment. Radiocarbon dates indicate mound construction and site development occurred in the late eighth and early ninth centuries A.D. during the Coles Creek period of Lower Mississippi Valley prehistory (Rolingson 1985), and that the site was built and occupied principally by members of the Plum Bayou culture, a local expression of Coles Creek period culture in the central Arkansas area (Rolingson 1982c). The internal arrangement of mounds indicates the site developed according to a preconceived plan related to the observation of solar and other celestial phenomena (Sherrod and Rolingson 1987).

A small habitation site related to Toltec was located during an Arkansas Highway and Transportation Department survey across Ink Bayou, which drains a part of the alluvial valley and enters the Arkansas near Little Rock (McClurkan 1983). Arkansas Archeological Survey excavations subsequently uncovered evidence of a structure, subsurface pit storage facilities, burials, and a midden deposit. Analysis of temporally diagnostic artifacts led to the identification of two prehistoric components. The first of these, dating to approximately A.D. 690, appears to represent a seasonal occupation of limited intensity by people of the Plum Bayou culture from late summer to early winter. There was considerable evidence of hickory nut collecting activities, as well as other hunting and gathering activities. The component was spatially limited to the bankline portion of the site, and there was no evidence of a habitation structure. The other component, dating to approximately A.D. 900, appears to represent a year-round occupation by people of the Plum Bayou culture. A rectangular habitation structure was associated with this occupation, as were most of the subsurface pits, burials and midden deposits. Analysis of functional artifact types led to the identification of several different activity areas, including a hickory nut and maize processing area, quartz crystal flaking area, and a food processing and disposal area, that were distributed around the structure (Waddell et al. 1987).

Survey projects along Fourche Creek, which drains the eastern edge of the Ouachita Mountain escarpment northwest of Toltec, shed some light on the distribution of cultural groups away from the alluvial valley and into the uplands. A preliminary reconnaissance conducted by John House, depending heavily on information reported by members of the Arkansas Archeological Society, discovered a high density of archeological sites situated principally on alluvial terraces near the stream. Most occupation of the valley was by people making artifacts similar to Plum Bayou and contemporary Fourche Maline cultures in the Ouachita Mountains. Artifacts from the Dalton through the Mississippi periods were also found in the valley, however (House 1972a). At the mouth of Fourche Creek, Arkansas Archeological Survey archeologists Robert Lafferty and Jeff Otinger surveyed 38 acres of land to be used for the expansion of the Little Rock Airport. Of the 12 sites found, most were from the period of Little Rock urban development, but one appears to be a habitation and burial site of the contact period Quapaw (Lafferty and Otinger 1980). Cypress Creek, a tributary of Cadron Creek, lies within a wedge-shaped portion of the Ouachita uplands north of the Arkansas River (Hemmings 1985:2). Extensive investigations were conducted in the creek basin by the Arkansas Archeological Survey for the U.S. Corps of Engineers in advance of construction of the Conway water supply reservoir. Following preliminary surveys for the Soil Conservation Service (Toney 1974) and the Corps of Engineers (Brooks and Brooks 1975), William Martin and Robert Jones conducted an intensive field and historic documentary survey that located 39 sites in the reservoir area. This was followed by a second intensive survey and testing project in 1980 that located 53 additional sites and tested 27 (Santeford and Martin 1980; Santeford and Quin 1980). A mitigation program involving the excavation of four sites was carried out in 1981 (Santeford et al. 1985; Hemmings and House 1985). Two of the four sites were found to have shallow deposits resulting from brief occupations during the Archaic through Mississippi periods. One site was the location of a nineteenth century farmstead. Investigations at this site provided valuable information for Santeford's study of late nineteenth century "log cabin society" in the region. The fourth, the Alexander site, was a small midden site occupied primarily during the Woodland or Coles Creek period and the Mississippian period. Midden deposits containing broken tools, food remains, and human burials were uncovered, indicating the site was a seasonally occupied camp or farmstead during both prehistoric periods.

The northern margin of the Ouachita Mountains contains numerous small rockshelters, topographic features more commonly found in the Ozarks and unknown in the central and southern zones of the Ouachita uplift. One such site, the Sliding Slab Shelter, was discovered during a survey of a tributary drainage of the Petit Jean River conducted by the Arkansas Archeological Survey for the Soil Conservation Service (Padgett et al. 1976). This site was subsequently excavated in 1977 by Pat Harden of Environmental Associates, Inc. (Harden 1981). The small shelter contained a series of intermittent occupations from the Late Archaic into the Mississippi periods. Excavations produced the only series of radiocarbon dates from a site of this kind in the Ouachita Mountains, and the only radiocarbon dates from any site in the northern Ouachitas in Arkansas. The shelter was apparently used as a temporary hunting and gathering camp from approximately 4550 B.P. to at least 730 B.P.

Shelters and open standing rock outcrops in the northern Ouachitas also contain a second kind of cultural feature, prehistoric rock art, that is also found in the Ozarks. Rock art comes in two basic forms, painted figures known as pictographs, and inscribed or pecked elements called petroglyphs. Although recognized as early as the late nineteenth century

(Green 1883), examples of rock art in this region have been recorded only intermittently and have been studied only in the last few years. Gayle Fritz and Robert Ray of the Arkansas Archeological Survey undertook the first detailed inventory of known rock art sites in 1980. They noted that some portions of the northern Ouachitas (particularly Petit Jean Mountain, the rock outcrops in the Russellville area, and Dardanelle Mountain) were known to have numerous examples of rock art, primarily pictographs, on the walls of overhangs and shelters (Fritz and Ray 1982:252–261). Designs are stylistically similar to art motifs on late prehistoric and protohistoric pottery found on sites in the Arkansas River alluvial valley, particularly those from the Carden Bottoms area, and the art appears to be related to rituals performed by members of these societies. The geographic extent of rock art in this region is currently unknown, although subsequent searches for sites (Sherrod 1984) indicate they are more abundant than previously suspected.

In recent years several rockshelter sites in the Ozarks have been the subjects of intensive investigation. In the early 1960s Don Dickson excavated the Albertson site along Spavinaw Creek in northwest Arkansas. This deeply stratified shelter contained 11 components which range in age from the Early Archaic period to the late Mississippian Neosho focus. Radiocarbon dates for four key features within the site have permitted the entire temporal span of occupations to be closely estimated. This site represents one of the most important cultural records for northwest Arkansas, and a final report is currently in preparation (Dickson 1988). In 1972 the University of Arkansas museum conducted excavations at the Bontke Shelter in McDonald County, Missouri, which contained extensive deposits representing the Neosho focus. The data produced by these excavations were analyzed and interpreted in a lengthy M.A. thesis by James Cobb (1976). Mark Raab, formerly of the Arkansas Archeological Survey, conducted excavations in three northwest Arkansas rockshelter sites in 1976 and 1977. Excavations at the Moss and Lynch shelters were undertaken by Survey crews working under the direction of Raab, with extensive additional assistance from members of the Arkansas Archeological Society. The Hartsfield Shelter was also tested by Survey crews. The primary aim of Raab's investigations was to collect a sample of chipped stone debris which could be analyzed to determine seasonality of site occupation. A study resulting from this project was published (Raab et al. 1979), but the results are of limited value due to errors in the analysis of data. The substantive data collected from these sites have been described in a series of reports by David W. Stahle (1986). Robert Bray (1968) has also reported on Broken Shin Cave in southwest Missouri.

One of the more important results of these recent rockshelter investigations has been a much better understanding of their role in prehistoric settlement systems. Most of these sites have been interpreted as seasonal base camps and special purpose sites of populations representing many different cultures dating from the Dalton through Mississippi periods. In addition to the rockshelter sites, many recent projects have also focused on other kinds of sites, especially those in open air situations along major rivers and streams. Price and Krakker (1975), for example, discuss investigations at Dalton habitations in the eastern Ozarks. Studies along the James River in southwest Missouri have produced much useful information about settlement patterns during the Woodland period (e.g., Cooley and Fuller 1975; Fuller 1975). Reports on Woodland and Mississippian sites along the Current and Eleven Point Rivers in the eastern Ozarks of Missouri have also recently appeared (e.g., Banks 1984; Lynott et al. 1984, 1985, 1986), and several Archaic, Woodland, and Mississippian sites in Oklahoma have been studied (e.g., Baugh 1970, 1978; Duffield 1969; Harden and Robinson 1975). Reports on stone mound complexes concentrated just beyond the OAO study area in southwest Missouri and dating primarily to the Woodland period have also been published (Wood 1967; Wood and Brock 1984). In northwest Arkansas, limited salvage excavations were conducted at the Lake Sequoyah site, a stratified Late Archaic and Woodland site along the upper White River (Stahle 1986), and Hoffman and Cherry (1983) have reported on an open air Mississippi period settlement nearby. Marcus Collier (1984) described sites located along War Eagle Creek in Madison County, Arkansas. The most extensive recent studies, however, have focused on mound sites dating to the Mississippi period. Excavations by the University of Arkansas Museum and Arkansas Archeological Survey were conducted in 1980 and 1981 at the Huntsville site (Sabo 1986), and from 1982 to 1985 at the Goforth–Saindon site (Kay 1986; Kay et al. 1988). Excavations conducted at the Loftin site in southwest Missouri during the Table Rock Reservoir investigations but never fully reported have also been published in articles by several authors in a recent (1983) issue of *The Missouri Archaeologist.*

Numerous small survey projects have been carried out in the Ouachita and Ozark National Forests in Arkansas. Since these characteristically have involved only a minimal amount of subsequent testing or site exploration, very little can be gleaned about the kinds of sites present or the cultural periods represented. In summarizing the collective information from a number of these projects in the Ouachita National Forest, Imhoff (1977) noted that larger sites tended to occur on stream banks, in the vicinity of both permanent and intermittent water courses, and on hill tops overlooking streams. Additional information about prehistoric and historic sites in the Ozark National Forest is presented along with a predictive model of site locations and a series of cultural resource management recommendations in an overview written by Sabo et al. (1982). Subsequent survey projects conducted in the Ozark National Forest have attempted to refine predictive statements about site locations (e.g., Kay and Sabo 1983; Kay and Sands 1984). A cultural resource overview has also been prepared for the Ouachita National Forest (Wright and Littlejohn 1982). The archeology of the Mark Twain National Forest in Missouri has been summarized in a cultural resource overview by Douthit et al. (1979). This overview is notable for the excellent presentation by Flanders on historic period settlement in the southern Ozarks. A report on the results of a major program of survey and test excavations in the Mark Twain National Forest has also recently been completed (Purrington 1985). This two-volume report contains information on 59 prehistoric, 45 historic, and 16 prehistoric/historic sites newly discovered in the national forest, along with information on geomorphological approaches to the investigation of archeological sites, sampling strategies, evaluation of alternative research strategies, and recommendations for future investigations. One particularly significant result of this project was the determination that the use of predictive models of site probability based on geomorphological landform classes, along with stratified sampling strategies based on these models, gave more productive and cost effective results in areal survey projects. These recent efforts in the Mark Twain National Forest are comparable to the studies along the Ozark National Scenic Waterways described above in demonstrating the significant contributions which may accrue from well organized, long term programs of cultural resource investigation.

Few of the minor tributaries of the Arkansas River have been intensively surveyed, but recent work in two drainages indicates cultural resources are abundant. Projects along the lower reaches of Lee Creek have been carried out intermittently over the last decade. A survey of the proposed Van Buren water supply by the Arkansas Archeological Survey in 1975 located 13 sites, four of which were subsequently tested. One site was found to contain the remains of a Mississippi period house (Flenniken and Taylor 1977). In 1984, 1,200 acres of land in the proposed Lee Creek Water Supply project area was intensively examined by Carol Spears of the Arkansas Archeological Survey's Sponsored Research Program for the city of Fort Smith, and 109 archeological sites representing all periods were found (Spears 1984a, b). These included sites in all topographic settings in the valley, from alluvial bottomlands to rockshelters and blufftops. A testing program involving a sample of these sites has recently been completed (Klinger and Imhoff 1985) by Historic Preservation Associates. Underscoring the significance of the lower Lee Creek area is the fact that it is one of the few remaining free flowing streams connecting the Ozark Mountains and Arkansas River Valley areas.

Upstream from this project, a program of survey and excavation was conducted by Guy Muto for the Oklahoma Historical Society and Oklahoma Archaeological Survey. The Parris Mound, dating to the Mississippi period, was tested with the University of Oklahoma archaeological field school, and site survey and environmental studies were carried out in the Parris site locality (Muto 1978; Muto et al. 1980). The survey located 27 sites, belonging to various cultural periods, indicating a density of cultural occupation similar to that observed downstream.

Further up Lee Creek in Crawford County, Arkansas, the Arkansas Archeological Survey has performed two major studies for the Corps of Engineers. In 1975 an intensive survey was conducted for the proposed Pine Mountain Reservoir (Raab 1975b). Fieldwork involved surface inspection of the valley bottoms where identified sites were mapped, photographed, and collected; bluff shelter sites along the valley walls were both surface collected and test excavated. These efforts resulted in the discovery of 48 sites in the following categories: small bottomland sites, small upland sites, large bottomland sites, and bluff shelters. Historic sites identified included several homesteads and cemeteries, plus a post office, cotton gin, stage stop, and blacksmith shop. Analysis of the Pine Mountain data centered on establishing the seasonality of subsistence activities and settlements within the project area. Several hypotheses were advanced which sought to link observable differences in site locations and artifact assemblages with prehistoric patterns of fall-winter deer hunting and spring-summer agricultural production.

Access to some large tracts of land within the Pine Mountain project area was denied the 1975 field crew, however, so in 1979 a second contract was made between the Corps and the Survey for further fieldwork and analysis. An additional 220 acres were intensively surveyed using a combination of surface examination and shovel testing techniques (Trubowitz 1980). Three previously recorded sites were revisited, and 10 new sites were discovered including the historic village of Cove City and its cemetery. Test excavations were conducted at two lowland sites and beneath 15 rockshelter overhangs. Cultural components were identified dating from the Early Archaic to the Historic periods. Site functions were inferred through analysis of site size, topographic location, and diversity of artifact assemblages. These inferences formed the basis for additional interpretations of changing patterns of subsistence activities and settlement in the upper Lee Creek valley. Use of diverse topographic settings for a wide range of activities was observed for the Archaic period. During subsequent Woodland and Mississippi periods subsistence and settlement patterns reveal an increasing focus on bottomland habitats, presumably as the importance of agricultural activities increased. Rockshelters were also used by Woodland and Mississippian groups, but now primarily for specialized purposes such as human burial and food storage. Trubowitz attributed the Mississippi period sites to local Caddoan populations (Trubowitz 1983), and suggested that these groups possibly made periodic visits to the Parris Mound center further downstream. The Pine Mountain reports by Raab and Trubowitz both offer recommendations for further investigation of specific sites, should plans for impoundment of the river proceed.

A survey of the Garrison Creek watershed near the Lee Creek basin by the Oklahoma Conservation Commission was a smaller scale project, but 58 archeological sites or isolated artifact discoveries were made and a valuable summary of late historic settlement changes is provided (Wallis 1983). In 1972 John House also performed a survey of the Mulberry Creek basin which drains into the Arkansas River (House 1972b). In his report House described 21 previously known sites along with 23 newly discovered ones. These sites occurred on alluvial terraces near streams, on low knolls overlooking stream bottoms, and in rockshelters. The densest concentration of sites was identified along the lower course of the Mulberry River, where the largest number of Woodland and Mississippian sites was found. This pattern was attributed to the importance of rich valley bottom soils to late prehistoric agricultural populations. Other sites identified as to their general temporal placement represented the Early, Middle, and Late Archaic periods. A few of these sites were observed in cutbanks to be buried under more recently deposited alluvium.

Upstream on the Arkansas, the Oklahoma Archaeological Survey conducted fieldwork in the watershed of Bayou Manard with the help from the Cookson Hills Archeological Society. A total of 82 archeological sites were located, ranging from Mississippi period settlements found clustered in the alluvial bottomlands, to Archaic period sites located in all physiographic zones in the study area (Drass 1981).

A series of investigations has also been completed by the Kansas State Historical Society in the Big Hill Reservoir located along upper Big Hill Creek, a tributary of the Verdigris River in southeast Kansas. The reservoir impoundment area was initially surveyed by James O. Marshall in 1966, and from 1972 to 1974 Thomas A. Witty conducted additional surveys and excavations of sites with structural remains (Rowlison 1977:31). Many of these sites were attributed to the Cuesta phase and Pomona focus defined as a result of previous work at the nearby Elk City Reservoir (Marshall 1972). In 1976, test excavations were conducted at eighteen sites in the Big Hill Reservoir. This work was done under a contract with the Corps of Engineers (Rowlison 1977). Recommendations were make for further work at seven sites within the reservoir area, plus two additional sites just beyond the area. The Corps of Engineers funded excavations at four of the seven sites in 1978 (Rowlison 1980), and the remaining three were tested in 1980 (Thies 1982). At the same time, additional studies were also conducted in the Elk River Reservoir (Brogan 1980). As a result of these investigations, much valuable information has been gained on settlement of southeast Kansas by Archaic, Cuesta phase (e.g., Brogan 1981) and Pomona focus groups.

Although attention has been directed to historic archeological sites in several of the studies mentioned so far, this treatment has been, for the most part, rather minimal, and as a result we have only a sparse understanding of the cultural resources of the historic period. This unfortunate situation is being remedied, fortunately, by increasing attention to these resources in cultural resource management projects and by the publication of several studies treating historic sites and settlement patterns. A few of the studies not identified above will be mentioned here.

In the eastern Ozarks, Cynthia and James Price have initiated a long term research project on nineteenth century pioneer subsistence and settlement patterns. Much documentary research and some test excavations are reported in the various watershed survey reports mentioned earlier, but the centerpiece of this investigation is a major study of the Widow Harris Cabin site, an early to middle nineteenth century homestead located along Harris Creek in southeast Missouri (Price and Price 1978; Price 1979). Extensive investigations also have been undertaken at two pioneer era town sites. Old Eminence, the seat of Shannon County, Missouri, has been investigated by Cynthia and James Price (Price 1984). The Arkansas Archeological Survey has undertaken several projects at Old Davidsonville in Lawrence County, Arkansas (Smith 1973, 1978; Dollar 1977; Stewart-Abernathy 1980). Several early fort sites have been studied, including Fort Smith (Bearss 1962; Moore 1963; Dollar 1966, 1976, 1983), Fort Gibson (Cheek and Cheek 1977), and Fort Towson (Lewis 1972; Scott 1975).

Few Civil War era sites have been excavated, and most of these are battlefield sites. Robert Bray (1967a, 1967b, 1975) has conducted several surveys and excavation projects for the National Park Service in Wilson's Creek Battlefield National Park, Missouri. A brief test excavation at the Borden House in Prairie Grove Battlefield State Park, Arkansas, is reported by Martin (1982). Excavation of a suspected powder magazine at the Honey Springs battlefield site in Oklahoma revealed that the structure was actually a storeroom built in the 1870s (Cheek 1976). In 1980 a more extensive survey was undertaken at this battlefield site, resulting in the discovery of 37 historic sites (Yates et al. 1981).

On the more recent end of the Historic period, extensive excavations were conducted by the Arkansas Archeological Survey at the Moser site in northwest Arkansas (Stewart-Abernathy 1986). This project, funded by the Arkansas State Highway and Transportation Department, produced significant information on Ozark lifeways at a rural farmstead occupied between 1875 and 1919. Hilliard (1983) also has begun an investigation of the early development of Fayetteville in northwest Arkansas.

Recently, several syntheses of archeological research and cultural occupations in the Oklahoma portion of the study area have been prepared. The entire prehistory of the western Ozarks was reviewed by Burton Purrington (1970) on the basis of sites known in Delaware County. This study presented, for the first time, much information gathered by WPA crews in the 1930s. In 1978 James A. Brown, Robert E. Bell, and Don G. Wyckoff used the extensive literature on Mississippi Period sites in the Arkansas River drainage to delineate the settlement pattern of the Arkansas River Valley Caddoan tradition, a regional manifestation related to Caddoan cultural traditions in the Red River drainage basin. They outlined the three sequential phases within the tradition, the Harlan, Spiro and Fort Coffee phases, identified the kinds of settlements associated with each phase, and explored the relationship between settlement patterns and environmental zones in the valley (Brown et al. 1978).

In 1980 Don G. Wyckoff used the same data base and additional unpublished information on sites in the region for his Ph.D. dissertation, a comprehensive investigation of the culture history, settlement pattern, and resource base of Caddoan tradition societies in the Arkansas River Valley in Oklahoma. In conducting this research, he compiled information on wild resources and environmental variables, archeological sites and their contents, tool assemblages, plant and animal remains, radiocarbon dates, architectural features, settlement plans and geographic distribution of sites in his study area. Wyckoff's work is a major compendium of information on the Caddoan tradition in northeastern Oklahoma (Wyckoff 1980).

Charles L. Rohrbaugh used portions of this same base to investigate the later part of the Caddoan tradition, the Spiro and Fort Coffee phases, for his Ph.D. dissertation (Rohrbaugh 1982). He concentrated on archeological sites in the Spiro vicinity, particularly the Moore site (34Lf-31) and others dug by WPA crews, to explore changing social and economic patterns in the Arkansas River Valley at the end of the prehistoric period.

Jerry R. Galm used information from the Archaeological Research and Management Center's work in the Wister Reservoir in the 1970s to develop an updated synthesis of the cultures of the Fourche Maline valley for his Ph.D. dissertation. Basing his study primarily on excavations at the Scott (34Lf-11), Wann (34Lf-27), and Curtis Lake (34Lf-5A) sites, he identified seven phases to a Historic phase representing Euramerican settlement in the valley. He synthesized information on subsistence practices, settlement characteristics, chronological placement, and artifact assemblages of each phase. This summary expanded on information compiled previously in the individual excavation reports (Galm 1978a; Galm and Flynn 1978).

James A. Brown used information from older studies and recent archeological syntheses from both the Arkansas River Valley and the northern Ouachita Mountains in his investigation of cultural parallels between these areas and the Ozark Highlands (Brown 1984a). He was testing the thesis that prehistoric cultures of the Ozarks were isolated from and less developed than contemporary societies in alluvial valleys to the east, south, and west. In comparing the cultural remains from these physiographic regions, Brown summarized the archeological sequences for each area, and identified artifact assemblages and settlement patterns for a number of archeological phases and time periods, including those in the Arkansas River Valley and the Wister valley, from the late Archaic through the Mississippi periods.

In 1984, Robert E. Bell edited a statewide summary of knowledge about the prehistoric cultures of Oklahoma, in part to replace an earlier summary (Bell and Baerreis 1951) now outdated by decades of archeological research. The book does not cover all parts of the state uniformly, but highlights particular geographic areas and cultural periods where significant new information has been collected. Of particular interest here is a chapter by Don G. Wyckoff on Archaic period cultures of eastern Oklahoma, one by Jerry R. Galm on the Wister and Fourche Maline phases in the Wister valley, a synthesis of the Harlan phase by Robert E. Bell, a similar synthesis of the Spiro phase by James A. Brown, and a chapter on the Fort Coffee and Neosho foci (phases) by Charles L. Rohrbaugh. The volume also contains summaries of information on Oklahoma environments by Lois E. Albert and Don G. Wyckoff, lithic resources by Larry D. Banks, and a review of archeological activity in Oklahoma by Lois E. Albert (all of the above found in Bell 1984a).

The prehistory of the southwest Missouri Ozarks has been summarized in detail by Carl Chapman in his volumes on the archeology of Missouri (1975, 1980). This treatment is especially valuable in that it extensively summarizes the results of the Table Rock Reservoir investigations, which are not available in published form.

In 1981, the Oklahoma Archaeological Survey undertook a compilation and synthesis of information about Oklahoma's archeological resources. Prepared under a cooperative agreement with the Oklahoma Office of Historic Preservation, the report (Wyckoff and Brooks 1983) summarizes previous archeological research in the state, offers capsule reviews of culture history for each of the state's six management regions, identifies important archeological sites, and outlines research and management needs and goals. This document also presents a 20 year program for research and management of the state's cultural resources and important discussions of the impact of modern land use practices on known and unknown cultural resources in various physiographic settings. Any cultural resources management program or activity in Oklahoma should be compatible with research problems and site management goals outlined here. In 1982 the Arkansas Archeological Survey published its state plan (Davis 1982), but unfortunately there is very little of value in this document for the OAO study area. A state plan is currently in preparation for the state of Missouri. This document organizes the prehistory of Missouri with respect to watershed units, then reviews known cultural units and identifies significant research topics which need to be addressed. Extensive information is provided on the various impacts federal and state programs are having on archeological sites in Missouri, and long range assessments of cultural resource management needs are presented. The Kansas Historic Preservation department has also recently developed a *Kansas Prehistoric Archeological Preservation Plan* (Brown 1987), and a companion plan treating historic archeological sites is scheduled for completion during the summer of 1988. These documents should be consulted in connection with any cultural resource management efforts in southeastern Kansas. Up-to-date information on cultural resources in the state is regularly reported in *Kansas Preservation*, the newsletter of the Kansas State Historical Society.

All of these reports share portions of the same data base, and they benefit from significant research completed in the last fifteen years to the extent that they effectively supersede earlier syntheses. Individual authors may interpret specific portions of the archeological record differently, but there is broad agreement in the sequence of cultural patterns in the region through time, and the kinds of adaptive systems they represent. The summary of cultural periods presented below relies extensively on these recent studies. There are no comparable syntheses for the Arkansas portion of the study area outside the Ozarks region.

PREHISTORIC CULTURE HISTORY

George Sabo III, Ann M. Early

In this chapter we discuss the prehistory of the Ozark Mountain–Arkansas River Valley–Northern Ouachita study area. The presentation is organized according to broad units of time which correspond to discrete cultural periods (Table 7). Though each represents a continuation of cultural systems from preceding periods, ongoing cultural developments produced changes over time, and the chronological divisions we employ correspond to these changes as we currently understand them. Time periods and chronology are identified in years before present, designated by the abbreviation "B.P." Thus, a radiocarbon date given as 1050 B.P. by convention refers to a temporal placement 1,050 years before A.D. 1950. Our focus throughout the discussion is on the interaction between prehistoric people and their environments (Table 8).

Table 7. Prehistoric cultural sequence for OAO study area

Cultural Period	Date Range
Mississippi	300–1,100 B.P.
Woodland	
Late	2,500–5,000 B.P.
Middle	1,350–1,800 B.P.
Early	1,800–2,500 B.P.
Archaic	
Late	1,100–1,350 B.P.
Middle	5,000–8,000 B.P.
Early	8,000–9,500 B.P.
Dalton	9,500–10,500 B.P.
Paleo-Indian	10,500–12,000 B.P.

* B.P. refers to years before present

The discussion of each cultural period after the Dalton period is presented in two parts. First, the Ozark area is reviewed by George Sabo, then Ann Early focuses on the Arkansas River Valley and northern Ouachita sections. This necessitates some back and forth referencing between sections to avoid redundant discussion. We feel, however, that this organization permits the clearest presentation of issues that often are quite complex.

EARLY MAN BEFORE 12,000 B.P.

The appearance on the North American continent by about 12,000 years ago of the sophisticated Clovis artifact complex has prompted considerable interest in the origins of Paleo-Indian cultures. The view held by many archeologists is that Clovis represents the earliest Eurasian immigrants across the Bering Strait land bridge during late Pleistocene times (Muller-Beck 1966; Haynes 1964). Considerable geological and biogeographical evidence supports the existence of an extensive land bridge connecting Siberia with Alaska at various times during the Pleistocene epoch (Haag 1962; Hopkins 1967). A corridor through which immigrants could pass may have been open at several intervals between 40,000 and 12,000 years ago, and it appears that a major open period extended from 20,000 to 12,000 B.P. (Creager and McManus 1967:23). Some archeologists have suggested, however, that unblocked corridors through glaciated Alaska and northern Canada may never have existed (Wendorf 1966; Bryan 1969). Consequently, alternative coastal migratory routes involving watercraft transportation have been proposed (Chapman 1975; Fladmark 1979). Carl Chapman, for example, has suggested that the first human migrants into the New World may have arrived by hopping islands across the northern Pacific rim. Upon reaching the western coast of North America, they then moved inland to settle along major inlets and waterways, such as the Fraser River in British Columbia, the Columbia River in Washington and Oregon, and the Gulf of California in Mexico (Chapman 1975:Figure 2-1). Chapman further suggests that subsequent Clovis developments originated as an outgrowth and northward extension of Early Man occupation in what is now northern Mexico and the southern United States.

> The association of Clovis Fluted with extinct big-game animals, the limited range of radiocarbon dates on them, and the concentration of sites on which they have been found seem to indicate that the earliest fluted points are found in Arizona, Colorado, New Mexico, Texas, and Oklahoma. Thus, on the basis of faunal, chronological, and distributional evidence, this area might be considered to be the heart of development of Clovis Fluted in connection with big-game hunting and to have spread from there. (Chapman 1975:61)

While this interpretation is certainly plausible, it must be noted that the three locations Chapman proposes as landfalls for Early Man settlement are based on the distribution of controversial sites thought to predate Clovis (Chapman 1975: Figure 2-4). There is much doubt surrounding the authenticity and dating of some of these sites, so for the time being confirmation of the interpretations of Chapman and others concerning the initial human settlement of the New World and the origin of Paleo-Indian cultures must await further evidence.

Table 8. Summary of paleoenvironmental changes affecting the OAO study area (after Bryson et al. 1970; Albert 1981)

Date A.D./B.C.	B.P.	Climatic Episode	Climatic Changes	Vegetational Changes
A.D.1900	50			decrease of forest cover due to historic settlement lumbering activity
		Neo-Boreal	"Little Ice Age," cool and moist	
A.D.1600	350			
		Pacific	fluctuating climatic conditions generally toward increasingly cool and moist conditions	establishment of essentially modern oak–hickory,and oak–pine forest association, with minor associational shifts resulting from fluctuating moisture
A.D.1200	750			
		Neo-Atlantic		
A.D.900	1150			
		Scandic		
A.D.400	1650			
		Sub-Atlantic		
500 B.C.	2450			
		Sub-Boreal		
2750 B.C.	4700			
		Atlantic	much warmer, Hypsithermal conditions	establishment of oak–hickory forest, generally xeric conditions
		Boreal	gradual warming	increase of deciduous elements
7700 B.C.	9659			
		Pre-Boreal	Wisconsin glaciation	Boreal forest

Clovis artifacts represent an advanced upper Paleolithic technology clearly derived from Old World antecedents (Griffin 1960; Muller-Beck 1966; Cotter 1981). However, occasional finds of crude stone "choppers" and flakes, some in putatively early stratigraphic contexts (e.g., Dragoo 1968; Adovasio et al. 1978; Reagan et al. 1978; Childers and Minshall 1980) have also stimulated discussion of a possible pre-Clovis cultural horizon in North America. Arguments concerning the relationship of this supposedly early manifestation to Clovis generally refer to one or the other of two alternative scenarios. In the first, Clovis is seen as a secondary migration into the New World following an unrelated and earlier diaspora of Eurasian immigrants — those responsible for the pre-Clovis "artifacts." The second or alternative scenario holds that Clovis and possibly other early projectile point traditions owe a common origin to a widespread "preprojectile point" industry present in the New World at a very early date. Despite considerable research attempting to firmly establish the stratigraphic and chronological position of these potentially early materials (e.g., Morlan 1980), the matter is presently far from resolution. It is likely to remain so until undisputed artifacts and skeletal remains of Early Man are found in undisturbed and datable geological contexts (Haynes 1969). In regard to this, it is important to note that several human skeletal remains from various sites in North America formerly attributed to the Early Man period have recently been dated using radiocarbon acceleration techniques. In all cases the ages of these skeletal materials have been established as less than 12,000 radiocarbon years (Taylor et al. 1985).

Don Dickson (1988) has reported that heavy chipped stone choppers and core tools occur on elevated Pleistocene-age terraces in northwest Arkansas, and he suggests that these finds may represent Early Man occupations. Otherwise no Early Man sites or materials are known for the Ozark area (see Chapman 1975; Gettys 1984 for discussion of Early Man finds reported for other parts of Missouri and Oklahoma). At the same time it should be kept in mind that few investigators have sought to identify such sites or materials. The following comments by Chapman may, therefore, be of some relevance to future cultural resource investigations in this region.

> If [Early Man] did not have specialized hunting gear such as the fluted point of the Early Hunter Tradition, Paleo-Indian period, where would evidences of their existence likely be found? Land surfaces near streams, dating 20,000–12,000 B.C., would be potential sources. These ancient surfaces might now be encompassed in river terraces. Caves or shelters that could have protected small groups of wanderers, who depended for their existence on an unspecialized or generalized collecting-hunting, gathering, and fishing, might be other places to look. The most promising area for such finds in the Missouri–Mississippi drainage would be in the Ozark Highland, the area least affected by glacial outwash. Here also the deep valleys with entrenched meander streams and numerous terraces would aid the protection of vegetative cover, and there would be little reworking of old terraces by the streams because of the meander entrenching. The places to look, then, are the terraces of river valleys of the Ozark Highland and in the many caverns and shelters formed in the limestone and dolomite rocks underlying much of the Ozark area. (Chapman 1975:54)

PALEO-INDIAN PERIOD 12,000–10,500 B.P.

The Paleo-Indian period represents the earliest archeological manifestation securely documented on the North American continent. Three distinctive artifact complexes, named the Clovis, Folsom, and Plano, probably represent chronologically successive phases of a single adaptive system which extends during the late Pleistocene from 12,000 to 10,500 B.P. Fluted Clovis and Folsom points and a variety of unfluted, lanceolate "plano" forms, are the primary diagnostic artifacts associated, respectively, with these three successive phases. Paleo-Indian tool assemblages also typically contain a variety of chipped stone forms including side and end scrapers of several varieties, drills and perforators, burins, gravers, knives, and many kinds of notched and spurred flake tools (Irwin and Wormington 1970). A few tools made of bone, antler, and mammoth ivory have also been found on the North American continent, including projectile points (Frison and Zeimens 1980); foreshafts for spears or darts (Wilmeth 1968; Lahren and Bonnichsen 1974), a mammoth bone shaft wrench (Haynes and Hemmings 1968), and crude bone choppers (Frison 1974).

The Paleo-Indian period is represented in the Ozark area primarily by isolated finds of Clovis or Clovis-like points. Examples of these have been found in several counties in northern Arkansas (Scholtz 1969; Newton 1977), southwest Missouri (Chapman 1975; Meyer 1984), and northeastern Oklahoma (Wyckoff and Brooks 1983:50). One unfinished fluted

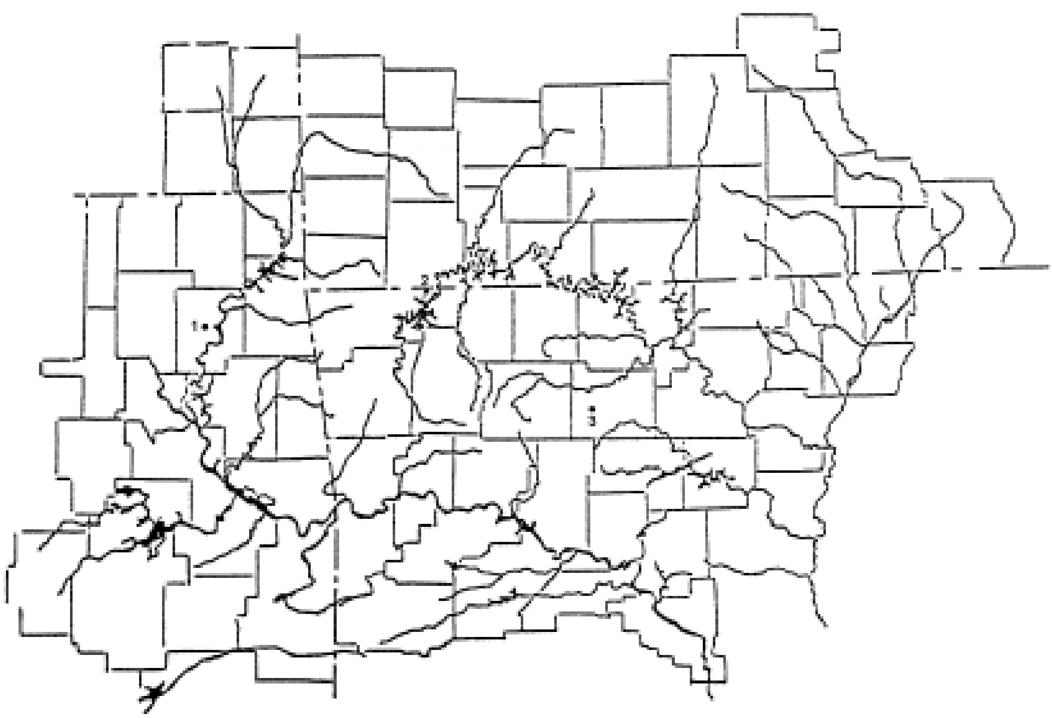

Figure 13. Locations of Paleo-Indian period sites in the OAO study area (surface finds are not indicated) 1. Packard site; 2. Breckenridge site; 3. Calf Creek Cave

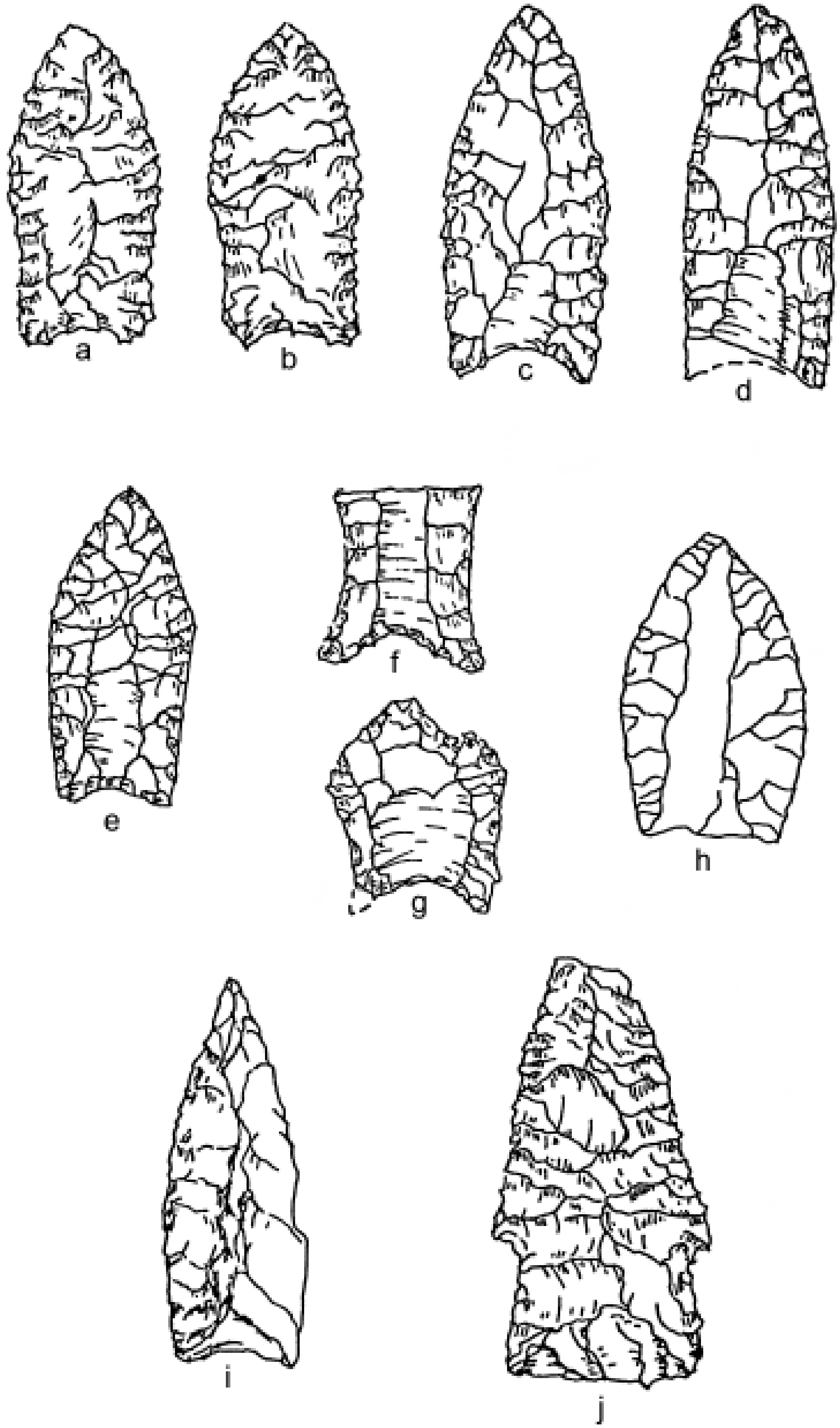

Figure 14. Paleo-Indian artifacts from the OAO study area
a-e. Clovis points (Chapman 1975; Newton 1977); f. Cumberland-like point (Newton 1977); g. Pelikan-like point (Newton 1977); h. Folsom-like point (Dickson 1970); i. Agate Basin-like point (Wood 1963); j. Scottsbluff point (Vogele 1980)

point, rather small in size and possibly resembling a local variant of the Folsom type, was found in the earliest cultural level at Calf Creek Cave in Searcy County (Dickson 1970). An unfluted lanceolate point similar to Plainview and Agate Basin types of the Plano phase was also found in basal deposits at the Breckenridge site in Crawford County (Wood 1963; Thomas 1969). A Scottsbluff point, another type usually associated with the Plano phase, was found on a surface site in Washington County, Arkansas by Louis Vogele (1980). Many Paleo-Indian points found on the surface and reported in the literature for the Ozarks area were made on locally derived cherts. In view of the widespread tendency of Paleo-Indians to employ high quality, exotic flints and cherts in the manufacture of their stone tools (discussed below), particular attention should be paid to this fact.

No radiocarbon dates are currently available for the Paleo-Indian period in the Ozarks. However, an Agate Basin-like point was found at the Packard site in Mayes County, Oklahoma, associated with a firepit that produced an uncorrected radiocarbon date on charcoal of 9416 ± 193 B.P. (Wyckoff 1985:14). Artifacts comprising a "Packard complex" were associated with this hearth and were stratified below a Dalton component at the site. This assemblage provides a basis for interpreting some aspects of adaptations to Ozark environments at this early date. These interpretations (Wyckoff 1985), however, are more appropriately discussed in the following section on the Dalton period.

Extending beyond the Ozark area proper in search of dates for Paleo-Indian occupation, mention can be made of the Domebo site, a mammoth kill site with associated Clovis artifacts located in south-central Oklahoma. Six radiocarbon dates were obtained for this site (Leonhardy and Anderson 1966), four of which closely overlap to yield an uncorrected average of 11,200 B.P.

Chapman (1975:69–71) has suggested on the basis of the distribution of fluted points in Missouri, that Paleo-Indian groups first entered the Ozark region from the Mississippi valley by following the White River and its tributaries. What environmental conditions did these early settlers encounter? During the period of maximum glacial extent in North America, the Ozarks supported a boreal forest dominated by spruce but probably exhibiting some variation in regional composition (Wright 1971; Martin 1958). The animal species thought to have inhabited this forest include a variety of mammals, such as elk and musk ox, which today are associated with modern boreal habitats (Semken 1969; Hallberg et al. 1974). These species probably coexisted with other "southern" types of mammals which suggests that summer and winter climatic extremes were moderate and stable during this period (Graham 1976). Several species of now-extinct large Pleistocene animals (megafauna) were also associated with the Ozark boreal forest habitat. Those species which have so far been identified are indicated in Table 9.

The status of Paleo-Indian occupation in the Arkansas River valley and the northern Ouachita mountains is similar to that for the Ozarks. Fluted points have been noted as surface finds in various physiographic settings, but no intact deposits have yet been discovered (Wyckoff and Brooks 1983:258; Davis 1967c). Mammoth and mastodon bones have also been discovered in Verdigris River deposits in Wagoner County, and in the Three Forks locale (Baugh 1978:11; Wyckoff and Brooks 1983:50). No cultural material indicating these animals were killed by Paleo-Indian hunters has been reported. It is important to note, however, that the bone deposits of extinct animals may not only be the result of human activity, but may also indicate the location of intact Pleistocene age sediments containing evidence of human occupation. Special care should be taken to regard discoveries of Pleistocene animal bone not only as paleontological specimens, but also as potential evidence of archeological sites.

By the time Paleo-Indians arrived in this region, Pleistocene conditions were already beginning to change. A warming climatic trend commencing after ca 14,500 B.P. initiated the northward retreat of Wisconsinan ice from the upper Midwest, and this brought about a change in the character of the Ozark boreal forest with an increase of deciduous tree species such as oak, ash and hickory (King 1973:562; cf. Delcourt and Delcourt 1979; Wright 1971). Corresponding adjustments in the ranges of boreal-adapted animal species also commenced, producing some changes in faunal communities. One major change in the environmental potential of the area for early hunting groups was the extinction of Pleistocene megafauna by ca 10,000 B.P. The possible role of Paleo-Indian hunters in bringing about this extinction through overkill, as suggested by Martin (1967, 1973; cf. Mosimann and Martin 1975) is still not completely resolved. Alternative hypotheses suggesting that climatic changes or other natural phenomena were responsible (e.g., Guilday 1967) are gaining increasing favor among archeologists (Wilkinson 1972) and paleontologists (Graham 1979) alike. Whatever the outcome of this debate may be eventually, the main points concerning environmental potentials for human populations during this period have been well summarized by Stoltman and Baerreis (1983:253–254):

> As it has been emphasized by a number of scholars, a salient quality of biotic conditions of late-glacial and early-postglacial times in the East was variability through both time and space (Brown and Cleland, 1968; Cushing, 1965; Fitting, 1968; Wright, 1968). Nonetheless, some generalizations can be made concerning the nature of the primary resources available for human exploitation. Big game (including caribou, musk-oxen, mastodons, mammoths, and long-horned bison) was relatively abundant, while edible plant resources were sparse (except for acorns in parts of the Midcontinent and the Southeast, which were not likely to have been an important early food resource for humans because they are unpalatable without special processing). The relative importance of aquatic resources such as fish and shellfish was severely curtailed by a series of interrelated environmental conditions that adversely affected their availability: low sea levels that steepened downward gradients, unstable shoreline conditions, and in some

Table 9. Pleistocene and Early Holocene large mammals in the Arkansas Ozarks

VERTEBRATE TAXA	SITE NAME AND COUNTY
Common name (Latin name)	
Edentata	Peccary Cave, Newton; Ten Mile Rock, Washington
Sloth (*Megalonyx jeffersoni*)	
Giant Armadillo (*Dasypus bellus*)	
Rodentia	
Giant Beaver (*Castoroides ohioensis*)	
Carnivora	Conard Fissure, Newton; Svendsen Cave, Marion
Mountain Lion (*Felis concolor*)	
Lion (*Felis* sp.)	Conard Fissure, Newton
Jaguar (*Panthera onca*)	Conard Fissure, Newton; Hurricane River Cave, Searcy
Sabertooth Cat (*Smilodon floridanus*)	Conard Fissure, Newton; Peccary Cave, Newton; Ten Mile Rock, Washington
Dire Wolf (*Canis dirus*)	
Wolf (*Canis* sp.)	Conard Fissure, Newton; Hurricane River Cave, Searcy
Black Bear (*Ursus americanus*)	
Proboscidea	Peccary Cave, Newton; Ten Mile Rock, Washington
Mastodon (*Mammut americanum*)	
Mammoth (*Mammuthus columbi*)	Peccary Cave, Newton
Mammoth (*Mammuthus* sp.)	
Perissodactyla	Conard Fissure, Newton; Ten Mile Rock, Washington
Horse (*Equus* sp.)	Peccary Cave, Newton; Ten Mile Rock, Washington
Tapir (*Tapirus* sp.)	
Artiodactyla	Ten Mile Rock, Washington
Buffalo (*Bison bison*)	
Bison (*Bison* sp.)	Conard Fissure, Newton; Peccary Cave, Newton
Musk Ox (*Symbos* sp.)	Peccary Cave, Newton
Elk (*Cervalces scotti*)	Peccary Cave, Newton
Deer (*Sangamona* sp.)	
White-tailed Deer (*Odocoileus virginianus*)	Conard Fissure, Newton; Peccary Cave, Newton
Deer (*Odocoileus hemionus*)	Conard Fissure, Newton; Peccary Cave, Newton; Ten Mile Rock, Washington
Canadian Elk (*Cervus canadensis*)	Albertson Shelter, Benton; Ten Mile Rock, Washington
Pronghorn (*Antilocapra americana*)	Conard Fissure, Newton; Ten Mile Rock, Washington
Peccary (*Mylophyus nasutus*)	Peccary Cave, Newton; Ten Mile Rock, Washington
Giant Peccary (*Platygonus compressus*)	

> rivers, cold temperatures and turbid water conditions related to glacial runoff. Even those aquatic species that were relatively available were not particularly productive, especially compared to later times when warmer water temperatures afforded rich aquatic habitats. (Matteson 1960; Parmalee 1968:107–108)

The association of Paleo-Indian artifacts with various species of Pleistocene megafauna at sites in the western United States led to the initial characterization of these people as nomadic, big game hunters. Paleo-Indians in the eastern United States were thought to represent a similar lifeway because the distribution of fluted points extensively overlapped the biogeographical extent of mastodons and mammoths (Williams and Stoltman 1965), even though for decades direct associations between artifacts and bones eluded the searches of investigators. In 1979 and 1980, excavations at the Kimmswick site near St. Louis, Missouri finally succeeded in demonstrating a link between Paleo-Indians and extinct Pleistocene mammals in eastern North America. Direct associations in buried Pleistocene pond deposits between Clovis points and the bones of the American mastodon (*Mammut americanum*) were established at this site (Graham et al. 1981).

Does this prove that Paleo-Indian subsistence in the eastern United States was primarily centered on big game hunting? Perhaps not, because along with mastodon remains were also found bones of white-tail deer, cottontail rabbit, marmot, squirrel, weasel, pocket gopher, 13-line ground squirrel, and many other species of smaller mammals. Which of these species were actually hunted and eaten by Paleo-Indians cannot presently be established, but these associations strongly imply a diversified and flexible adaptation to late Pleistocene Ozark environments. This adaptation most likely included hunting many smaller animal species endemic to emerging deciduous woodland and meadow habitats, as well as gathering of available vegetal foods and resources, in addition to the occasional capture of larger, now extinct species such as the mastodon.

The evidence at Kimmswick of a more generalized hunting and gathering way of life is certainly not surprising in view of other evidence for contemporaneous change in the environments supporting Paleo-Indians. On the other hand, this interpretation, if correct, would put Ozark Paleo-Indians at some variance with the characterization of Paleo-Indian subsistence generally in the eastern United States put forth by Stoltman and Baerreis: “Without minimizing the diversity that must have characterized [Paleo-Indian] subsistence patterns, especially the seasonal variations, the foregoing lines of evidence concerning environment, technology, and diet converge at the same conclusion: big-game hunting occupied an overall position of preeminence in [Paleo-Indian] subsistence" (Stoltman and Baerreis 1983:254).

Paleo-Indian settlement patterns can only be guessed at for the Ozark area since most of the sites we currently have on record are only isolated find spots. The distribution of these finds, however, may be instructive. Fluted and lanceolate points occur both in rock shelters (for example, Breckenridge and Calf Creek Cave) and in open situations, especially on river terraces and on older, elevated surfaces (Marshall 1958; Chapman 1956; Scholtz 1967; Wyckoff 1985). This distribution might imply variation in functional site types across the landscape and utilization of different (and no longer extant) microenvironmental zones. The finds of Paleo-Indian artifacts in rock shelter sites, for example, may represent the camping sites of these early hunters, while finds in other locations across the landscape may indicate places where activities such as the hunting of animals and gathering of plant resources were carried out. Until more complete Paleo-Indian artifact assemblages can be associated with sites in these locations, however, such interpretations are premature and speculative at best.

Paleo-Indian sites in other parts of North America do reflect settlement patterns involving multiple, functionally specific site types, including base camps and special purpose sites such as quarries, tool manufacturing sites, and animal processing stations (e.g., Wilmsen 1970). In the American Southwest, studies of Paleo-Indian sites indicate that Paleo-Indians sometimes adjusted the locations of their activities within a region in response to changing environmental circumstances (Judge and Dawson 1972). An important implication of these changing patterns of land use is that Paleo-Indian groups were not completely nomadic but instead were adapting to specific, delimited territories. Evidence of regional adaptations during late Paleo-Indian times has been identified in other areas of the eastern United States (Rolingson and Schwartz 1966).

Archeologists frequently ascribe Paleo-Indian social organization to the "band level," but this term is really quite meaningless in view of the extensive diversity exhibited even among modern hunting and gathering societies, which are confined for the most part to some of the least habitable places on earth (Murdock 1968; Bicchieri 1968). We really have no idea what Paleo-Indian social organization was like, and certainly considerable variation in social patterns should be expected among a people occupying so vast a continent as North America. We generally assume that local Paleo-Indian groups represent small scale societies, but exactly what this should imply concerning archeological settlement patterns is unclear. For example, Campbell (1968) has shown that several small and normally dispersed bands may temporarily coalesce into a single, very large group for trading or other important social purposes, and leave no physical traces of these gatherings. Yet such gatherings might represent a highly important component of the annual settlement round with regard to economic as well as social organization. Recent research (e.g., Leacock and Lee 1982) on band level societies has shown, furthermore, that local bands frequently participate in large and extensive interactional networks, which often include groups exhibiting more complex forms of social organization, and this participation has important consequences for the subsistence and settlement characteristics of the smaller groups. Modern band-level societies participating in such networks, therefore, might not be appropriate analogs for Paleo-Indian bands.

Until we better understand Paleo-Indian settlement patterns and how they relate to specific environmental parameters, our speculations about Paleo-Indian social organization should at least be tempered by use of constructs more thoughtful and specific than mere attribution to the "band level." For example, we have asserted that Paleo-Indians were adapting to a changing Ozark boreal forest during late Pleistocene times. Paleoenvironmental changes during this period may well have rendered some important food resources temporarily unpredictable in terms of their annual patterns of distribution and levels of abundance. A generalized subsistence organization and flexible settlement pattern, as we have suggested for the Paleo-Indians, would have been effective under circumstances such as these. In a cross cultural analysis of hunter-gatherer adaptations to similarly unpredictable environments, Yellen (1977) argues that an "anucleate" pattern of social organization is often found. Anucleate bands maintain extensive ties with neighboring bands, usually by means of their kinship organization. These ties may extend very widely, so members of any one local band will be able to identify kinsmen over a very large territory. This organization permits rapid dissemination of information among local groups — for example, about the distribution of important resources — and it also facilitates movement and relocation of populations throughout a region. Should resources become limited in any one locality, the residents of that locality can simply relocate themselves with kinsmen in adjacent areas where resources are more plentiful. Rapid information flow and social mechanisms promoting flexibility in residential patterns obviously may provide important adaptive advantages to populations dependent on the unpredictable distribution and abundance of natural resources. It is, therefore, not unreasonable to suggest that this form of social organization may have existed among Ozark Paleo-Indians, and perhaps among subsequent populations before the advent of greater levels of social complexity.

What kinds of archeological data might indicate the existence of "anucleate" patterns of social organization? According to Brian Hayden (1982), stylistic attributes of artifacts like projectile points can provide one useful measure. Using data from a number of well documented Paleo-Indian sites in the western High Plains region of North America, Hayden attributes stylistic homogeneity among projectile points of the Clovis and Folsom traditions, along with the frequent use of exotic stone in the production of these points, to the existence of widespread interaction networks which tied together otherwise separate Paleo-Indian groups. Using analogies with several well studied groups of modern hunter-gatherers in Australia, Hayden argues that such alliances "were crucial to hunter/gatherers with impoverished resource bases, especially resource bases which fluctuated dramatically over a period of years and which were periodically unreliable.... When resources failed, bands simply paid prolonged 'visits' to other bands in areas with better resources" (Hayden 1982:117–118). Though it is doubtful that Ozark Paleo-Indians experienced situations of overall resource impoverishment, changing Pleistocene environments must have produced occasional resource shortages. As we accumulate more and better data about Paleo-Indians and their environments in the Ozarks, it would be very worthwhile to test propositions such as these.

In summary, future studies of Paleo-Indian occupation in the Ozarks should keep in mind two points. First of all, the environments into which these populations were entering and adapting were possibly more varied and complex than we have previously supposed. A mosaic forest comprised of boreal as well as deciduous elements may have existed, supporting a mixed community of megafauna and smaller northern and southern animal species unlike any which has existed since then. Second, Paleo-Indian economic and social adaptations to this changing environment probably were also more complex than we have previously imagined. Modern studies of band level, hunter-gatherer subsistence and social organization may provide helpful models for interpreting some aspects of Paleo-Indian lifeways. These models will be of little relevance, however, without much additional archeological evidence. This evidence will have to be sought through intensive efforts, including geomorphological studies to identify the landscape contexts in which this evidence may still be preserved.

DALTON PERIOD 10,500–9500 B.P.

The Dalton period falls at the terminal Pleistocene/early Holocene transition, and represents a continuation of generalized hunting and gathering adaptations to changing Ozark environments.

The most diagnostic trait of this period is the Dalton point, a form of lanceolate biface used both as a projectile tip and as a cutting tool, belonging to the same technological industry that produced earlier Paleo-Indian points. Dalton artifact assemblages are well documented in Arkansas (Goodyear 1974; Morse and Morse 1983), and consist of a variety of tools used for many different purposes. Dalton adzes, spokeshaves, cutting and scraping tools, and ground stone abraders reflect the importance of woodworking to produce such items as weapon shafts, tool handles, containers, snares and traps, and undoubtedly, a multitude of other artifacts. Bone awls and needles along with scrapers and chipped stone perforators suggest that clothing and perhaps other items were fashioned from animal skins. Sandstone mortars, grinding stones, and pestles were used to process wild plant foods such as nuts, berries, and seeds.

The Dalton period is represented in the Ozarks in stratified components at the Albertson site (Dickson 1988), the Breckenridge site (Wood 1963; Thomas 1969), and at the Packard site (Wyckoff 1964b, 1985). Other sites containing Dalton artifacts include Tom's Brook Shelter (Bartlett 1964), and the Holman Creek site (Mapes 1965). The Dalton component at the Packard site stratigraphically overlies a firepit which has produced the aforementioned radiocarbon date of 9416 ± 193 B.P. (Wyckoff 1985:14). Albert Goodyear (1982) has recently bracketed the period between 10,500 and 9900 B.P. for a number of Dalton sites in the southeastern United States. The clearly defined Dalton component at Rodgers Shelter in the Pomme de Terre valley of southwestern Missouri, has two dates of 10,530 ± 650 (ISGS-48) and 10,200 ± 330 (M-2333) radiocarbon years before present (McMillan 1971), and is generally interpreted as dating between 10,500 and 9500 B.P. (McMillan 1976a; Kay 1982d). This time range is preferred for the area considered in this report.

The Dalton period environment in the Ozarks represents a continuation of trends seen in the late Pleistocene/early Holocene transition. Replacement of the spruce dominated, moist boreal forest continued as deciduous species such as oak, hickory and elm expanded (King and Lindsey 1976; Wright 1971). Final extinctions of megafaunal species and range shifts among continuing small animal species initiated trends toward modern animal communities. Postglacial river systems were also adjusting to modern regimes.

Marvin Kay (1982d) has suggested that around 10,500 B.P. many western Ozark hillcrests and valley slopes were mantled with loess, and consequently there were fewer bedrock exposures. If this is so, then access to some geologically bedded chert and mineral sources important to later prehistoric populations in the Ozarks might not have been available to Dalton groups. The identification of lower member cherts from the southwestern Ozarks (e.g., St. Joe, Reed Springs, Keokuk) in dated archeological contexts might eventually prove, therefore, to be a valuable monitor of landform modifications in the region (cf. Dickson 1988). Rapid aggradation of the Pomme de Terre river is also documented at Rodgers Shelter commencing after 10,500 B.P., and continuing until about 7500 B.P. During this period, 4 to 5 m of reworked loess was deposited as alluvium over the Pleistocene floodplain, within which Dalton components are now buried.

The Dalton occupation at Rodgers Shelter occurs both on the open terrace in front of the shelter as well as beneath the shelter overhang. These occupations appear to center around open hearths, and limited areas of artifact scatter surrounding these hearths have been interpreted as reflecting small residential groups (McMillan 1976a). Kay (1982c) believes these occupations represent autumn or spring hunting stations. Butchering, woodworking, and hideworking are activities indicated by the artifact assemblages.

Faunal remains at Rodgers Shelter reflect a primary dependence on deer hunting, supplemented by raccoon, beaver, rabbits, and squirrels, and other forest and forest edge species. Riverine species such as turtle were occasionally sought.

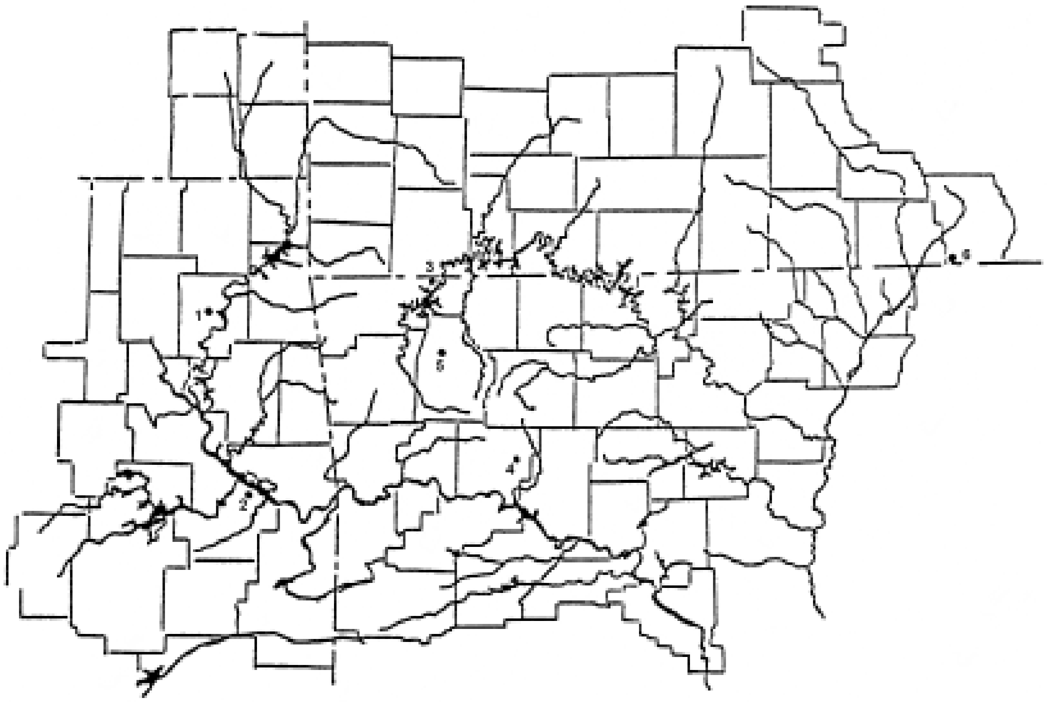

Figure 15. Locations of Dalton period sites in the OAO study area
1. Packard site; 2. Billy Ross site; 3. Breckenridge site; 4. Tom's Brook site; 5. Holman site; 6. Lepold and Sullivan sites

Hickory nuts and walnuts were at least two vegetal resources gathered in the bottomland forests (Kay 1982d). Chapman (1975), following the ethnographic observations of Lee (1968), suggests that as early Holocene climates warmed, Dalton populations may have begun to spend more time foraging for native plant resources, at the expense of time spent hunting.

Another important Dalton component in the Ozarks was identified at the Packard site (Wyckoff 1964b, 1985), an open habitation site located along Saline Creek, a tributary of the Grand River in Mayes County, Oklahoma. The Packard site lies adjacent to a natural salt spring and is also close to chert-bearing bedrock exposures, two factors likely to have repeatedly drawn prehistoric hunters to this locality and thereby accounting for the stratified, multicomponent deposits this site contains.

The Dalton component at the Packard site, found at depths of 1.52 to 2.59 m below the surface, produced a small assemblage attesting to temporary use of the site. Artifacts including five Dalton points or knives, a few cores and biface preforms, drills, scrapers, a polished hematite cobble, and several hundred flakes suggest that this occupation represents a limited activity camp in which stone tool making and refurbishing was carried out. The most important aspect of this Dalton occupation, however, lies in its stratigraphic position above an earlier component representing what Don Wyckoff has identified as the Packard complex (Wyckoff 1984, 1985).

Packard complex materials were found at depths below 2.45 m. A firepit occurred at a depth of 3.0 m. Associated with this hearth was an assemblage of artifacts including hammerstones, cores and flakes, lanceolate spear points similar to the Agate Basin type, other point fragments, scrapers, knives, a bifacially flaked ax, some preform fragments, and a small sandstone abrader. One additional projectile point found in this context was a side notched type similar to points associated with 8,400 year old bison remains at the Simonsen site in Iowa (Agogino and Frankforter 1960). All of the chipped stone tools were made of local cherts, primarily the Reed Springs variety from the Boone Formation.

Wyckoff interprets the Packard complex assemblage as the product of a single depositional event which took place between intermittent flood episodes on a sloping terrace surface alongside Saline Creek. If so, the deposition of more than a meter of alluvium upon this surface during the Packard complex and Dalton occupations would be comparable to rates of alluvial deposition mentioned above for the Pomme de Terre River in the vicinity of Rodgers Shelter. The dominance of the lithic assemblage by the Reed Springs cherts would seem to further corroborate this interpretation. In this depositional event, lithic materials accumulated around the hearth presumably as a result of a single episode of activity centered in

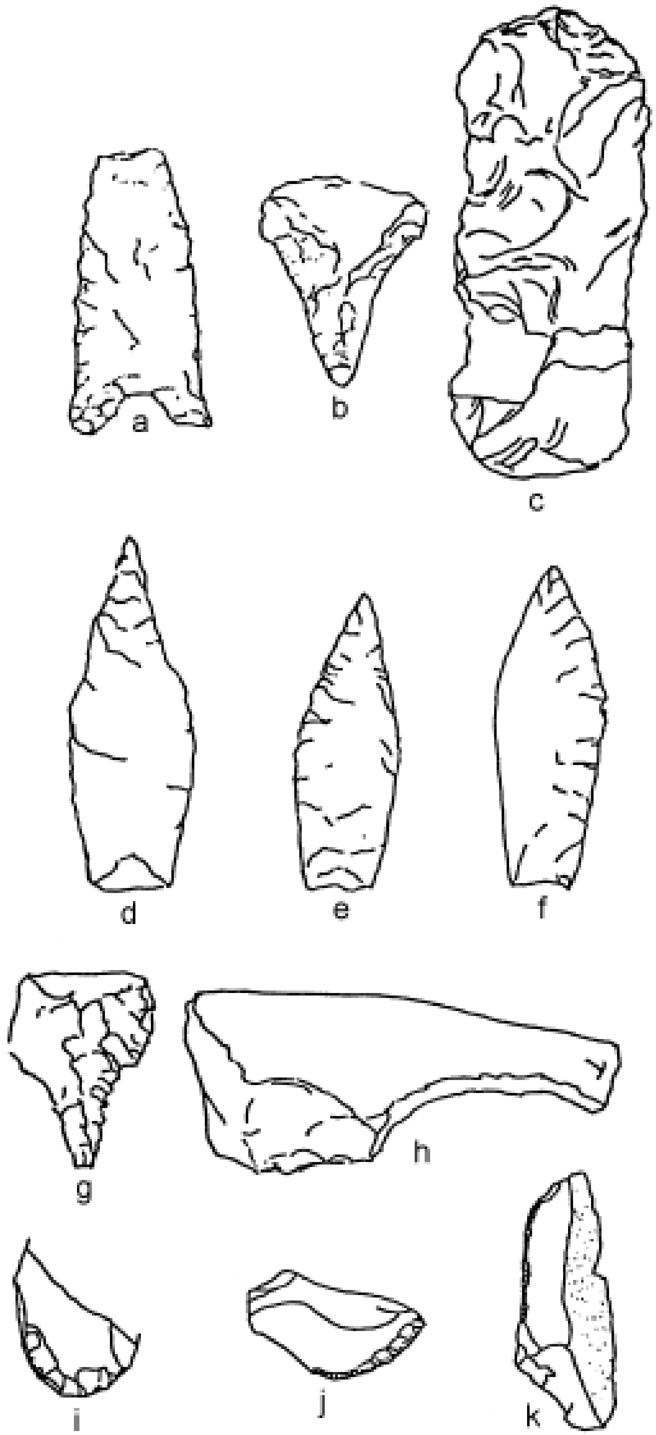

Figure 16. Dalton period artifacts from the Packard site in the OAO study area
a. Dalton point; b. endscraper; c. preform; d-f. Agate Basin-like points; g. perforator; h-k. flake tools (after Wyckoff 1985)

that area of the site. If this interpretation is correct, the Packard complex materials are exceptionally important for the information they provide about lithic technology and campsite activities during this early period. Activities represented by the Packard complex artifacts include stone tool production and projectile point/knife refurbishing, and use of flake tools for unspecified tasks. The distribution of these artifacts correspond, incidentally, to Binford's (1978) work, drop and toss zones observed around open hearths of modern hunter-gatherers.

Lanceolate points similar to those found at Packard were found at the Breckenridge site (Wood 1963; Thomas 1969) in association with other Dalton-like materials, and at a small number of other sites in eastern Oklahoma suggesting that the Packard complex may represent a distinctive regional adaptation. Wyckoff has further compared the Packard assemblage with materials from the Agate Basin site and other related complexes. There are many technological similarities with the Agate Basin materials, but there also are some notable stylistic differences. Given the fact that we now recognize the Agate Basin materials to predate the Packard complex by as much as 800 to 1,000 years, these differences are not surprising.

The stratigraphic and chronological position of the Packard complex led Wyckoff to question Albert Goodyear's (1982) interpretation of Dalton as a "basically synchronous style horizon" extending across the eastern United States, following fluted point traditions in time and preceding the notched point horizons characteristic of the Early Archaic. Wyckoff argues on the basis of the Packard site evidence that Dalton persists for some time after the 9900 B.P. terminal date suggested by Goodyear, and is therefore contemporaneous with other stylistic traditions. One such tradition would be the Packard complex, which, Wyckoff notes, exhibits some Paleo-Indian characteristics (lanceolate point form) along with other characteristics shared with Dalton (reworking of point forms). "What is critical, however, is that the Packard assemblage and the Packard complex comprise evidence for an early Holocene adaptation that was contemporaneous with the western extent of the Dalton complex" (Wyckoff 1985:22–23).

The Packard complex may be related, according to Wyckoff, to other sites with Agate Basin-like points which date between ca 10,000–7000 B.P. and which occur, for the most part, along the edge of an oak savanna phytogeographic zone which reached its easternmost extent ca 7000 B.P. (Delcourt and Delcourt 1981). Because the chipped stone assemblages at these sites, like Packard, are comprised primarily of locally derived cherts, Wyckoff suggests that these sites attest to locally circumscribed groups adapting to regionally variable changes in early Holocene environments.

The only well documented Dalton component in the Arkansas River Valley is the Billy Ross site in the floodplain of the Sans Bois Creek near its confluence with the Arkansas. Gravel stripping operations unfortunately destroyed the site before it was recognized, and the artifact assemblage is known only from surface collections (Galm and Hofman 1984; Wyckoff 1985). The Dalton bearing soil horizon was a gray silty loam, apparently buried by at least 60 cm of yellow silt loam. The assemblage included Dalton points in various stages of manufacture and reuse, flake scrapers, bifaces, preforms, and adzes, as well as a collection of artifacts from later occupations. Packard complex lanceolate points were also found at the site (Wyckoff 1985:16). Both the Dalton and Packard complex artifacts are made from Ozark and Ouachita Mountain raw materials.

Although the complete Dalton assemblage cannot be recognized among the surface materials alone, the occupation seems to have been the location of repeated short term encampments where hunting and tool manufacture were important activities. One scant aspect of the Billy Ross site is that it demonstrates Dalton period sites are buried in alluvial valley settings in the Arkansas valley.

No intact Dalton period occupations have been studied in the northern Ouachita Mountains. However, the diagnostic projectile points have been found in surface settings and intact deposits can be expected, particularly in alluvial valley settings.

The Dalton settlement pattern seems to reflect a stream valley orientation incorporating use of both shelter overhangs and river terraces for habitation. This suggested pattern is supported by the distribution of Dalton artifacts on other sites in the Ozarks. At the Montgomery site along the Sac River in southwestern Missouri, for example, Dalton artifacts buried in Holocene alluvial deposits appear to represent multiple small, overlapping residential areas, each measuring 10 to 15 m in diameter (Collins et al. 1977). It is likely that many other Dalton components remain deeply buried at the base of Holocene alluvial deposits, in situations similar to those which occur at the Montgomery site, the Packard site, and at Rodgers Shelter.

Dan Morse (1982; see also Morse and Morse 1983) adds semipermanent base camps occupied by multifamily groups and cemeteries as components of Dalton settlement patterns in northeast Arkansas. These site types figure importantly in Morse's interpretations of L'Anguille phase Dalton settlement patterns in the central Mississippi valley. Morse regards this settlement pattern as an adaptation to individual watersheds, consisting of a single base camp settlement and associated hunting and butchering camps, food collecting and processing camps, quarries and cemeteries reflecting utilization of the watershed by a single band. In this model the base camp would support a year-round occupation by at least some members of the group. Morse adds that these watershed territories do encompass some upland areas thereby providing access to microenvironments not associated with the lowlands. Patrilocal exogamous bands (that is, bands with a social organization based on male descent lines, with sons bringing into the band wives from other areas and daughters leaving to marry husbands belonging to other bands) in adjacent water-sheds would presumably be related through cross cutting patterns of kinship. Such ties would be important, in

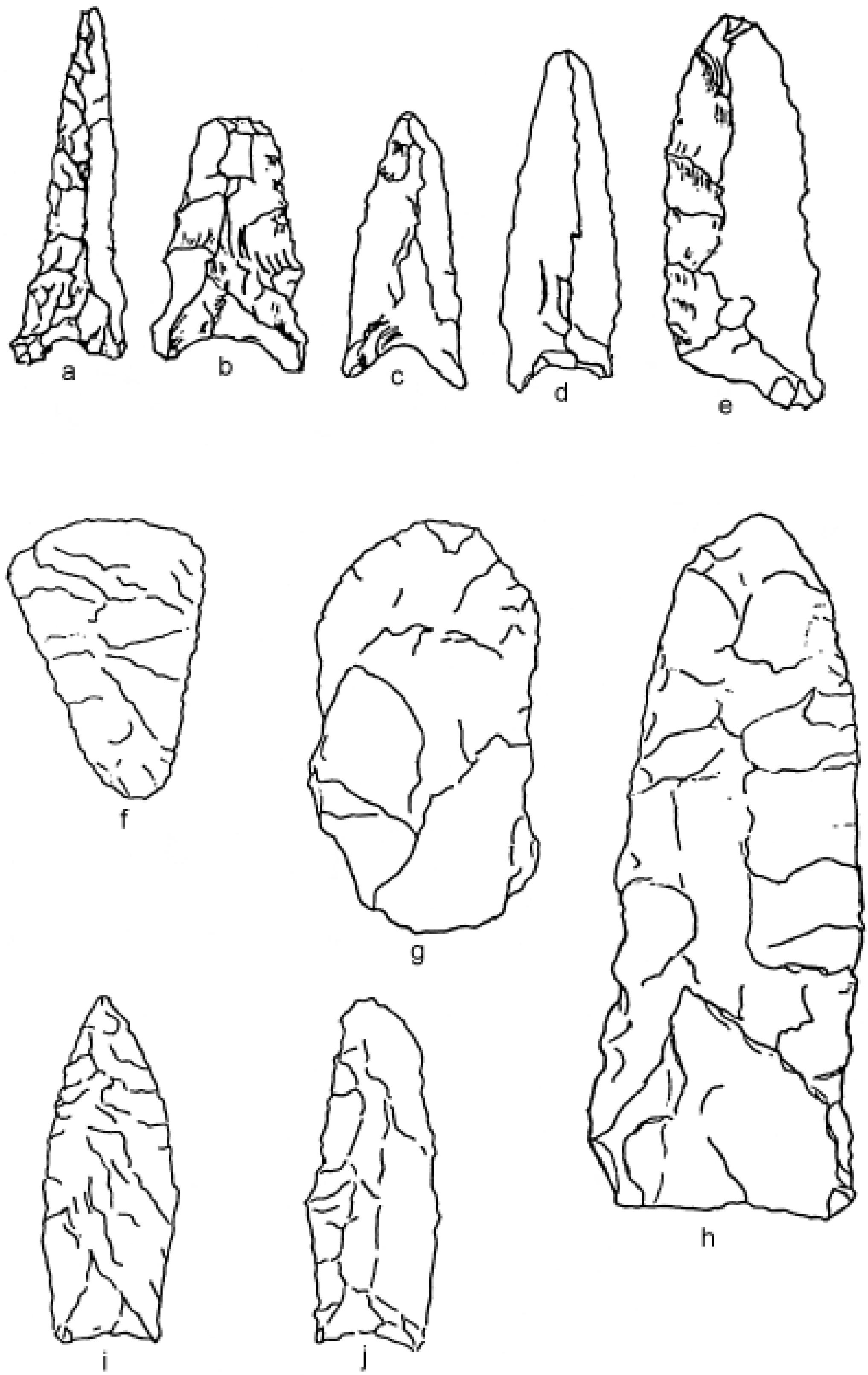

Figure 17. Dalton period artifacts from the Breckenridge site in the OAO study area
a-e. Breckenridge points; f. endscraper; g. oval knife; h. lanceolate knife; i-j. lanceolate points (after Wood 1963)

Morse's view, for facilitating the sharing throughout the region of such resources as chert from the Ozarks.

In a contrasting view, Michael B. Schiffer (1975) contends that Dalton occupants of the central Mississippi valley would not have adapted to uniformly sized watersheds, but would have utilized territories cross cutting several drainages. Rather than adjusting to "banana-shaped" river valleys and their hinterlands, Schiffer argues that Dalton bands arrayed themselves across the landscape in hexagonally shaped territories. In Schiffer's view, base camps would not represent year-round occupation but seasonal usage instead.

These alternative interpretations of Dalton settlement dynamics were critically evaluated by James Price and James Krakker (1975) in a study using survey and excavation data from sites along the Little Black River along the eastern Ozark border. Surveys in the area produced evidence for two types of Dalton sites: large sites associated with multicomponent middens and containing a wide range of Dalton tool types, and smaller sites usually consisting of a single Dalton point. In evaluating the distribution of these sites relative to major environmental zones in the area, Price and Krakker postulated that the large sites represented two kinds of seasonal base camps. Large sites located at the Ozark escarpment were taken to represent winter-spring base camps, whereas large sites found in the lowlands were interpreted as summer-fall base camps.

These interpretations were examined further using evidence derived from excavations at two Dalton sites within the Little Black river watershed. The Lepold site located at the base of the Ozark escarpment produced a Dalton assemblage consisting of points and preforms, adzes and adz fragments, a perforator, and other tools including scrapers, utilized flakes, and miscellaneous bifaces. These materials came from the base of a buried midden zone which also produced a quantity of burned clay fragments, some with impressions of twined fabrics. The burned clay pieces appeared to have been the result of burning in and around hearths (although no hearths were found in the Dalton levels of the site). Some of the burned clay fragments also contained unopened mason wasp nests, which Price and Krakker interpret as evidence for the existence of mud-plastered dwellings at the site which may have burned before early fall when wasps pupate. One of nine burials excavated at the Lepold site was attributed to the Dalton occupation. Preserved animal bone also associated with this occupation suggests that deer was a major food resource in addition to smaller mammals and birds. Nut hull fragments preserved at the site indicate some dependence upon that resource.

At the Sullivan site located in a Pleistocene levee zone within the lowland portion of the watershed, Dalton artifacts also occurred at the base of a multicomponent midden. But here only minute quantities of burned clay were found and none contained wasps nests. In other words, no evidence of substantial structures was found at the Sullivan site. Faunal remains were too poorly preserved to allow any economic interpretations to be made. Acknowledging the limitations of their data, Price and Krakker suggest that the evidence from these two sites does, in any event, conform to the expectations of the seasonal model base camp. That is, Lepold can be most comfortably interpreted as a winter-spring base camp, and Sullivan as a summer-fall base camp.

In comparing these findings to the Morse-Schiffer "debate," Price and Krakker favor Schiffer's scenario, and comment that

> Morse felt that a single band exploited an entire banana-shaped river basin and equated the shape of the band territory with the shape of the basin. There is really no good method at hand to reconstruct the band territory of the Little Black Phase. We are certain, however, that it did not correlate with the shape of the Little Black River watershed since not all zones appear to have been exploited extensively. Rather than banana-shaped, we suspect the Little Black Phase territory was dipper gourd-shaped with the largest concentration of population in the lowland meander belt and secondary concentration in a neck that penetrated the Ozark escarpment via the Little Black entrenchment. (Price and Krakker 1975:35)

Regardless of whether we interpret Dalton band territories as being shaped like bananas, dipper gourds, or hexagons, it seems clear that Dalton settlements represent adaptations to local environmental conditions. In a few cases, direct evidence of settlement and subsistence adjustments are preserved at Dalton sites. The potential certainly seems to exist at buried sites for further investigation of Dalton adaptations to early Holocene environments.

Dalton society probably was not substantially different from Paleo-Indian society which preceded it. Local groups probably remained small, and the anucleate pattern of social organization probably continued. Evidence of ceremonialism, however, is now seen in burials interred with grave goods at the Sloan site (Morse and Morse 1983), and also by a possible "ceremonial hearth" found at Graham Cave. Chapman (1975:97) describes this feature as an unusual semicircular arrangement of stones around a burnt area, which lacks the association of burned bone and other refuse typically accompanying hearths at which food has been prepared. Another candidate for investigation of prehistoric ceremonial treatment of the dead are the Dalton burials at Graham Cave (Logan 1952).

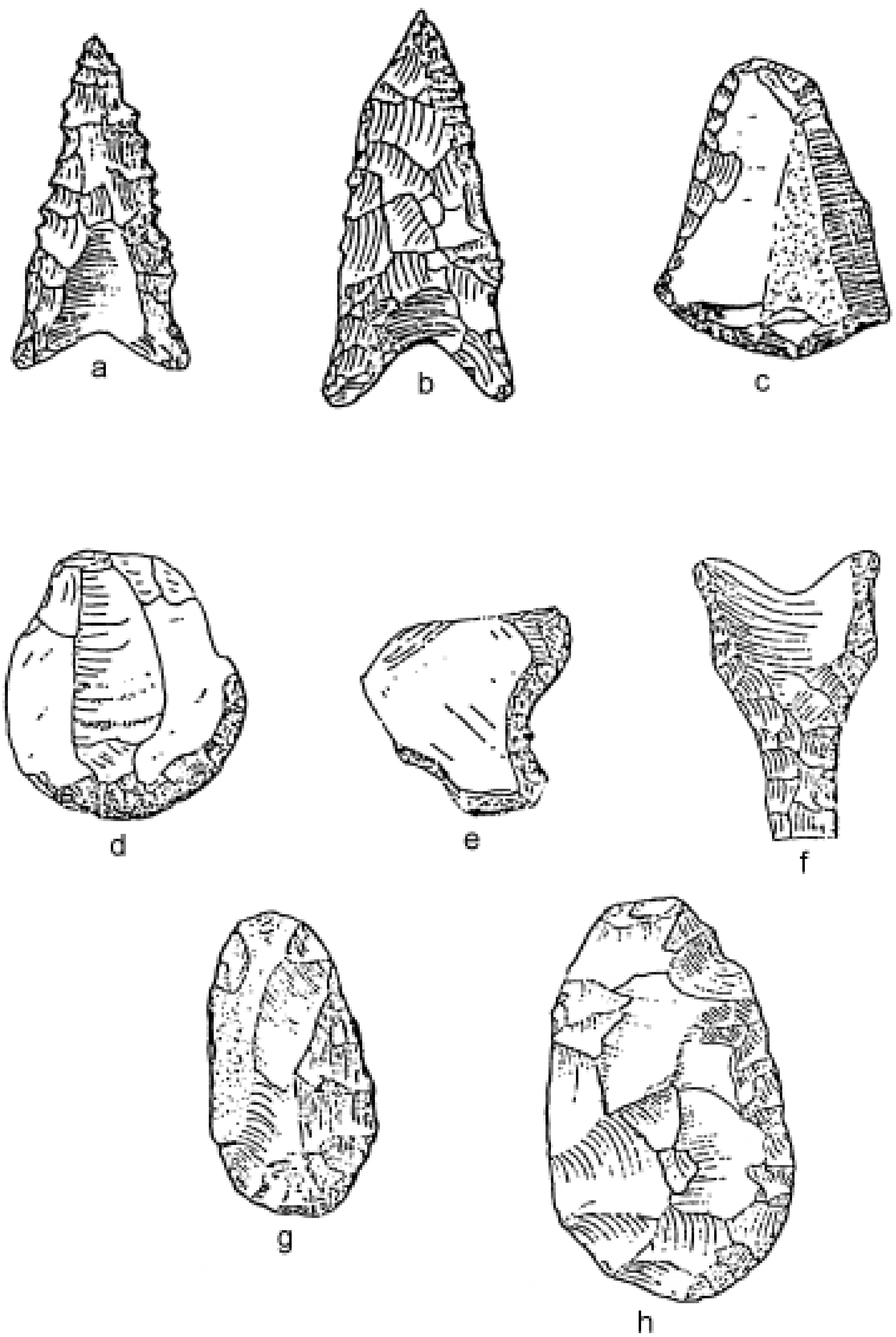

Figure 18. Dalton period artifacts from the eastern Ozark border in the OAO study area
a-b. Dalton points; c-d. endscrapers; e. spokeshave, f. drill or perforator; g-h. adzes (after Price and Krakker 1975)

EARLY AND MIDDLE ARCHAIC PERIODS 9500–5000 B.P.

The concept of the Archaic initially referred to a prehistoric cultural unit that contrasted in important ways from subsequent Woodland and Mississippian developments in the eastern United States.

> The term *Archaic* has been defined in terms of the absence of pottery, burial mounds, agriculture, and settled village life, and the presence of certain stone tools and preparation techniques thereof. And the general understanding of *Archaic* as a ‘Stage’ has long been a normative one, even though regional variants and such factors as seasonality have been recognized. (Winters 1974:xviii)

We now understand that pottery, burial mounds, plant domestication, and semisettled village life all are to be found during the Archaic period (Phillips 1983:1; Smith 1986). Rather than representing a long term continuum of hunting and gathering lifeways, the Archaic now appears to be a period during which many innovations were developed and many distinctive cultural complexes emerged. Also developing hand in hand with our changing notions of the Archaic is a better appreciation of the role of environmental change as an active element in adaptational shifts. No longer do we regard the environments of Archaic populations simply as passive backdrops against which people refined their exploitative efficiencies (cf. Caldwell 1958, 1965). We have already mentioned the importance of these conceptual shifts with regard to our understanding of Ozark prehistory.

OZARKS

The Early and Middle Archaic periods can be combined for the Ozark area due to the lack of significant differences within the archeological record. It is quite clear, however; that this time span provides a contrast to the preceding Paleo-Indian and Dalton periods.

A major technological expansion is seen in Early and Middle Archaic assemblages throughout the Ozarks. The most notable typological change occurs in the proliferation of projectile point forms and functions. Characteristic point forms are many, and include corner-notched varieties like Rice Lobed, side notched forms such as Big Sandy or White River Archaic, the contracting stemmed Hidden Valley type, and other stemmed varieties including Searcy, Rice Lanceolate, Jakie Stemmed, and Johnson. One basally notched form, the Calf Creek point, may originate during the Early Archaic but is more often found in Middle Archaic assemblages. These points occur in stratigraphic contexts at Calf Creek

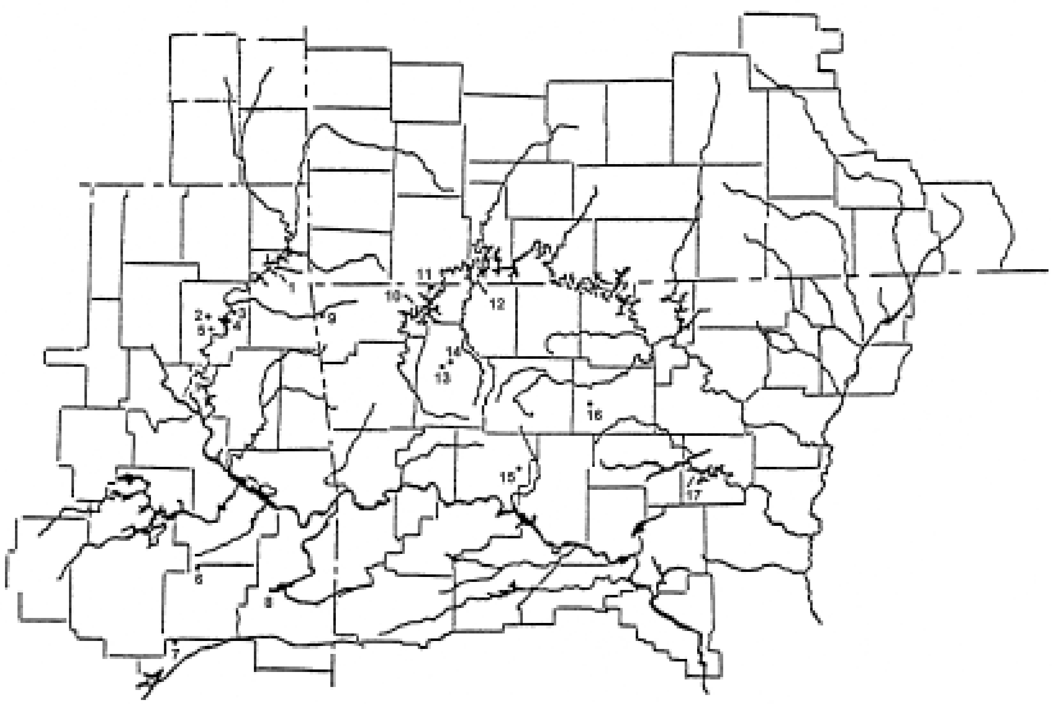

Figure 19. Locations of selected Early and Middle Archaic sites in the OAO study area
1. Grove focus sites (Evans, Caudill, McConkey); 2. Jug Hill; 3. Pohly; 4. Packard; 5. Dawson; 6. Tucker’s Knob; 7. Bug Hill; 8. Scott; 9. Albertson; 10. Beaver Reservoir sites; 11. Breckenridge; 12. Table Rock Reservoir sites (Rice, Jakie, Standlee I, Lander I and II, Crisp IV); 13. Turner Cave; 14. Holman Creek; 15. Tom’s Brook; 16. Calf Creek Cave; 17. Greer’s Ferry Reservoir

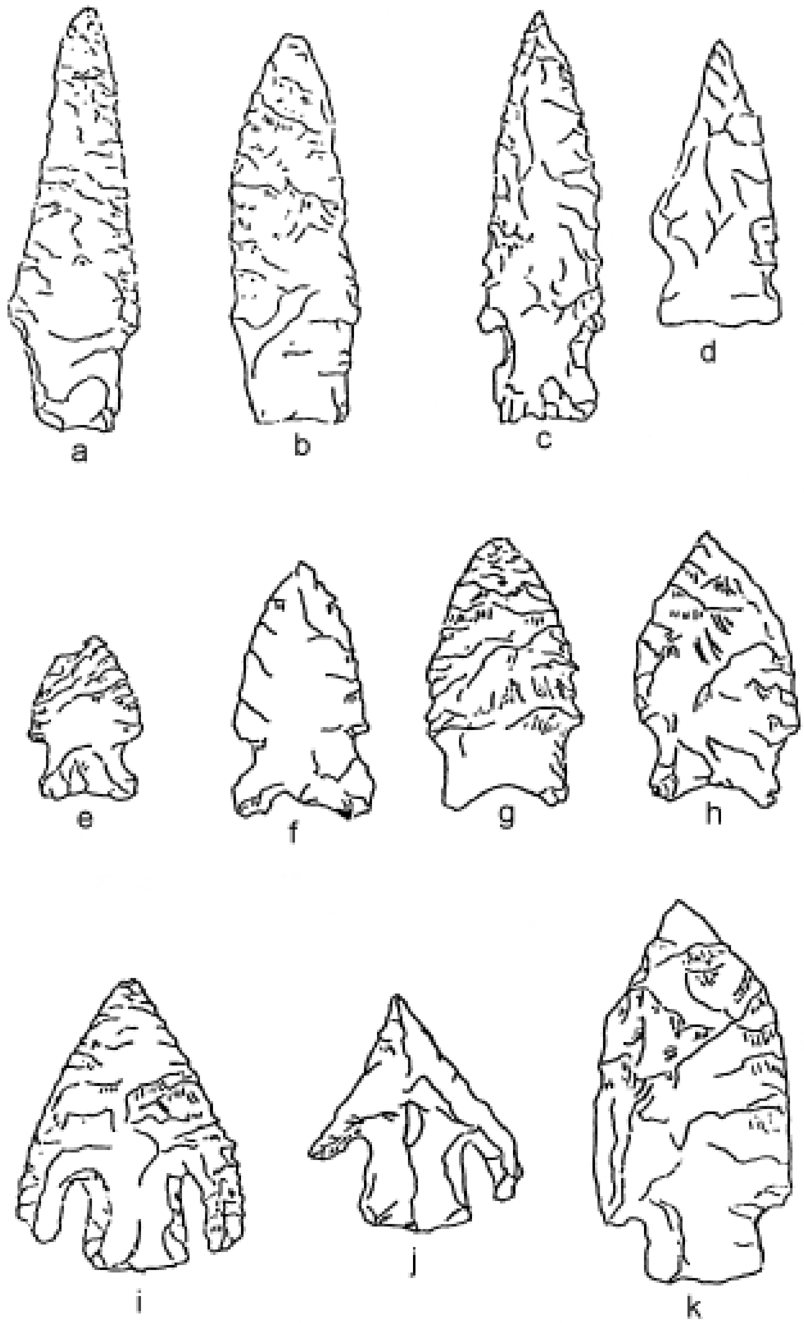

Figure 20. Early and Middle Archaic period artifacts from the Ozarks
a-b. Searcy points; c-d. Rice points; e-f. White River Archaic points; g-h. Johnson points; i-j. Calf Creek points; k. expanding stem point (after Dickson 1970)

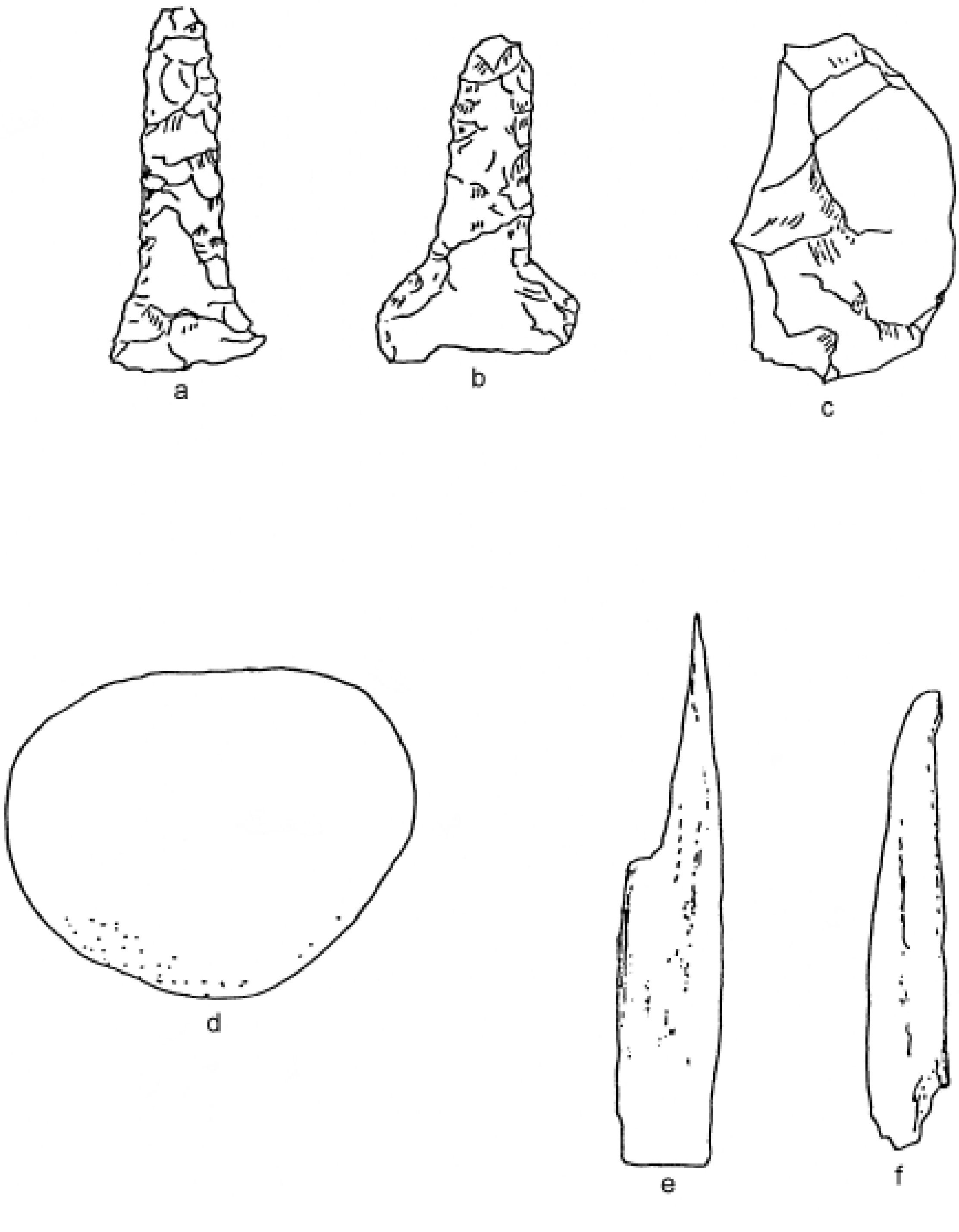

Figure 21. Early and Middle Archaic period artifacts from the Ozarks (Calf Creek Cave) a-b. drills; c. flake tool; d. abrader, e. bone awl; f. antler flaking tool (after Dickson 1970)

Cave, Albertson, Breckenridge, and Tom's Brook shelters in Arkansas, and at Rodgers and Jakie shelters (Chapman 1975) in southwest Missouri. The Holman Creek site (Mapes 1965) produced several of these point types from surface contexts, and additional examples have been found at sites recorded in the Beaver Lake Reservoir (Scholtz 1967) and Greer's Ferry Reservoir (McGimsey 1965) in Arkansas, and Table Rock Reservoir in Missouri (Marshall 1958).

Stanley Ahler (1971) analyzed the morphology and edge characteristics of many of these point types using a sample from Rodgers Shelter. He determined that these artifacts were used for several tasks including specialized cutting and slicing and heavy duty cutting, in addition to service as weapon projectiles. Supplementing this expanded chipped stone tool assemblage are a variety of ground stone tools including milling and nutting stones and full grooved axes and celts, the latter used for heavy woodworking. Twined fiber fabrics also first appear during the Middle Archaic and were used in making sandals, bags, mats, and other items. Decorated bone and shell ornaments were found in Early Archaic contexts at Arnold Research Cave in Missouri and are illustrated by Chapman (1975:164).

Several cultural complexes have been identified in the Ozarks on the basis of distinctive Early and Middle Archaic artifact assemblages. For example, David Baerreis (1951) used data from a number of stratified habitation sites along the Grand River in northeastern Oklahoma to define the Grove focus. Differences in stratified assemblages at these sites led Baerreis to further discern three sequential phases (Grove A, B, and C) which were thought to reflect a temporal trend toward increasing sedentarism. Wyckoff (1984) identifies a more specific Middle Archaic cultural unit in eastern Oklahoma believed to be 5,000 to 6,000 years old, which he calls the Tom's Brook complex. This complex is named after the Tom's Brook site, a stratified rockshelter site in northwest Arkansas. The Tom's Brook complex is characterized by a number of specific point types along with such other artifact classes as points reworked into scrapers and knives, T-shaped drills, large, thin flakes with edges specially modified for cutting or scraping, choppers, and a wide variety of ground stone implements including fully grooved axes, and grinding and nutting stones. Chipped stone technology involved the knapping of chert cobbles into bifacially worked blanks which were then finished into the characteristic point types, most of which exhibit heavy grinding along the edges of the basal stems. The use of cores to produce flakes for the manufacture of a variety of expedient cutting and scraping tools also seems to be a hallmark of this complex, especially in contrast to earlier technologies in the region. Heat treating of chert to improve its knappability is also seen by Wyckoff as an important technological feature of this complex. This distinctive assemblage is present in northeastern Oklahoma at the Dawson, Pohly, Jug Hill, Packard, McConkey, Cooper, and Smith I sites. At the Cooper and Smith I sites and also at the Tom's Brook site in Arkansas preservation of animal bone indicates that the subsistence of these Middle Archaic people was based partly on hunting deer and other small mammals, and partly on the use of riverine resources such as shellfish and turtles. Evidence from other Tom's Brook sites in southwestern Arkansas demonstrates that plant foods including nuts were also collected. Although sites representing the Tom's Brook complex include both open sites and rockshelters, little is known about the nature of activities which took place at them. However, at the Dawson site (Baugh 1978) burned limestone suggested that hearths or ovens were used, and workshops occurred on some areas of the site where stone tools were made. In summary, the Tom's Brook complex "is believed to represent traces of roughly contemporaneous, but locally distinct, hunting and gathering bands that principally inhabited the Ozark and Ouachita uplands" (Wyckoff 1984: 139).

Several sites in Delaware and Mayes counties, Oklahoma, have produced evidence of another Middle Archaic occupation by hunting and gathering peoples, known as the Caudill complex. This manifestation is slightly later in time than the Tom's Brook complex, but the relationship between the two cultures presently is unknown (Wyckoff 1984:140–142).

Caudill complex artifacts include a few types of ground stone implements including cupstones, grinding stones, and hematite pigment stones, along with scrapers and knives made of large chert flakes, chert cobble choppers, and large dart or spear points. These points include basally notched parallel stem forms (Bulverde, Calf Creek, Smith), basally notched, expanding stem forms (Marshall, Marcos), and contracting stem forms (Hidden Valley, Standlee), in addition to several less commonly represented types (e.g., Castroville, Williams, Table Rock, and Jakie Stemmed). In a few instances bone awls and deer antler flakes have been found, and it is without doubt that many additional tools and implements were fashioned out of these and other perishable materials (e.g., wood, shell).

Caudill complex components occur in rockshelter sites as well as in open sites located along the Grand River in northeast Oklahoma, although Wyckoff notes that no seasonal or functional indicators of site utilization have yet been identified. At a few rockshelter sites, abundant amounts of deer bone have been found, along with lesser amounts of the bones of turkey, raccoon, skunk and turtle. No vegetal remains have been recovered, but the grinding implements attest to the utilization of plant foods such as nuts, seeds or berries.

At the Rice site in southwestern Missouri, Bray (1956) identified an Early Archaic component characterized by various lanceolate, stemmed, and notched points along with stemmed points reworked into scrapers and pitted anvil stones. Similar assemblages noted at the Jakie and Standlee shelters have subsequently been attributed along with the materials from the Rice site to an Early Archaic manifestation known as the Rice complex. Diagnostic artifacts include Dalton, Rice Lobed, Rice Contracting Stemmed, Rice Lanceolate, Agate Basin, and Graham Cave Notched points, along with various forms of scrapers, choppers, trianguloid adzes, pebble choppers, and pitted anvil stones (Chapman 1975:129). Chapman notes also that the Rice complex does seem restricted to the White River drainage of southwestern Missouri (cf. Tong 1955) and northwestern Arkansas (where

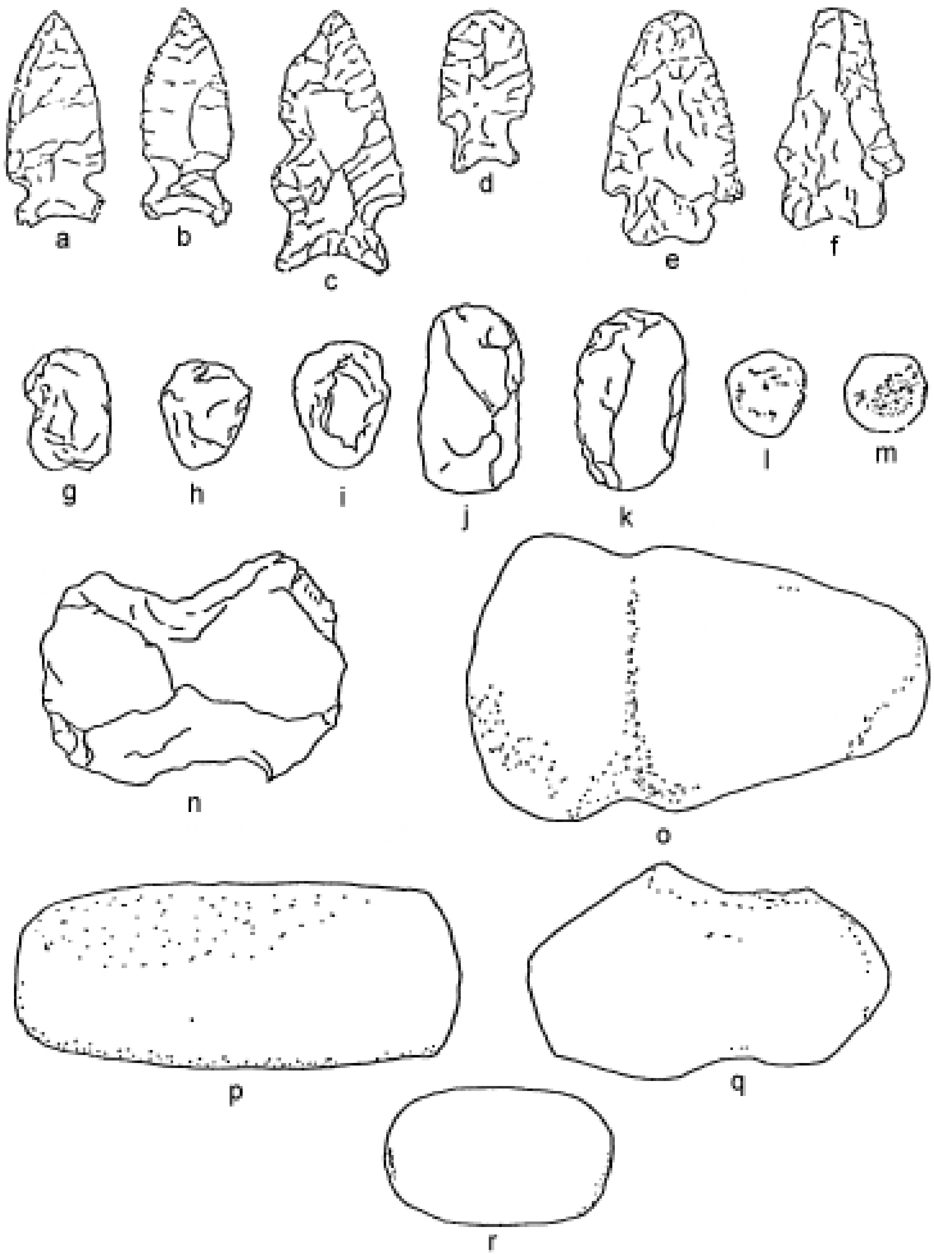

Figure 22. Early and Middle Archaic period artifacts from the Ozarks (White River complex)
a-b. Big Sandy Notched; c-d. Jakie Stemmed; e-f. Rice Lobed; g-i. endscrapers; j-k. choppers; l-m. hammerstones; n. double bitted chipped ax; o. full grooved ground stone ax; p. ground stone celt; q. stone mortar; r. mano (after Chapman 1975)

this complex occurs at the Breckenridge site). The Middle Archaic in this same region is represented by the White River complex, known from assemblages found at the Jakie, Rice, Standlee I, and Lander I and II shelters and at the Crisp IV site. Diagnostic point forms include the types Big Sandy, Jakie Stemmed, Rice Lobed, and Stone Square Stemmed. Other artifacts include various scrapers and expanding base drills, and chipped, double bitted axes. Ground stone tools include fully grooved axes, celts, pitted anvil stones, mortars, and hammerstones (Chapman 1975:164). At the Montgomery site in the Stockton Reservoir, Middle Archaic points including the types Rice Lobed and Big Sandy were found in buried alluvium above the previously mentioned Dalton materials (Collins et al. 1977). In northwest Arkansas, the White River complex has been identified by Vogele (1982) at Turner Cave, and by Scholtz (1967) at sites in the Beaver Reservoir. The indications of strong continuities between Early and Middle Archaic complexes in the region probably are not fortuitous.

The Early Archaic period in northwest Arkansas has been radiocarbon dated to 8410 ± 245 B.P. (UGa-3939) in Stratum 5 at the Albertson site (Dickson 1988). Several radiocarbon dates have now been obtained for the Early and Middle Archaic components at Rodgers Shelter, which range in age from 8100 ± 140 B.P. (GAK-1170) to 5100 ± 400 B.P. (M-2332) (McMillan 1971; Kay 1982a). Two radiocarbon dates representing the Middle Archaic White River complex at the Jakie Shelter in southwestern Missouri were 7070 ± 450 B.P. (M-697) and 6280 ± 400 B.P. (M-698) (Chapman 1975).

Several important environmental shifts are recorded for this time period. Hypsithermal conditions prevailed throughout the western Ozarks by 8,000 years ago (King and Allen 1977), at which time an eastward invasion of prairie vegetation is seen in the pollen profile from Muscotah Marsh in southeastern Kansas (Gruger 1973). Land snail species at Rodgers Shelter indicate a reduction in annual precipitation (Baerreis and Theler 1982), and mussel species indicate a restricted stream flow in the Pomme de Terre River (Klippel et al. 1982). In general, climate conditions after ca 8,000 years ago were warmer and drier than either before or after, and it is certain that occasional episodes of prolonged drought were experienced in the Ozarks area.

Some comparative data on the character of the Hypsithermal are available from the Cherokee Sewer site in northwest Iowa (Anderson and Semken 1980a). Evidence from the study of pollen, micromammal, and snail remains preserved at the site along with consideration of climatological data suggested that by about 6400 B.P. winter and summer temperatures were warmer by 1 to 2° centigrade, and precipitation was reduced by about 10% from present levels (Wendland 1980:147). Northward displacement of large scale atmospheric circulation patterns and changes in the frequency of certain frontal conditions are believed to be the primary causes of these climatic changes. The authors of the Cherokee study also note, however, that these differences were "in degree rather than in kind, as the biotic and airmass assemblages were largely variants of the Recent configurations" (Anderson and Holmes 1980b:265).

Bruce McMillan and Walter Klippel note (1981:221) that landscape erosion patterns throughout the Midwest also corroborate a climatically induced shift in vegetation associations at this time. Increasingly xeric (dry tolerant) hillslope vegetation throughout the Hypsithermal apparently led to decreased stabilization and subsequent erosion of upland soils, identifiable now as depositional episodes in the floodplain sequences of the Pomme de Terre (Brakenridge 1981) and other rivers. Elsewhere in the eastern United States, increased loads of fine sediments are interpreted as one variable in changing fluvial regimes leading to the development during the early Holocene of meandering channel patterns and convex floodplains with levees and sluggish backwaters (e.g., Butzer 1977, 1978; Saucier 1974). A graphic example of the interaction of these environmental changes and Archaic populations is afforded at Rodgers Shelter, where Marvin Kay (1982d) notes that abandonment of the shelter by its occupants after about 5100 B.P. was due to the deposition on the terrace of coarse colluvium and alluvial fans derived from adjacent hillslopes. Study of the large size rock particles comprising these terrace deposits indicated that upland slopes adjacent to Rodgers Shelter were progressively denuded of vegetation and soil during the latter part of the Hypsithermal. In seeking to explain the causes of this hillslope degradation, Kay suggests that human use of slope areas and upland plant resources may have interacted with drought conditions to weaken slope vegetation, thereby leading to subsequent erosion on a large though localized scale. These were the conditions which consequently rendered Rodgers Shelter unsuitable for human habitation until a much later date.

Richard Ford (1977:172), citing evidence from the Koster site in Illinois, cautions us about interpreting too strongly the effects of the Hypsithermal on Early and Middle Archaic populations. He asserts that, while climatic changes may certainly have affected annual yields of some fruit and nut bearing trees, it is doubtful that such impacts would have been experienced in the bottomland gallery forests along major rivers and streams, where most archeological sites — and therefore the populations which produced these sites — tend to occur. James Brown and Robert Vierra (1983) have since argued that the Koster evidence indicates that changes in Holocene river floodplains resulted in an increase in the food potential of these habitats. They suggest that this led in turn to an Archaic period shift toward increasing bottomland utilization and associated sedentarism. However, analysis of Rodgers Shelter faunal data by Purdue (1982) indicates that the floodplain forest along the Pomme de Terre did contract somewhat, and perhaps more importantly, the distributional mosaic of upland forest, oak barren, and prairie communities was altered in important ways. Faunal resources along the western fringe of the Ozarks were affected in two ways by these vegetational shifts: deer and other forest edge species probably experienced stress due to the decreasing availability of browse; various prairie species including bison, pronghorn antelope, prairie chicken, and 13-line ground squirrel moved into the area between 6300 and 3600 B.P. These changes certainly must have affected resource opportunities throughout the region, and perhaps it is for this very reason that most sites do indeed occur in the river valleys, where the most drastic impacts of Hypsithermal conditions would have been buffered.

These changing ecological relationships recorded in the Pomme de Terre valley appear to have been more widespread. At the Albertson site and at Ten Mile Rock (Medlock 1978) in northwest Arkansas, plains/prairie species such as pronghorn antelope occur in archeological contexts (see also Guilday and Parmalee 1971). Knox (1966) also identifies several prominent colluvial deposits at the hillslope/floodplain interface along a number of streams in southern Missouri and northern Arkansas. One positive effect of Hypsithermal upland erosion episodes would have been the exposure of limestone and sandstone bedrock strata containing chert and other mineral resources.

At the Albertson site the Early Archaic component is interpreted by Dickson (1988) as representing temporary family group habitation as well as recurrent short term occupation by male hunting parties during the fall and winter. The Middle Archaic component at Albertson contains an even wider variety of functional tool types, suggesting a longer seasonal occupation. However, the small size of the shelter probably limited the number of inhabitants to only a few at any one time. Middle Archaic habitation of the much larger Calf Creek Cave (Dickson 1970) does seem to represent the base camp of a larger family or multiple family group.

Rodgers Shelter also provides evidence of seasonal base camp occupation of possibly several months duration by a sizable residential group (McMillan 1976a). Kay (1982c) believes that this occupation took place continuously from fall through spring. Rock alignments within the shelter indicate that a crude structure may even have been erected to provide additional protection from the elements. Site activities reflected in the artifact assemblage include hunting, butchering, hide preparation, wood-bone-antler working, heavy woodworking, and extensive stone tool production.

Some important shifts in food-getting activities are also reflected. There is a marked decline in the dietary importance of deer, with smaller mammals, especially rabbit and squirrel, being most intensively hunted. Birds and fish also were utilized, and mussels were added to the diet in increasing numbers. These subsistence shifts, indicating heavy reliance on bottomland habitats, may well have been a response to the climatically induced adjustments noted above in plant and animal communities. Another shift in food procurement may be reflected in the significant increase in the quantity of artifacts used for grinding and processing plant foods. One other notable aspect of the Early to Middle Archaic occupation at Rodgers Shelter is evidence for the domestication of the dog; one was found buried in a rock cairn. New industrial activity is found both at Rodgers and Albertson where hematite and galena were processed, probably for use as pigment.

Settlement patterns during the Early and Middle Archaic seem to be oriented increasingly toward river valley settings. The development of food storage techniques might have aided in countering fluctuating native food resources and might also have led to base camp settlement of longer seasonal duration. At the same time, the importance of information exchange within and between local groups concerning the distribution and abundance of critical resources may have increased. Settlement locations undoubtedly continued to correspond closely to seasonally changing native food distributions, resulting in many series of adjustments of human populations throughout the territories they inhabited. However, juggling around alternative methods of getting food (Flannery 1968), such as decreasing the effort spent hunting deer in favor of increased attention to rabbit and squirrel hunting, might easily have kept to a minimum additional adjustments in settlement patterns. In either case, the flexible nature of anucleate band organization incorporating extensive social ties among adjacent groups could easily have accommodated modifications in subsistence-settlement strategies without inducing additional social stress.

Some other factors should be mentioned that might have affected Hypsithermal settlement patterns in the southern Ozarks. McMillan and Klippel (1981) compared cultural/environmental records at Rodgers Shelter and at Graham Cave and noticed a time-transgressive and clinal effect of Hypsithermal climatic impacts from west to east. At Graham Cave, located east of Rodgers Shelter, drought-related phenomena occurred later and to a lesser degree of severity than they did at Rodgers. Conditions in the interior of the Ozarks might have paralleled those at Graham Cave, where an increase in deer predation there may be explained by localized prairie expansion creating more extensive forest edge habitats. These areas are favored by deer for feeding.

Landscape morphology and bedrock characteristics could also have affected Early and Middle Archaic settlement patterns. West to east trending climatic patterns in the Ozarks would result in warm and dry conditions more seriously affecting south facing slopes, leading in those areas to increasingly xeric vegetation associations which provide few resources for humans. Similarly, the water retention properties of sandstone derived soils may have supported more mesic vegetation during the Hypsithermal; consequently, those areas may have been selected for settlement or resource utilization in favor of other areas exhibiting karst (limestone bedrock) topography.

Increases in site sizes during the Early and Middle Archaic may imply that local groups were growing larger. Or, it may imply that sites were being occupied for longer periods of time or more frequently. Presently we are unable to support one alternative over the other because we cannot control for possible decreases in territorial extent if settlement patterns did contract into bottomland settings. However, population densities do seem to have increased relative to local carrying capacities, and this may account for the broadening of their ecological niche which Archaic peoples achieved through expansion of native plant food utilization. These adaptive shifts may also have produced more circumscribed band territories and more localized social boundaries. The increased stylistic diversity we see in regional archeological complexes dating to the Early and Middle Archaic periods would seem to be one indication of such social changes.

ARKANSAS RIVER VALLEY AND NORTHERN OUACHITAS

The discussion of early and middle subdivisions of the Archaic period are here also combined, because information about these cultures in the northern Ouachita Mountains and Arkansas River Valley is extremely limited. The time interval corresponds roughly with the Hypsithermal or Atlantic climatic episode, a period of increasing desiccation, during which grassland plant communities increased their range at the expense of forests, presumably throughout much of the midcontinent (cf. Wyckoff 1984:135; Brown and Vierra 1983; McMillan and Wood 1976; King 1981). This change in plant community distribution would, in turn, have affected the range and composition of animal populations and created a mosaic of resource distribution available for human populations that may have been substantially different from the environment in the recent presettlement periods. Changing climate and vegetation conditions would also have affected drainage patterns and the formation of land surfaces in alluvial valleys through aggradation and hillslope erosion. The interplay of these complex geomorphic processes has not only had an effect on the kinds of past human settlements and their distribution in this region, but also on the preservation, burial, or destruction of archeological sites.

The exact nature of environmental and geomorphic change in the Ouachita Mountains and the Arkansas River Valley in this and succeeding periods is poorly known. There is some indication, however, that the environmental changes postulated for the Hypsithermal were affecting the region. Ferndale Bog is a peat bog in the McGee Creek drainage near the southwestern margin of the Ouachita Mountains, close to the modern transition zone between forest and savannah vegetation communities. Sediment samples taken from this bog and from Natural Lake in the Jackfork Creek valley yielded pollen that recorded changing vegetation patterns over the last 5,000 years (Albert 1981). The Ferndale Bog pollen column was the longest. A radiocarbon sample taken from midway along the lowest column segment yielded a date of 5170 ± 80 B.P. (WSU-2434) (Albert 1981:Figures 26 and 31). This segment showed a mix of arboreal and nonarboreal pollen, indicating the local environment was a mixed oak savannah at the time of deposition. There is a clear trend of increasing arboreal pollen, especially oak, and a corresponding decrease in nonarboreal pollen from the bottom to the top of this segment, a pattern that continues, with some fluctuations, to the top of the core. In general, the pollen core indicates that the areal extent of grassland vegetation cover had peaked and was already decreasing in the face of encroaching arboreal communities by around 5000 B.P., a trend that gradually produced the oak-pine mosaic forest of the presettlement period. It is important to note that Ferndale Bog lies in a locality that is close to the western margin of modern Ouachita forest communities, and, therefore, may have been more dramatically affected by drying climate conditions than areas further east. However, Dan and Phyllis Morse (1983) postulate that significant environmental changes occurred in the Central Mississippi Valley during this period, with large scale deforestation of the alluvial bottomlands and a corresponding movement of human populations into the eastern Ozark hills.

Middle Archaic artifact assemblages are characterized by the appearance of a number of stemmed and notched projectile points such as the Johnson, Big Sandy, Frio, Ellis, Edgewood, and Rice Lobed types, points modified into hafted scrapers, T-shaped stone drills, and notched pebbles (Wyckoff 1984: 136). These have most commonly been found as surface occurrences or in deposits mixed with younger cultural materials.

Radiocarbon dates from this period come from the Scott site in the Fourche Maline valley. The bottom stratum of the midden mound, Stratum VI, yielded a date of 4500 ± 270 B.P. (UGa-1970) associated with a small sample of biface fragments, straight stemmed dart points, modified flakes, and a small collection of flaking debris and hammerstones (see Galm and Flynn 1978:Table 2-9, for the Scott site radiocarbon dates). Immediately above this deposit in Stratum V, a date of 4048 ± 90 (Tx-2893) came from a similar context, along with more recent dates of 3850 ± 155 B.P. (UGa-1969), 3555 ± 215 B.P. (UGa-1976), and 3749 ± 110 B.P. (Tx-2890). These two strata, referred to as Component 1 at Scott, may mark the end of the Middle Archaic period and the start of the Late Archaic adaptive pattern that was responsible for the creation of the "black mound" sites in the Ouachita Mountains.

A similar situation seems to occur at the Bug Hill site in the Jackfork Creek valley. A date of 3555 ± 125 B.P. (BETA-1420) came from the top of the Jackfork terrace underneath the midden and marks the end of terrace aggradation and the beginning of Late Archaic formation of the accretion mound. Within the terrace formation was a small collection of straight stemmed and corner notched dart points, broken bifaces, flakes, and sandstone cobbles (Altschul 1983:284) that appear to represent the location of transient hunting related camps or bivouacs from the Middle Archaic period.

Don Wyckoff (1984:136) has identified one distinctive Middle Archaic assemblage he calls the Tom's Brook complex. It is named after an assemblage from Levels 11 through 13 in the deeply stratified Tom's Brook Shelter on the south edge of the Boston Mountains in Johnson County, Arkansas (Bartlett 1963). In addition to Johnson and Big Sandy projectile points, Charles Bartlett and his Arkansas Archeological Society excavators found flakes, flake scrapers, and a drill. This assemblage indicates the shelter was used at this time for a short term hunting camp where tool repair also took place.

This component at Tom's Brook Shelter is undated, but radiocarbon dates on a similar assemblage at the Paw Paw site on the Ouachita River south of the Ouachita Mountains are available. Stratum 8, at the bottom of a stratified midden containing later Woodland and Mississippi period occupations, has two dates, 6640 ± B.P. and 3450 ± B.P. (Valastro et al.

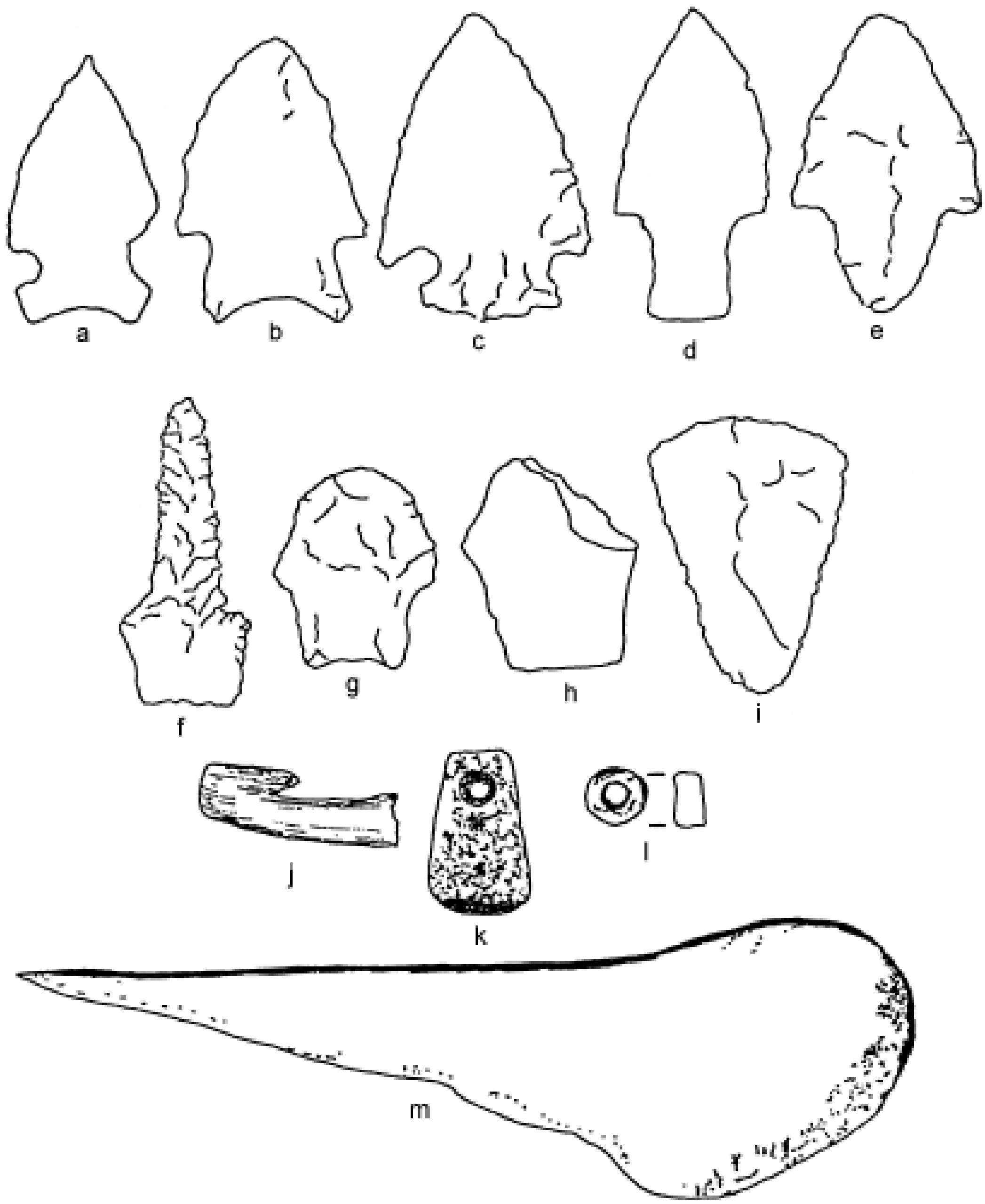

Figure 23. Archaic artifacts from the Arkansas River Valley and the northern Ouachita Mountains (Tom's Brook Shelter, Scott site, Wann site)

a. Big Sandy point; b. Johnson point; c. Williams point; d. Bulverde point; e. Gary point; f. drill; g. hafted scraper, h. flake scraper, i. endscraper; j. atlatl hook; k. shell pendant; l. shell bead; m. deer ulna awl (after Bartlett 1963; Galm and Flynn 1978)

1975:87) associated with projectile points, lithic debris, and at least one human burial (Schambach 1979:26). The first date has been considered appropriate by Frank F. Schambach, who has defined a Tom's Brook phase, or culture, for the Middle Archaic period based upon these materials (Schambach 1970, 1979; Schambach and Early 1982). According to Schambach, Tom's Brook is a hunting adaptation that marks the first intensive use of riverine environmental zones. In the Ouachita River Basin, for instance, deeply buried Tom's Brook occupations occur at the Gulpha site (Harrington 1920) and Jones Mill site on river terraces in the Ouachita Mountains and at Paw Paw. Unfortunately, none of these components has been reported in detail, and the types of settlement they represent are largely unknown. Assemblages appear to be dominated by hunting related tools such as projectile points and debris from tool manufacture and repair.

Irrespective of differences in terminology that characterize Tom's Brook as a complex, a phase, or a culture, the general impression of the adaptation it represents is the same. Most components appear to be short term occupations related to hunting and small scale domestic activities. Sites in the southern Ouachita Mountains are particularly noticeable in riverine situations, especially on aggrading alluvial landforms and underneath more substantial occupations belonging to later cultural periods. Similar occupations in the northern Ouachita Mountains and Arkansas River Valley can be expected in locations where depositional environments have preserved intact deposits.

According to Wyckoff (1984:138–139), another Middle Archaic settlement type is represented at the Tucker's Knob site, located on a prominent ridge toe overlooking Gaines Creek valley in Latimer County, Oklahoma (Neat 1974b:192), in the northern Ouachita Mountains. The site is a burned rock midden containing large amounts of fire fractured sandstone, chipped stone projectile points, preforms and blade debris, and relatively small numbers of other chipped stone tools and grinding stones (Neal 1974a:253). No architectural or residential features, with the exception of a single stone lined pit, were found, and plant and animal remains were missing. The site was occupied during several periods, but the principal component is marked by side notched and corner removed Archaic projectile points.

The principal activity at Tucker's Knob appears to be the manufacture of stone tools from local river cobbles with a secondary and smaller emphasis on hunting and food preparation. The very small number of ground stone tools indicate plant processing was not an important activity at the site. Although the abundant sandstone cobbles are burned, heating was not used in stone tool making, and the activities responsible for the burning are unknown. Large Archaic period rock middens in central Texas (Suhm 1958; Kelley and Campbell 1942) occasionally contain deposits of ash and food remains that indicate heating and cooking activities were taking place, but this material was largely absent at Tucker's Knob. Whatever purpose the sandstone cobbles may have served, the site appears to be the location of repeated short term but intensive occupations on a high promontory overlooking a small stream valley. This topographic location is similar to several low, rock filled mounds on bluffs overlooking the Grand River valley in northeastern Oklahoma (Neal 1974a:248–249), but those features apparently were inhabited during the Woodland period (cf. Wyckoff and Barr 1964; Schneider 1967). Additional examples of these distinctive cultural features need to be examined before the range of activities they represent is clear.

There is little direct information available to determine the full range of Middle Archaic settlement types or to characterize the social and economic organizations behind them. This was a period of dynamic environmental change, with apparent reduction in areas of forest cover and changing distributions of the mosaic of plant and animal communities used by Middle Archaic people. The overall economic emphasis appears to be on hunting, with the collection of plant foods a clearly secondary activity. Settlements are very small and indicate a pattern of short term occupation by small social groups, showing no significant differences in size from the preceding Dalton period, although the arrangement of sites across the landscape may be dissimilar. Riverine sites were clearly a part of the settlement system, but upland camps and rockshelters were also used, presumably in a pattern of seasonal and shorter term movement through a variety of ecological zones.

Middle Archaic social groups were small and arranged into bands, although their configuration is impossible to determine from the minimal information available. Desiccation of some environmental zones may have restricted population movement and shaped the boundaries of individual group foraging territories. Intensive use of certain special resources, like the occupation at the Tucker's Knob site, indicate repeated reuse of particularly favorable locations by groups familiar with a specific geographic area.

LATE ARCHAIC AND EARLY WOODLAND 5000–1800 B.P.

OZARKS

Evidence of the Early Woodland period in the Ozarks is so sparse that in this narrative it will be treated along with the Late Archaic.

In southwest Missouri the Late Archaic period is represented by the James River complex (Chapman 1975), which is characterized by Smith Basal Notched, Stone Square Stemmed, Table Rock Stemmed, and Afton Corner Notched points. Other artifacts include triangular bifaces, manos and grinding basins, double bitted chipped stone axes, and a variety of incidental chipped stone tools (scrapers, perforators, drills, knives, etc.) which are quite similar to those made during earlier periods. This complex is represented in stratified context at the Jakie Shelter, as well as at open sites in the Table Rock Reservoir including the Long Creek A and B sites and the James River site (Chapman et al. 1960). The James River site is the most important of these in that it appeared to be a single component manifestation (Henning

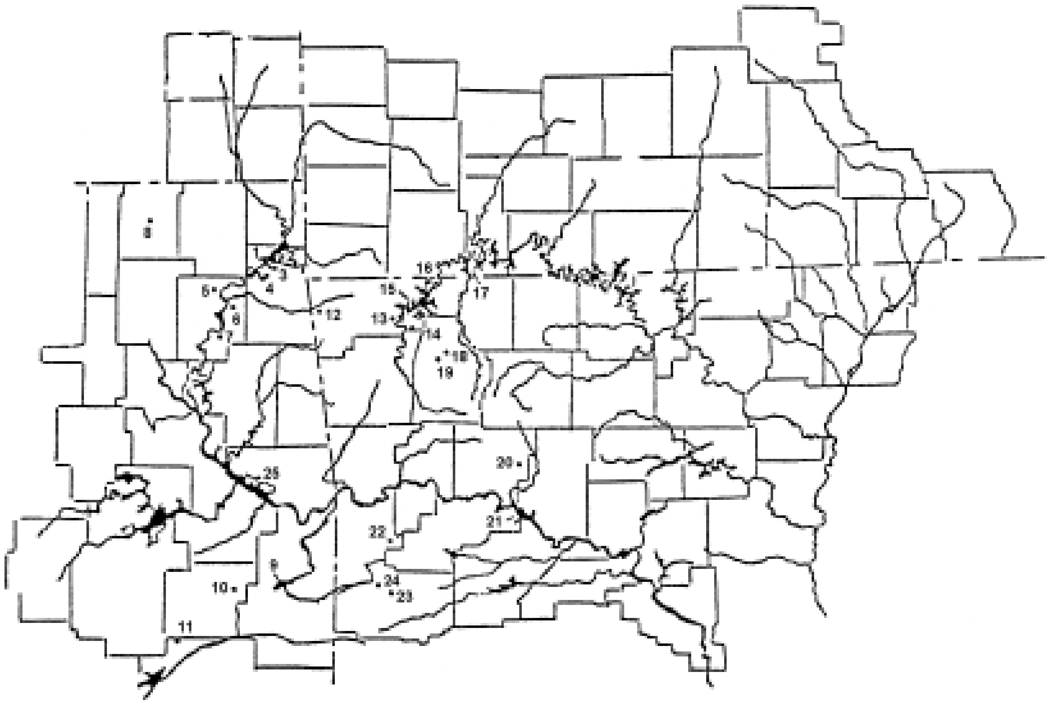

Figure 24. Locations of selected Late Archaic sites in the OAO study area
1. Cooper; 2. Caudill; 3. McConkey, 4. Smith I and II; 5. Shetley; 6. Pohly; 7. Kerr Dam; 8. Lawrence; 9. Wister Lake sites (Scott, Curtis Lake, Williams I); 10. McCutchen-McLaughlin; 11. Bug Hill; 12. Albertson; 13. Eden's Bluff; 14. White Bluff; 15. Beaver Lake sites; 16. Breckenridge; 17. Table Rock Reservoir sites (Jakie, James River, Long Creek A and B); 18. Holman Creek, 19. Turner Cave; 20. Tom's Brook; 21. Dardanelle Reservoir; 22. Sliding Slab; 23. Fuller and Judy sites; 24. Strickland Island; 25. Harkey-Bennett

1960b). One specialty tool which is also diagnostic of the Late Archaic is the "Sedalia digger," a form of chipped stone hoe with a curved bit (Chapman 1975:184). Soil polish along the bit end of many of these artifacts indicates that the tool was indeed employed in groundworking activities. This artifact is one of the diagnostic elements of the Sedalia phase, which has been radiocarbon dated at the Rodgers Shelter by a large series of assays ranging from 3530 ± 84 B.P. (SMU-451) to 2349 ± 79 B.P. (SMU-454) (Kay 1982a:83). The significance of the Sedalia phase to interpretation of the Late Archaic elsewhere in the Ozarks will be discussed below.

In northwest Arkansas, assemblages typical of the Late Archaic are found at open sites and at rockshelters. The terminal Archaic occupation at the Albertson site has produced a radiocarbon date of 2850 ± 120 B.P. (UGa-3940). Albertson apparently was not occupied during the Early Woodland, but a mixed Late Archaic–Early Woodland component is represented at the Breckenridge site (Thomas 1969). The James River complex has been identified by Vogele (1982) at Turner Cave. In addition to the point types Chapman attributes to the Late Archaic, these Arkansas sites have also produced Stone Corner Notched, Langtry, Kings Corner Notched, Pandale, Gary, and Uvalde points. These point types also commonly occur in assemblages from large, multicomponent sites such as those described by Scholtz (1967) from the Beaver Reservoir, Holman Creek (Mapes 1965), and the Tom's Brook site (Bartlett 1963).

In northeastern Oklahoma the Late Archaic is represented by the Lawrence phase (Wyckoff 1984). Typically Late Archaic assemblages are found at open sites (Kerr Dam, Caudill, McConkey) and in rockshelters (Shetley, Pohly, Cooper, Smith I and II) along the Verdigris and Grand rivers. The type component occurs in a buried, stratified context at the Lawrence site located along the Verdigris River (Baldwin 1969). At the Shetley Shelter the Lawrence phase occupation is associated with the interment of a single individual which has been radiocarbon dated at 3590 B.P. ± 175 (SM-764) (Wyckoff 1967b). Four radiocarbon dates were obtained for the Late Archaic occupation at the Lawrence site (Valastro et al. 1972) ranging from 3460 ± 110 B.P. (Tx-816) to 2710 ± 70 B.P. (Tx-815). Wyckoff (1984:147) suggests that the main occupation of this site occurred around 2,600 to 2,700 years ago. Artifacts diagnostic of the Lawrence phase can be divided into an earlier and a later group based on assemblages found in stratified contexts. The earlier group includes Frio-like points and Table Rock Stemmed points, whereas in the later complex Marshall, Williams, Marcos, Afton, Palmillas, Ellis, and Morhiss points are found in addition to the Frio-like forms. A Snyders point, usually associated with the Middle Woodland period, was found in a buried and evidently undisturbed Lawrence phase component at the Kerr Dam site (Wyckoff 1963). At the Lawrence site, small, corner notched points which may have been used to tip arrows were found in the latest Late Archaic component. If this interpretation is correct, this is the earliest evidence for use of the bow and arrow in the Ozark area. In addition to these point forms other artifacts characteristic of the Lawrence phase include a variety of chipped stone implements used for cutting and scraping, gravers, and drills with rectangular haft elements. Grinding basins, mullers, abraders, net weights, stone balls, gorgets, and paint stones also were made. Antler points, bone awls, and pendants made of animal teeth found at the Lawrence site indicate that Late Archaic material culture included many kinds of artifacts made of substances other than stone. Unfortunately, few artifacts made of organic substances have endured from this period.

Data concerning Late Archaic site structure and function are available from the Kerr Dam site and from the Lawrence site. At the Kerr Dam site, Wyckoff (1.963) identified a rock lined hearth and associated work and knapping areas buried beneath 1.2 m of alluvium. He attributes these remains to a single occupation. By contrast, overlapping rock ovens consisting of burned limestone concentrations indicate that the Lawrence site was occupied repeatedly during the Late Archaic period (Baldwin 1969). Other features at this site include a rock lined hearth and several refuse pits. Two clay lined holes interpreted as post holes and scattered fragments of fired clay suggest also that a shelter may have been erected at the site. If so, the Lawrence site may represent a more permanently occupied base camp. Other sites containing Lawrence phase assemblages attest to a broad and diversified settlement adaptation to the Ozark landscape. Open sites are found on terraces along the Grand River, for example, as well as along a few of its tributaries leading into the uplands. Rockshelter sites are also found adjacent to the Grand River bottomlands as well as in upland settings. Flexed burials have been found at the Smith I and II shelters (Wittry 1952) and at the Cooper Shelter (Purrington 1970). Wyckoff (1984:150) suggests that ash beds and midden development in these shelters indicate increased fall and winter usage during the Late Archaic period.

Faunal remains preserved at the Lawrence site provide some idea of which species Late Archaic populations in northeastern Oklahoma depended on for food. Deer comprised 20% of the identifiable bone at the site. Other species included beaver, coyote, gopher, raccoon, spotted skunk, and squirrel. Several species of birds were identified, as were fish and turtles. The Lawrence site inhabitants were evidently making extensive use of their bottomland habitat for subsistence resources, while evidence of upland resource use is lacking (Baldwin 1969).

Finally, Wyckoff (1984:150) notes that exotic cherts found in Lawrence phase assemblages at the Kerr Dam site may indicate involvement in regional and long distance trade.

The environmental parameters of the Late Archaic and Early Woodland time periods can be reconstructed using data from Oklahoma, Kansas, and Missouri. The pollen data from Ferndale Bog (Albert 1981) provide a useful record of potential vegetation associations of the post-Hypsithermal period. This record begins around 5200 B.P., at which time an oak savannah complex is represented. This also correlates with the terminal period of open grassland represented at Muscotah Marsh in northeast Kansas (Gruger 1973).

Following this final Hypsithermal association there is an increase in the profile of tree pollen dominated by hickory. This may be interpreted as a period of greater effective moisture which commenced around 5000 B.P., and which corresponds to the subboreal climatic episode (Bryson et al. 1970). Increasing forest vegetation is also recorded during this period at Muscotah Marsh, and an erosional episode is recorded in the Pomme de Terre floodplain sediments at about this time (Brakenridge 1981). These events seem to monitor a widespread pattern of increasing moisture on the western fringes of the Ozark highland. Such conditions led to the subsequent growth of an open oak/hickory forest, which is recorded in the Ferndale Bog pollen profile before 2700 B.P. and which was probably widespread throughout the southwestern Ozark uplands. This forest seems to have remained fairly stable throughout the Early Woodland period, but by 1700 B.P. an increase in pine pollen indicates that upland forests were closing and changing in composition toward an oak–hickory–pine association. Throughout this entire period bottomland hardwood forests were probably within the range of modern variation. Pollen data from Phillips Spring (Kay 1982c) indicate that by the end of the Hypsithermal, bottomland vegetation was similar to the present and since that time only minor compositional shifts have occurred.

Faunal evidence from Rodgers Shelter further indicates a lengthy period of gradual post-Hypsithermal transition, rather than abrupt climatic/ecological shifts. Indeed, Kay (1982c) suggests that vegetation mosaics since the Hypsithermal seem to be largely controlled by aclimatic factors including underlying bedrock associations, and other edaphic and topographic factors. Forest advances during the Late Archaic and Early Woodland periods were bringing about more mesic associations but still, many areas remained drier and oak openings and prairie areas probably were more widespread than in historic times. Consequently, deer and other forest edge species probably expanded once again into an enlarging habitat.

Late Archaic populations in the Ozarks evidently took advantage of these increasing deer populations, for archeological components dating to this period reflect a heavy reliance on this species. Predation of other forest edge species also continues, as does utilization of riverine habitats for fish,

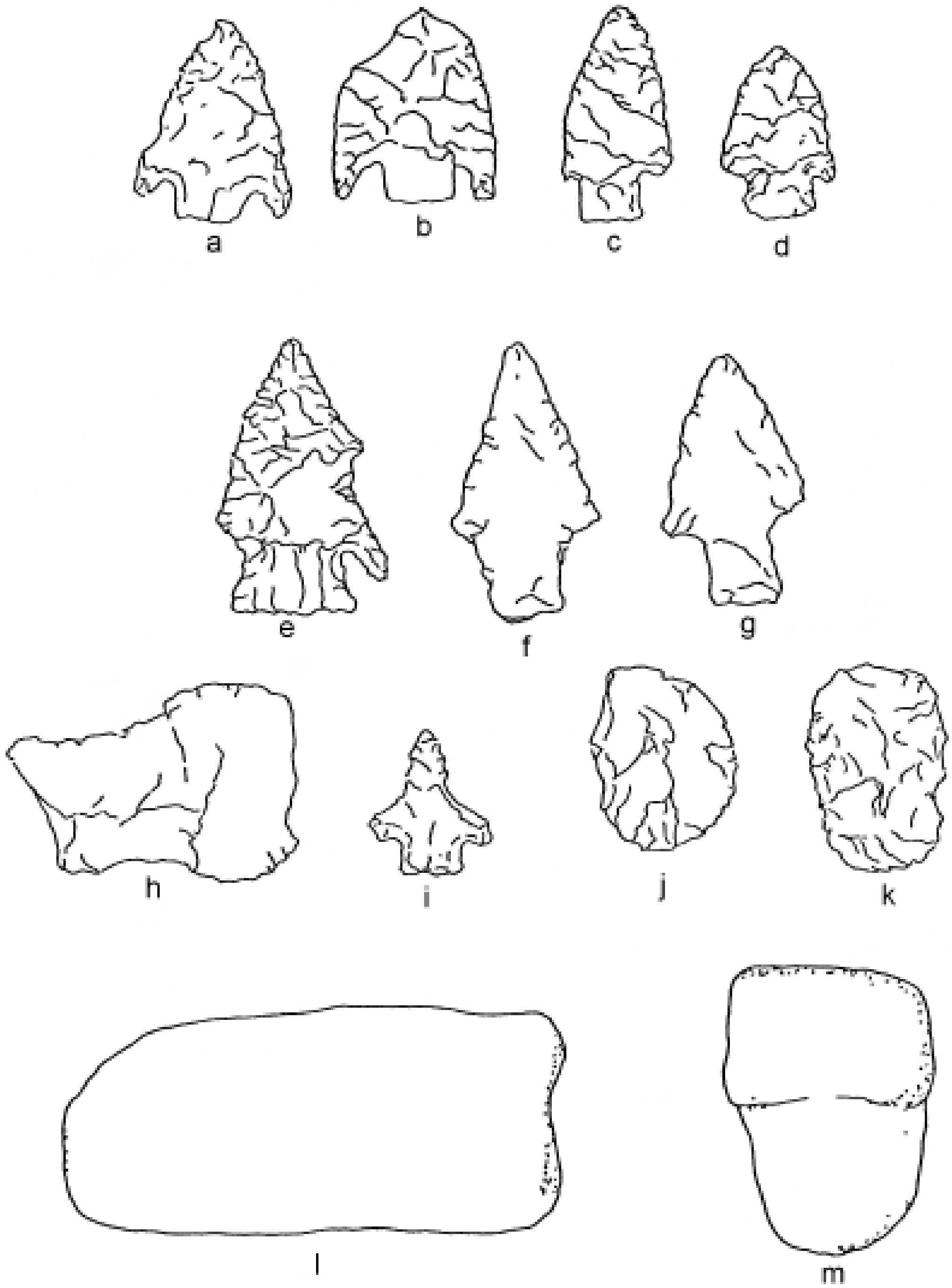

Figure 25. Late Archaic period artifacts from the Ozarks (James River complex)
a-b. Smith Basal Notched; c-d. Stone Square Stemmed; e. Afton Corner Notched; f-g. Table Rock Stemmed; h. chipped ax; i. drill; j-k. scrapers; l. anvil stone; m. mano (after Chapman 1975)

mussels, and turtles. Extensive foraging for native plant foods was sustained and perhaps even increased, and at this time a new element was added to the subsistence base which subsequently would affect profoundly the resource potential of the land, and, in time, lead to a major restructuring of the human ecosystem. By 4200 B.P. tropical cultigens squash (*Cucurbita pepo*) and bottle gourd *(Lagenaria siceraria)* were adopted by Late Archaic populations at Phillips Springs, thereby adding domestic plant cultivation to the repertoire of Late Archaic food-getting techniques (Kay et al. 1980). It is most likely that squash and gourds were grown by Late Archaic people in small garden plots (Ford 1979, 1981). These plants may well have been grown for use as containers or perhaps even to be used as floats, apart from whatever nutritive benefits might have been derived from consumption of the flesh and oily seeds. One immediate effect of even small scale gardening, however, would be realized in buffering occasional fluctuations in the availability of other native food sources. “It seems...likely that the principle value of...gardens was as a source of easily storable commodities that could be called upon during times of special need or scarcity in a subsistence cycle still geared primarily to the seasonal exploitation of deer, nuts, fish, shellfish, and small game” (Stoltman and Baerreis 1983:257–258).

Theories concerning the advent of prehistoric agriculture in the eastern United States have been proposed by several archeologists. Some have argued that an indigenous agricultural complex was first domesticated, and included such common species as lambsquarter, pigweed, marshelder, and sunflower (Fowler 1971; Struever and Vickery 1973). Others have argued that the occurrence of cucurbits at several Late Archaic sites precedes the appearance of domesticated native plant species and therefore it was these tropical plants which blossomed in the first aboriginal gardens north of Mexico (e.g., Chomko and Crawford 1978). The recent data from Phillips Spring indicates that, for the time being, squash and gourd must be recognized as the initial garden domesticates. It has been hypothesized that these species reached the southeast via “down-the-line” exchange mechanisms already in place among populations extending eastward from the Mesoamerican and southwestern regions (Kay et al. 1980). The most intriguing aspect of this scenario is that these cultigens constitute the only evidence we have in the Ozarks for the existence of such exchange networks during the Late Archaic (although extensive trade and exchange networks are documented for this time period elsewhere in the eastern United States; e.g., Dragoo 1976; Seeman 1979b; Struever and Houart 1972; Webb 1968; Winters 1968).

By about 2,000 years ago, it is evident that a variety of native seed plants were being cultivated widely throughout the eastern United States (Smith 1985). These weedy plants include annuals producing oily seeds (sunflower, sumpweed) as well as those producing starchy seeds (goosefoot, knotweed, maygrass). Recently little barley (*Hordeum pusillum*) has been added to this list based upon its occurrence in archeological contexts in Illinois (Asch and Asch 1983). All of these plants require human disturbance of the soil for their continued propagation. While such tending does not necessarily constitute domestication (Ford 1979), it has been established (using several lines of biological evidence) that sunflower, sumpweed, and goosefoot were domesticated by prehistoric Native Americans in the eastern United States.

Domesticated goosefoot (*Chenopodium*) seeds have been found in a number of Ozark rockshelter sites (e.g., Fritz 1984, 1986a, b). Recently, radiocarbon dates have been obtained on samples of cultigen Chenopodium from Eden’s Bluff (1930 ± 100 B.P.; BETA-13396) and from White Bluff (1960 ± 105 B.P.; BETA-13397; both dates are uncalibrated RCYBP, fractionation corrected), two rockshelter sites in Benton County, Arkansas, indicating these species were being raised by about 1,950 years ago (Gayle Fritz 1986b:74). We may be certain, therefore, that Ozark groups were engaged in the development of premaize gardening systems, as were many other groups throughout the eastern United States (Smith 1985). The adaptive advantages initially bestowed by gardening, as indicated above, probably were manifested primarily in the security these second line food resources would have provided during times when the availability of primary resources may have been restricted (Ford 1977:173). Some archeologists believe that as the benefits and, consequently, dependence upon gardening increased, food production may have interacted with population trends resulting in increases in the latter.

> A final bonus of the gardening system, as it evolved into an increasingly more secure source of storable food reserves, was the increased measure of sedentariness afforded a segment of the population, especially child-bearing women, children, and old people. This asset, in turn, might have been fed back into the population component of the ecosystem, contributing to further growth as a result of the expectable relaxation of fertility controls accompanying a more sedentary existence. (Stoltman and Baerreis 1983:258)

The circumstances leading to the adoption of tropical cultigens and native plant species in the Ozarks remain obscure, but McMillan (1976a) observes that climatically induced ecological stresses during the Hypsithermal seem certain to have affected subsistence strategies, resulting in increased utilization of river valley habitats. Such a shift in subsistence and settlement orientation may have promoted a corresponding increase in sedentariness as the resource potential of adjacent upland habitats declined (cf. Brown and Vierra 1983). The less affected and probably still fertile bottomland habitats were undoubtedly well suited for experimentation with the newly acquired cultigens.

Gayle Fritz’s (1986b) analysis of botanical remains preserved in several dry Ozark rockshelters demonstrates that by Late Archaic times prehistoric Indians were cultivating several domesticated plant species. These included indigenous starchy seed bearing plants like goosefoot *(Chenopodium),* knotweed *(Blygonum),* maygrass (*Phalaris*), sumpweed (*Iva*) and sunflower (*Helianthus*). The tropical cultigens

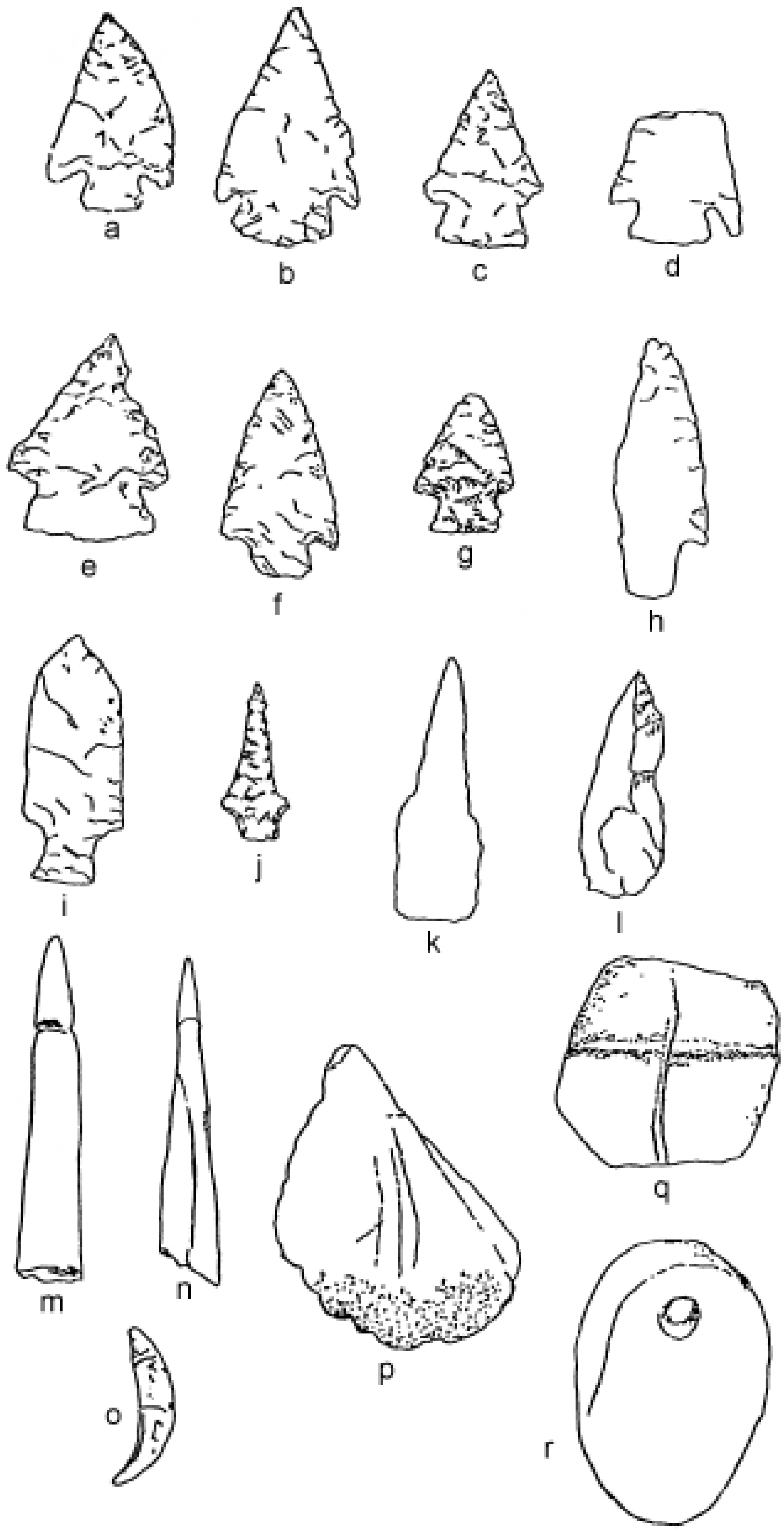

Figure 26. Late Archaic period artifacts from the Ozarks (Lawrence site)
a. Marshall point; b-c. Afton points; d. Castroville point; e. Williams point; f. Palmillas point; g. Ellis point; h. Morhiss point; i. Table Rock Stemmed; j-k. drills; l. graver; m. bone point; n. bone awl; o. grooved canine pendant; p. awl sharpening stone; q. net sinker, r. perforated gorget (after Baldwin 1969)

squash and/or pumpkin (*Cucurbita*) and the bottle gourd (*Olagenaicia*) were also cultivated, and, evidently, indigenous ragweed (*Ambrosia*) invaded the disturbed soil habitats of prehistoric gardens and was consequently also harvested for its starchy seeds. Although genetic changes are apparent in ragweed as a consequence of interaction with humans, it did not become an established cultigen.

The processes leading to the domestication of plant species in the prehistoric eastern United States has been a subject attracting considerable investigation and extensive scholarly debate among specialists for more than a half century. In her study of prehistoric Ozark agriculture, Fritz (1986b) integrated some of the theoretical ideas of David Rindos (1984) and Bruce Smith (1987) to reconstruct a scenario:

> With agricultural domestication, further coevolution between people and crops 'proceeds exclusively within the agroecology and is consequently subject to new potentials and limitations' (Rindos 1984:164). Selection pressures upon the crops are very different from those under natural conditions. The agricultural environment is more predictable, and the nature of competition changes. Selection toward increased productivity is heightened, and human populations rise as the carrying capacity increases. Rindos (1980 and 1984) argues that this type of instability is inherent in agricultural systems and causes their geographical spread and sometimes their demise.
>
> Bruce Smith's focus differs from that of Rindos in placing more emphasis on anthropogenic modifications to the environment from the beginning. During the Middle Holocene (8000–5000 B.P.) in eastern North America, there was an extension of base camp occupations on floodplains of major mid-latitude river systems. The development there of slackwater and shoal area aquatic habitats where fish and mussels were abundant created enriched, fixed place food resource concentrations. Dry season base camps at these particularly favorable locations were occupied repeatedly and probably for longer periods, while time spent on trips for exploitation of the uplands may have been shortened. Shell mounds and midden mounds dating to the Middle Archaic attest to strong preference for proximity to these spatially limited, rich aquatic areas. (Fritz 1986b:60–61)

The following passage from Smith's study suggests how the gradual spread of plant husbandry across different localities might have proceeded:

> Different drainage systems and specific domestilocalities within drainage systems would have exhibited variation in terms of both the relative level of selective pressure and the timing of the developmental process. Against this backdrop of spatial and developmental variability, the 'dispersal' of seed stock, information, and individuals between domestic localities would have resulted in a complex mosaic of occasionally linked, generally parallel, but distinct co-evolutionary histories for different areas of the mid-latitude eastern woodlands. (Smith 1987:36–37)

Settlement patterns of Late Archaic and Early Woodland populations in the Ozarks mark the beginning of a divergence from earlier patterns. As we have seen, prior to this period settlement patterns were closely tied to the seasonal distributions of important native food resources and therefore most sites were occupied only seasonally. Late Archaic base camps in major river valleys were probably occupied throughout the year. The Lawrence site in northeastern Oklahoma, mentioned above, is one example of this type of site. The Phillips Spring site is another example; its location adjacent to an artesian spring may reflect the importance of permanent water sources as determinants of these settlements (Robinson and Kay 1982). Although definite structure outlines are lacking at this site, the distribution of artifacts and animal and plant remains around hearths does seem to represent discrete residential areas. Artifact assemblages reflecting, among other activities, heavy woodworking may indicate the importance of bottomland hardwood forests as sources of timber. Subterranean pits also found at Phillips Spring bear witness to the increasing importance of storable food resources.

In contrast to these year round, multiple activity base camps, rockshelter occupations during the Late Archaic seem to reflect increasingly specialized uses. The artifact assemblage at Rodgers Shelter, now limited to items used primarily for animal butchering and plant food grinding, implies usage of this site as a temporary hunting and food processing station (Kay 1982c). At the Albertson site, Dickson (1988) interprets shelter occupation during the Late Archaic as reflecting repeated use by small groups of hunters engaged in deer hunting and the capture of other small game. Some hideworking activity is also reflected in this artifact assemblage, as well as a limited amount of plant food processing.

There is no direct evidence that dramatic changes in social organization occurred in the Ozarks during Late Archaic or Early Woodland times. The discussion by Kay et al. (1980) concerning alternative exchange mechanisms by which tropical cultigens may have entered the Ozarks is instructive in demonstrating, at least tentatively, that local groups were largely autonomous, engaging in little more than reciprocal exchanges of utilitarian goods with their neighbors. There is definitely no evidence, at any rate, for participation in the elaborate interaction networks, trade cycles, and status value systems exhibited at other Late Archaic centers in the eastern United States, such as Indian Knoll (Winters 1968; Rothschild 1979) and Poverty Point (Webb 1977). The evidence summarized above suggests some growth in population, increasing sedentarism, and involvement of Ozark populations in limited trade and exchange with their neighbors. This is consistent with the emergence of "tribal" forms of social organization elsewhere in the eastern United States in which increasing social differentiation is postulated as one consequence of alliance and exchange networks of varying extent (Braun and Plog 1982; Bender 1985).

There are, however, some additional social consequences of these adaptive changes which may be considered, if only in purely hypothetical terms. In a recent study of modern hunter-gatherer adaptations, James Woodburn (1980) distinguished between immediate return systems and delayed return systems. Delayed return systems are found among sedentary or semi-sedentary groups among whom storage and property accumulation have some importance. When food production systems (like gardening) involve intrinsic delays in food consumption, social mechanisms are required to hold the group together and to organize the distribution of these resources when they are needed (cf. Meillasoux 1973). These social mechanisms often involve the recognition of common ancestors who support ideologies tying notions of the past to a particular inhabited territory. Specialized treatment of the dead in a regionally distinctive pattern, therefore, would be one possible archeological indicator of the incorporation of these social strategies into the adaptive organization of semisedentary Late Archaic populations. While there is presently no such archeological evidence in the Ozarks, Ann Early's discussion below of Wister phase burial patterns may be relevant to Woodburn's thesis.

ARKANSAS RIVER VALLEY AND NORTHERN OUACHITAS

The Late Archaic period encompasses the time when climate conditions gradually approximated a modern pattern, and woodland and riverine systems approached their present extent and diversity. George Sabo has just reviewed the environmental data showing increased rainfall and forest growth in and around the study area. This gradually created a mosaic of forest composition and habitat distribution essentially similar to that seen by early European and American settlers. The rate at which these changes occurred is still poorly known, and it is possible that portions of the Ouachita Mountains and Arkansas River Valley were much slower in developing a forest habitat than others, particularly the western hills and valleys nearest the open grasslands. The appearance of Late Archaic period cultures within this region may, therefore, have varied from one place to another. Unfortunately, only one Late Archaic cultural manifestation is well defined in the Arkansas River Valley and northern Ouachita Mountains, and how well it reflects the general pattern of cultural adaptation over the whole region during this period is essentially unknown.

Many Late Archaic cultural complexes have been studied in the Eastern Woodlands, particularly in the valleys of major river systems. In general, they show that human populations were becoming increasingly diversified in their use of wild plant and animal resources. In some places this led to increasingly settled lifeways, experimentation with domestic plants of central American origin such as squash and bottle gourd, and the domestication of a number of native North American starchy seed producing plants (Emerson and McElrath 1983; Griffin 1978). In addition, long distance trade, particularly in stone, but undoubtedly in other commodities, is noted for this period, as is the emergence of human burial ceremonialism like the construction of mounds. Because so few Late Archaic period sites have been studied in this region, only some general characteristics of local adaptive patterns are discernible.

The most distinctive manifestation belonging to this period in the study area south of the Ozarks is the Wister phase, a culture identified at several midden or "black mound" sites in the Poteau and Fourche Maline Creek valleys in the Oklahoma Ouachitas (Bell 1980; Galm and Flynn 1978; Galm 1978b, 1981, 1984; Wyckoff 1984). Midden mounds were found on alluvial terraces close to modern or relict stream channels. They are locations of intensive cultural activity and were used by numerous social groups over a long period of time. Bell and Baerreis (1951:19–20; see also Bell 1980:91–92) described the salient characteristics of these sites as follows:

> The Fourche Maline sites are represented by accumulations of village debris or midden deposits situated on the bank of a river or stream. These middens are characterized by a black colored earth which contains, scattered throughout the deposit, considerable amounts of clam shells, animal bones, charcoal, fire cracked rocks, various artifacts, human burials, occasional occupational surfaces, and other miscellaneous objects.

These sites have a number of attributes that have obscured the identification of the culture or cultures responsible for their development. The dark soil masks distinctions between sequential occupations. Activities carried out by the inhabitants such as digging burial or storage pits mixed older and younger deposits together, thereby disrupting the orderly layering of younger artifacts over older ones. There is a notable uniformity in artifact assemblages throughout much of the use life of these sites. The middens were periodically refurbished by redistributing garbage accumulations and adding new soil to the deposits (Galm 1981:42), thereby mixing the deposits even further.

Nevertheless, varying proportions in projectile point styles and the appearance of some artifact classes, particularly ceramics, at different depths in the middens were noted by earlier investigators (cf. Proctor 1957) and confirmed by excavation in the 1970s. Mound deposits containing undecorated ceramics comprised the upper layers of most sites and are attributed to a Fourche Maline phase of the Woodland period which will be discussed later. Beneath these deposits are occupations lacking pottery, which are the Wister phase components. The best studied components are those at the Scott, Curtis Lake, McCutchen-McLaughlin, and Williams I sites. Since the materials are all very similar, they will be discussed as a group. Numerous additional Wister phase sites are among those unanalyzed or unreported from WPA work in the valley (Galm 1984:Table 9.4).

A large suite of radiocarbon dates has been collected for the Wister valley middens (Galm 1981:Table 10; Wyckoff 1984:Table 6.1; Galm 1984:Table 9.3; all list available dates) indicating a time span of approximately 4000 B.P. to 2000 B.P. for the Wister phase (Wyckoff 1984:151). Artifact assemblages are dominated by a chipped stone tool technology that includes contracting stemmed Gary projectile points and a variety of corner notched or expanding types such as Marshall, Marcos, Lange, Williams, and Pamillas types (Wyckoff 1984:154). Other tools include bifacially and unifacially flaked cutting and scraping implements. Lithic debris from tool repair is abundant. Ground stone, bone, and shell technologies are also present with the appearance of grinding stones, cupstones (cobbles with depressions pecked into one or both faces, believed used for nut cracking and other activities), pendants, bone awls, knapping tools, fishhooks, spear thrower hooks, pins, shell beads, disks and pendants (Galm 1981, 1984; Wyckoff 1984).

The midden mounds appear to be base camps where a wide range of domestic activities took place. Features within the middens include human and dog burials, redeposited concentrations of ash and burned food, occasional pits, post holes, hearths, and burned clay concentrations that may mark occupational surfaces, and rock concentrations. As Galm notes, however, these features may not be an accurate representation of the kinds and intensity of activities undertaken at the sites, because periodic renewal of living areas undoubtedly obliterated many features while accidentally preserving only a few (Galm 1981:88).

Food remains indicate these settlements were oriented toward the collection of riparian and forest based resources. The most common plant remains are hickory nuts, with only rare occurrences of other seeds and nut fragments. Deer is the principal meat source, but turtle (both aquatic and terrestrial species), small mammals, fish, mollusks and birds (particularly turkey) were also part of the diet (Galm 1981:169–193). Animal products were used for tools and ornaments and probably for clothing and containers.

The mounds appear to be only one part of the total settlement system. Galm sees them as the result of intensive but intermittent occupation. Hickory nuts indicate the sites were used in the fall or early winter, but the animal resources may have been collected at other seasons, and plant foods without hard parts that may have been part of the spring or summer diet are unlikely to have been preserved in the disturbed midden soils. Occasional post stains found in the deposit indicate shelters of some sort may have been constructed, but there is no evidence of substantial dwellings expected for permanent residential sites. Not enough work has been done in the upland areas around the Wister valley to identify and study the other kinds of settlements and work areas used by midden mound inhabitants.

In speculating about the Wister phase adaptive pattern, models taken from ethnographic studies of hunting and gathering societies are useful, although, as George Sabo has already noted, most living hunters exist today in environments considerably different from the rich forest and river habitats inhabited by Archaic people. These models may not account for the richness and diversity of the Archaic environment.

Using information taken primarily from Eskimo and South African Bushman hunting and gathering societies, Lewis Binford (1980) has developed two contrasting models of subsistence and settlement activities that are pertinent to interpretations of archeological cultures. The first model he refers to as foragers, where small groups of people inhabit base camps from which they disperse daily to collect foods within a short distance of the camp. As local resources are used up, base camps are moved repeatedly to new locales. The archeological result of such a subsistence pattern, Binford believed, would be a series of relatively small base camps where domestic activities are performed, and a large array of very small and functionally specific sites arrayed around the base camp where collecting parties encountered desirable resources. Base camps would not necessarily be repeatedly established in any single location, but would be situated near several resources.

Binford's contrasting pattern refers to logistically organized collectors (Binford 1980:10) who establish long term base camps and supply themselves with resources through task groups that leave periodically to collect specific resources that may be at some distance from the home base. This adaptive pattern implies more organization of economic activities, with collecting trips planned and directed to known resources within a familiar territory. The material result of such a system would be larger and more intensively used home base camps and an array of distinct specialized field camps and collecting stations where work parties may remain for more than a single day while engaged in such activities as collecting and knapping stone, or killing and field dressing game. At the home base, pits for food storage would mark long term residence, and artifacts resulting from some kinds of collecting activities, such as the initial stages in stone tool manufacture, would be rare, because these activities took place elsewhere. Base camps may be periodically moved, perhaps when some slowly replenishing important local resources such as firewood or river mussels were depleted, but could be reestablished at a later period on the same site.

There is evidence the second of Binford's models is appropriate for the Wister phase, even though upland sites are currently poorly known. At the midden mounds, although large storage pits are not common, the evidence of repeated reuse of the same locale is obvious. Some kinds of subsistence activities were not carried out at these sites, however, and must have been undertaken elsewhere. For instance, chipped stone tool repair took place, but there is little evidence for the early stages of tool manufacture from raw cobbles or quarry stone (Galm 1978a:197). Deer were an important meat source, but only some parts of the skeleton, in particular limb bones and teeth, dominate the animal bone remains left in the middens and indicate only certain cuts of meat and raw materials were returned to the camp (Galm 1981:188).

Galm (1981:216–217) postulates that an array of special purpose sites similar to those proposed by Binford occur in the hinterlands around midden mound sites, including light exploitation camps, bivouacs, special food collection stations and quarry sites. Examples of these sites have not been studied, and one important consideration of future work in the Wister valley would be to understand the nature and distribution of these ancillary sites and their relationship to midden mounds.

It is difficult to envision the social organization of Wister phase people except in the most general terms. If Binford's model is appropriate, the valley was probably inhabited by a small number of interrelated residential groups organized along family lines. The egalitarian nature of the society is reflected in burial practices. Interment characteristically involved placing the corpse in a shallow pit in the midden in a flexed position, that is with arms and legs drawn up close to the torso. Grave offerings are relatively infrequent and are usually a small number of useful or domestic items such as dart points, or items of personal adornment such as pendants or beads. There is no indication of significant social differentiation among Wister phase people, and society was probably organized around groups of interrelated families into a loose corporate entity recognizing the valley as its domain. There is some evidence supporting this notion in the pattern of human burial.

In discussing Archaic period burial practices in the Illinois and nearby Mississippi River drainages, Douglas Charles and Jane Buikstra (1983) explore the relationship between the sense of a corporate identity possessed by social groups, and their practice of burying the dead in highly visible and special cemetery areas. Briefly, the practice of burying members of society in a special place is an act that symbolizes to practitioners their association with a particular geographic area. Making burial areas conspicuous and setting them apart from living areas is a public symbol of territorial control by members of a corporate social group.

Charles and Buikstra were speaking of special burial mounds in their discussion, and there are no such sites in the Wister valley. However, human burials are the most common cultural features in midden mounds, with over 1400 individuals from all cultural periods recovered in previous excavations (Galm 1978a:Table 24). Although it is difficult to determine which burials belong to which cultural period, the practice of inhumation began during the Wister phase.

Although people were buried in midden deposits, it is not evident they were buried while the sites were occupied. Residents of one midden mound may have buried their dead in a neighboring mound a kilometer or so away that had been temporarily abandoned. The mounds are prominent landscape features, and some became the site of hundreds of interments during their periods of use (see for instance the map of human burials at the Williams I site in Galm 1978a:Figure 51). It is clear that residents focused their mortuary rituals at these sites and that they served, at least intermittently, as formal cemeteries. In doing so they may have been reaffirming their sense of corporate control over the valley and its resources.

Some burials in midden mounds are evidence of violent death. For instance, at the McCutchen-McLaughlin site, Feature 6 was a large grave containing the remains of six humans and a dog, found with 31 complete and broken projectile points. The location of the projectiles and condition of the deceased indicate at least some of these individuals were killed (Powell and Rogers 1980:57). Galm (1978a:240) notes similar features may have been encountered at other sites by previous excavators, but may have gone unnoticed. The projectiles found in Feature 6 were made of Boone chert, a stone native to the Ozarks and uncommon in cultural deposits in the Ouachita Mountains, and may represent conflict between resident populations and groups from outside the region. Such a pattern of intergroup conflict lends support to the notion of territorially based social groups inhabiting the valley during the Wister phase. Bioarcheology studies from well controlled excavations of midden mound cemeteries would help address questions of biological distance between Wister phase and neighboring social groups.

The geographic extent of the Wister phase is uncertain, partially because the artifacts in the assemblage are stylistically similar to other Late Archaic assemblages found over a broad geographic region. Dark, artifact filled middens are not limited to the Wister valley however. In the Jackfork Creek valley are several midden mounds. At the Bug Hill site, Stratum III within the mound contained a Late Archaic assemblage similar to those in the Wister valley. Fifteen radiocarbon dates bracket the occupation between 3550 B.P. and 2399 B.P. (Altschul 1983: 286). The artifact assemblage includes contracting and expanding stemmed projectile points, scrapers and bifacial cutting implements, grinding stones, chipped stone axes or hoes, and other piercing and cutting implements. Bone awls, flakers, and fishhooks were recovered with bone and shell beads and pendants. The features such as post molds, burials, and ash concentrations were similar to those previously described for Wister valley midden mounds. Animal bones indicate diet was also similar, with an emphasis on deer, turtle, small mammals, birds, fish, and mollusks. Altschul (1983:291) considers Bug Hill another example of a Wister phase base camp.

Upstream from the Wister valley on the Poteau River in Arkansas, WPA crews appear to have excavated at least two midden mounds, the Fuller and Judy place and the Strickland's Island site, that may have had Late Archaic components. Neither site has been analyzed, but the field notes and descriptions of the discoveries indicate the composition of the mounds and the artifact assemblage, including human burials, come from Archaic and Woodland period occupations similar to those in the Wister valley (Arkansas Archeological Survey site files). Very little useful information can be discovered from the field data alone, but they do indicate the kinds of sites, and perhaps the same kind of settlement system, are not limited to a single Ouachita Mountain valley, but may be a much broader regional manifestation. Future research efforts in the northern Ouachita Mountains, particularly in Arkansas, should take note of the need to determine the areal extent of Wister phase occupations in this region.

The Sliding Slab site represents a different kind of site that may have been part of Wister phase and other Late Archaic settlement systems. This small northwest facing overhang overlooks a tributary of the Petit Jean River in Sebastian County, Arkansas. The shelter contained a stratified series of occupations, but no perishable remains like those found in similar sites in the Ozarks. The earliest two components in the shelter belong to Late Archaic occupations. The first, with radiocarbon dates of 4600 ± 60 B.P. (Tx-3348), 4130 ± 50 B.P. (Tx-3355), 3920 ± 100 B.P. (Tx-3347), 3690 ± 70 B.P. (Tx-3354), and 3540 ± 80 B.P. (Tx-3346) contained deposits with expanding stemmed and corner notched projectile points, a single drill, a single grinding stone, and a small collection of chipped stone debris from repairing tools. The second and immediately overlying component, with dates of 3510 ± 90 B.P. (Tx-3345), 1950 ± 180 B.P. (Tx-3342), and 2070 ± 60 B.P. (Tx-3353) was a deep deposit, with an artifact assemblage of many expanding and contracting stemmed projectile points, small chipped stone flakes from tool repair, and a small number of grinding stones. Small amounts of hickory nut shell were present. The animal bone recovered from the shelter was not integrated with the archeological analysis, but initial tabulation shows use of deer, small mammals, birds, turtles, and mollusks in small quantities. The small amount of material recovered indicates the site served as a short term hunting station/camp for at least two periods during the Late Archaic (Harden 1981).

Far less is known about Late Archaic occupations elsewhere in the study area. Expanding and contracting stemmed projectile points have been found in numerous locations in virtually all topographic locales, but these assemblages are characteristically in shallow deposits mixed with later materials, or have not been excavated or properly dated. For instance, the Harkey-Bennett site lies on a second terrace in the alluvial valley of the Arkansas River in Sequoyah County, Oklahoma. It contained a shallow deposit of lithic artifacts that included expanding and contracting stemmed projectile points, scraping tools, bifacial knives, preforms (unfinished chipped stone tools), battered cobbles, lithic debris, but no dated materials or features (Burton and Stahl 1969). The site appears to represent a number of short term encampments during the Archaic period, but little other information can be ascertained.

Moving downstream along the Arkansas River Valley the quality of information, or rather the lack of it, is similar. Late Archaic artifacts are found in open sites in alluvial settings, in upland stream valleys, and in rockshelters, in the Dardanelle area (W. W. Caldwell 1958). Although no components have been adequately studied, the distribution of artifacts suggests all topographic settings were used, at least for short term encampments and collecting activities.

George Sabo has already discussed the evidence for the use and domestication of plants during this period. Direct evidence for gardening activities in the form of preserved seeds or other plant parts has not been recovered in the Arkansas River Valley or Ouachita Mountains in occupations of this period, but it should be noted that techniques necessary for recovering specimens have only recently been used in the area, and very few sites have been investigated. Dry shelters where unburned plants could be preserved have not yet been found in this part of the study area either.

Local environments where weedy plants may have flourished would have been available in the disturbed and enriched soils of abandoned base camps, and the harvest of these foods could have been added to the annual cycle of collecting activities. Any scenario incorporating plant use into Late Archaic period economies in this part of the study area must be used with caution, however. The northern Ouachita Mountains are a relatively mesic environment, witnessed by the survival of northern tree species in favored topographic situations (Braun 1950). While the effects of Hypsithermal desiccation are noticeable in the western Ouachita Mountains (Albert 1981), there is no evidence that by the Late Archaic, resources were unpredictable to the point where the stabilizing effects of small scale gardening were a significant asset to human settlements. Moreover, the indirect evidence of gardening, such as pits, containers, or dry shelters for food storage, digging tools, or quantities of seed processing implements are not now part of local Late Archaic assemblages. There is more supporting evidence for cultivating in succeeding Woodland period deposits.

MIDDLE AND LATE WOODLAND PERIODS 1800–1000 B.P.

OZARKS

The Middle and Late Woodland periods are poorly understood in the Ozarks. Although some interaction with Hopewellian populations during Middle Woodland times is evident in the Cooper complex, the relative paucity of evidence for Late Woodland cultures has led to the suggestion that during this period the region may have seen only occasional use by groups centered elsewhere (e.g., Chapman 1980:79–80; Pertulla 1983). Unfortunately, our understanding of the events which transpired during these periods is hampered by the fact that only a few sites containing individual Middle or Late Woodland components have been studied. Where discrete components do occur, such as, for example, at the Albertson site in northwest Arkansas, some clarification of the archeological record is afforded. These sites are particularly crucial with regard to interpreting evidence for the Middle and Late Woodland periods from the far greater number of mixed sites, many of which were dug before the advent of modern data recovery techniques and interpretive frameworks.

The Middle Woodland component at the Albertson site is represented by Snyders, Dickson, and Waubesa points, Honey Creek Plain ceramic sherds, and dentate stamped ceramic sherds including Cooper Zoned Stamped and Ozark Zoned Stamped. This assemblage closely resembles that from the Cooper site in Oklahoma (Baerreis 1953), which is the type site of the Cooper complex, a local Havana Hopewell outlier probably affiliated with the Kansas City Hopewell. This component at the Albertson site has not been radiocarbon dated. Other evidence of the Woodland period in northwest Arkansas includes the possibly mixed Period VI component at the Breckenridge site (Thomas 1969), and assemblages from the Prall Shelter (Thomas and Davis 1916)

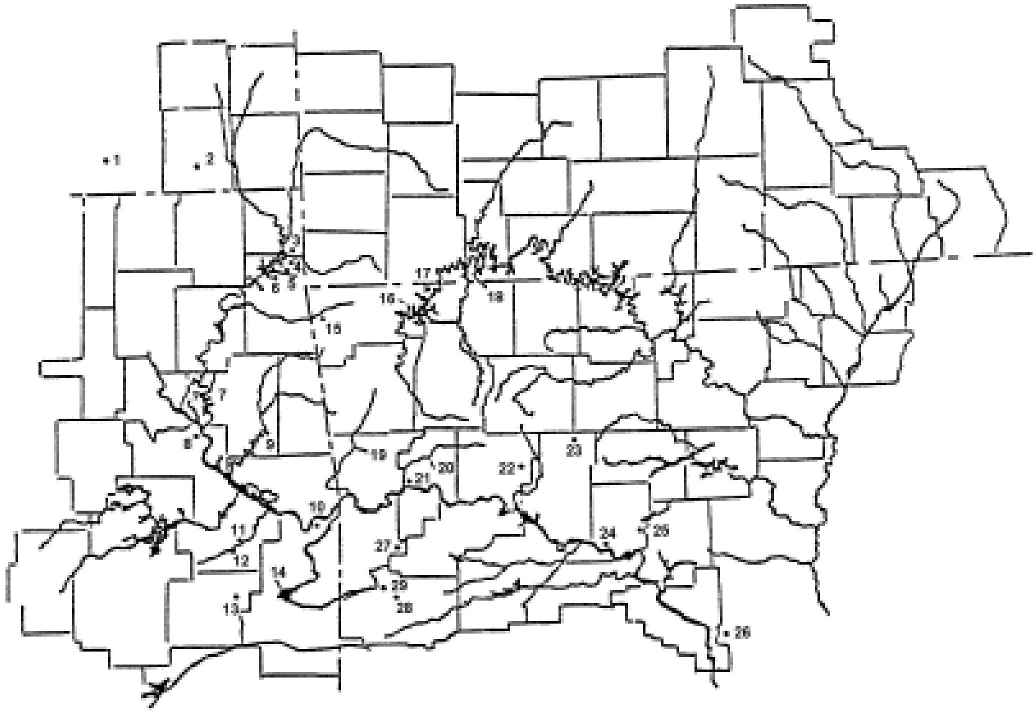

Figure 27. Locations of the selected Woodland period sites in the OAO study area
1. Elk City (Cuesta phase) sites; 2. Big Hill Lake (Cuesta phase) sites; 3. Guffy; 4. Copeland; 5. Cooper; 6. Evans; 7. Harlan; 8. McCarter; 9. Vanderpool; 10. Spiro; 11. Otter Creek, 12. 34Hs-111; 13. McCutchen-McLaughlin; 14. Wister Lake sites (Wane, Sam, Scott, Copeland, Curtis Lake); 15. Albertson; 16. Beaver Lake sites (Prall, Coal Gap Cairn); 17. Breckenridge; 18. Table Rock sites (Lander II, Cantwell III); 19. Pine Mountain; 20. Mulberry River; 21. Spinach Patch; 22. Tom's Brook; 23. Falling Water Falls; 24. Point Remove; 25. Alexander; 26. Toltec; 27. Sliding Slab; 28. Fuller and Judy; 29. Strickland Island

and the Tom's Brook Shelter (Bartlett 1963). A Middle Woodland component is reflected in the possible Marksville Incised sherds at the Falling Water Falls Shelter in Pope County (Gregoire 1971), and in similar sherds from an undisclosed Arkansas Ozark location illustrated by Dellinger and Dickinson (1942:Plate xxi:e). The Coal Gap Rock Cairn (Scholtz 1963) probably dates to the Late Woodland period. A radiocarbon date of 1100 ± 75 (UGa-3941) represents the final Late Woodland occupation at the Albertson site (Dickson 1988).

Evidence for the Middle and Late Woodland periods in southwestern Missouri is equally spotty. At the Lander II Shelter in the Table Rock Reservoir two dentate stamped sherds were found along with a zone incised sherd, a plain cord marked sherd, and a reel shaped gorget (Bray 1957:Figures 8, 11). At the multicomponent Cantwell III site, also in the Table Rock Reservoir on a terrace overlooking the White River, a Havana-like rim sherd was found in the middle component of the site along with other grit tempered sherds exhibiting cord impressed, punch and boss, stamped parallel line, and dentate stamp decorations indicative of the type Cooper Zoned Stamped (Chapman 1980:26). A hearth found in this component produced a charcoal sample that was radiocarbon dated to 1223 ± 200 (M-696). Chapman notes that this date of A.D. 727 ± 200 falls within the Late Woodland period, but Brown (1984a:21) observes that "the large counting error makes possible a reconciliation of this date with its associations since the 97% confidence limits of the date allow a true date as early as A.D. 327, well within the time span of Havana." Three additional radiocarbon dates reported by Bass and McMillan (1973:313) for a Middle Woodland burial at Boney Springs cluster tightly around 1910 B.P.

In extreme southeast Kansas a related Middle Woodland complex is represented in the Cuesta phase (Marshall 1972). Cuesta phase ceramics include a clay tempered Cuesta ware decorated with incised, punctated, cross hatched, cord wrapped stick, rocker stamped, and dentate stamped motifs. Chipped stone assemblages include a variety of dart points including the Gary, Langtry, Steuben, Manker, Rockwall, Ellis,

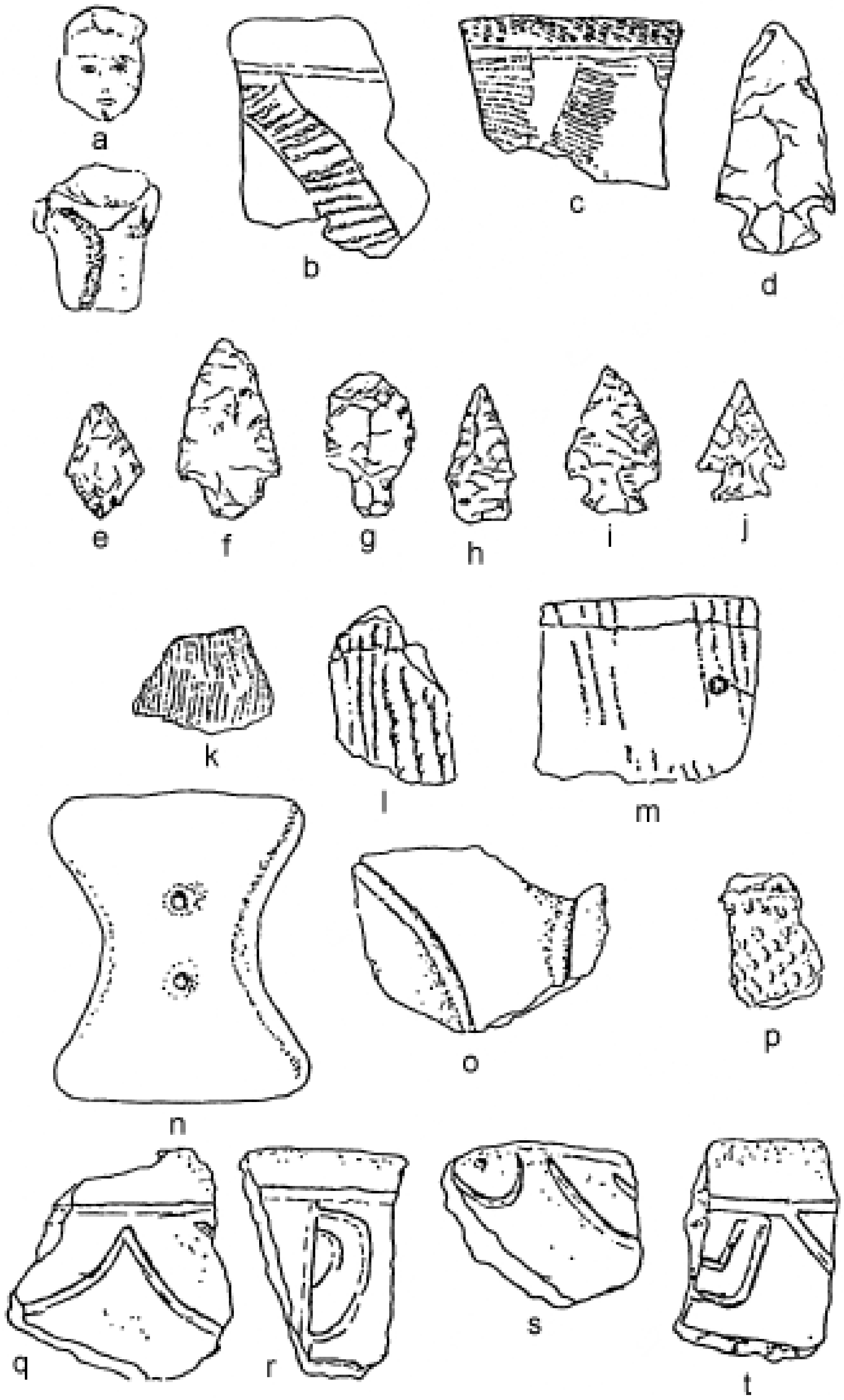

Figure 28. Woodland period artifacts from the Ozarks

a. Hopewellian figurine; b. Ozark Zone Stamped rim sherd; c. Cooper Zoned Stamped rim sherd; d. corner-notched point; e-j. stemmed and notched projectile points; k. cord-marked body sherd; l-m. cord-impressed body sherds; n. reel-shaped gorget; o-p. Cooper Zone Stamped body sherds; q-t. Marksville-like rim and body sherds (after Vehik 1984; Lynott et al. 1986; Chapman 1980; Gregoire 1971)

Cupp, and Williams types. Scallorn arrowpoints occur in addition to the usual variety of beveled knives, scrapers, drills, choppers, and flake tools. A ground stone technology produced abraders, boatstones, celts, gorgets, grinding basins, mullers, pendants, and plummets. A variety of bone implements has been found, including awls, beads, and fleshers or scrapers.

In the Elk City Reservoir area, Cuesta phase sites include large, permanently occupied settlements with circular or oval house patterns. At the Infinity site, for example, Marshall completely excavated five houses which ranged in size from 8.5 x 12.2 m to 10.9 x 15.2 m. Interior house features include pits and hearths. A thick midden area was identified at this site measuring roughly 25 x 16 m and containing artifacts, shell, and bone. Two infants and a dog burial were also interred in the midden. The majority of animal bones were deer, although bison, beaver, rabbit, raccoon, turkey, and turtle were also represented.

Hoes or other gardening tools are not common on Cuesta phase sites. Few plant remains have been recovered from sites in the Elk City Reservoir area, and no domesticated species have been identified, although it must be noted that techniques for the effective recovery of small remains (such as water flotation) were not employed in the excavation of these sites. However, corn and sunflower seeds were found in a Cuesta phase site in the Big Hill Reservoir (Rowlison 1977:42) indicating that gardening may have been practiced by some of these groups.

In the Big Hill Reservoir area, a series of investigations (Rowlison 1977, 1980; Thies 1982) have identified a Cuesta phase settlement pattern that differs from the pattern of large, nucleated villages represented along Elk Creek. Large, oval shaped houses also occur along Big Creek, but only one or two are commonly found on a single site. These sites contain no middens, and burials also appear to be absent. Brogan (1981) has investigated this phenomenon in detail through additional surveys and excavations, and he attributes the difference in settlement pattern to differing environmental potentials of the two tributary systems.

> assuming the Cuesta phase peoples were exploiting a riverine oak–hickory forest and a similar technological level existed at both localities, the Elk River locality would have been able to support a large population due to its being quantitatively richer in fauna and flora. The Elk River is a primary drainage and contains a significant number of permanent tributaries in the vicinity of Elk City Lake. On the other hand, Big Hill Creek is basically a secondary stream and, in the vicinity of the lake, is surrounded by uplands and prairie. Therefore, its carrying capacity is not as great as the Elk City Lake locality. (Brogan 1981:70)

The Late Woodland period is represented in southwestern Missouri at several sites, mostly rockshelters in the Table Rock Reservoir (Chapman et al. 1960) or along some of the tributaries of the White River (e.g., Adams 1941, 1950, 1958), where grit tempered, cord marked or cord roughened pottery has been found. Much of this pottery is tempered with crushed limestone and is similar to the ceramic wares of the Late Woodland Lindley and Meramec Springs phases of the central Ozark Highland region. The occurrence of these ceramics in the southwestern Ozarks, however, is sufficiently limited — no more than a few sherds were found at any of the sites in the Table Rock Reservoir, for example — that Chapman has suggested that "[t]he greater abundance of the pottery in the part of the Southwest Drainage Region nearest the Ozark Highland region suggests that there were incursions from the Ozark Highland Region into the Southwest Drainage for hunting and gathering purposes during the time that the typical pottery usually associated with the Late Woodland period was being made" (Chapman 1980:79). Stone burial cairns have also been reported in southwest Missouri (Marshall 1956; Henning and Pangborn 1960), but Chapman warns against a specific cultural or temporal attribution for these mounds (Chapman 1980:80). While this recommendation certainly should be heeded, it probably would be very profitable to compare closely the characteristics of these mounds with those a little further to the north which W. Raymond Wood has ascribed to the Fristoe (Wood 1967) and Bolivar (Wood and Brock 1984) burial complexes.

In northeastern Oklahoma the Woodland period has been divided into three foci known as Delaware A, Cooper, and Delaware B (Vehik 1984). There are no radiocarbon dates for Delaware A or B. A few radiocarbon dates from the Cooper sites plus dates from related Middle Woodland sites elsewhere permit the Cooper focus, or complex, to be placed in time.

Susan Vehik (1984:178–179) describes the Delaware A focus as a gradual development out of the Late Archaic Grove focus. Contracting stemmed projectile points including the types Langtry and Gary are the initial indices of Delaware A, and at a later time ceramics are added to the material inventory. The primary pottery types are Delaware Plain and Delaware Cord Marked. Both are tempered with crushed sandstone and/or shell, and the latter type occasionally is decorated with cord wrapped stick impressions, incised chevrons, or barrel shaped punctates on the vessel lip. Vessels include both jar and bowl forms, which have concoidal or flat bases. Other Delaware A artifacts include a variety of large straight stemmed or expanding stemmed projectile points as well as a variety of smaller barbed or expanding stemmed points, some of which continue in use from earlier periods. Arrowpoint types including White River Elliptical, Sequoyah, Scallorn and Reed are found. Chipped stone knives, scrapers, drills, single and double bitted axes, and hoes occur along with several ground stone items including manos, milling slabs, nutting stones, hammerstones, abraders, and ground hematite. A few bone implements include flakers, fleshers, beamers, and awls. Turtle shell bowls, mussel shell disc beads, and perforated shell hoes have also been found. These materials occur at only a few sites, most of which are mixed. However, Delaware A assemblages have been found at rockshelter sites as well as open sites. In analyzing these assemblages according to functional artifact categories, Burt

Purrington (1970) has noted that the shelter sites typically contain only hunting and butchering categories of implements, whereas the open sites usually contain artifacts representing a wider variety of activities including stone tool making, woodworking, and plant processing.

The Cooper focus is represented at five northeast Oklahoma sites. The Cooper I and II sites (Dl-33 and Dl-49) are large open sites located along the confluence of the Neosho River and Honey Creek (Baerreis 1951, 1953). Copeland Shelter (Baerreis and Freeman 1961) is located along a tributary of the Neosho, as is the Evans site (Purrington 1970). Somewhat further to the south than these four sites is the Smullins I Shelter, located along the Illinois River (Hall 1954). The materials diagnostic of Middle Woodland occupation at these sites include Cooper points, a variant of the Snyders type, and ceramics including the types Cooper Zoned Stamped, Ozark Zoned Stamped, Cowskin Dentate Stamped, and Honey Creek Plain (Baerreis 1953). Decoration on the first three of these types include dentate stamping, embossing, and punctation, usually within zones set off by incised lines. Ozark Zoned Stamped is clay or clay and grit tempered. Cowskin Dentate Stamped is tempered with grit and shell. Cooper Zoned Stamped has two varieties, one tempered with crushed quartz grit and the other with grit and shell (Purrington 1970:283–287). Other artifacts include Gary, Langtry and Williams B points, several arrowpoint types including Scallorn, Alba, Young, Fresno, and Sequoyah (although Vehik 1984:182 notes these occur infrequently), and various forms of knives, scrapers, drills, and axes. Bell and Baerreis (1951) describe some ground stone items which occur with the Cooper focus including manos, milling basins, nutting stones, abraders, and pieces of a polished hematite gorget and a polished hematite boatstone.

Two radiocarbon dates from Dl-49 (680 ± 55 B.P. and 1840 ± 60 B.P., Bender et al. 1969:230) are inconsistent with a Middle Woodland placement for this site. A single radiocarbon date from Dl-33 (980 ± 55 B.P., Bender et al. 1969:230; cf. Vehik 1984:Table 8.1) is in better accord. As mentioned previously, the Cooper focus has been interpreted as a Havana Hopewell manifestation; Chapman (1980) for example, notes that the Cooper ceramics are closely similar to the ceramics of the Kansas City Hopewell and Big Bend (central Missouri) Hopewell complexes. The Kansas City Hopewell complex at the Deister site is bracketed by five radiocarbon dates ranging from 1680 ± 105 B.P. (N-968) to 1500 ± 100 B.P. (N-1056), and at the Trowbridge site, five more dates extend from 1829 ± 105 B.P. (N-971) to 1550 ± 105 B.P. (N-974; Johnson and Johnson 1975). The Havana complex of the Big Bend region in central Missouri has also been radiocarbon dated between 1880 ± 105 B.P. (N-1049) and 1510 ± 105 B.P. (N-1054; Kay and Johnson 1977).

The Delaware A and Cooper foci are followed in northeast Oklahoma by the Delaware B focus. As was the case with Delaware A assemblages, much of the material representing Delaware B comes from mixed sites (both rockshelters and open sites) within the Neosho River drainage. Artifacts are very similar to those representing Delaware A, although now a few shell tempered and limestone tempered sherds (plain and cord decorated) occur along with the more frequent Delaware Plain and Cord Marked ceramics. Another difference in artifact assemblages is addition of some Caddoan materials (Vehik 1984:183), such as ear spools. Delaware B rockshelter sites tend to be characterized by artifact assemblages representing primarily hunting and butchering activities, whereas open sites, such as Guffy 4 and 5, provide artifact evidence of a wider range of activities suggestive, perhaps, of village occupation (Purrington 1970). Vehik notes (1984:185), however, that no unequivocal evidence for the practice of agriculture by Delaware B peoples has ever been found.

Perhaps the best example of an Ozark village settlement dating to this period is the Vanderpool site (Harden and Robinson 1975) located on a terrace along the lower Illinois River in northeast Oklahoma. At this site postmold patterns representing houses were found in two areas, along with refuse pits and concentrations of burned rock. Three human burials were also found at the site. Don Wyckoff (1980:268) also identified a number of Late Woodland seasonal campsites in the Ozarks along the lower stretches of the Illinois and Grand rivers. These sites contain a wide variety of artifacts such as arrowpoints, dart points, pottery, axes, and grinding stones indicating that their occupants were busily engaged in hunting, gathering, and a variety of other maintenance tasks. Stone hoes found at a few of these sites indicate that gardening may also have been important.

A few burned rock mounds are also found in northeastern Oklahoma, and these tend to be situated on blufftops overlooking river valleys. Vehik (1984:186) suggests on the basis of some radiocarbon evidence that these mounds date around 1550 to 1450 B.P., but, like Chapman, cautions against attributing any specific cultural affiliation. Some evidence (Vehik and Pailes 1979:207–210) suggests that these rock mounds may be accretional, reflecting different uses through time.

There is clearly a much greater abundance of evidence for Woodland occupation of northeast Oklahoma than is the case for southwest Missouri. Given the intensity of the investigations in the Table Rock Reservoir this difference probably should not be attributed to the amounts of archeological work that have been done in these two areas. Chapman may be correct, therefore, in viewing the southwestern Missouri region as one supporting only occasional usage by groups centered to the north during Late Woodland times. Wyckoff and Brooks (1983: 50) are likewise justified in claiming northeastern Oklahoma as “a homeland for Woodland Period peoples.” Considerably less work has been done in northwest Arkansas than in either of the other two states, but the few data we do have indicate Middle and Late Woodland occupation by indigenous groups. Perhaps these Arkansas sites represent an extension of the larger populations located further to the west.

As we have seen in our review of earlier paleoenvironmental changes, essentially modern topographic, fluvial, floral, and faunal association were established in the Ozarks by

Middle Woodland times. Subsequent environmental fluctuation primarily entails minor alterations in the mosaic character of vegetation communities with probably few, if any, corresponding shifts in animal distributions. The magnitude of fluctuation in the distribution of plants and animals seems to be within modern ranges, in any event.

At the Big Hawk Shelter in northeastern Oklahoma the pollen record between 1,650 and 1,150 years ago exhibits a moderately high frequency of oak and hickory pollen, which Henry (1978) attributes to nearby upland oak/hickory forests and bottomland elm/walnut associations. At Ferndale Bog, Albert (1981) reports the existence of a moist, open oak/hickory forest around 1,700 years ago. After this date an influx of pine pollen is recorded which indicates a shift to oak–hickory–pine associations as forested areas begin to close in response to increasing moisture levels. An erosional episode recorded in the floodplain sediments of the Pomme de Terre River at about 1500 B.P. may similarly indicate hillslope runoff due to increased precipitation (Brakenridge 1981). Toward the end of the Late Woodland period a shift toward slightly drier conditions begins (Hall 1980).

The Middle Woodland component at Albertson reflects seasonal occupation by a family unit engaged primarily in hunting and foraging. Activities represented in the artifact assemblage include processing of animal and native plant resources, hide-working, bone-antler-woodworking, and stone tool production (Dickson 1988). At Rodgers Shelter the Middle Woodland occupation reflects similarly a fall hunting and native plant processing camp which Kay (1982d) interprets as part of a larger subsistence-settlement system involving more permanently occupied hamlets located elsewhere in the Pomme de Terre valley. In any event, it does appear that use of rockshelters as seasonal hunting and foraging stations does continue from earlier times.

The Late Woodland period is poorly known in the Arkansas Ozarks, but at the Albertson site this component represents a continuation of Middle Woodland trends. One new addition to the technological repertoire is the bow and arrow, which was introduced in this area before 1100 B.P. Upon its introduction it soon replaced the atlatl propelled dart as the primary hunting weapon. The processing of native plant foods continues to be represented in the functional character of the artifact assemblage as well as in the floral remains recovered from this site. However, a single kernel of maize (*Zea mays*) found at the Albertson site indicates that some horticultural developments were underway by Late Woodland times.

The suggestion that these Middle and Late Woodland rockshelter occupations were components of settlement systems incorporating habitation sites in larger river valleys finds support in recent studies by House (1972b) and Trubowitz (1980). In the upper Lee Creek valley near Pine Mountain, Trubowitz identified several sites within the terrace system as Woodland in age, relating them to Hoffman's (1977a) Gober complex, a Fourche Maline-like manifestation centered in the Arkansas River Valley in western Arkansas. The presence on the Lee Creek sites of siltstone flakes and hoes along with consideration of site size, was used to characterize these sites as farmsteads or hamlets. These interpretations must be tempered with great caution, however, since the artifact assemblages were derived from surface or near-surface contexts (the latter by means of shovel testing and, in a few cases, minimal test excavation). No direct evidence of structures, pits, or other features that would constitute unambiguous evidence of farmstead or hamlet occupation of sites was identified in the Pine Mountain survey, nor is the geomorphological context of the recovered artifacts fully understood. Still, the evidence from these sites is equivalent to that from sites discussed above which have been interpreted on the basis of assemblage diversity as representing hamlets or villages, and artifact collections from the Lee Creek sites were obtained using techniques considerably more systematic than those employed in the investigation of most of the other sites referred to here. In the Mulberry Creek drainage which flows from the Boston Mountains into the Arkansas River Valley, John House (1972b) identified a variety of sites which appear to be similar to those identified by Trubowitz along upper Lee Creek. House also attributed many of these sites to the Woodland period Gober complex.

One other characteristic of these northwest Arkansas sites is evidence summarized by David Jurney (1981) for a specialized stone working technology involving the production of chipped stone hoes and other tools, from a distinctive material known as Webber's Falls siltstone. The distribution of the Webber's Falls siltstone is limited to a few outcrops in eastern Oklahoma and western Arkansas, and the development of several distinctive types of hoes and spades (Bond 1977b) made of this material seems to be particularly characteristic of the Gober complex. These distinctive artifacts occur at a number of sites in northwest Arkansas within the Arkansas, Illinois, and White River drainages (Jurney 1981:Figure 4).

The occurrence of settlements and base camps along most of the larger stream valleys in the southwestern Ozarks (e.g., Fuller 1975) and the presence of a hoe technology on many of these sites, raise questions concerning the importance of horticultural activities in Late Woodland subsistence organization. Until recently little direct evidence of horticulture has been recognized and even fewer critical evaluations of the available data have been made. Studies by Richard Yarnell (1978, 1981) and Gayle Fritz (1984, 1986b; see also Fritz and Yarnell 1985) demonstrate that many of the native and domesticated plant food remains preserved in the dry rockshelters of northwest Arkansas date to the Woodland period, and reflect a horticultural program incorporating a wide variety of tropical and native cultigens. On the other hand, Gayle Fritz's extensive series of radiocarbon dates on maize preserved in Ozark rockshelters indicates that although corn was present in small amounts before 950 B.P., it may not have gained importance as a food crop until after 750 B.P. (Fritz 1986b:213). The extent to which plant resources contributed to Woodland period diets, must therefore be carefully assessed through multiple analytic approaches including bioarcheological studies of human skeletal remains. Current interpretations of bioarcheological evidence are summarized in Chapter 8 of this report.

The first indications of prehistoric social changes which can be related to trends external to the Ozarks occur during the Middle Woodland period. The presence of Havana Hopewell artifacts on sites in the Ozarks suggests some participation in extraregional social networks, although the strength and direction of this participation presently is unknown. Most telling of this interaction, perhaps, are the two fragments of a human effigy figurine from the Cooper site. Baerreis (1940b:1) has suggested that the headdress on this figurine is similar to the copper headplates found on Hopewell burials at the Hopewell site in Ohio. A copper plate like the Ohio ones was also found at the Havana site in Illinois (Deuel 1952:172). More recently, Struever and Houart (1972) have suggested that these small Hopewell figurines were manufactured at centers located in Illinois or Indiana from which they were redistributed via centers comprising the "Hopewell Interaction Sphere." Whether or not this is true, the occurrence of this artifact at the Cooper site does indicate some tie between the Ozarks and Havana Hopewell centers located elsewhere, most likely those near Kansas City.

On the other hand, we know very little about the burial practices of Middle Woodland populations in the Ozarks, nor is there much additional evidence for participation in trade and exchange networks involving high status goods. It is not even certain that Havana Hopewell "influences" or contacts were felt uniformly throughout the Ozarks. Purrington (1970), for example, has compared materials from the Cooper sites with the nearby Guffy 4 site. At the latter site he was able to trace continuity in artifact styles from the Late Archaic period through the Woodland era, but with no evidence whatsoever of the Hopewellian manifestation seen at the Cooper sites. This led him to conclude that during Middle Woodland times Hopewellian groups were intrusive into the area, and left after a short stay during which local populations (representing a continuum from Delaware A to Delaware B) remained largely unaffected. Chapman (1980:26) has made similar suggestions concerning the nature of the Hopewell representation at Middle Woodland sites in southwestern Missouri. Whether Hopewell in the Ozarks does in fact represent a brief site unit intrusion rather than a moderate diffusion of ideas, cannot presently be determined. The absence of high status Hopewellian trade items and the lack of burials containing these goods probably does mean that the "Hopewell Interaction Sphere" was in any case something which failed to inspire great excitement and activity among Ozark populations.

During the Late Woodland Period there is some suggestion that some Ozark populations, at least those residing along major waterways flowing south toward the Arkansas River, were developing relationships with Fourche Maline-like groups in the latter area. The organized community pattern exhibited by Gober complex sites does suggest that important social changes were taking place among Late Woodland societies in the Arkansas River Valley. At the Spinach Patch site (Bond 1977a), for example, the occurrence of two possible mounds adjacent to a plaza surrounded by residential areas indicates that important steps were being taken toward development of the multimound, civic-ceremonial centers characteristic of the subsequent Mississippi period. As noted above, paleobotanical evidence suggests that Late Woodland populations were beginning to incorporate horticulture as an element of their adaptive organization. This would have increased the ability of Late Woodland people to counter environmental fluctuations in natural resources by reorganizing elements within the human ecosystem — by expanding the production of cultivated plant foods, for example. Increases in the breadth and complexity of human ecosystems resulting from the addition of horticulture may have led also to elaborations in the social and religious institutions integrating these systems. For example, the development of ritually sanctioned social classes supporting new forms of economic, political, and religious decision making characteristic of Mississippian societies may actually have begun during this period. This possibility certainly warrants further investigation.

ARKANSAS RIVER VALLEY AND NORTHERN OUACHITAS

During the Woodland period, a series of cultural developments between 2000 and 1000 B.P. mark changes in the technology, subsistence base, and social systems of cultural groups across eastern North America. The archeological expression of these changes, and the time of their appearance, vary from region to region within this broad area, and not all Woodland people incorporated the same array of cultural practices into their societies. For instance, although pottery making was practiced in some places as early as 3500 B.P. (cf. Muller 1978), it does not seem to have appeared in our study area until over a thousand years later. Mound building, the development of mortuary ceremonialism in local and regional ceremonial centers, and long distance trade in raw materials and exotic artifacts developed during this period, particularly in the valleys of major river systems (Griffin 1967). These have been hypothesized to be linked to new subsistence practices involving the use of domesticated plants, which were first used on a restricted basis in the Late Archaic period (Yarnell 1976).

Unfortunately, very little is known about Woodland period settlement in the Arkansas River Valley and northern Ouachita Mountains, particularly in the region between the Arkansas/Oklahoma border and Little Rock. It seems that by the end of this period, however, regionally distinct traditions were emerging in the western and eastern ends of the study area, with eastern populations linked to cultures in the Lower Mississippi alluvial valley, and western groups developing a distinctive local tradition known during the succeeding Mississippian periods as the Arkansas River Valley Caddoan.

The environment of the study area appears to have been relatively stable during this period, and plant and animal communities resembled those found during the presettlement period. The pollen cores from Ferndale Bog and Natural Lake indicate forest conditions at those two locales, with an open

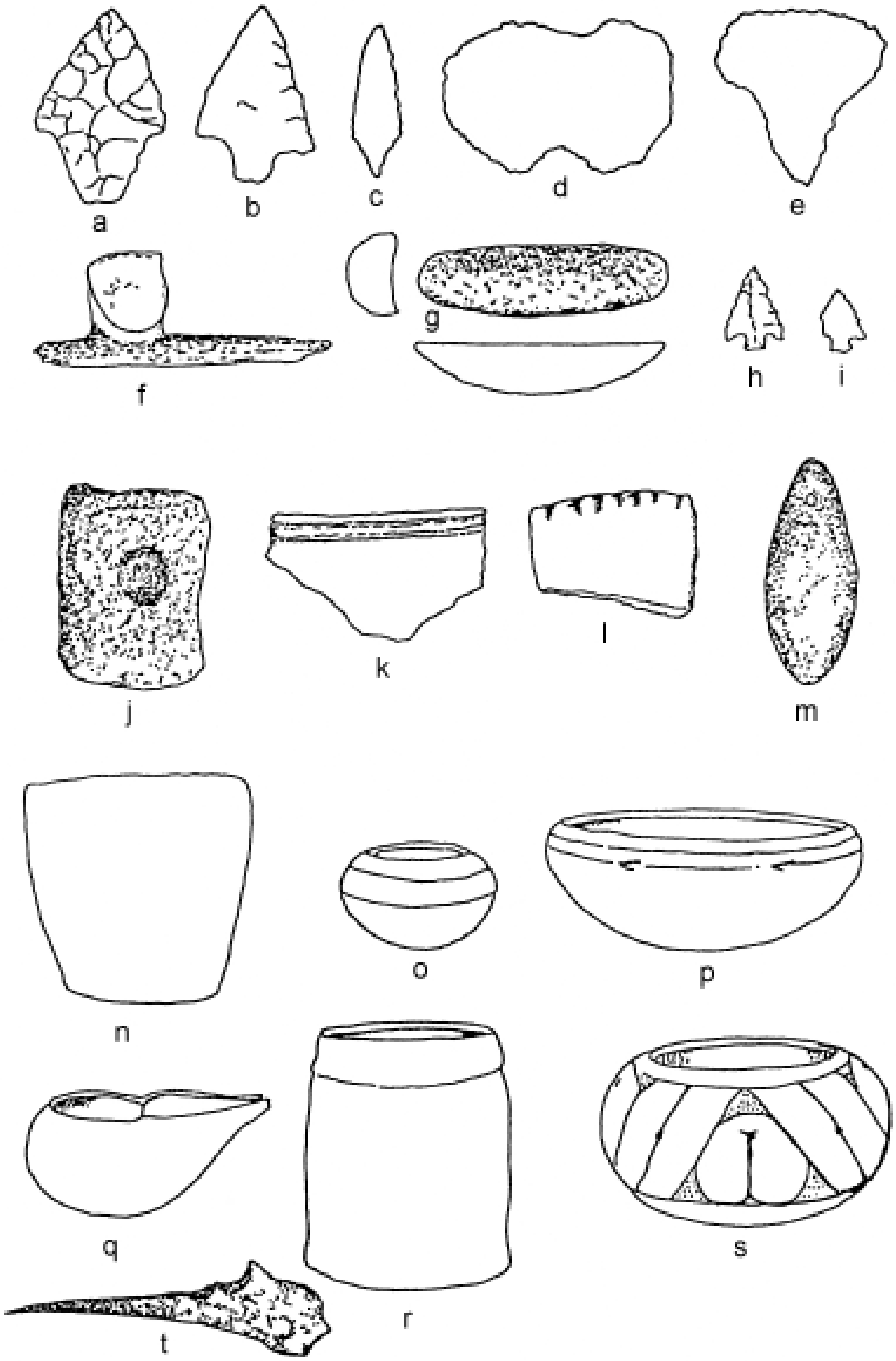

Figure 29. Woodland period artifacts from the Arkansas River Valley and the northern Ouachita Mountains a. Langtry point; b-c. Gary points; d. double bitted ax; e. hoe or spade; f. Poole pipe; g. boatstone; h. Rockwall point; i. Scallorn point; j. pitted cobble or cupstone; k. Coles Creek Incised, *var. Clear Lake*; l. Officer Punctated sherd; m. plummet; n. Williams Plain beaker, o-s. Coles Creek Plum Bayou pottery types; t. deer bone awl (redrawn from Wood 1981; Hemmings and House 1985; Stewart-Abernathy 1982; Brown 1984a)

oak–hickory–pine forest in the vicinity of the former, and a closing oak–hickory forest developing around the latter (Albert 1981). Indications are that plant and animal resource distributions would not have been substantially different from the preceding Late Archaic period.

The principal Woodland manifestation in the northern Ouachita Mountains is the Fourche Maline phase occupation at several midden mound sites in the Wister valley (Bell 1980; Galm 1981, 1984; Galm and Flynn 1978). Several suites of radiocarbon dates are available for these occupations, and indicate a time range for the phase between ca 2250 B.P. and 1150 B.P. (see Galm 1984:Table 93 for a list of the dates and sites).

The Fourche Maline phase appears to be a continuation of the cultural adaptation pattern that began in the preceding Wister phase. Dominant artifact forms include Williams Plain pottery (which is a thick walled grog- or clay-tempered ware), contracting stemmed Gary projectile points, and double bitted chipped stone axes (Galm 1984). Corner-notched projectile points, bifacially and unifacially flaked scraping and cutting tools, and bone and shell implements seem to remain in the assemblage as well. Grinding stones are common and are more abundant than they were in Late Archaic components. An addition to the ground stone assemblage are boatstones, boat-shaped objects believed to be weights for spear throwers. In later Fourche Maline deposits, arrow points and LeFlore Plain pottery, a grit-tempered ware, also make an appearance. In general, the Fourche Maline assemblage is virtually the same as that from the preceding Archaic period, with the addition of pottery, changing frequencies of some artifact types, and the late appearances of arrowpoints.

Fourche Maline phase components retain the same settlement characteristics as preceding Wister phase occupations. The best documented occupations are at the Wann, Sam, Scott, Curtis Lake, and McCutchen-McLaughlin sites, but several other examples are known in the valley and are indicated by Galm (1984:Table 9.4). At the Scott site, for instance, human burials, ash deposits, and rock concentrations were all associated with Stratum II, the level Jerry Galm assigns to the Fourche Maline phase (Galm 1981:114).

These components are typically midden deposits. According to Galm (1984), components belonging to the early part of the phase are not as numerous as those belonging to a later time interval and may indicate a slightly different settlement pattern from preceding Wister phase use of the river terrace environmental zone. By the end of the phase, however, components are well documented and indicate if anything a more intense use of these sites.

Animal and plant remains from Fourche Maline midden components show no significant change in subsistence patterns or site use from preceding Archaic occupations. Increased quantities of grinding stones may indicate a greater emphasis in the preparation of plant foods, and double bitted chipped stone axes and chipped stone hoes suggest digging or grubbing activities were taking place (Brown 1984a). However, there is no direct evidence of gardening in the form of charred domesticated plant or seed remains, and the bioarcheological data presented elsewhere in this report lend support to the characterization of Fourche Maline economy as a continuation of hunting and collecting practices established in the Archaic. Deer, fish, small mammals, birds, turtles, and mollusks contributed meat to the diet, and nuts, particularly hickory, were also consumed. Basketry impressions on the bases of pottery indicate woven containers were used in addition to ceramics for storage and food preparation. Brown (1984a) suggests a growth in container needs marked by the appearance of ceramics was related to population expansion during this period.

Other components of the Fourche Maline settlement system are not well documented. The model of subsistence activities and social organization presented for the Wister phase would seem to apply to this phase as well. Known Fourche Maline components appear to be stream valley base camps used intensively and episodically for domestic activities and human burial. Related short term hunting and collecting camps, quarries, and other special purpose sites are expected to exist in the vicinity, and would shed light on the full range of Fourche Maline subsistence/settlement activities.

Human burial practices suggest Fourche Maline social organization underwent no significant changes from the preceding phase. Inhumations are typically flexed, and may be single individuals or groups. Grave offerings are relatively rare, and generally contain only utilitarian items like dart points or small amounts of personal jewelry such as beads and pendants. There is no evidence of social differentiation marked by special treatment of certain members of society.

Trade and other external relationships between Fourche Maline people and other regions are poorly documented and appear to be limited. Galm (1984) notes the occasional appearance of Hopewellian or Marksville ceramics in site deposits and evidence of nonlocal stone, minerals, and shell artifacts in graves. The nonlocal stone comes primarily from elsewhere in the Arkansas basin and appears to enter the valley in finished form. Minerals include galena, possibly asphalt, rose quartz, and phosphate, all of which could have come from the Ouachita Mountain region. The only artifacts indicating long distance trade are copper beads and whelk shell ornaments (Galm 1981) that appear to have been traded into the region in finished form and probably came ultimately from the Appalachians and the Gulf Coast. The small size and infrequent occurrence of these objects suggests Fourche Maline people did not participate extensively in trading networks with their neighbors.

Other Fourche Maline phase sites may occur outside the Wister valley. The Fuller and Judy site, and the Strickland Island site upstream on the Poteau both have assemblages similar to Fourche Maline phase components, with Gary points, Williams Plain pottery, other dart point styles as well as arrowpoints, grinding stones, double bitted axes, and human burials all present (Arkansas Archeological Survey site files). S. C. Dellinger and S. D. Dickinson believed some of the pottery from Strickland Island was Marksville or Coles Creek (Dellinger and Dickinson 1942). As Frank Schambach has pointed out, however (Schambach 1982a), undecorated pottery found at sites in southwest Arkansas was once traditionally called either Marksville or Coles Creek because investigators did not envision a resident plain pottery manufacturing tradition independent of these well known pottery types from the Lower Mississippi valley. Today these would most likely fall into the Williams Plain category.

The Otter Creek site in the Sans Bois Creek valley 10 km upstream from the Arkansas River valley is a dark midden deposit apparently related to the Fourche Maline phase. The midden mound is ca 24 m by 18 m in diameter and contains a Woodland period assemblage of Gary points, large expanding stemmed points, William plain pottery, and Scallorn arrowpoints. Testing by Don G. Wyckoff found four burials, hearth areas and rock concentrations in the midden which seem to be the result of a single episode of occupation. Two radiocarbon dates from the midden are 1080 ± 90 B.P. and 950 ± 75 B.P. (Wyckoff 1980; Miller 1977:286; Gettys 1978). Otter Creek appears, from the preliminary testing alone, to be a similar type of settlement to the Wister valley midden mounds.

About 15 km upstream on Sans Bois Creek from the Otter Creek site is 34Hs-111, an unnamed site located on an abandoned channel in the alluvial floodplain. In the creek channel are two rock concentrations that appear to be redeposited midden contents. Artifacts found on the surface include lithic debris, grinding stones, cupstones, bifacially flaked tools, axes, Gary points, expanding stemmed dart points, and a few arrowpoints of the Massard or Hayes type. In the exposed bank of the abandoned creek a series of buried soils were exposed, one of which was a thick midden deposit lying between 1.3 and 1.6 m beneath the present terrace surface. A radiocarbon sample taken from the top of the midden deposit yielded a date of 1645 ± 75 B.P. (UGa-1979; Lintz 1978:73). The site has not been excavated.

Although prehistoric ceramics were not found in surface materials, the radiocarbon date indicates the buried midden is a Woodland period occupation that may be similar to Otter Creek and other midden mounds in the northern Ouachita Mountains. Since it is buried under over a meter of recent alluvial sediment, it may indicate additional sites from this and preceding cultural periods are buried in alluvial settings.

East of the Wister valley at the Sliding Slab Shelter Strata 9 through 13 were assigned to the Woodland period. Stratum 9, with radiocarbon dates of 1380 ± 50 (Tx-3352) and 1280 ± 60 B.P. (TX-3344), contained William Plain pottery, Gary points, two drills, two cupstones, a grinding stone, numerous bifacially flaked cutting tools, used and unused flakes and five sherds of incised clay-tempered pottery. Stratum 10, with dates of 1420 ± 110 B.P. (Tx-3351),1160 ± 180 B.P. and 520 ± 50 B.P. (Tx- 3350) has essentially the same assemblage, with the addition of two arrowpoints, one Scallorn and one a side-notched Washita type, a double bitted ax, and a preform. A lens of burned hickory nutshell and small ash concentrations were the only features recorded within this stratum, and the only features attributable to Woodland occupation of the shelter (the 520 B.P. date is clearly too late, and may be the result of mixing in the deposit).

Above Stratum 10, Strata 12 and 13 contained similar assemblages. Gary points, large corner-notched points, and arrowpoints are all found, along with Williams Plain pottery, bifaces, preforms, grinding stones, cupstones and flakes. A single date of 1360 ± 50 B.P. (Tx-3343) came from Stratum 12, and Stratum 13 was undated (Harden 1981).

In addition to the lithic and ceramic artifacts, a small collection of bone and shell tools including deer antler tines, cut mussel shell, bone awls and beads, and a bird bone awl were recovered. Floral and faunal remains were similar to those recovered in the Archaic period deposits. Hickory nuts were the principal plant food, and animal bone came from deer, small mammals, turtle, birds, fish and mussels. The amount of animal bone recovered from the Woodland period levels at the site far exceeded the Archaic and Mississippi period levels and indicates a more intensive use of the shelter during this time (Marrinan 1981:V.25). The only notable trend in changing collecting patterns is that turtle becomes more frequent in samples about halfway through the Woodland period relative to other animal remains. It is unclear whether this reflects changing biotic communities in the vicinity of the shelter, or changing seasonal or functional uses of the site.

In general, it appears the shelter continued to be used by small groups of people engaged in hunting and collecting activities in the nearby stream valley. These visits may have been episodic, occurring at various seasons.

Gary points and plain clay- and grit-tempered pottery are widespread occurrences in the northern Ouachita Mountains in Arkansas, and undoubtedly reflect Woodland period use of numerous habitats within this region. Unfortunately, the data base for Woodland period occupation of the uplands is as poor as it is for the preceding Archaic period. Much basic research into the function, distribution, and chronology of Woodland sites must be done before any meaningful statements about human use of this part of the Ouachitas can be made. It is not unreasonable, however, to expect a full range of settlement types, including base camps, temporary collecting stations, and shelter deposits.

Downstream from Fort Smith in the Arkansas River Valley, Michael P. Hoffman (1977a) has identified the Gober complex as a discrete Woodland period manifestation. The type site is the Spinach Patch site, located on a terrace in the Mulberry River bottomland near its confluence with the Arkansas. The site is described as a rectangular dark midden area approximately 66 m by 500 m in extent. At one short end of the rectangle were two low conical rises, 35 m in diameter, identified as possible mounds. Portions of three human burials were removed from the western conical mound, but not enough work was done to determine if these rises were indeed artificial mounds, or what other purposes they may have served. A rectangular area within the midden appeared to have lower concentrations of discolored soil and artifacts, and was identified as a plaza, or open public area at the site

(Bond 1977a; Hoffman 1977a). The site is undated but the presence of arrowpoints indicates it was occupied in the later portion of the Woodland period.

Diagnostic Gober complex artifacts are Williams Plain pottery, Gary dart points, and argillite spades, according to Hoffman (1977a). This last artifact type is a coarsely chipped tool with a broad rectangular blade and narrow hafting element. Polish on blades of numerous hoes is viewed by Hoffman as possible evidence for their use as digging tools, possibly for gardening activities, although he cautions that this functional interpretation is speculative (Hoffman 1977a:35). Recently, Jurney has identified the raw material of these spades to be Webber's Falls siltstone, which is available over a wide area of the southwestern Ozarks along streams draining south into the Arkansas River (Jurney 1981). Clell Bond manufactured siltstone hoes similar to those found at Gober complex sites and used them in a series of digging and wood cutting activities. According to Bond (1977b), polish and wear patterns produced by digging were similar to wear on the archeological specimens, thereby strengthening the identification of these implements as digging tools.

The kinds of activities carried out at the Spinach Patch site are unclear. Daub fragments, nodules of fired clay, indicate structures were present, but limited excavation with small pits found only a small arc of postmolds. Lithic debris included decortication flakes (flakes with the cortex on one face from the first stages of knapping a cobble) and indicate early stages of stone tool manufacture were carried out at the site. Food remains indicate nuts, deer, small mammals, birds, fish and turtle were part of the diet (Bond 1977a:116).

Although evidence is extremely fragmentary, the Spinach Patch site appears to be a habitation site, perhaps with permanent structures and an organized community plan. A wide range of domestic activities, including tool manufacture, food processing, and human burial took place.

Other Gober complex components are recorded in the Arkansas River Valley and up neighboring tributary streams. George Sabo has mentioned evidence from the Lee and Mulberry Creek valleys earlier in this review. The Ozark Reservoir survey found numerous sites with argillite flakes, hoe fragments, and other Gober artifacts on alluvial sites in the valley, but surface survey information alone is insufficient to determine the range of site types and their relationship to Spinach Patch in more than a most general way (Hoffman 1977a).

Further downstream on the Arkansas River, the Plum Bayou culture represents the later part of this period in the eastern end of the study area. The Toltec Mounds site, where the culture was defined, and the Alexander site are two different site types belonging to this entity.

The Toltec site is situated on an abandoned channel of the Arkansas River about 20 km downstream from where the Arkansas now exits the Ouachita Mountains. The channel, which is now part of the Plum Bayou drainage system, forms the northwest boundary of a 40 ha area circumscribed by an earthen embankment 1,620 m long that originally stood at least 2.5 m high and was constructed for part of its length along an abandoned stream channel that served as a ditch outside the earthwork.

Inside this D-shaped enclosure are three large mounds and at least 14 small ones, many of which have been leveled by farming. Six of the mounds have been tested. Mound A, the largest mound, is a 15 m tall cone of unknown function. The second highest earthwork is Mound B, a flat topped quadrilateral 11.5 m tall, built in several stages, that supported structures on its summit. Mound C is dome shaped and 4 m tall. Burials recovered from the fill of the mound and its periphery indicate it served as a mortuary facility.

The smaller mounds appear to have been low platforms that supported buildings. Test excavations in four mounds, D, E, S, and G, revealed that midden deposits, pits, and structures were buried by subsequent mound construction, and the platforms were refurbished and/or rebuilt during their period of use (Rolingson 1985; Rolingson 1982a).

Radiocarbon dates from within and beneath the tested mounds indicate the site was under development before 1250 B.P. (All of the following are presented in uncorrected form. See Rolingson 1985 for corrected calibrations). A date of 1199 ± 50 B.P. (SMU-832) came from a midden deposit on a construction stage 6.9 m above the base of Mound B. From a hearth beneath the same earthwork came a date of 1269 ± 48 B.P. (SMU-1031). A date from the base of the premound midden of Mound G is 1261 ± 57 B.P. (SMU-1027), and two dates from a similar context beneath Mound E are 1183 ± 57 B.P. (SMU-026) and 1193 ± 48 B.P. (SMU-1025). An archeomagnetic date from beneath Mound D falls between 1135 and 1035 B.P. (Rolingson 1985:16, Table 1). A date from beneath the embankment of 1798 ± 48 B.P. (SMU-1182) is considered by Rolingson to be a little earlier than expected, but still within an acceptable range of interpretation.

The arrangement of mounds within the site reveals an orderly layout reflecting both comprehensive site planning and public use. Mounds ring two open plazas with Mound B overlooking both areas. Mound placement appears to have been guided by a concern for solar alignments, that is, at least some were arranged to correspond to the position of the sun at certain times of the year, such as the equinoxes and the summer and winter solstices. In addition, standardized distance measurements were employed to determine the relationship of mounds to each other (Sherrod and Rolingson 1987; Rolingson 1985).

Cultural material is not uniformly distributed across the site, but appears concentrated on and around mounds and around the edge of the south plaza. There is no indication the site contained a large resident population, but domestic activities undertaken at mound locations are marked by a wide range of artifact types.

The Plum Bayou artifact assemblage is dominated by pottery and lithic debris. Ceramics are predominantly Baytown Plain. Decorated types include Larto Red Filmed, local varieties of Coles Creek Incised (particularly the Keo variety), French Fork Incised, Officer Punctated, Alligator Incised, Evansville Punctated, Mulbery Creek Cord Marked, Salomon

Brushed, Indian Bay Stamped, Woodville Zoned Red and Withers Fabric Impressed (J. Stewart-Abernathy 1982; Rolingson 1982a, 1985). Small quantities of grog and bone-tempered Morris Plain and shell-tempered sherds are also found. Martha Rolingson notes that some of these ceramic types may have been used for special ritual or social, rather than domestic purposes (Rolingson 1985:23).

Lithic artifacts are made predominantly from local chert pebbles, but stone from the Ouachita Mountains such as quartz crystal, porphyry, lampryphere, and novaculite are also present. Chipped stone tools include Gary variety Camden and Means Stemmed dart points, and Scallorn, Rockwall and Honey Creek arrowpoints, preforms, bifaces, gravers, perforators, and chipped adzes and celts. Ground and polished stone items include hammerstones and pitted cobbles, celts, adzes, abraded galena cubes, boatstones, plummets, and carved siltstone pipes (T. Hoffman 1982; Rolingson 1985).

Tool manufacturing took place at the site. Theresa Hoffman, in looking at the lithics from the Mound D-1 midden, notes that both flake and core tools were being made. Arrow points in particular were being manufactured from local chert cobbles. Tools were also being made from novaculite, apparently brought to the site in partially finished form from bedrock deposits somewhere in the Ouachita Mountains (Hoffman 1982), and quartz crystal, another Ouachita Mountain resource. Arrow points, engravers, bifaces, and used flakes were all produced (Rolingson 1982a). Rolingson attributes the presence of gravers and perforators in collections to woodworking and boneworking industries undertaken at the site as well (Rolingson 1985:20).

Plant remains have not been analyzed, but Rolingson hypothesizes that a wide variety of wild plants and several domesticated species were constituents in the local diet. She points to the floral remains recovered from the Alexander site, discussed below, as a model of the kinds of plants to be expected in Toltec deposits (Rolingson 1985:18).

Many animal bones were recovered during test excavations of Mound D, one of the low, flat topped mounds at the south end of the site. Robert W. Hoffman analyzed these bones for his master's thesis at the University of Arkansas. The sample of bone he examined indicates the inhabitants of the Toltec site were using a wide range of animals from riverine, backwater swamp, forest edge, and forest habitats. Food remains included numerous species of fish (particularly those that favored slow, sluggish waters), birds, turtles, mammals, and rodents. The principal meat source was deer, but birds (especially turkey) and fish were also important dietary constituents (R. Hoffman 1982).

The species represented in this animal bone collection indicate that Mound D was being used during all seasons of the year. The fish, which include bowfin, catfish, suckers, bass, and drum, would have been easiest to capture in spring and summer. In contrast, birds included a number of migratory species such as ducks, geese, and passenger pigeons that would have been in greatest abundance in the winter months. Other animals, such as deer and squirrels, and small mammals like raccoons, beaver, and fox would have been available essentially at all seasons.

Hoffman notes (1982:45) that some of the animals in the collection may have been used for purposes other than food. For instance, redheaded and pileated woodpeckers would have had little food value, but their brilliant feathers may have decorated costumes, or parts of these birds such as beaks or skins could have been used as ritual paraphernalia.

Rolingson (1982b, 1985) postulates that the Toltec site represents the civic and religious center of Plum Bayou culture, an indigenous manifestation related to formative cultures elsewhere in the Lower Mississippi valley, but exhibiting its own local identity. The site was inhabited by a small residential population, but was supported by a larger population dispersed in small hamlets and households situated on natural levees in the alluvial bottomland and adjacent tributary valleys. She notes a number of smaller mound sites, with one or two mounds, also exist within the region and may have been local centers subsidiary to Toltec. None of these local centers has been studied, and only one household, the Ink Bayou site has been excavated. Analysis is still underway, but this site appears to have contained a single dwelling, a small midden deposit, and other features such as pits that served as food storage facilities (Rolingson 1985, citing D. Waddell, personal communication).

The abundance of stone and mineral resources from the Ouachita Mountains and a diet postulated on a wide spectrum of wild plant and animal resources in addition to domesticated plants, both suggest an array of special purpose camps, bivouacs, and collecting stations must be part of the Plum Bayou settlement systems. In his reconnaissance of the Fourche Creek valley which drains the eastern edge of the Ouachita uplift and enters the Arkansas River upstream from Toltec, John House (1972a) noted that the most intensive use of the valley appeared to be during the Woodland period. He attributed this occupation to Fourche Maline cultural groups, but his study was done before any of the recent work at Toltec began. Red filmed, cord marked and Coles Creek Incised sherds found in the valley may now be more usefully compared with the Plum Bayou assemblage, and may represent debris from camps and special purpose sites ancillary to Toltec.

About 100 km northwest of Toltec up the Arkansas River Valley is the Alexander site, with one component related to the Plum Bayou culture, that represents a residential settlement type that is probably similar to small domestic sites linked to the mound.

The Alexander site is situated on a low rise in the alluvial floodplain of Cypress Creek about 7.6 km above its confluence with the Arkansas River. This midden deposit is the result of four periods of occupation, two of which fall within the Woodland period. A Middle Woodland occupation includes a single burial dated at 1615 ± 160 B.P. (Gx-8832). The grave pit contained the flexed remains of a child accompanied by two whelk shell drinking cups, shell beads, and the cremated bones of a human adult (Rose and Marks 1985). The beads and burned bone may originally have been deposited in the cups. A collection of boulders partially lined and filled the deep pit. In the midden, 14 Marksville Incised and Marksville Stamped sherds are also attributable to this occupation, but no other features were recognized in the uniformly dark midden deposit (Hemmings and House 1985). Hemmings notes that Marksville sherds were bone tempered, a technological attribute aligning the ceramics with Woodland period cultures of southwestern Arkansas rather than classic Marksville sites in the Lower Mississippi Valley where bone tempering is unknown (Hemmings 1985:37). The presence of a burial containing nonutilitarian goods in a site with virtually no other evidence of contemporary occupation is unexplainable at present.

The major Woodland occupation at Alexander is related to the Plum Bayou culture and is referred to by House (1985: 101) as belonging to the Coles Creek period. A significant part of the midden deposit and numerous features belong to this occupation. Scattered postmolds were found beneath the midden, but do not form a recognizable structure. At least two shallow storage-refuse pits, an earth oven (a large pit used for repeated burning activities) later reused as a refuse pit, and a small cemetery area with six interments belong to this period. The earth oven was dated to 1210 ± 160 B.P. (Gx-8831) by radiocarbon, and to 1120 ± 17 B.P. through archeomagnetism.

Artifacts associated with this occupation of the site include Baytown Plain, Morris Plain, Alligator Incised, Evansville Punctate and Officer Punctate ceramics, Gary, and Langtry (Hemmings also identifies these as Means Stemmed) dart points, Rockwall, Scallorn, Honey Creek, and Young arrowpoints, scrapers and spokeshaves, drills and perforators, and modified flakes. An unknown proportion of the bifacial blanks, preforms and tools probably also belong to this component, but were not separable in the midden.

Hemmings feels most of the flaking debris at the site is the result of extensive Coles Creek period flintknapping activity (1985:32). Local chert cobbles were heat treated and used for tool manufacture on the site, particularly the production of projectile points (Hemmings 1985:36). Quartz and novaculite were also used, however, with the latter coming to the Alexander site in semifinished form from bedrock deposits located elsewhere in the southern Ouachita Mountains. Plummets, celts, a hone or file, grinding slabs, manos, pitted cobbles, hammerstones, chipped stone axes and hoes, and an abrader were also found, as were perforated sherds, a ceramic bead, and a piece of a fired clay Poole pipe (cf. Hoffman 1967). The cemetery feature contained the remains of four adults and two subadults lying in an extended position. None were accompanied by grave offerings.

Bone and shell objects included deer ulna awls, a bird bone awl, worked antler tines, parts of two human cranial fragments worked into containers, a grooved bone pin, a bone disk, and disk-shaped shell beads. Faunal and floral remains give considerable insight into dietary practices at the site. Terrestrial species, particularly deer and box turtles dominate the animal bone assemblage, with small mammals, fish, and turkey also present. Forest edge and riverine habitats were the principal sources of animal resources, but some species were also collected from open habitats that may have been small prairie openings in the valley (King 1985:71).

Plant remains are dominated by hickory nutshell and smaller quantities of black walnut. In addition, a collection of starchy and oily seeds was recovered that included maygrass, goosefoot, knotweed, wood sorrel and purslane. The midden also contained rinds of squash and bottle gourd, and sumpweed seeds, at least one of which appears to be a domesticated variety, and a single corn cupule (Styles et al. 1985:54). Unfortunately, the midden samples cannot be attributed unequivocally to the Plum Bayou occupation. However, the presence of seeds in undisputed Woodland period contexts lends credence to the view that the other domesticates in the midden belong to this component as well.

The later Woodland period occupation at Alexander appears to be a residential camp or homestead that could have been used on a muitiseasonal basis, or as a permanent residence. Subsistence activities included both wild food collection and small scale gardening activities, and a range of domestic activities also took place at the site. The material culture assemblage shows affinities to the Plum Bayou occupation at Toltec, but the distance between the two sites suggests that Alexander was not part of the support population for the large ceremonial center. It is plausible that it was instead related to the nearby poorly known Point Remove Mound site.

The Point Remove site is situated near the confluence of Point Remove Creek and the Arkansas River, approximately 20 km from the Alexander site. It originally consisted of a large mound approximately 10 m tall, and at least four small mounds. The large mound was built in a series of stages which supported structures of some sort (Davis 1967b). Mississippi period artifacts have been recovered, but Coles Creek pottery on shell tempered paste similar to ceramic assemblages from Toltec have also come from the site (Rolingson 1985:32). The site is undated, but there is a likelihood that one of its components belongs to the Woodland period, and it is a sociopolitical-political center subsidiary to Toltec.

Woodland period sites in the Arkansas River Valley of Oklahoma are present but difficult to characterize, partly because so few well dated and/or sealed deposits have been studied, and even diagnostic artifact assemblages are difficult to identify. Wyckoff identified 56 sites in the Arkansas and Poteau valleys on the basis of a small number of dated contexts, and assemblages with corner-notched arrowpoints, Gary points and Williams Plain pottery that he feels belong to the later part of this period, between 1300 and 1000 B.P. According to Wyckoff (1980:259), these sites represent community centers, settlements, base camps and secondary camps found in both alluvial valley and upland settings throughout the basin. He is including Fourche Maline phase components from the Wister valley in his tabulation. Wyckoff's two community centers are the Harlan and Spiro sites, which will be discussed below in regard to their Evans phase components.

These are postulated to be places where specialized kinds of ritual activity centering on burial were taking place.

Wyckoff's base camps and settlements are hypothesized to be sedentary residential sites, and he has identified them both in alluvial valley settings and on ridges away from streams. One example is the Vanderpool site, described earlier by George Sabo. Secondary camps are postulated to be located primarily on terraces in the alluvial valley, and to be the result of short term hunting or collecting activities. It is important to note that most of the sites in Wyckoff's sample are unexcavated, and further work is necessary to verify their functional and temporal interpretation (Wyckoff 1980). A general interpretation would be that these settlements and camps were localities for hunting, foraging and perhaps gardening activities.

It is safe to say, however, that many sites in the basin contain assemblages similar to those described for the Fourche Maline phase in Ouachita uplands. Populations were residing in the valley throughout the Woodland period, and toward the end of this period a new cultural configuration was developing that led directly to the succeeding Arkansas River Valley expression of the Caddoan tradition.

This terminal Woodland manifestation is the Evans phase, defined primarily at the Spiro and Harlan sites. George Sabo will describe the Harlan site in detail below. I will describe the Spiro site in the following discussion of the Mississippi period, but a general characterization is relevant here in explaining the Evans phase occupation.

Spiro is a mound group situated on a terrace of the Arkansas River and an adjoining eroded upland in an area known as the Fort Coffee-Braden Bottoms. The site was described by James A. Brown as having nine mounds in two groups. On the terrace were the Craig Mound, a compound edifice of four conjoined conical mounds, and two low conical mounds. On the upland about 400 m to the northwest was a group consisting of two platform mounds and four small conical mounds (Brown 1966a; see also Phillips and Brown 1978). Recent work at the site has identified three possible additional small mounds on the upland, making a total of 12 known or suspected mounds in the group (Rogers et al. 1980; Rogers 1982).

The Craig Mound is a complex earthwork that was the result of several episodes of use and modification. It served as a burial feature, and contained a sequential series of mortuaries where bodies of the deceased and rich grave offerings were stored, accretional deposits of mortuary contents, inhumations of some individuals, a large crematory basin, and mantles and mound stages resulting from the periodic burial of old mortuaries and the construction of new ones. At its abandonment, the mound covered an area approximately 30 m by 100 m, and the northernmost conical segment was 10 m tall.

The two smaller mounds near Craig, Ward Mounds 1 and 2, were low accretional deposits where the contents of mortuaries were buried. One of the mounds may have mantled an abandoned mortuary structure.

On the upland, the two platform mounds appear to have been the result of numerous episodes of rebuilding and refurbishment during their use life, but it is unclear what buildings or other features may have been on their upper surfaces because craters dug in them by commercial looters destroyed the stratigraphy, and WPA era excavators did not explore them completely. Small conical mounds form a ring with the two platforms on the upland surface, enclosing an area relatively free of cultural debris and interpreted as a plaza or public square. The low conical mounds are mantles burying the remains of buildings believed to be mortuaries or other special purpose buildings. Between the Craig Mound area and the upland mounds is a broad area containing scattered cultural material. WPA excavations in this location uncovered evidence of dwellings and other domestic features such as fire pits, both on the terrace and on the slope leading to the upland mound goup. This scatter of material and surface debris found on the terrace and the adjoining upland is referred to as the Spiro village area (see Brown 1966a for a detailed description of the site and its mounds following WPA work, and Rogers et al. 1980, Rogers 1982, and Rogers et al. 1982 for more recent descriptions of newly discovered site features).

The Spiro site was the locus of activity for over 600 years, and the configuration of the site and its functions changed through time. Later phases of site occupation will be discussed below; what is of concern here are the early episodes of site use which Brown associates with Fourche Maline and Evans phase periods.

The Fourche Maline occupation of the site is marked, according to Brown, by a scattering of burials in the areas of the Craig and Ward mounds (Brown 1971b:Table 48) and cultural debris along the terrace edge, but no other conceptualization of the occupation is possible.

The Evans phase occupation of Spiro is marked by the appearance of new pottery types interred with individuals in burial features, and with similar ceramics appearing in the fill of the Brown Mound (Brown 1971b:220, 1984a) and in surface deposits in the uplands. According to Brown, (1984a:12–15) distinctive types are Coles Creek Incised pottery similar to varieties described for the Plum Bayou culture: French Fork Incised vessels with overall body decoration, grit-tempered LeFlore Plain, gourd-shaped bowls, Williams Plain, and decorated Williams Plain jars and beakers. Dated contexts identified by Brown are Feature 5, a square post walled structure built on the edge of the uplands with an uncorrected date (based on an average of seven pooled dates) of 1058 ± 22 B.P., and Feature 1, a midden deposit located northwest of the Craig Mound with an uncorrected date of 1160 ± 90 B.P. (Tx-36140) (Brown 1984a:12; Rogers et al. 1980:Table 26; Rogers 1982:Table 5).

According to Brown, the appearance of the decorative style markers present on ceramics from the earliest occupations of Spiro and other mound centers such as Harlan, Brackett and Eufaula is evidence that a significant change in local social organization is occurring during this period. This is marked most conspicuously by the beginnings of burial ceremonialism at special sites, and the appearance of new ceramic technology with ties to contemporary social groups down the Arkansas River in central Arkansas (Brown 1984a). The material culture assemblage indicates this change is taking place within indigenous Woodland populations, but it is part of a broader pattern of social change taking place throughout a large part of the Trans-Mississippi South.

Brown estimates a time range for the Evans phase of 1250 to 1000 B.P. (Brown 1984a:12). Little can be said at this time, however, about the settlement and subsistence pattern during this period, because few components outside of the mortuary sites can be identified. As Rogers et al. note (1980:110), without the appearance of the distinctive decorated pottery types, Evans phase components are indistinguishable from other Woodland period settlements unless they are securely dated. One domestic component belonging to the phase appears to be located at the Copeland site in the Wister valley where a French Fork Incised vessel was found with a grave that also contained a galena cube, a stone celt, conch shell beads and traces of copper. The burial appeared to be associated with a postmold outline denoting a structure of some sort (Guilinger 1971).

Jerry Galm (1981:147) attributes Bonham, Agee, and Sequoyah styles of arrowpoints to this phase in the Wister valley, as well as some persistence of Gary dart points, and Williams Plain, Williams Decorated and LeFlore Plain ceramics. According to Galm, Evans phase components reflect a mixture of late Fourche Maline and early Mississippian material traits. He postulates that mound building and subtle changes in settlement patterns may have begun in the Wister valley during this interval, but the details of this change remain to be clarified.

The McCarter site, situated on the bank of the Arkansas River near Muskogee, Oklahoma, may be another domestic settlement. Remains of three structures were found, each marked by an irregular rectangular or square area of sandstone slabs surrounded by postmold outlines, each about 3.5 m in diameter. Cultural material associated with the structures was primarily lithic debris, manos or abraded cobbles, chipped stone, bifacial and unifacial cutting and scraping tools, choppers, Gary points and a small number of other notched and stemmed dart points, and a chipped stone hoe. Two Williams Plain sherds and seven shell-tempered Woodward Plain sherds from a later occupation were also found, as was a small collection of historic debris (Shaeffer 1957). A radiocarbon date from the top of the midden is 1160 ± 100 B.P. (Campbell 1961). It is unclear whether the structures are attributable to the Woodland period, but if so they represent a kind of residential settlement unlike those from the Wister valley and other Woodland sites downstream. It is noteworthy that the stone floored buildings are formally similar to a feature under Mound Unit 3 at the Harlan site (Bell 1972:150), a square enclosure outlined and partly floored by stone slabs that was buried by a low mound. Radiocarbon dates from beneath the stones are 1280 ± 50 B.P. (Tx-601) and 1250 ± 50 B.P. (Tx-604) (Bell 1972:253) and fall within Brown's estimate for the Evans phase.

In summary, then, Woodland populations in the Ouachita Mountains and Arkansas River Valley maintained a subsistence and settlement pattern through most of this period reflecting significant dependence on the collection of wild resources. Technological innovations, however, reflect enhanced efficiency in some portions of the economy and increasing reliance on some kinds of foods. Arrowpoints mark the introduction of the bow and arrow. Increasing frequencies of grinding implements indicate nuts and perhaps seeds became more important dietary constituents, and hoes in Woodland contexts in the Arkansas River Valley are evidence for the addition of at least small scale gardening to some economies. The plant remains from the Alexander site suggest squash, gourds, and native weedy plants were cultivated by late in this period, and offered important manageable supplements to the subsistence cycle.

George Sabo has already referred to the relationship between increasing subsistence reliance and sedentary settlement patterns in his discussion of the Late Archaic and Early Woodland periods in the Ozarks. Briefly, if some resources used in an annual round of collecting activities are made more reliable and manageable, settlements occupied during the availability of those resources can be used for longer periods of time. The reliability of food resources is also linked to population increases and, as Brown (1984a) notes, the development of new social forms integrating members of the larger society. The adoption of pottery technology during this period is likely to be related to food storage needs, and perhaps to changes in food preparation practices that in turn may be a function of changing dietary makeup.

In the latter part of this period there is evidence for the emergence of new social forms exemplified by the appearance of mound building and community planning at Toltec, and perhaps at Point Remove and Gober, and specialized burial practices in the Arkansas River Valley in Oklahoma. These practices are accompanied by the development of ritual and perhaps managerial social roles filled by some members of society. Community planning and residential precincts at Toltec are strong indicators that in the eastern part of the study area at least, a religious and political center managed by resident specialists was supported by a dispersed local population. There are formal differences between these two developments at the east and west ends of the study area, with an apparent emphasis on burial ritual in the west, and mound construction as foundations for residential structures in the east. Nevertheless, similarities in artifact assemblages testify to interrelationships between the two areas and to their contemporary evolution.

The rise of these two regional traditions undoubtedly was the result of a complex interplay between local population increases and external developments going on in the Lower Mississippi Valley at this time. Frank Schambach (1982a) notes a corresponding development of mound centers and burial ceremonialism in his Fourche Maline 7 period in the

Red River basin, which he equates with the Evans phase and places between ca 1250 B.P. and 1000 B.P. Artifact assemblages similar to those from Plum Bayou sites mark the initial period of burial ceremonialism and mound construction at regional centers like Crenshaw, Mounds Plantation, the Washington Mounds site, Bowman and Mineral Springs in southwest Arkansas and northern Louisiana (Schambach 1982a:182–183). Schambach postulates that the development of this phenomenon in the Red River is related to the rise of Toltec and culture change in the central Arkansas area. The relationship between the Toltec sphere and emerging societies in the Arkansas River Valley in Oklahoma is obscure, in part because of the woefully inadequate understanding of Woodland period populations in the intervening area.

Evidence of trade during this period is uneven. Small quantities of trade items from outside the region in the form of marine shell objects and copper appear primarily as occasional grave offerings and indicate only minor participation in long distance trade networks. Intraregional exchange, however, seems to be well developed. Stone and minerals from the southern Ouachita Mountains in particular were being moved in large quantities into and probably through the Toltec site to smaller domestic sites in the Plum Bayou settlement system and possibly to exchange centers outside the region. Similarities in vessel shapes and decorative styles on pottery in Evans phase and Plum Bayou components testify to sustained interaction up and down the Arkansas River between these two areas.

MISSISSIPPI PERIOD 1100–300 B.P.

OZARKS

Evidence summarized above suggests that by Late Woodland times the Ozarks were occupied by local groups scattered along some of the major waterways of the region. These communities made occasional use of rockshelter sites, most often for specialized purposes but sometimes for habitation. More permanently settled sites were concentrated on terraces overlooking fertile bottomlands. Small bits of evidence scattered among a few of these sites indicate that these populations were becoming more involved in the development of horticulture, incorporating new tropical domesticates such as maize. It is also clear that these groups still vigorously pursued hunting activities and made extensive use of native wild plant species. Whether domesticated crops actually outweighed native foods in dietary importance cannot now be determined. In fact, bioarcheological evidence presented below suggests that Late Woodland subsistence was still based primarily upon the intensive utilization of native wild plant and animal species.

There are further indications that by Late Woodland times social alignments were developing between some groups residing in the Ozarks and groups located elsewhere. For example, communities located in drainages flowing to the south and west (such as the Illinois River, Lee Creek and Mulberry Creek) show evidence in their artifact assemblages of alignment or affiliation with the Fourche Maline cultures of the Arkansas River Valley (Bell 1980; Galm 1984). By contrast, the northern portion of our study area may not have been occupied permanently during Late Woodland times. Rather, these territories may only have been used on an occasional basis by populations centered deeper in the Ozark Highland region of central Missouri.

Upon this indigenous Late Woodland population base developed the Mississippi period Ozark societies, which in recent years have been the subjects of much research and attempts at interpretation. The horticultural adaptations begun during Middle and Late Woodland times continued, and perhaps were intensified during the Mississippi period. As shall be argued below, however, levels of dependence upon domesticated plant resources probably did not remain stable throughout this period. Correspondingly, there is little evidence of any major shifts in settlement toward fully sedentary societies. Settlement patterns during the Mississippi period appear to remain much the same as they were during Late Woodland times. One possible exception to this pattern occurs among sites along the Grand River and lower Illinois River in northeastern Oklahoma. Here a more sedentary adaptation does seem to have developed (Wyckoff 1980). What is most notable about Mississippi period societies in the Ozarks, however, is the evidence we have for a marked increase in contact and interaction with groups in adjacent areas, particularly the Arkansas River Valley to the west and south, and the Mississippi River Valley to the east. This increased interaction is indicated by three lines of evidence: (1) the emergence and distribution of ceremonial mound centers throughout part of this region, (2) the character of artifact assemblages found on sites of this period, and (3) the distribution of exotic and, presumably, high status artifacts, many of which represent the Southeastern Ceremonial Complex, or Southern Cult (Brown 1976b). To facilitate discussion and comparison of trends in Ozark cultural development during the Mississippi period, the archeological evidence will be presented in terms of three loosely defined subareas: the Southwestern Fringe, the Central Ozark Interior, and the Eastern Fringe.

Mississippi period adaptations in the Ozarks take place during the Pacific climatic episode (Baerreis and Bryson 1965; Bryson et al. 1970), at which time changes in atmospheric circulation patterns brought drier summer conditions into the central Plains region. The on-ground effects of these conditions were to reduce effective moisture levels, which could have seriously affected agriculturally dependent populations. Pollen data from the Big Hawk Shelter in northeastern Oklahoma indicate that from 1150 to 450 B.P. there was a sharp rise in oak pollen and a corresponding decline in hickory, with grass pollens remaining stable (Henry 1978). This implies that the hickory element was largely displaced by oak in the upland forests. On the floodplains, forest associations may also have shifted toward a walnut/elm/oak association by the end of the first millennium A.D. The pollen profiles from Ferndale Bog and Natural Lake (Albert 1981) indicate a similar pattern. Sometime between 750 and 650 B.P. large, rapid shifts

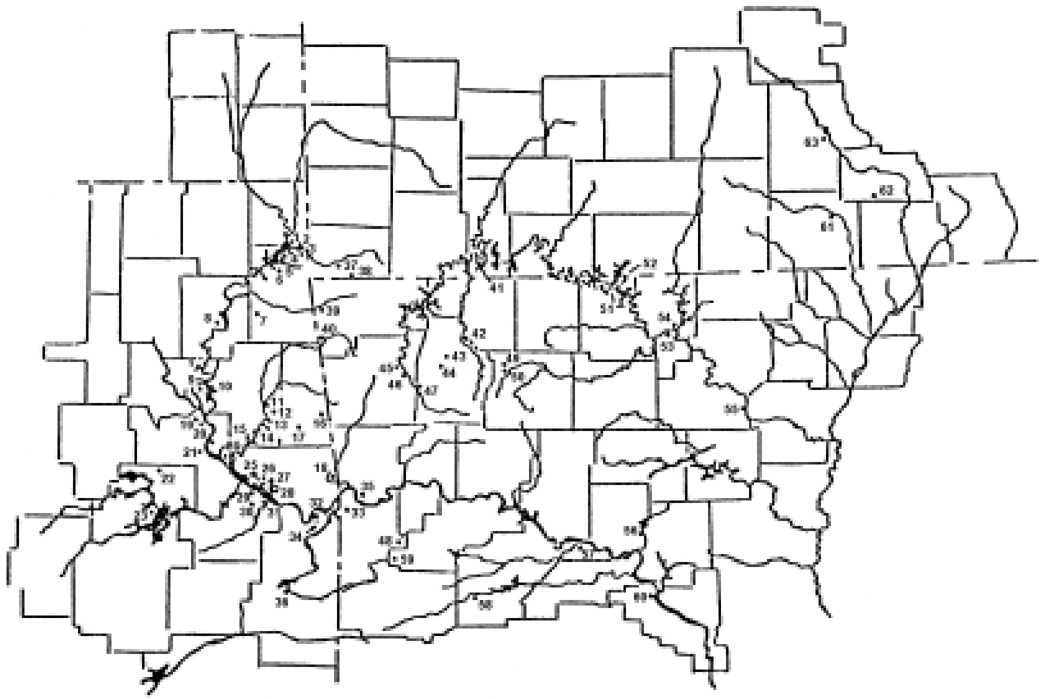

Figure 30. Locations of Mississippi period sites in the OAO study area
1. Guffy IV; 2. Huffaker; 3. School Land I and II; 4. Reed; 5. Smith I; 6. Neosho focus sites; 7. Pohly; 8. Jug Hill; 9. Norman; 10. Harlan; 11. Brackett; 12. Vanderpool; 13. Swimmer; 14. Morris; 15. Cookson; 16. Ewing Chapel; 17. Owl Cave; 18. Lee Creek Mound; 19. Hughes; 20. Wybark; 21. Goff; 22. Plantation; 23. Eufaula; 24. Cat Smith; 25. Sheffield; 26. Fine; 27. Norton; 28. Harvey; 29. Tyler-Rose; 30. Tyler; 31. Robinson-Solesbee; 32. Spiro; 33. Skidgel; 34. Braden Bottoms area (Littlefield, Choates, Lymon Moore, Edgar Moore); 35. Cavanaugh; 36. Wister Lake area; 37. Pineville; 38. Bontke; 39. Albertson; 40. Goforth-Saindon; 41. Table Rock Reservoir sites (Loftin, Vaughn I, Cantwell I, 23Z1, Jakie); 42. Holman; 43. Huntsville; 44. Turner Cave; 45. Collins; 46. Watt's Farm; 47. Poole; 48. Sliding Slab; 49. Cobb Cave; 50. 3NW539; 51. Wilkerson; 52. Newton; 53. Shipps Ferry; 54. Young; 55. Mill Creek; 56. Alexander; 57. Carden Bottoms; 58. Bluffton; 59. 3LO15; 60. Kinkead-Mainard; 61. Pigman Mound; 62. Gooseneck; 63. Owl's Bend

in the percentages of oak and pine pollen appear, and higher amounts of nonarboreal pollen accumulate. These data indicate some reduction in tree cover accompanied by increased erosion and spread of invading ground vegetation. Local erosional events are identified in at least two Oklahoma archeological sites dating to this period (Duffield 1969; Lopez 1973), and at a slightly earlier date (ca 1000 B.P.) channel trenching is noted in the Little Caney River valley (Hall 1977, 1978). However, this dry episode does not last long as indicated by increasing pollen influxes at Ferndale Bog and Natural Lake after 550–450 B.P. (Albert 1981).

The Southwestern Fringe

Mississippi period sites in the Ozark Uplift area of northeastern Oklahoma and adjacent portions of northwest Arkansas have recently been accorded placement within the cultural framework developed for the Arkansas River Valley and consisting of the successive Harlan, Spiro and Fort Coffee phases and the Neosho focus (Bell 1984b; Brown 1984a; Brown et al. 1978; cf. Wyckoff 1980). Ann Early will outline the general characteristics of the Harlan, Spiro and Fort Coffee phases in her treatment below of the Arkansas River Valley portion of our study area. Contemporaneous sites in the southwestern Ozarks portray many of the same material traits, such as the characteristic house architecture. Artifact assemblages are also comparable, but with one important exception. In the Ozark sites shell-tempered pottery occurs throughout the Mississippi period, whereas in the Arkansas River Valley grit- and clay-tempered pottery predominates until about 600 years ago, at which time shell-tempered pottery becomes prevalent. Wyckoff (1980) points to the occurrence of shell tempering in some Woodland period Ozark

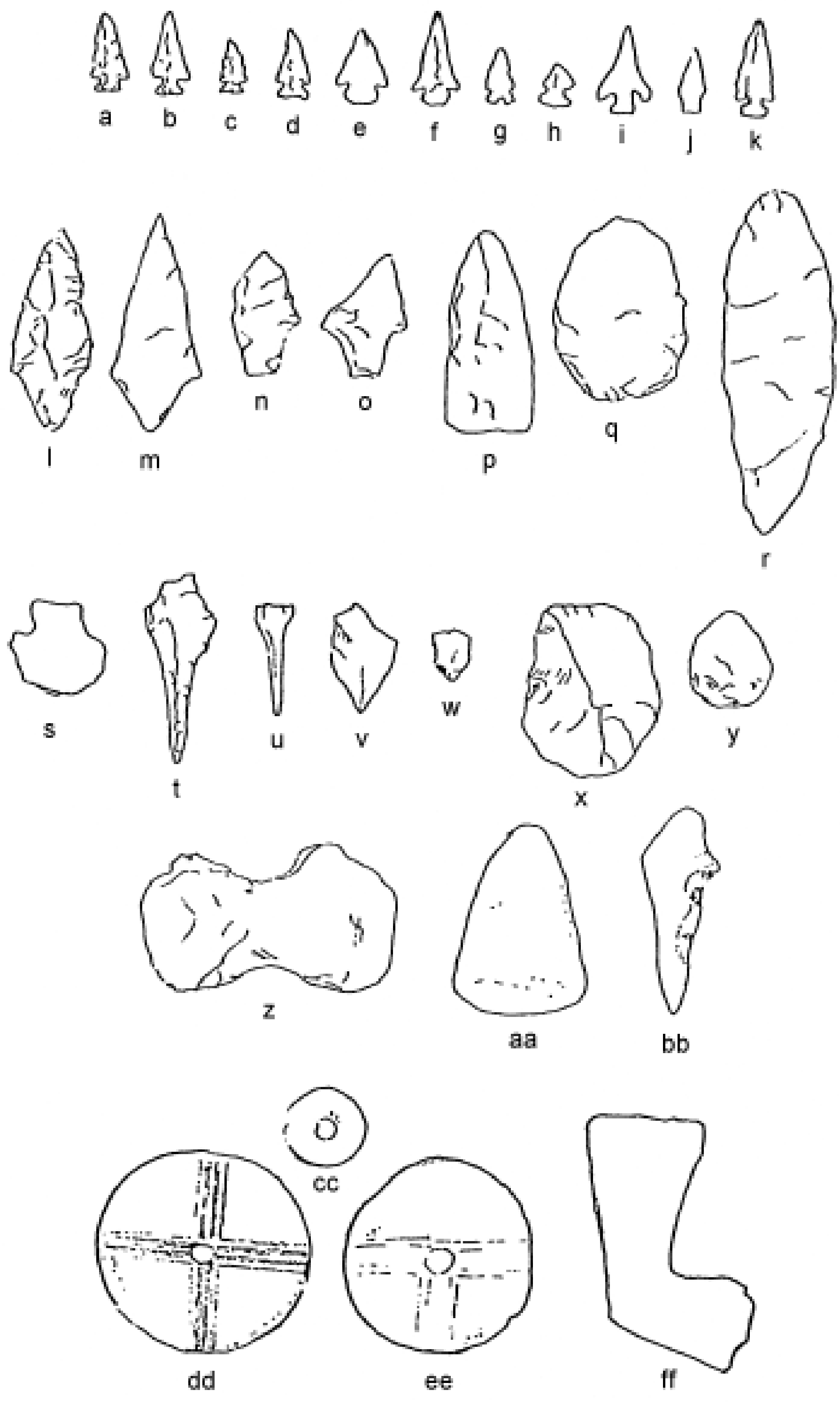

Figure 31. Mississippi period artifacts from the southwestern fringe subarea of the Ozarks (Harlan phase) a-k. notched arrowpoints; l-m. Gary points; n-o. Langtry points; p-r. knives; s. endscraper; t-u. drills; v-w. perforators; x-y scrapers; z. chipped double bitted ax; aa. ground stone celt; bb. bone awl or flaker; cc-ee. stone earspools; ff. pottery elbow pipe (after Bareis 1955)

complexes (e.g., Cooper) as an indicator of some level of technological and presumably cultural continuity in this area.

The following discussion will concentrate first on Ozark sites located within the drainage of the Arkansas River. Contemporaneous sites within the drainage of the White River in northwest Arkansas and southwest Missouri will be discussed as a separate unit within the southwestern fringe subarea.

The Harlan site is located within the Grand River drainage on the extreme western fringe of the Ozarks in Cherokee County, Oklahoma, and it is the type site for the Harlan phase. A large series of radiocarbon dates (see Bell 1984b:Table 10.1) from this and other sites establish the general time range of this phase as extending from 1050 to 700 B.P. (Bell 1984b:221). The Harlan site consists of five mounds arranged around an open area or plaza (Bell 1972, 1984b). A few houses indicated by buried postmold patterns were discovered in offmound areas of the site, but the lack of abundant midden debris suggests that the site did not serve as a primary village residence. Rather, Bell suggests, the site served as a "tribal mortuary and ceremonial center to which a dispersed supporting population gathered in times of crisis or to honor their dead" (19846:229).

This interpretation is supported by the character of the five mounds at the site. The largest mound, measuring 40 m in width, 49 m in length, and 43 m in height, was built in four major stages or episodes of construction. Before this mound was begun, a structure which had been built upon the original ground surface was destroyed. The mound was erected over the remains of this structure, and the orientation of the mound was aligned with that of the structure in all subsequent stages. Radiocarbon dates indicate that this mound construction took place over a period of some 200 years. Two other mounds at the Harlan site were interpreted as mortuary mounds. These contained structures which appeared to have been ceremonially destroyed. One of these mounds contained a single structure but the other one contained three superimposed structures, each covered over by a layer of earth. These submound structures were similar in outline to typical residential structures although their entryways sometimes contained an elevated clay platform and were often blocked by a post. These structures also lacked interior hearths and their floors had been cleaned of debris prior to destruction by burning. The occurrence of a few human skull fragments in these deposits suggests their function as temporary mortuaries. One of the other mounds at the site was a composite burial mound consisting of three conjoined units of decreasing size. Burials found in this mound were most frequently single flexed interments, but multiple burials, cremations, and bundle burials also occurred. These burials were distributed within the mound in such a way as to suggest three or four major periods of interment. Presumably at these times, remains of the dead were taken from the mortuary houses for deposition in the accretional burial mound. Burial goods were associated with slightly more than one half of the interments, with a trend toward increasingly elaborate goods accompanying the later burials. Earlier burials were typically accompanied by flint bifaces, bone pins, copper coated wooden pins, natural concretions, deer mandible sickles, stone pipes, black stone beads, galena chunks, stone celts, and Coles Creek Incised and Williams Plain pottery. The later burials more often were accompanied by such items as pulley-shaped earspools, wooden earspools, tubular shell beads, conch shells, ring type stone earspools, copper beads, effigy pipes, Woodward Plain pottery (Reed variety), and other pottery wares (Bell 1984b: 231). The fifth mound on the site contained an unusual large, rectangular feature consisting of limestone slabs. The function of this feature and the mound which contained it is not understood, and Bell suggests that it may in fact predate the Harlan phase occupation at the site. For reasons that are also poorly understood, the Harlan site evidently was abandoned about 700 B.P., at which time the Norman site, located on the Grand River only 5 km away, became the center of local ceremonial activity during the succeeding Spiro phase.

In addition to the Harlan center, a few other mound centers were established at this time along southwestern Ozark streams draining into the Arkansas valley. These include the Reed site along the Elk River, the Lillie Creek site along the Grand River, the Brackett and Goforth-Saindon sites along the Illinois River, and the Parris or Lee Creek Mound site along Lee Creek. Two other undated mound centers in this region which probably belong to the Harlan phase are the Ewing Chapel or Maconally site along a tributary of the Illinois River, and a mound site along the Elk River near Pineville, Missouri.

The Reed site (Thoburn 1931; Purrington 1970) seems to have been established at the beginning of the Harlan phase judging from two uncorrected radiocarbon dates of 1050 ± 60 B.P. (WIS-46) and 1020 ± 60 B.P. (WIS-49). These assays date a structure beneath the two-stage pyramidal mound at the site (Bender et al. 1965:404). An uncorrected radiocarbon date of 1090 ± 150 B.P. (M-819; Baerreis and Bryson 1965:73) for an offmound house structure at the site further indicates early Harlan phase activity. In addition to the pyramidal mound the Reed site also has one burial mound. The presence of at least 19 offmound house structures at the site suggests that Reed, unlike Harlan, also supported a sizable residential population. Eight additional radiocarbon dates (uncorrected; Bender et al. 1968:167) from the village area of the site range in age from 890 ± 55 B.P. (WIS-247) to 670 ± 55 B.P. (WIS-253).

Lillie Creek (Purrington 1970) was a somewhat smaller center than Reed, consisting of only a single mound. This mound was erected over a dismantled structure which may have been used for a special purpose. There is also evidence at this site for habitation by a small number of people. A single uncorrected radiocarbon date of 760 ± 90 B.P. (WIS-42) is available from the structure beneath the mound (Bender et al. 1965:403). The Parris or Lee Creek Mound also seems to have been a minor center at this time. Like the other centers the single mound at this site was built over the remains of a burned structure which has been radiocarbon dated at 1090 ± 230 B.P. (UGa-1846). A single archeomagnetic date of 925 ± 45 B.P. was obtained from a burned clay sample associated with this structure (Northcutt 1978:181–182). The Brackett

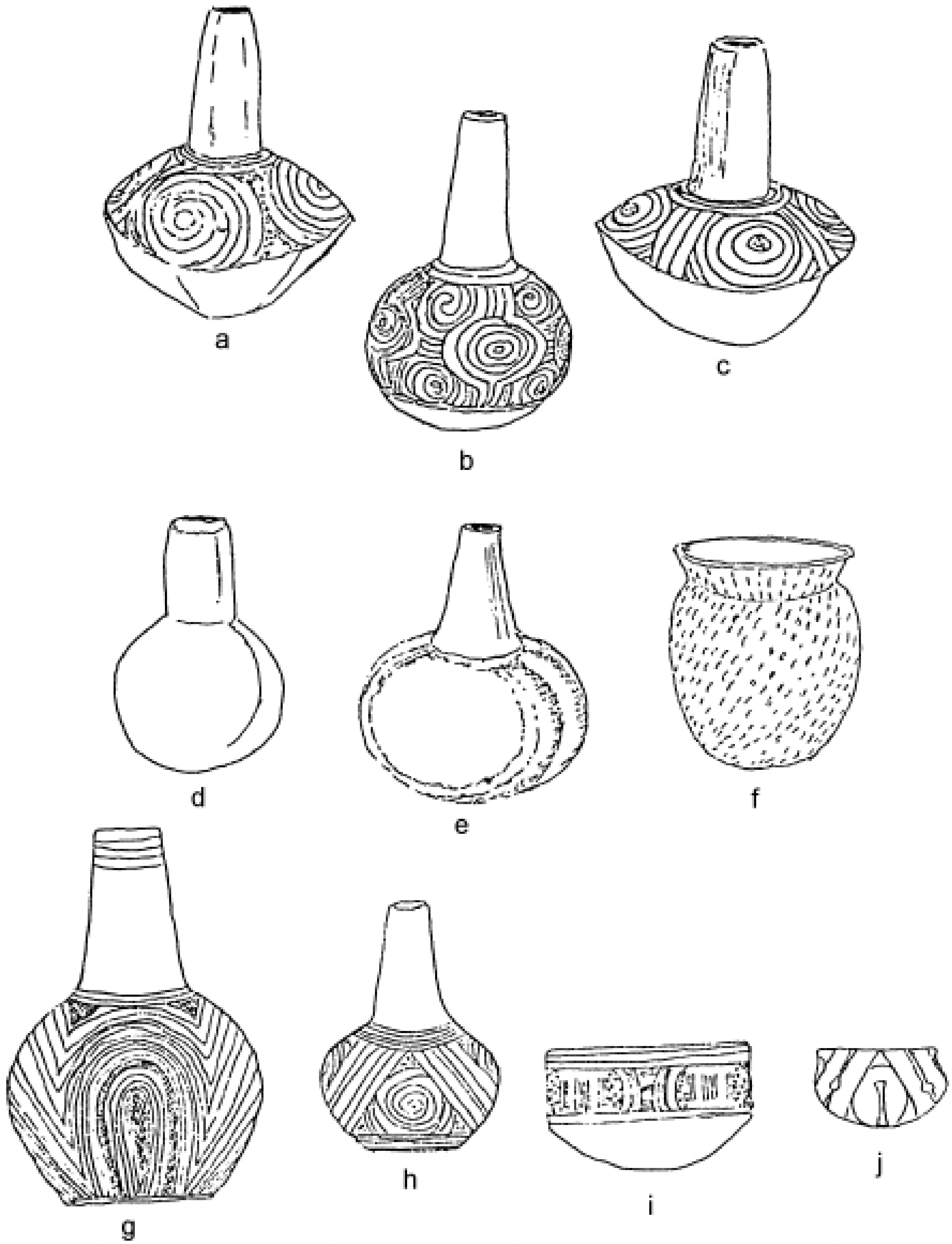

Figure 32. Mississippi period artifacts from the southwestern fringe subarea of the Ozarks (Harlan phase) a -j. Caddoan vessels from Huffaker and Brackett sites (after Baerreis 1954, Bareis 1955)

site located at the confluence of the Barren Fork and the Illinois River may have been established at the end of the Harlan phase as a third minor center. Its main period of occupation, however, seems to have been during the Spiro phase.

Farther up the Illinois River in present day Arkansas is the Goforth-Saindon site, a multiple mound center consisting of at least three smaller mounds and a single large mound. The arrangement of these mounds forms an irregular trapezoidal enclosure roughly comparable to the plaza area at the Harlan site. Excavations at Goforth-Saindon from 1982–1985 (Kay 1986; Kay et al. 1988) have concentrated entirely within the large mound, Mound 1. This mound presently stands about 3.5 m high, and measures roughly 53 m east-west and 41 m north-south. Lateral extensions from this mound which may have been ramps increase the overall dimensions to 105 m by 60 m. During the 1950s a large silo trench was excavated into this mound, extending deeply into the center from one lateral edge. Recent excavations have been concentrated largely within the silo trench, so that stratigraphic profiles and other details of mound construction could be observed with minimal damage to undisturbed portions of the mound.

Three major stages of construction were discerned. The Early Platform Stage consists of a prepared, fired clay surface which slopes gently away from its highest point near the center of the mound. The surface of this original low mound overlies a series of three superimposed house structures, the first of which was constructed in a shallow pit excavated into the original ground surface. The final house (Feature 355), which is the one best preserved, possesses features similar to the structures identified as mortuary houses at the Harlan site, including an entryway plugged with a deposit of clay and blocked with a post. The directional orientation of the Feature 355 house relative to the arrangement of other mounds at the site is also the same as one of the houses at Harlan (House 2 in Mound 4). Although excavations did not extend to the center of Feature 355 at Goforth-Saindon, so that the presence or absence of a hearth is not known, the floor of this structure was carefully cleaned of any debris prior to destruction by fire, and the plastered clay floor was even patched in several places. Of particular interest is the close correspondence in age between this structure and its analogue at the Harlan site. Two radiocarbon dates (C-13 adjusted) for Feature 355 are 904 ± 48 B.P. (SMU-1344) and 855 ± 49 B.P. (SMU-1517, preliminary). Four radiocarbon assays (weighted mean, Long and Rippeteau 1974) reported by Bell (1984) for House 2 in Mound 4 at the Harlan site give a date of 904 ± 30 B.P. In short, virtually identical mortuary house features at the two sites are also virtually identical in age.

The Intermediate Stage consists of a series of small mounds which were erected on top of the Early Platform Stage. These mounds were distinctive in that they contained a core of alternating light and dark colored sediments encased in an outer skirt of black clay. However, the black clay skirt also contained thin lenses of ashy gray silt, producing a negative image of the "zebra striped" inner core. These mounds were subsequently remodeled, and finally they were enclosed within a single flat, prepared fired clay surface. One archeomagnetic date has been obtained for this surface indicating its construction took place about 725 B.P. (Dan Wolfman, personal communication).

The Late Platform Stage is represented by a series of four flat topped mound surfaces, the first being the one just described There is evidence in the form of silt berms, occasional postmolds, and puddled clay floor areas, indicating that structures were erected on these surfaces. In places stratified berms are vertically aligned, indicating maintenance through time of certain spatial orientations.

In addition to its close resemblance with the Harlan site, one other characteristic of the Goforth-Saindon site can be mentioned. Ralph Merletti has compared the placement of the mounds on the site with the winter and summer solstice angle of incidence (approximately 29 1/2 degrees north and south from the east-west directions on the horizon for the 36 degrees North latitude of northwest Arkansas; Koeppe and DeLong 1958:152), and has identified possible solar equinox alignments between Mounds 1 and 2, and between Mounds 3 and 4. These celestial alignments may represent a significant difference between Goforth-Saindon and Harlan, in that the latter site does not appear to exhibit an astronomical arrangement of mounds (Sherrod and Rolingson 1987).

These southwestern Ozark mound centers indicate that new forms of social and ritual activity promoting local group solidarity had been adopted by the beginning of the Mississippi period. Apparently one of the most important aspects of mound ceremonialism involved specialized treatment of the dead. This treatment was accorded only to some members of the society, indicating that in some localities social stratification had developed in which an elite caste was recognized. This elite caste may have consisted of priestly chiefs whose status derived from their hereditary lineage. In many historic Native American societies such individuals often traced their lineages back to some mythic hero or leader. The widespread distribution of mound centers in the western Ozarks suggests, at any rate, that interaction among local groups participating in these rituals was very important.

Don Wyckoff (1980) has summarized data concerning other types of sites in the southwestern Ozarks which may be taken to represent the settlement pattern of the Harlan phase. In addition to the ceremonial centers described above (or community centers in Wyckoff's terminology), other sites include settlements (equivalent to the often used terms farmstead, hamlet, and village), base camps, and secondary camps. Two settlements which are known for the Ozark portion of northeastern Oklahoma are the School Land I and II sites (Duffield 1969). Both sites are located on terraces along the Elk River just upstream from its confluence with the Grand. Wyckoff interprets School Land I as a major village consisting of at least 10 houses arranged around an elliptical plaza. Midden deposits are extensive at the site, and four sets of overlapping house floors attest to a lengthy period of occupation. By contrast, School Land II is a smaller settlement with only two partially overlapping house structures. One burial was identified at this latter site.

The Huffaker (Baerreis 1954, 1955) and Jensen (Wyckoff and Barr 1964) sites are examples of Ozark base camps. Both are large open sites similar to the settlement type except that they represent a less permanent occupation. For example, no evidence of house structures could be identified at either of these sites, although Huffaker did have a sizable cemetery area. Two secondary camps have also been identified, the Houston site and site CK-34. The artifact assemblages from these temporarily occupied sites include items associated with hunting and gathering activities and with stone toolmaking. Few gardening tools such as hoes are found on these sites.

The subsistence base of Harlan phase populations in the southwestern Ozarks is poorly documented. Large, permanently occupied settlements like School Land I imply a horticultural economy but there is little hard evidence of this. Of course, this site like many others in northeast Oklahoma was excavated in the 1930s by WPA crews when the technology for collecting minute carbonized plant remains did not exist. Preliminary examination by Gayle Fritz of carbonized materials from flotation samples collected recently at the Goforth-Saindon site has identified the presence of cucurbits (squash or pumpkin) and maize (Fritz, personal communication). Otherwise, horticultural activities can only be inferred on the basis of a pronounced tendency for settlements and base camps to be located in areas where arable soils are most extensively distributed, and upon the occurrence at these sites of gardening tools, such as hoes, and other plant processing implements.

Lathel Duffield's analysis of faunal remains from the School Land I and II sites clearly indicates, however, that hunting continued to be an important supplier of dietary and other material resources. The large bone samples recovered from these sites indicate that Harlan phase hunters pursued a wide variety of species, including beaver, bison, bobcat, deer, dog, elk, opossum, rabbit, and raccoon. Of these species deer and bison were the most frequently represented. Catfish, gar and turtles were taken from streams, and owls and turkeys were caught. Comparison of faunal samples between these sites indicated an important difference in the relative amounts of deer and bison. Using weighted bone counts (after Baerreis and Bryson 1967), Duffield found that deer constituted 86% of the faunal sample from School Land I versus roughly 13% bison. At School Land II an opposite pattern was found: here bison represented about 70% of the sample with deer accounting for only about 24%. The most tempting way to interpret these data is by recourse to environmental changes through time, with the School Land II assemblage representing an adaptation to more prairie-like conditions not present at the time of the School Land I occupation. But as Duffield notes (1969:64), the radiocarbon evidence from these sites does not suggest any significant difference in age. Perhaps this difference in animal utilization relates to seasonality, or to Wyckoff's observation that these two site represent, in fact, two different settlement types.

The Spiro phase represents a continuation as well as an elaboration of trends in cultural development underway during the Harlan phase. According to James Brown (1984b) the Spiro phase dates between 700 and 500 B.P. (cf. Wyckoff 1980).

As mentioned above, toward the end of the Harlan phase, burial ceremonialism was shifted to the Norman site located only a short distance away along the Grand River. The Norman site (Finkelstein 1940) contains four mounds including one large circular mound measuring 2.1 m in height and 33 m in diameter, one small circular mound measuring 0.45 m in height and 13.5 m in diameter, and two sets of conjoined mounds each with two units. The large circular mound was constructed in two stages. Structural remains were identified both on top of and beneath the first stage. The smaller circular mound was not investigated. One of the conjoined mound sets covered the remains of three rectangular buildings, and one of the mounds comprising this set also contained a sequence of five flat topped surfaces capped by a final conical stage. The other set of conjoined mounds contained 73 burials. All but four of these appeared to be bundle burials consisting of disarticulated groups of bones. Two cremations contained in jars were found, and a third cremation was identified in a prepared basin. Some of the bundle burials were accompanied by grave goods including ceramics, arrowpoints, pipes, and copper plates. One burial was interred with pipes, earspools, shell beads, and arrowpoints arranged on a cedar bark carpet. Offmound house remains and midden areas further indicate that a small population resided at the Norman site, perhaps the caretakers or chiefs.

Other ceremonial centers used during the Spiro phase in the Arkansas River portion of the southwestern Ozarks include the previously described Brackett and Ewing Chapel sites (Wyckoff 1980:306–307) and the Goforth-Saindon site. Based on the single archeomagnetic assay of 725 B.P. from the latter site, the Late Platform Stage at least partially overlaps the Spiro phase. Unfortunately, we do not have a terminal date for this stage as yet. Relatively little is known about the other two sites. The Brackett site consists of a single mound built in three stages, eight offmound houses, and a small cemetery area (Bareis 1955). Twenty-five individuals were buried in the cemetery. These individuals were interred in a semiflexed position and some of them were accompanied by grave goods including chipped and ground stone artifacts, pipes, and ear spools. At the base of the mound were two additional burials.

It is interesting to note that, as far as we can presently tell, the burial program at Spiro phase mound centers in the southwestern Ozarks represents a high level of continuity with that of the preceding Harlan phase. In particular, there does not seem to be any indication of the development of exceptionally elaborate, very high status burials such as those seen at the Spiro site.

Wyckoff (1980) identifies four sites along the Illinois River in Oklahoma as settlements dating to the Spiro phase interval. These are the Morris (Bell and Dale 1953), Cookson

(Israel 1979), Vanderpool (Harden and Robinson 1975), and Swimmer (Wenner 1948b) sites. These sites all contain evidence of dispersed house structures with associated middens and nearby cemetery areas. All of these sites are located downstream from the Brackett ceremonial center, and therefore may represent some of the local populace who built that center and who periodically attended the important social or religious ceremonies that took place there. Similarly, Mississippi period sites located along lower Lee Creek (Muto et al. 1980) and along upper Lee Creek (Trubowitz 1980) have been interpreted as representing communities related to the Lee Creek ceremonial center, or Parris Mound.

A number of rockshelter sites in northeastern Oklahoma are also interpreted by Wyckoff as Spiro phase base camps. Owl Cave (Lawton 1964), for example, contained artifacts representing primarily food-getting activities in contexts suggesting temporary habitation. A burial area was also found in this shelter containing the remains of possibly three individuals, although disturbance by relic seekers made impossible a more specific identification. Several sherds of engraved ceramics including one piece illustrating the extended claw of what looks like a raptorial bird were found at this site. Lawton initially identified these as Woodward Engraved but Brown more recently has ascribed them to the type Poteau Engraved (1984b:Fig. 11.4). The Albertson site (Dickson 1988) in northwest Arkansas contained two Mississippi period components which have not been dated but which probably fall within the Spiro phase. Artifacts reflecting the collecting and processing of animal and plant resources, hideworking, stone-bone-woodworking, and stone tool production were found in these components. Evidence of cooking and food storage was also noted, and the presence of some fired daub suggests that an enclosure of some sort may have been erected within the shelter.

Spiro phase base camps also include open sites located on stream terraces (Wyckoff 1980:317). For example, the Guffy IV site (Purrington 1970) located along the Cowskin River in Oklahoma contained midden deposits and artifacts indicating that in addition to hunting and maintenance tasks, the site's inhabitants may have engaged in some seasonal farming. Interestingly, the two Ozark sites identified by Wyckoff (1980:321) as secondary camps of this period also contain chipped stone hoes in their assemblages.

Spiro phase subsistence is not particularly well documented for the Ozarks although some relevant data exist from rockshelter sites formerly attributed to the Ozark "Bluff Dwellers," but now thought to represent primarily Spiro phase occupations (Brown 1984a, 1984b). At these sites squash, maize, beans, gourd, sunflower, goosefoot and sumpweed appear to be fairly common domesticates, but intensive utilization of native plants is also indicated (e.g., Gilmore 1931; Yarnell 1981). Fritz (1986a) has recently provided an extensive review and assessment of the plant food remains preserved in one typical set of rockshelter assemblages. Maize and squash were also identified in one of the possibly Spiro phase components at the Albertson site (Dickson 1988). An analysis of the faunal remains from that site (Barnett 1982) indicates that hunting remained an important activity focused particularly on the capture of deer. This evidence is consistent with other data from the Ozarks at this general time level (e.g., Cleland 1965; Medlock 1978).

The Spiro phase of the Arkansas River Valley sequence is followed by the Fort Coffee phase and the Neosho focus. The Fort Coffee phase is widely regarded as representing a continuum with the Spiro phase although several cultural changes are evident, most notably a decline and eventual termination in the elaborate ceremonialism associated with the mound centers. The taxonomic status of the Neosho focus and its relationship to the Harlan-Spiro-Fort Coffee sequence is less well understood (e.g., Brown 1984a; Rohrbaugh 1984).

As Ann Early notes in her review, there is little evidence for the continued usage of ceremonial centers in the Arkansas River Valley during the Fort Coffee phase. Even the premier center at Spiro lacks evidence of major ritual activity during this period. This is not quite the case for the southwestern Ozarks. The Norman site continued in use at least as a burial repository, and 59 additional burials were interred there during this period. Based on the artifacts accompanying these burials this activity occurred after 550 B.P. However, in contrast to the Spiro phase burials at this site, none of these later burials contain exotic, high status items. Utilitarian goods including knives, scrapers, arrowshaft smoothers, grinding stones and pottery are now placed in the graves of the dead. These items are the same as materials commonly found on contemporaneous settlements and base camps along nearby stretches of the Grand River, and indicate that Fort Coffee phase society may have dropped the elite caste distinction maintained during the preceding Harlan and Spiro phases. "More than likely, residents of these sites were continuing the tradition of returning their dead to this once-prominent center" (Wyckoff 1980:327).

The Cookson site (Israel 1979) may be identified as one example of an Ozark Fort Coffee phase settlement. Occupation of this site continued after the Spiro phase occupation mentioned above. The later occupation is represented by the remains of three houses strung out along the Illinois River terrace, and a cluster of some 32 refuse pits located at a distance of about 100 m from the houses. A single burial is also attributed to the Fort Coffee occupation. The Fort Coffee assemblage at the Cookson site includes a bison scapula hoe and two digging stick tips made of bison bone. These and a few other items may indicate contact with the Plains regions to the west. Small triangular arrowpoints and Neosho Punctate pottery also point to some relationship with the Neosho focus.

Wyckoff (1980:332–333) suggests that the widespread occurrence of storage pits during this period indicates that the residents of these sites may be leaving them for longer periods to occupy other sites in other areas, at least on a seasonal basis. If true, this would represent a significant shift in settlement and adaptation from the preceding Harlan and Spiro phases.

Base camps of the Fort Coffee phase include both rockshelters and open sites. The large number of such sites

(Wyckoff 1980:Figure 41) further indicates that residents of the Fort Coffee settlements (which tend to be located along the lower stretches of Ozark draining streams close to the Arkansas River Valley) were seasonally using upland resources more intensively than were their Spiro phase predecessors. Examples of rockshelter base camps include the Smith (Hall 1951) and Pohly (Ray 1965) sites. Artifacts from these sites including arrowpoints, knives, scrapers, drills, awls, grinding stones and pottery indicate that the procurement and processing of food and other natural resources were the major activities. Middens, hearths, and a few burials occasionally found permit these sites to be distinguished as a class from the more temporarily used secondary camps. The occurrence of hoes made of bison bone and shell at the Smith and Pohly sites also indicates that some local gardening may have taken place. Open base camp sites include the Guffy IV site (Purrington 1970) and the Barren Fork site (Walks 1973). The artifact assemblage from the Guffy IV site includes chipped stone hoes, and several burials and a midden area occur on the site. The Barren Fork site is much smaller, consisting of a single pit, one burial, and a small collection of artifacts.

Further into the Ozarks of northeast Oklahoma, a concentration of sites in Delaware County near the confluence of the Elk River and the Grand River has been attributed to the Neosho focus (Baerreis 1939a, 1940a, 1941; Baerreis and Freeman 1959, 1961; Bell and Baerreis 1951; Freeman 1959a, 1962; Rohrbaugh 1984). The material assemblage characteristic of Neosho focus sites has been summarized by Freeman (1962) and includes unnotched triangular arrowpoints (Fresno, Shetley) and the shell tempered pottery types Woodward Plain (Neosho variety) and Neosho Punctate. Of these traits, Neosho Punctate pottery appears to be the singularly most diagnostic element of the Neosho focus assemblage. Rohrbaugh (1984: 283–284) elaborates other differences between the ceramic assemblages of the Fort Coffee phase and the Neosho focus. Other material traits such as beveled edge chipped stone knives and tools made of bison bone are thought by Freeman to indicate relationships with or influences from protohistoric Siouan groups to the north and west. This idea has been strongly supported by Chapman (1959, 1974b), who traces the historic Osage of southwest Missouri from a late prehistoric Neosho focus base. The temporal duration of the Neosho focus extends from about 500 to 300 B.P.

Neosho focus site types include settlements as well as base camps and, perhaps, secondary camps. The best example of the settlement type is the Jug Hill site (Wyckoff 1964a; Wyckoff et al. 1963) along the Grand River. Two uncorrected radiocarbon dates from this site (Wyckoff 1964a:5) are 550 ± 100 B.P. (O-2162) and 325 ± 100 B.P. (O-2126). The Jug Hill site seems to represent a small permanent settlement, as indicated by postmolds forming a rectangular house pattern. This house contained two storage pits and a hearth area. A few more pit features were identified outside of the house area. A copper tinkler, a rolled copper cylinder, and a triangular copper fragment from the site suggest that the occupation may in fact date to the period of indirect or (less likely) direct contact with Europeans. On the other hand, Wyckoff points out that since the cultural stratigraphy at the site was mixed and since these artifacts were not retrieved from features, a contact era interpretation for this Neosho component would not necessarily be warranted. Turning to Chapman's hypothesis for a generative relationship between the Neosho focus and the historic Osage, Wyckoff compares house form, refuse pit form, and artifact traits from the Jug Hill site with other historic Osage sites. There are both similarities and differences in these comparisons, but in general the findings at Jug Hill are in accordance with the postulated relationships between Neosho and the Osage (Wyckoff 1964a:50).

A number of base camps found within rockshelters as well as in open situations along river terraces have been described by Freeman (1959, 1962; see also Kerr and Wyckoff 1964; Purrington 1970). In identifying the characteristics of these sites Freeman makes the following statement:

> The wide variety of artifacts present in Neosho focus components in rockshelters, hunting tools, tools for preparing hides, sewing, pottery for cooking, indicate that many activities were carried on in the rockshelters. These sites are most probably year round dwelling places for one or two families. The open sites were not large enough to have been summer dwelling places for the entire Neosho focus population in Delaware County, but could have been gathering spots for a few families engaged in gathering or agricultural activities. (Freeman 1962:6)

Burials occasionally found in rockshelter base camps are described by Freeman as representing extended or flexed interments occurring either singly or in groups. Grave goods generally are sparse, but sometimes include ornamental items such as beads, along with utilitarian artifacts (cf. Baerreis et al. 1956).

Several classes of artifacts including hoes and milling basins suggest that horticulture may have been an important part of Neosho subsistence organization although no cultigens were recovered from the Oklahoma sites. In fact, preservation conditions at these sites were so poor that little evidence of any kind concerning subsistence was recovered.

Two important Neosho focus components — one in southwest Missouri and one in northwest Arkansas — have recently been studied and provide additional information on the settlement and subsistence characteristics of this cultural unit. The Bontke Shelter in southwest Missouri was excavated in 1972 by the University of Arkansas Museum and is the subject of an M.A. thesis by James Cobb (1976). This site produced abundant cultural materials from an intensively occupied Neosho component for which two uncorrected radiocarbon dates are available. These are 565 ± 50 B.P. (WIS-724) and 525 ± 60 B.P. (WIS-714). This component directly overlies an earlier Mississippi period component reflecting a minor occupation of the site estimated to date between 1000 and 500 B.P., during which time the shelter is thought to have been used as a seasonal hunting camp.

The Neosho component at Bontke is typologically characterized by Woodward Plain and Neosho Punctate ceramics,

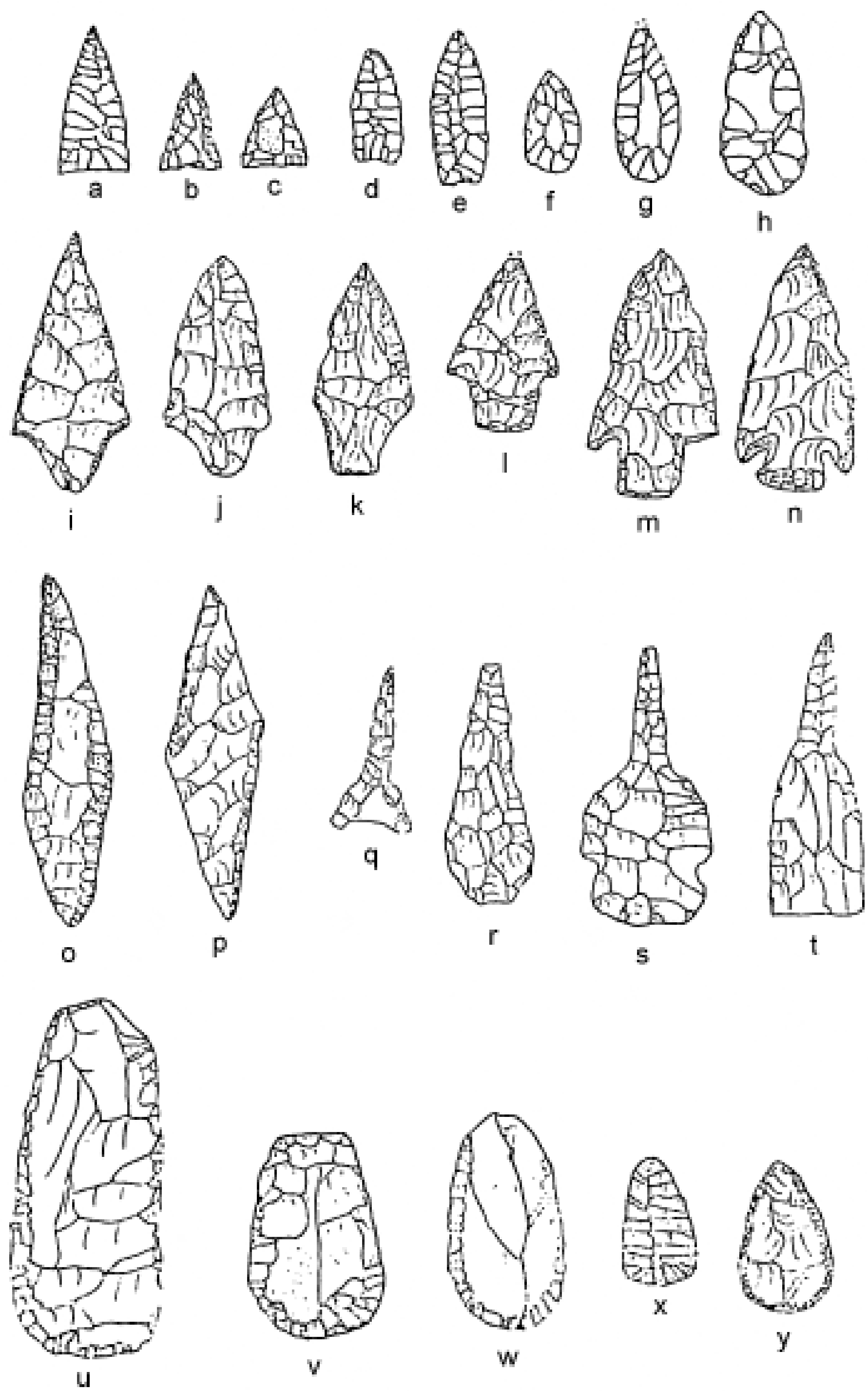

Figure 33. Mississippi period artifacts from the southwestern fringe subarea of the Ozarks (Neosho phase) a-h. arrowpoints; i. Gary A point; j. Gary B point; k. Langtry A point; l. Langtry B point; m-n. Smith Barbed; o-p. beveled Harahey knives; q-t. drills; u-y. scrapers (after Freeman 1962)

and by triangular Fresno arrow points. Other artifacts were found reflecting hunting, processing of animal and plant products, stone tool production, bone-antler-woodworking, and hideworking. Specially prepared pits were used to store food at the site. A central living area was kept free of trash, which accumulated only along the walls of the shelter and in refuse pits. Cobb interpreted the occupation of the site as representing an extended family base camp inhabited from fall through spring. During these seasons, deer hunting and acorn gathering were the primary subsistence pursuits. Cobb also suggested that the Bontke Shelter represented one major component of an annual settlement pattern that also included spring/summer base camps. The latter were thought to be located in river bottomlands where horticultural activities were carried out.

The Neosho component at the Albertson site (Dickson 1988) in northwest Arkansas commences directly above a hearth in Stratum 1, radiocarbon dated at 450 ± 105 B.P. (UGa-3942, uncorrected). Artifacts associated with this component include several varieties of dart points in addition to Shetley, Maud, and Fresno arrowpoints and Woodward Plain and Neosho Punctate pottery. Other artifacts can be grouped into the same functional categories as those identified by Cobb at the Bontke site. In fact, Dickson interprets the Albertson component as representing a similar kind of fall-spring, extended family hunting and gathering base camp.

Jim Barnett's (1982) analysis of deer teeth from the the Albertson site indicates that hunting pressure was significantly intensified during the Neosho period. The character of the faunal assemblage further suggests that communal deer drives might have been employed in place of earlier solitary stalking techniques. In a separate study of late prehistoric nut use in the Ozarks, Jerry Hilliard (1980, 1986) examined samples from the Bontke Shelter and several other rockshelter sites in northwest Arkansas. The evidence from these sites indicate quite clearly that acorns were a particularly important resource. Preference for the more nutritious acorns from the red oak group and the development of elaborate storage techniques in dry rockshelters (not all of which date with certainty to the Neosho period, however), give further indication that acorns were highly prized. In considering the uses of acorns by North American Indians Hilliiard also shows that this resource may serve as an important and easily obtainable alternative to maize. To the extent that Hilliard's findings may be regarded as reflecting trends within Neosho subsistence organization, these data in combination with Barnett's conclusions raise important questions about the relative importance of Neosho horticulture. An argument could be made based on these data that during very late prehistoric times gardening was less important that it previously had been. It would be tempting to attribute such a shift to changing environmental factors, and the paleoclimatic data we have for the region does suggest decreasing annual precipitation, and therefore, decreasing levels of effective soil moisture can be inferred. This possibility needs to be investigated further, especially since the topographically diversified character of the Ozarks would result in many regional differences in the ecological effects of climatic changes.

The information from the Bontke and Albertson sites may also bear upon the poorly understood relationships between the Neosho focus and earlier Mississippian phases. The stratigraphic and chronometric positions of these components are clearly separated from the earlier Mississippi period components at both sites. However, in both cases strong stylistic similarities may be observed in the lithic and ceramic assemblages of these components. This is especially true at the Albertson site where the Mississippi period components were relatively prolific. Also at both sites, material traits portray "influences" from the Mississippi valley (e.g., Nodena arrowpoints) as well as from the southern Plains (e.g., beveled knives, the punctate mode of ceramic decoration, triangular shaped scrapers, and certain bone tools) during the Neosho period. In light of the strong evidence for cultural continuity with earlier Mississippi period components at these sites, this evidence may indicate that during Neosho times social networks extending into the Mississippi valley, and out onto the southern Plains were intensified, resulting in the acquisition of new materials as well as, presumably, new ideas. Therefore, the Neosho focus may reflect more of a cultural shift among indigenous populations, rather than an influx of new people into the region as has been suggested by others (e.g., Purrington 1970).

In the upper White River drainage of northwest Arkansas and southwest Missouri, Mississippi period cultural developments parallel those of the Arkansas River drainage in many ways. The most important point of comparison is the development of ceremonial mound centers which are very similar to those found in the Arkansas River Valley area. Although information on other settlement types is far more limited in the White River drainage than in the Arkansas River area, the few secure data we do have point to a similar settlement adaptation.

Work in the Table Rock Reservoir area (Chapman et al. 1960) identified the first group of sites in this region to be recognized as reflecting a major Mississippi period manifestation. These sites include one ceremonial mound center, the Loftin site (Henning 1960a, 1960c; Marshall 1960b; Wood and Marshall 1960), as well as the Vaughn I and Cantwell I sites which are interpreted as village settlements (Chapman and Bray 1960; Marshall 1960a). These sites along with 23OZ1 have since been used by Carl Chapman (1980) to define the Loftin phase, which is considered to be roughly contemporaneous with, and related to, the Harlan phase of the Arkansas River Valley sequence. Radiocarbon dates from the Loftin, Jakie, and Vaughn I sites support a temporal placement between 950 and 700 B.P. (cf. Pertulla 1983; Kay et al. 1988).

Much valuable information on the Loftin site has been published in a recent volume (1983) of *The Missouri Archaeologist*. The single mound at the Loftin site is described by Hillman and Gearhart (1983) as measuring 1.2 m in height and about 30.5 m in diameter. Excavation of the mound identified

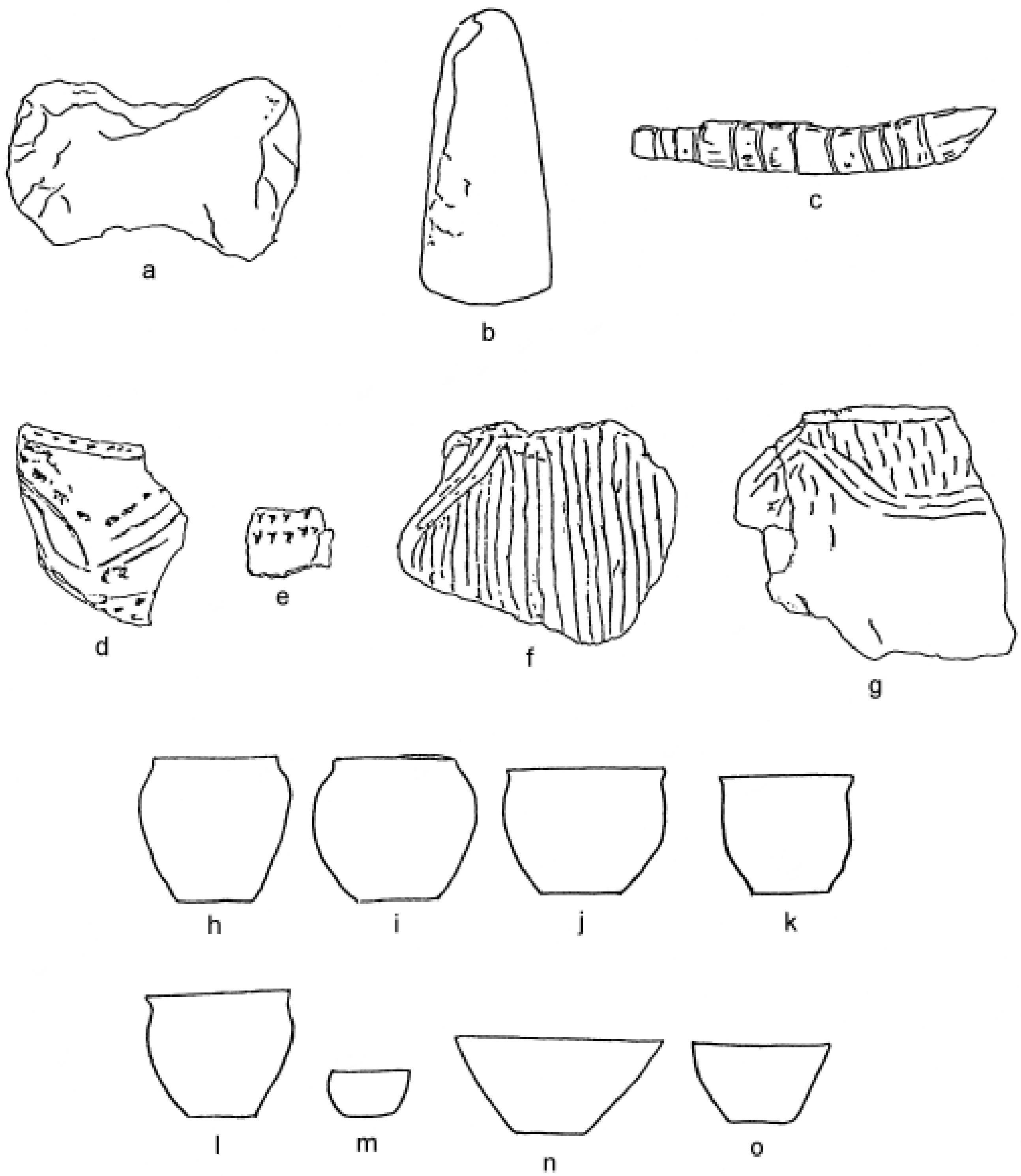

Figure 34. Mississippi period artifacts from the southwestern fringe subarea of the Ozarks (Neosho phase) a. chipped double bitted ax; b. ground stone celt; c. bone rasp; d-g. Neosho Punctate rim and body sherds; h-o. Neosho Punctate and Woodward Plain vessel forms (after Freeman 1962)

its primary feature to be a large, rectangular earthen enclosure. The walls of this enclosure consisted of black clay encasing a core of yellow or orange colored clay. Berms of dark gray clay extended perpendicularly from both sides of one of the enclosure walls. Prior to the construction of this unusual feature, the ground had first been leveled and prepared with a thin layer of gray clay. Beneath this layer some village refuse including shell tempered sherds and other Mississippi period artifacts were found, along with the remains of a rectangular house structure. In contrast to the specially prepared and burned houses found beneath mounds at the Harlan and Goforth-Saindon sites in the Arkansas River drainage, the submound structure (House 5) at the Loftin site had a central hearth and it was not destroyed by fire, as indicated by wall posts that had deteriorated naturally or else were removed (Reeder 1983: 17). In addition, some artifacts were found lying on the floor of the house and just beyond the wall line. This evidence suggests the house had served as a dwelling, in contrast to the submound houses at Harlan and Goforth-Saindon sites. However, the fact that the mound was constructed over it raises the possibility that House 5 may have served some special purpose other than as a temporary mortuary. A few scraps of burned and unburned human bone found on the surface of the mound and in the fill within the rectangular structure suggest that the mound and/or the earthen enclosure may have served some ritual function associated with the treatment of the dead. Further interpretations of the mound have not been made, nor is the relationship between the mound and the earlier House 5 clearly understood.

Four additional houses excavated at the Loftin site are described by Reeder (1983). House 1 was a square structure measuring about 9 m on a side and exhibiting four interior support posts and a central fireplace. This house had been destroyed by fire. Scattered across the fired clay floor of this house were the charred remains of cane and timber wall and roof components, as well as a small variety of stone and ceramic artifacts and some charred acorns. Though somewhat smaller in size House 2 was similar in its features to House 1, except that it had an entryway of postmolds extending from one of its walls. This house apparently was not destroyed by fire although it did have a baked clay floor. Numerous artifacts were scattered about the floor, including chipped and ground stone tools, hematite chunks, and a small Woodward Plain bowl. Four small pits filled with charcoal and earth also were found in this house. Houses 3 and 4, both smaller than House 1, had only a few associated artifacts. House 3 had two interior support posts and a central fireplace. House 4 had four interior support posts and two interior pit hearths.

At the Cantwell I site the remains of a burned structure similar to those at the Loftin site were uncovered. Burials were excavated at the Vaughn I site containing burned human bones. Four unburned human skulls also were included in a burial accompanied by a hematite pendant and a Davis Incised vessel. A radiocarbon date of 890 ± 150 B.P. (uncorrected, Crane and Griffin 1961:114) was obtained from a sample of charred bone from this feature. At 23OZ1 semiflexed burials (one of which was accompanied by a trophy skull) were excavated along with a pit feature containing burned rocks, animal bones, mussel shell, galena, and Marginella shell beads. Chapman (1980:141–142) lists additional material traits of the Loftin phase.

A number of other sites identified in the Table Rock Reservoir area containing Loftin phase assemblages (Chapman 1980:142; Pertulla 1983) include rockshelters and open sites. Many of these sites can be interpreted as base camps (e.g., Jakie Shelter), suggesting that the settlement pattern of the Loftin phase was much like that of the Harlan phase. Charred cobs of maize from House 1 at the Loftin site (Trader 1983) in addition to maize, squash, gourd, and sunflower remains from other sites in the Table Rock area (Harvey 1962) indicate a subsistence organization based partly on horticulture. A wide variety of native animals and plants also were utilized.

A second mound center in the White River drainage area is the Huntsville site, located in northwest Arkansas along War Eagle Creek. This site contains four mounds, three of which had large holes dug in them by amateur archeologists during the early 1960s. In 1980–1981 additional excavations were undertaken in Mound A, the largest of the four on the site, which measures about 3 m in height and 40 m in diameter (Sabo 1986; Kay et al. 1988). Mound A was trenched by an 18 m by 2 m excavation unit extending from the disturbed central portion of the mound to one lateral edge. Additional 2 m square excavation units were dug across the top of the mound to partially trace out structural features recognized in that area. These excavations disclosed four stages of mound construction, and in one small area premound deposits were reached.

In 1985–1987, Marvin Kay conducted further excavation in Mound A, completing excavations of the main trench down to premound sediments. Stage I represents the construction of a flat topped mound built on top of a low natural mound. One hearth was identified in the first stage sediments, but the subsequent excavation of large basins into Stage I sediments during later episodes of mound construction obliterated any evidence for other early mound features. During Stage II, additional surfaces were added, into which several large basins (some overlapping) were dug. Some of these basins contained structures indicated by wall trenches with associated postmolds, whereas other basins served as containers for large fires that were periodically extinguished and then relit after a layer of clay had been added to the floor of the basin.

Hearths were associated with at least two of the stratified Stage II surfaces from which radiocarbon and archeomagnetic dates were obtained. Carbonized maize and squash remains were preserved in one of these hearths for which a calibrated (Damon et al. 1974) radiocarbon date of 950 ± 77 B.P. (BETA-3976) is available, along with an archeomagnetic date of 900–750 B.P. (Dan Wolfman, personal communication). Stage III is represented by a new series of additions which incorporate the practice of scraping earlier mound surfaces clean in preparation for adding additional sediments. Two more flat topped surfaces were prepared during this stage, both of which supported structures.

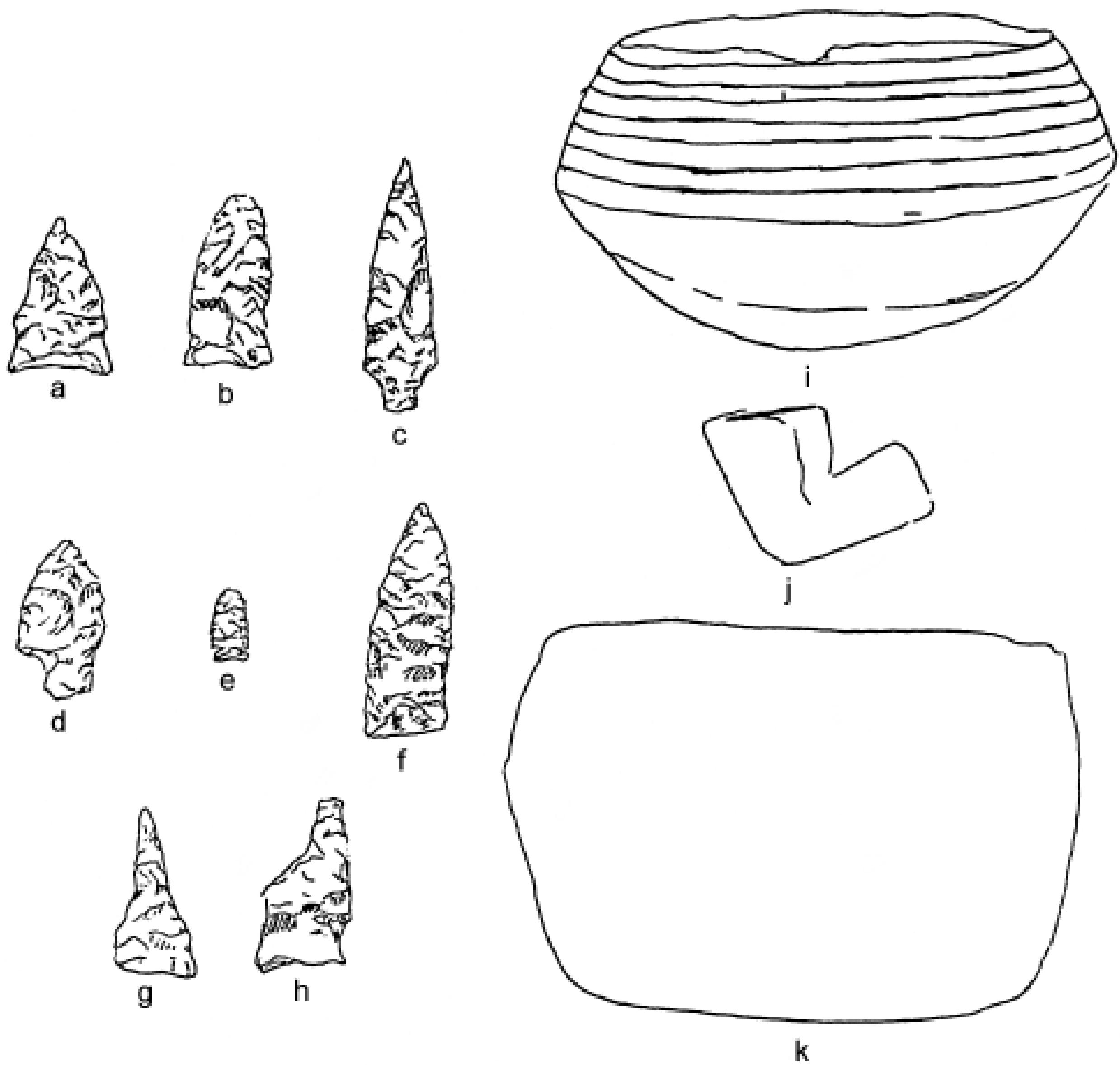

Figure 35. Mississippi period artifacts from the southwestern fringe subarea of the Ozarks (Loftin phase) a-b. Rice Side Notched points; c. Gary-like point; d. miscellaneous point or knife; e. arrowpoint; f. knife; g. drill or perforator; h. side scraper, i. incised ceramic bowl; j. pottery elbow pipe; k. plain ceramic bowl (after Neusius 1983; Chapman 1980)

A hearth associated with the structure on the first stage III surface produced a radiocarbon date of 673 ± 133 B.P. (BETA-4664). The second Stage III surface supported a rectangular structure demarcated by a berm and postmold complex directly aligned over the earlier Stage III structure. A radiocarbon date of 775 ± 67 B.P. (BETA-3975) and an archeomagnetic date of 600 B.P. (Dan Wolfman, personal communication) were obtained for this second structure. One large basin, also containing a structure, was excavated from Stage III sediments into the underlying Stage I and Stage II sediments. Stage IV represents the terminal stage of construction and utilization of Mound A. An oval structure represented by double clay lined wall trenches was built over the dismantled remains of the final Stage III structure. The oval structure was also aligned with the orientation of the underlying Stage III structures. Following its abandonment or destruction the walls of the oval structure were left partially standing and were encased in a massive yellow clay berm which capped the apex of the mound.

Based on the chronometric evidence from Mound A, Sabo (1986; cf. Kay et al. 1988) has suggested that the early occupation of the Huntsville site (represented in Stage I and II) can be attributed to the Loftin phase. This would expand the geographical range of the Loftin phase considerably beyond the confines of the Table Rock reservoir area, but extension of this phase to encompass related sites in the upper White River drainage would not be out of line with the similarly large area in the Arkansas River drainage throughout which Harlan phase sites have been designated. Sabo has also proposed the War Eagle phase to correspond to Stage III at the Huntsville site, dating from 700–600 B.P., and the Huntsville phase for Stage IV which dates after 600 B.P. Since few artifacts were recovered in primary contexts in the Huntsville excavations, Sabo has not indicated what the material assemblages of these phases might be; rather, these are for the present purely stratigraphic cultural units. However, Agee, Agee A, Morris, and Reed arrowpoint types along with undecorated shell tempered pottery and a few sherds of Poteau Plain pottery were found in Mound A and probably represent the War Eagle phase occupation.

A study by Louis Vogele (1982) of artifacts from the Turner Cave site, located only a few miles from the Huntsville site, identified a component which better represents some of the diagnostic artifacts of the proposed War Eagle phase. These items include small notched arrowpoints including the Sequoyah, Haskell, and Reed types, along with Spiro Engraved, Poteau Plain, and Woodward Applique pottery. These artifacts are also characteristic of the Spiro phase in the Arkansas River Valley (Brown 1984a, b).

It is furthermore possible that the Stage IV activities represented in Mound A, designated as the Huntsville phase, may correspond to the Jakie aggregate, a middle to late Mississippi period cultural unit identified by Chapman (1980:228) for the southwestern Missouri area. The Jakie aggregate is represented by components found in rockshelters only (i.e., no open village sites are known to occur), and its assemblage consisting of small triangular arrowpoints, Neosho Punctate pottery, beveled knives, and other items clearly relates it to the Neosho focus. But again, since the Huntsville excavations produced no diagnostic artifacts that could be related to the Stage IV construction, the only association which presently may be demonstrated between the Jakie aggregate and the so-called Huntsville phase is a temporal one.

One other multiple mound center located in northwest Arkansas is the Collins site (3WA1), located near Elkins, Arkansas. This site consists of five mounds situated in an elevated area within the broad bottomlands of the upper White River. The mounds enclose a broad, flat area which is comparable to the plaza areas of the Harlan and Goforth-Saindon sites. Scientific excavations have not been recently conducted at this site, but photographs in the files of the University of Arkansas Museum document the excavation of a trench in at least one of the mounds by personnel from that institution, perhaps during the 1940s. A few years ago some local treasure seekers dug a huge crater, roughly 6 m square, deeply into the largest mound on the site which measures about 3 m in height and 51 m in diameter. Gayle Fritz observed this digging for a short time and is certain that no remarkable artifacts or burials were encountered by the diggers. On the following day the treasure-seeking operations were moved over to one of the other mounds, where the backhoe soon encountered the remains of a burned submound structure. A crude sketch map was made and before the excavations were covered over a paper grocery bag full of burned grass thatch was collected along with a few charred wall posts. The map and the charred thatch and posts were later donated to the Arkansas Archeological Survey.

In his study of celestial alignments at western Ozark mound centers, Ralph Merletti identified significant mound arrangements at both Huntsville and Collins. At Huntsville, Mounds A and B appear to be aligned with the summer solstice sunrise, and Mounds A and D form an alignment with the summer solstice sunset. At Collins, Mounds C and D are aligned with the summer solstice sunrise and winter solstice sunset, Mounds C and B were aligned to the solar equinox, and Mounds A and E are aligned to the summer solstice sunset and winter solstice sunrise.

To summarize current evidence regarding these mound centers in the upper White River drainage, they seem to represent the same kind of social and ceremonial phenomena attributed above to the mound centers within the Arkansas River drainage. One possibly significant difference, however, is current lack of evidence for an elite burial program at these sites. However, this may be due to the very limited extent of excavations at these sites.

Mississippi period settlement patterns in the upper White River drainage, as noted earlier, are comparable to those in the Arkansas River drainage. In addition to the mound centers, a few permanent settlements such as the Cantwell I and Vaughn I sites are known. Another likely candidate for a permanent settlement of this period is the Watt's Farm site recently described by Michael P. Hoffman and James Cherry (1983). This site is located along the upper White River about 5 km upstream from the Collins mound site. It was excavated in 1933 by personnel from the University of Arkansas Museum. Unfortunately, the records which exist of this excavation are of poor quality by modern standards, so much of what we know about this site has come from oral interviews with local residents and other investigations by Hoffman, Cherry and Gayle Fritz. The distinctive features of the site, as best as they can be reconstructed, include some sort of a structure described by the excavators as an "earth house" along with three burials. One of the burials was accompanied by a black phosphate nodule bead; another had two T-shaped stone pipes. Other artifacts from the site include ceramic sherds representing the Woodward Plain, Williams Plain, and LeFlore Plain types, a single shell bead, and a variety of chipped stone artifacts including nine hoes or spades. Faunal remains include a few fragments of mussel shell and animal bone. The ceramics and phosphate bead suggest a temporal placement equivalent to the Harlan or Spiro phases in the Arkansas River Valley, which places the Watt's Farm site either in the Loftin or War Eagle phase of the proposed upper White River valley sequence. It would be interesting to learn more about the "earth house" seen by the earlier investigators at this site. Evidently, this occurrence is not an isolated phenomenon since the University of Arkansas Museum records identify a similar structure at the nearby Esther Harris place, which was associated with burned logs, cane, daub, and a spade (Hoffman and Cherry 1983).

Like their counterparts in the Arkansas River drainage, Mississippi period inhabitants of the upper White River basin established their settlements primarily along the terraces of major streams where the distribution of arable soils is most extensive. On the other hand, Pertulla (1983:45) points out that these open sites "are not only near large tracts of potentially arable soil, but are also near dense and compact wild plant and animal resources in hardwood floodplain environments." In addition to the influences soils and other natural resources may have had upon the distribution of permanent bottomland settlements, one other variable affecting settlement patterns must have been the distribution of ceremonial mound centers. It is likely that a close correspondence existed between the locations of these centers and the distribution of local communities. The distribution of sites with identified Loftin phase components in southwest Missouri supports this contention (Chapman 1980:141–142; Pertulla 1983:Fig. 16), and a number of Mississippi period open sites also were found in surveys along War Eagle Creek in the vicinity of the Huntsville site (Collier 1984).

Numerous rockshelters containing evidence of Mississippi period utilization attest to the importance of this type of site in the upper White River region. Many of these sites, like Jakie and Turner Cave, served as base camps supporting extensive seasonal occupation. Others seem to have functioned in more specialized roles including use as temporary camps, burial repositories, or places where food supplies could be cached. Consequently rockshelters in a wide variety of sizes, shapes, and topographic orientation were utilized (e.g., Harvey 1962; Scholtz 1967; Collier 1984). The distribution of Mississippi period sites reflecting a diversified settlement pattern in the upper White River region implies a similarly diversified subsistence organization. This seems to be the case. Evidence from the Loftin and Huntsville sites indicates some level of horticultural practice, as do the even more extensive assemblages of cultigens preserved in dry rockshelters of the region (Fritz 1986b). But, horticultural practices were accompanied by extensive collecting of a wide variety of native plant and animal species. Unfortunately, the archeological data are not sufficient by themselves to determine if differences existed between the Arkansas River and upper White River drainages in the relative importance of these resources.

Recent work by Gayle Fritz (1986b) is particularly important to our understanding of Mississippi period subsistence in the upper White River drainage. At the Holman Shelter along the Kings River, examples of cultigen amaranth (*Amaranthus hypochondriacus L.*), a Mesoamerican domesticate characterized by pale colored seeds, were found associated with other plant remains including maize, cucurbits, chenopodium, acorns, hickory nuts, hazelnuts, chinquapin nuts, persimmon, wild grape, wild bean, maygrass, and various other nonfood species.

The uncalibrated, fractionation corrected radiocarbon date on amaranth stems from this site is 920 ± 109 B.P. (SMU-1632; Fritz 1986b:74). Accompanying the amaranth at Holman and also found at the Poole Shelter 2 were pale colored seed specimens of chenopodium, which Fritz (1984) initially suggested were a Mesoamerican domesticate. It now appears, however, that the pale seeded variant is actually a local evolutionary derivative of early, dark seeded cultigen chenopodium (Fritz 1986b:78–81). During Mississippian times, as maize became the dominant crop, amaranth, chenopodium, and other starchy seed-bearing plants were relegated to minor crop status in the Ozarks.

Over the years a number of comparisons have been drawn between Mississippi period complexes in the Arkansas River Valley and those of the upper White River drainage (e.g., Marshall 1958; Chapman 1980; Harvey 1962; Scholtz 1967; Brown et al. 1978; Brown 1984a; Pertulla 1983). The Harlan–Spiro–Fort Coffee phase sequence of the Arkansas River Valley is widely regarded as reflecting the development of a Caddoan tradition in that area (Wyckoff 1980; Bell 1984b; Brown 1984a, 1984b; Rohrbaugh 1984), although it is clear that important differences exist between the Arkansas River Valley Caddoans and their counterparts in the Caddoan core area along the Red River and its tributaries (e.g., Schambach 1982b). Carl Chapman (1980, cf. Chapman et al. 1960) noted close similarities in the material inventories of the Harlan and Loftin phases (including ceremonial mound construction, house form, and similarities in lithic and ceramic items), and upon this basis suggested that the Loftin phase represents an extension of the Arkansas River Valley Caddoans into the upper White River region.

> The working hypothesis has been proposed that the Loftin phase components represent an intrusion of people from the Arkansas River Valley Caddoan area into the

> Southwest Drainage region some time between A.D. 900 and 1100, perhaps first of all on hunting expeditions, and then to establish a colony or colonies to exploit the resources in the area on a more permanent basis. At least one center was set up in the White River valley, the Loftin site, which may have acted as a ceremonial center in connection with a number of secondary occupational centers or villages coinciding with the entrances of major tributaries into the White River. Perhaps the villages at the entrances of the major tributaries were used as bases for exploiting the main stream for its resources of fish, shellfish, amphibians, and water dwelling animals and for utilizing the fertile White River floodplain for horticultural purposes. Through hunting and gathering expeditions, the smaller feeder streams and the nearby prairies could have been used as well. Local populations in the area would have been brought into the village pattern, and their technologies and tool kits, which were adaptations to the region, would have been incorporated into the colonizers' methods of exploiting natural resources. (Chapman 1980:142)

Others have explored in greater detail the archeological and environmental relationships between the two areas (e.g., Sabo et al. 1982; Pertulla 1983; Brown 1984a) to further support the argument that, during the Mississippi period, a Caddoan cultural manifestation is expressed in the southwestern Ozark fringe. Many Caddoan traits can be identified in Ozark ceramic assemblages, lithic assemblages, basketry assemblages (e.g., Scholtz 1975), house form, and mound architecture. However, there are also large differences between the Caddoan core area and the southwestern Ozarks in their respective archeological and ecological characteristics. These differences demand some qualification of the sense in which the term "Caddoan" has been applied to the southwestern Ozark fringe-area. Although Chapman's statement quoted above is quite clear in this regard, some additional comments stemming from Kay and Sabo's recent studies can be made.

Kay and Sabo (Kay et al. 1988) have identified a pattern of nearly regular spacing which ties the ceremonial mound centers located throughout the southwestern Ozark fringe into a single, comprehensive network (Figure 36). These centers, each situated prominently within broad alluvial valleys of the primary drainages of the region, fall along a geographic cline trending from southwest to northeast along the southern edge of the zone of maximum July precipitation. It has been suggested above that social or ceremonial activity at these individual centers promoted the solidarity of the local communities responsible for the construction and maintenance of these centers in addition to providing contexts for the expression of important aspects of social structure such as systems of ranking (e.g., Brown 1971b; Rogers 1982, 1983). We may suggest also that the network of mound centers throughout this region promoted socially integrative activity on a larger level than the local corporate group, that is, solidifying geographically separated, small corporate groups into a single, regional community.

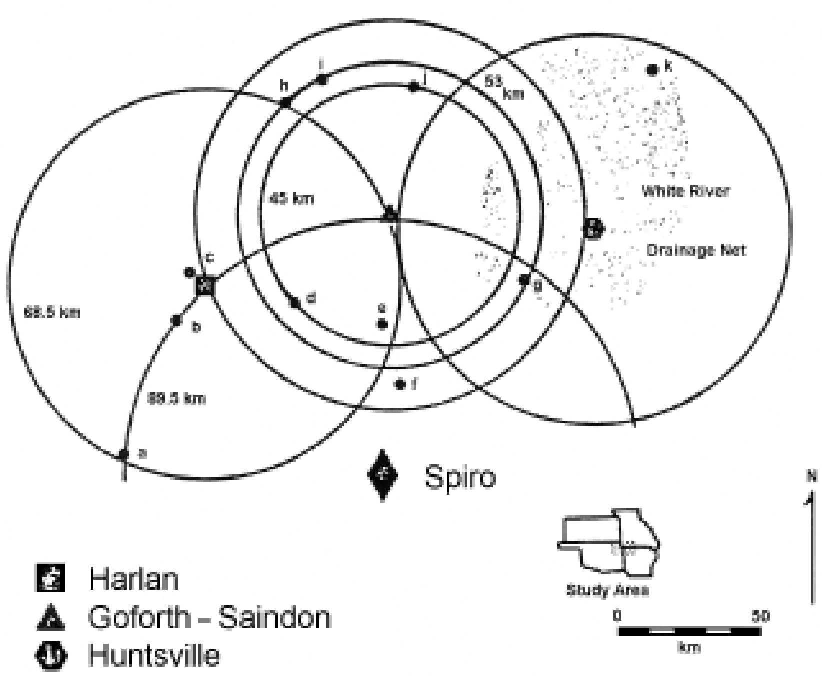

Figure 36. Caddoan civic-ceremonial center distribution in the study area compared to four potentially key central mound groups. Sites outside of the shaded area are all within either the Arkansas River Valley or its tributary valleys. a. Eufaula; b. Hughes; c. Norman; d. Bracken, e. Ewing, f. Parris; g. Collins; h. Lillie Creek; i. Reed; j. Pineville; k. Loftin

Within this larger community, some hierarchical differentiation may have been expressed from time to time. For example, the Harlan site may have served as the principal center of this network between 1050 and 750 B.P. Later, the Norman site may have assumed a more prominent status, at a time when it was simultaneously subordinate to the premier Arkansas River Valley ceremonial center at Spiro. As a result of these relationships, we may further hypothesize that the network of southwestern Ozark mound centers represent nodes within an even larger network emanating from the Spiro site. Thus the southwestern Ozark community represented by its mound centers may have been one of several regional communities related through an interactional network which, for a time, recognized the Spiro center as an important source of social and ideological leadership.

What evidence exists of these hypothesized relationships, and how might they pertain to the question of "Caddoan" culture in the Ozarks? In the first place, the timing of construction of mound centers throughout the southwestern Ozarks coincides with the construction of similar centers both in the Arkansas River Valley (Wolfman 1986), and in the Caddoan core area. If anything, this fact suggests that the mound centers emerged as a result of some synchronous social or ideological phenomenon transcending the Trans-Mississippi South, rather than representing the efforts of colonists to establish a presence in the region (cf. Purrington 1970:543–548). Secondly, the source of galena, one of the "high status" imports found at the Spiro site (Brown 1983), has been identified southeast of Cahokia in eastern Missouri (Walthall 1981), and material from this same source also occurs at the Harlan site (Bell 1984b: 221). This suggests that the southwestern Ozark mounds may have indeed served as nodes within a trade or exchange network supplying certain high and/or low status goods to the more important centers such as Harlan and Spiro. Galena was also recovered from the Loftin site (Reeder 1983:25), but this material has not been identified as to source.

Even if the southwestern Ozark mounds did function as nodes in an import system bringing materials into the Spiro status system, this probably was not their main function since the majority of status goods at Spiro were imported from regions to the south and east (Brown 1983). Therefore a third indicator of panregional, socially integrative activity centered at these mound sites may actually have been the most significant. As indicated in the preceding descriptions of these sites, patterns of mound construction always were very deliberate. Horizontal and vertical alignments were maintained when, for example, mounds were constructed over previously dismantled structures, or structures or enclosures were built on stratigraphically superimposed surfaces. Excavated mound surfaces produced few if any artifacts, indicating deliberate, intentional cleaning. This is even more pronounced in the submound mortuary structures which were not only cleaned before ritual destruction but were also sometimes repaired. Sediments of highly contrasting colors and textures are used to delineate spaces, to form mirror and negative imaging, or to simply set off one construction stage or unit from another. None of these deliberate elements of mound construction need be interpreted as serving any functional principle of earthwork engineering. Rather, these qualities may reflect something of the symbolic character these mounds must have had for the people who built and used them.

To investigate this possibility, Sabo (1985; cf. Kay et al. 1988) analyzed early historic descriptions of Caddoan rituals to identify major aspects of their symbolic content, and interpret the basic structuring principles underlying this symbolism. Caddoan ritual symbolism typically employs a set of relationships based on distinctions in vertical and horizontal dimensionality, alignment, hierarchy or superpositioning, and contrast. These properties form a grammar, or set of rules, used by Caddoans to invest a symbolic quality in many material and behavioral components of their rituals. These relationships can also be identified in the deliberately patterned feature of southwestern Ozark mounds. These characteristics of mound construction can be interpreted, therefore, as symbols expressing cultural principles, which must have been very important in the lives of the people who built and used these mounds (cf. Knight 1986).

Similar qualities of mound construction are also found at other centers within the Arkansas River Valley (e.g., Spiro, Harlan, and Parris), and they are duplicated at some of the major centers in the Caddoan core area such as the George C. Davis site (Newell and Krieger 1959), the Belcher Mound (Webb 1959), and the Ferguson site (Schambach 1972). The conclusion we may suggest is that separate populations — regional communities located in the southwestern Ozarks, the Arkansas River Valley, and the Red River valley — were interacting socially and ritually for a certain time and to such a degree that some very basic structuring principles came to commonly underlie certain aspects of the material culture — including mound construction practices — in these societies. Whether other aspects of the artifact assemblages of these groups or their ecologies are similar or different hardly matters from this point of view. Nor is it essential that the Arkansas River or southwestern Ozark groups be regarded as "Caddoan." What is important is that these communities appear to have been interacting socially and symbolically, and what we need to try to understand more fully is the nature of and reasons for this interaction. As we shall also see below, this interaction with groups to the south and west of the Ozarks was transcended by another interaction network, in which relations were established with yet other groups within the Ozarks as well as beyond.

The Central Ozark Interior

Relatively little archeological research has been done in the interior of the Ozarks, but a few key Mississippi period sites are known. When this evidence is considered in relation to the data from the eastern and southwestern Ozarks, it becomes clear that this subarea is an extremely important one which warrants much closer investigation.

A handful of sites along the middle White River have produced exotic, high status artifacts. Long-nosed god masks

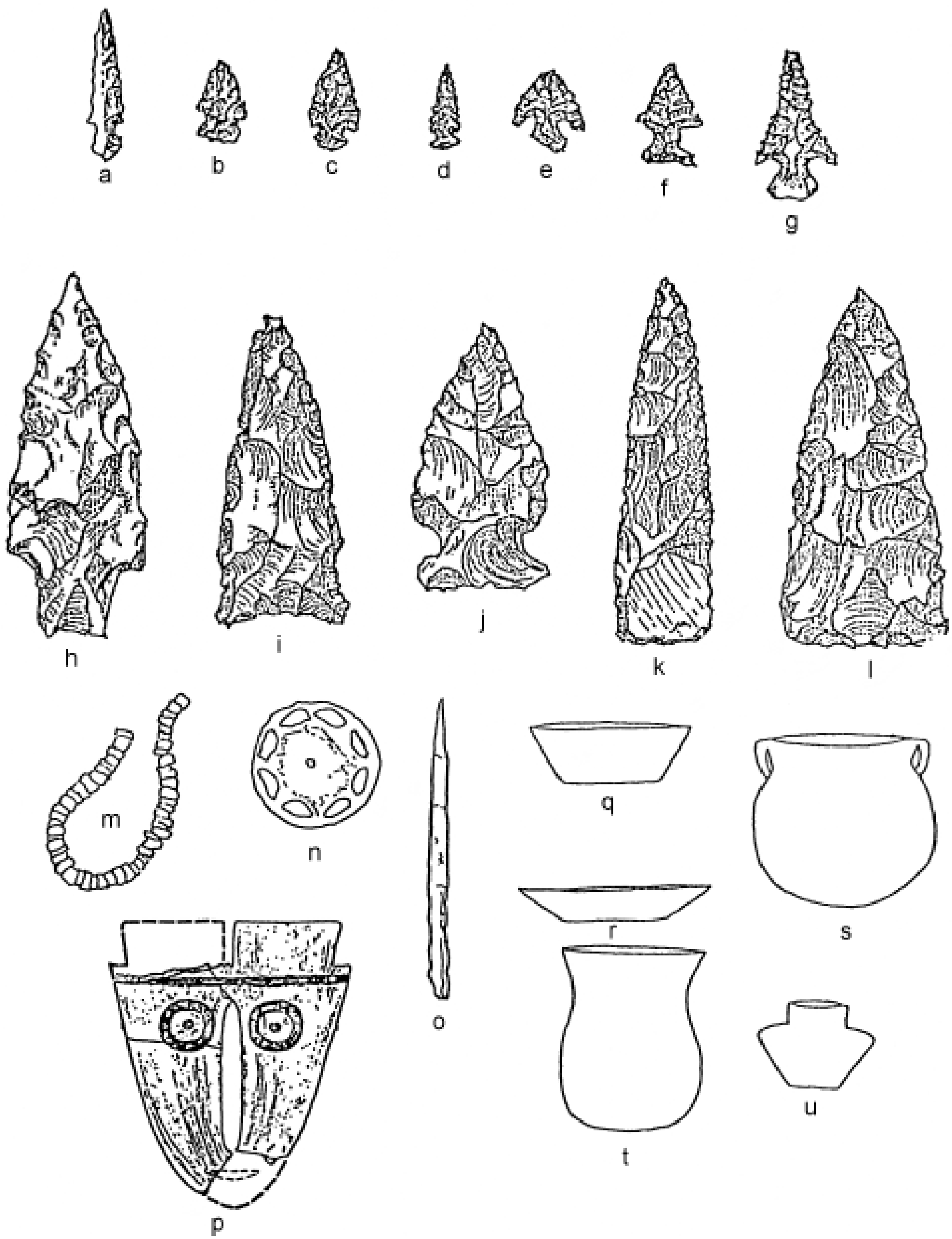

Figure 37. Mississippi period artifacts from the central interior subarea of the Ozarks
a-g. arrowpoints; h. Langtry point; i. Rice Side Notched; j. miscellaneous side-notched point; k-l. knives; m. shell disk bead necklace; n. fenestrated shell pendant; o. bone pin; p. long-nosed god mask; q-u. pottery vessel forms (after Davis 1961, 1964b)

made of shell were found at the Shipps Ferry (Davis 1961) and Young sites (Davis 1964b), and at the latter site a fenestrated sunburst shell gorget and marine shell disc beads also were found accompanying a burial. At the Wilkerson site (Crumpier 1969) burials were found accompanied by copper-covered earspools, a shell pendant, and marine shell beads. Shell beads and earspools were also found at the Newton site (Howard 1963). Finally, at the Toul Spring site (Sly 1958) pulley-shaped earspools, a conch shell dipper, and an embossed copper plate depicting a falcon (cf. Phillips and Brown 1978: 186) were found in association with another burial. Many of these artifacts can be attributed to the Southeastern Ceremonial Complex, or Southern Cult, a panregional ritual system emanating out of the great Mississippian ceremonial centers at Moundville (Alabama), Etowah (Georgia) and Spiro (Oklahoma). The occurrence of Southern Cult artifacts at sites scattered throughout the Ozarks indicates that these group were somehow connected with, or participating in, this panregional cultural system. An important but unanswered question is, to what extent did participation in the Southern Cult ritual system influence or transcend the interactions between Ozark groups and their Caddoan neighbors to the south and west?

Excavations at the Mill Creek site (Baker 1974) provide some information which is helpful in assessing the cultural context of these high status goods. Pieces of wattle and daub were preserved at this site along with an artifact assemblage indicating that a wide array of activities were performed. We may therefore interpret this as a residential settlement. Faunal remains have not been analyzed but upon preliminary inspection Baker reports that deer bones were most frequently represented, followed by turkey. Box turtle, gar, and mussels were taken from Mill Creek, and one bear canine also was identified. Plant remains found at the site include charred acorns and maize cobs. An undecorated, shell-tempered biconical pipe was found. Numerous sherds and one restorable vessel of Mississippi Plain, var. Neeley's Ferry were recovered. The stone tool assemblage includes small arrowpoints, most of which are Nodena points. These artifacts are characteristic of the Morse's (1983) Mississippian Nucleation period in the central Mississippi valley. The site can be more specifically identified as a likely component of the Greenbrier phase.

Other surveys in the area, curiously, have not identified large numbers of Mississippian sites (e.g., Padgett 1979; Novick and Cantley 1979). This may be the result of oversight stemming from the methods of survey employed in these studies, or this may reflect a truly limited utilization of the area by Mississippi period settlers. In regard to the latter possibility, Baker's suggestion that the Mill Creek site may represent an outpost of a trade network centered in the Mississippi valley is intriguing. Such an outpost might be expected to exist on the border of, rather than deeply within, another population area.

The archeological situation along the Buffalo River in the central Ozarks interior has been well summarized by Dan Wolfman (1979). In his temporal assessment of sites known in the area of the Buffalo National River, Wolfman notes (1979:36–39) that Mississippi period components are rare. On the other hand, greater numbers of these sites downstream may indicate that "cultural influences were moving up the Buffalo River from the White River during the latest stage of prehistoric occupation in the area."

Among the better known Mississippi period sites in the Buffalo River area is Cobb Cave, where excavations by the University of Arkansas Museum in 1931 produced a cradle burial, a variety of cordage and basketry specimens, a gourd, and quantities of maize cobs (Dellinger 1936; Dellinger and Dickinson 1942; S. Scholtz 1968, 1975). Animal bones preserved at the site indicate the importance of hunting to the late prehistoric occupants of the site as well (Cleland 1965).

Recently, emergency excavations were undertaken by the Arkansas Archeological Survey at site 3NW539, to salvage materials from two pit features eroding out of a cutbank that was eating away portions of a broad terrace along the Buffalo River (Limp 1986). The contents of these pits included shell-tempered ceramics and arrowpoints, grinding basins, animal bone and shell, and carbonized plant remains. National Park Service archeologists who discovered these eroding features also report that carbonized nuts, a maize cob, and charred fabric were collected from one of the pits. These pits and their contents indicate that site 3NW539 most likely represents a permanent settlement occupied by local Mississippi period groups engaged in horticulture, hunting, and gathering.

The data from Cobb Cave and from 3NW539 leave little question but that at least some Mississippi period groups were permanently settling along the Buffalo River and its major tributaries. As suggested by Wolfman, these sites may reflect expansion of Mississippi valley populations via the lower White River drainage. These sites indicate that previous notions about the paucity of Mississippian sites in this region may not be wholly correct. But regardless of how extensive Mississippian settlement in the central Ozark interior may actually have been, the certainty of this presence in the area demands further investigation into the relationships these populations may have had with their contemporaries both to the east and to the west (Limp 1986).

The Eastern Ozark Fringe

Until recently there has not been much information available about the Mississippi period settlement of the eastern Ozark fringe. Dan and Phyllis Morse (1983) note that a few sites dating to the Middle Mississippi period (954–600 B.P.) are known along the Black River which flows at the edge of the Ozark Escarpment, and we may suppose that the inhabitants of these sites made occasional forays into the Ozarks for food and other material resources, such as chert. The Greenbrier phase (Morse and Morse 1983:298–300), dating between 600 and 300 B.P., represents a nucleated population centered around the mouth of the White River. These groups lived in small villages which extend for a short distance into the Ozarks. The Pigman Mound (Anderson n.d.) along the Eleven Point River in southeastern Missouri has been known for some time but very little information about this site has been published (eg., Chapman 1980). The single platform mound comprising the site evidently was constructed in two stages in which a black sediment containing abundant amounts of artifacts and refuse was added to the periphery of a core mound that consists of a compact yellow-orange clay virtually devoid of cultural material. Shell-tempered ceramics found at the site are similar to those found on other early Mississippi period sites discussed below. This suggests that the Pigman Mound may also correspond to an early Mississippian time level.

Recent archeological investigations along the upper Current River have contributed much new and important information about Mississippian settlement in the eastern Ozarks. These studies indicate that this region is also a significant one for understanding the emergence and development of Mississippian adaptations (Lynott 1982b; Price et al. 1983, 1984; Banks 1984; Lynott et al. 1984; Price et al. 1985; Lynott et al. 1985). This work has documented the existence of a very early or developmental stage of Mississippian culture, followed by a middle period occupation during which population attrition seems to have occurred. By late Mississippi times this area evidently was very thinly occupied.

Evidence for the developmental Mississippian comes primarily from two sites, Gooseneck (Lynott 1982b) and Owls Bend (Lynott et al. 1984). The Gooseneck site is situated on a high terrace overlooking the upper Current River bottomlands. Radiocarbon and thermoluminescence dates (the latter on shell-tempered ceramics) establish the age of the site between 1305 ± 120 B.P. (WU-TL-91a2) and 1085 ± 105 B.P. (WU-TL-91b2). There is an extensive midden deposit at the site, and this along with the remains of a structure suggest that the site was permanently occupied. Mark Lynott describes the house remains as consisting of a large, oval depression about 40 cm deep with a flat bottom. The fill of the house pit contained charcoal, burned clay, fire cracked rock, animal bone, stone toolmaking debris, and shell-tempered ceramics. No hearth area could be identified within the pit but a partial line of possible post molds indicates that there may have been a partition or some other internal feature. The artifact assemblage from other areas of the site consists of ceramic, unifacial arrowpoints and other chipped stone tools, pottery discs, and bone awls and pins. A large sample of faunal remains were collected which have been described in a study by Mick and Falk (1982). These remains indicate that deer and turkey were the primary prey of early Mississippian hunters, but a range of other animals, birds, reptiles and fish also were sought. Plant remains preserved at the site demonstrate that a variety of wild species such as acorns, walnuts and hickory nuts were collected. Only a single cupule of maize was recovered.

The Owls Bend site is also located along the Current River. Five radiocarbon dates (Lynott et al. 1984:14) range from 1370 ± 90 B.P. to 930 ± 60 B.P., with four of these dates falling after 1150 B.P. The artifact assemblage from this site is similar to that from the Gooseneck site, with key diagnostic materials being shell-tempered pottery representing jar and bowl forms (decorated in a few instances by tool impressions, incising, or textile impressions) and small unifacial arrowpoints. Preliminary identification of the large amounts of faunal and floral specimens recovered from the site indicate once again a broadly based subsistence in which deer hunting and nut gathering played important roles. There were no structural features identified at the site but several pit features were disclosed along with a single flexed burial. A tortoise shell found near the upper body may have been a grave offering.

A third early Mississippian site recently excavated by James Price is the Mouth of Rocky site also located along the Current River (Price 1984). This site produced a single component assemblage of shell-tempered pottery, small unifacially retouched arrowpoints, and other lithic artifacts similar to the materials found at the Gooseneck and Owls Bend sites. Two thermoluminescence dates obtained on pottery sherds were 1220 B.P. (Alpha-884(B)) and 1070 B.P. (Alpha 884(A)). The artifacts and other materials found in the excavations were recovered from a homogeneous sediment which extended below the ground surface, and which revealed no evidence of stratification or other features.

These three excavated sites along with many others identified in surveys (e.g., Lynott 1982a; Banks 1984; Lynott et al. 1985) indicate that by A.D. 700 an emergent Mississippian adaptation was developing along some of the major waterways of the eastern Ozark fringe. The settlement pattern of this cultural system included semipermanent or permanent settlements, temporary campsites, and the single known mound center. Subsistence organization was based on the use of a wide variety of natural resources, and horticulture although present was seemingly a minor constituent of the food-getting economy. Identification of this early Mississippian manifestation

> forces us to reexamine the hypothesis that the Mississippian lifeway owed its development to an adaptation to the meander belt ecology of the Mississippi Valley (Smith 1978), for the environment of the Current and Jacks Fork valleys offered a far different set of natural variables than did the sand ridge and swamp environment of the Mississippi Alluvial Valley. While environment must have played an important role in the rise of Mississippian culture, the data from the Ozark Highland indicate that populations there were on the same cultural trajectory as those in the Mississippi Valley at the same time the Old Varney River and Zebree sites were flourishing. The similarity in ceramics and other cultural material in the two dichotomous regions points to a widespread development of the Early Mississippian lifeway and to the conclusion that it can no longer be argued that the lowland environment and its biota were the prime movers in shaping Mississippian culture. (Price and Price 1983:273–274)

Following this early developmental phase there is evidence of continuing occupation of the eastern Ozarks by Mississippian peoples, but evidently their numbers were thinning. Much of the evidence for occupation during the Middle

Mississippi period consists of diagnostic ceramic or stone artifacts found on sites also containing evidence of other occupations (e.g., Price and Price 1983:275–277). One excavated component dating to this period is the Round Spring site (Lynott 1982b), where evidence of a Mississippian village and cemetery was found. Many of the burials at the site were exposed by natural erosion. In some cases shell-tempered ceramics were associated with the human remains; in one instance a small vessel accompanied a burial and in another instance a ceramic elbow pipe decorated with an incised human face was found. The habitation area was represented by an extensive midden deposit containing numerous ceramic and chipped stone artifacts. Two radiocarbon dates (corrected, Damon et al. 1974) on human bone from the site which were accepted by the investigators were 1754 ± 95 B.P. (BETA-3194) and 719 ± 153 B.P. (TX-4094). Although no evidence of structures was found at the site, it has been interpreted as a hamlet or small village due to the presence of the cemetery. Stable carbon isotope assays on human bone from the Round Spring site demonstrates that these people were consuming maize as part of their diet (Lynott et al. 1986). As mentioned above there is less evidence in the Current or Jacks Fork valleys for late Mississippi period occupation. A few isolated artifacts have been identified in private collections which may date to protohistoric or early historic times (Price and Price 1983:277–279).

Arkansas River Valley and Northern Ouachitas

Between 1000 and 300 B.P. new forms of social integration emerged in cultures across most of the southeast and the midcontinent with the appearance of political and religious hierarchies whose leaders exerted widespread influence over other members of society. The most conspicuous evidence of this development is the appearance of local and regional mound centers where the elite presided over religious and political affairs, and where the honored members of society were buried. Mound centers were supported by a local or regional population that resided in or around the center. The economic base supporting these societies was a mixture of wild plant and animal foods and the cultivation of tropical plants, particularly corn and beans, that had originally been domesticated in Mesoamerica.

The elite members of society affirmed their privileged positions in life by possession and display of elaborate symbols of their authority and rank, some of which were acquired through long distance trade networks. When they died, they received special treatment that not only reflected their social standing, but also legitimized the right of their kinsmen to assume their privileged social positions. The repositories of the honored dead were the focal point of community religious activity and were reminders to the local support population of the legitimacy of the existing social order. These societies continued in some parts of the southeast up until the arrival of European explorers in the sixteenth and seventeenth centuries.

Populations in the OAO study area were undoubtedly influenced by these social developments. In the western portion of the area a distinct regional manifestation developed known as the Arkansas Valley Caddoan tradition (cf. Brown et al. 1978; Wyckoff 1980), to distinguish it from contemporary but distinctively different Caddoan developments in the Red River basin to the south. Three sequential phases, the Harlan, Spiro, and Fort Coffee phases, encompass this period. At the eastern end of the study area a different and currently poorly delineated, cultural tradition developed that was related to emerging societies in the Arkansas and Mississippi alluvial valleys to the east and south. In the northern Ouachita Mountains in Arkansas, a third cultural tradition may be represented that will be discussed below. In general, our knowledge of societies of this period is weighed very heavily toward the western end of the study area.

The Harlan phase marks the development of mound centers and significant mortuary ceremonialism in the Arkansas River Valley in Oklahoma and up neighboring streams flowing out of the western Ozarks. Numerous radiocarbon dates from the Harlan site and other sites place this phase between ca 1,000 B.P. and 700 B.P. (Brown 1984a:16; see Bell 1984b:Table 10.1 for a list of relevant dates). The stratified deposits and features at the Harlan site, described elsewhere in this narrative by George Sabo, are the definitive association for the phase, but numerous other components exist in the region.

During this phase the Spiro site became an important regional center, and the site reached its areal extent. The principal activity at the site appears to have been the curation of the remains of honored dead in mortuary buildings, and the periodic interment of the contents of mortuaries as old buildings were cleaned out and buried, and new ones were constructed. At the location of the Craig Mound, a series of accretional burial mounds were built up, each containing the contents of one or more mortuaries and perhaps additional interments as well. Part of the burial activity at the nearby Ward Mounds also appears to have occurred during this period. In the upland west of the Craig and Ward mounds, the ring of buried structure mounds and the platform mounds was established. Both the Brown and the Copple mounds appeared to have served as platforms for buildings or public activities, and burials were interred in the Brown Mound as well. The structures under the low mounds are interpreted to be mortuaries. In the intervening areas between the upland and lowland mound clusters, a residential community is represented by perhaps as many as 45 house locations, although it is unclear who used the structures and for how long (Brown 1971b:220–228; Phillips and Brown 1978:14; Orr 1946:230).

Artifacts representing the Harlan phase include both utilitarian objects made by people from locally available raw materials, and nonutilitarian objects made of exotic materials and/or transported to the area in finished form through long distance trade networks. These nonutilitarian objects include items of costumery worn by the elite, and symbols of power or office that were their possessions, and were undoubtedly displayed on special occasions. It is important to distinguish

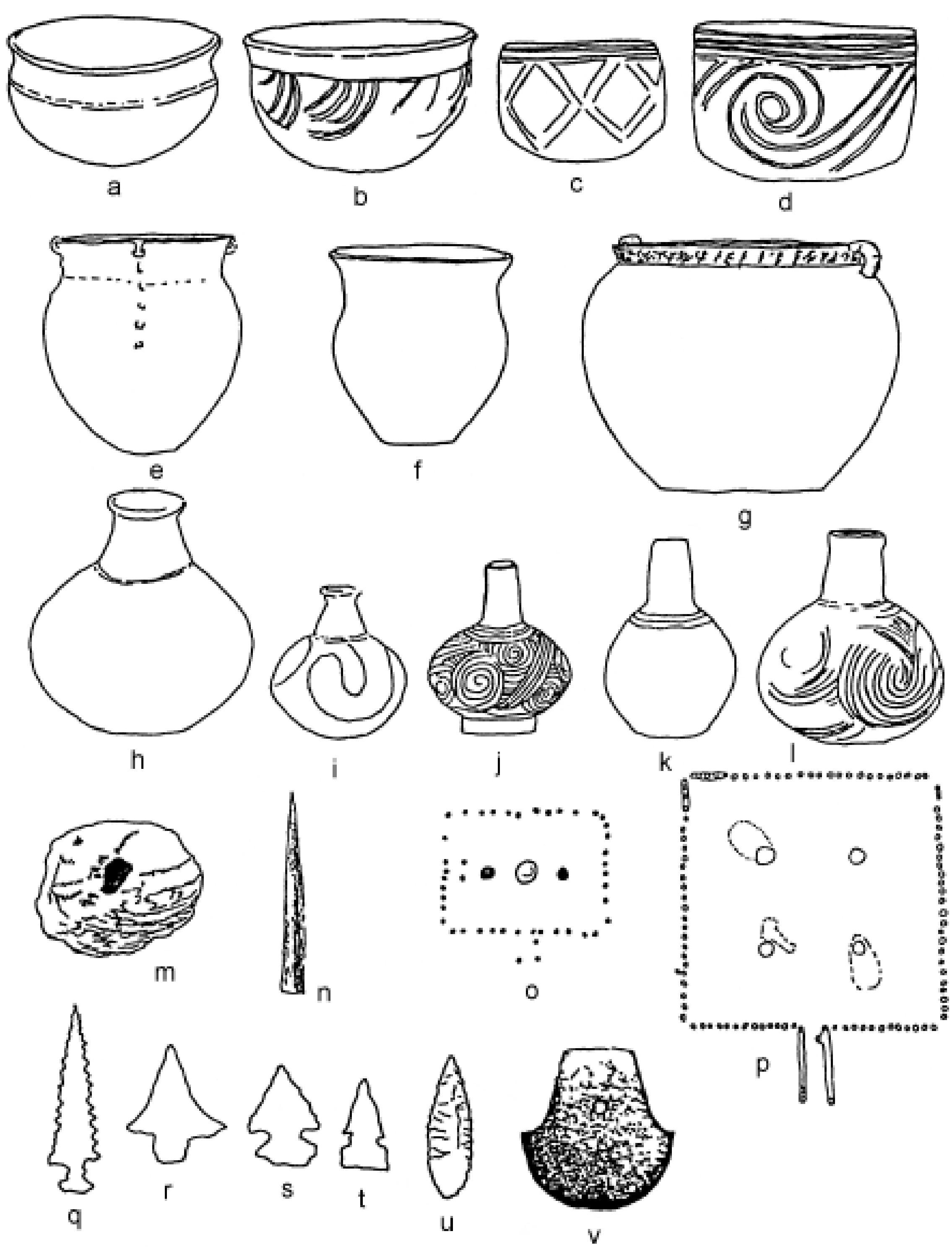

Figure 38. Mississippi period artifacts from the Arkansas River Valley and northern Ouachita Mountains
a. Mississippi Plain jar; b. Wallace Incised bowl; c. Pennington Punctate Incised bowl; d. Crockett Curvilinear Incised bowl; e. Woodward Applique jar; f. LeFlore Plain jar; g. Braden Punctated bowl; h. Old Town Red bottle; i. Avenue Polychrome bottle; j. Spiro Engraved bottle; k. Hickory Engraved bottle; l. Keno Trailed bottle; m. shell hoe; n. split bone awl; o. Spiro phase house pattern; p. Harlan phase mortuary building pattern; q. Sallisaw arrowpoint; r. Alba arrowpoint; s. Keota arrowpoint; t. Washita arrowpoint; u. Nodena arrowpoint; v. spatulate celt (redrawn from Hoffman 1977; Hemmings and House 1985; Brown 1984b; Bell 1984b)

between these classes of objects, because the latter are likely to be found only in special contexts in mound centers while the former are present on various components of the settlement system such as base camps, farmsteads, and temporary campsites.

Technological innovations in pottery making in the Harlan phase include the introduction of shell as tempering material in utilitarian containers (Brown 1984a, 1971a) with the appearance of small amounts of Woodward Plain pottery in assemblages still dominated by clay- or grog-tempered Williams Plain and grit-tempered LeFlore Plain jars. New vessel forms appear in the shape of bottles and carinated bowls, and red filming as a surface treatment is noted. Decorated types include Arkadelphia Engraved, Crockett Curvilinear Incised, Davis Incised, Hickory Fine Engraved, Holly Fine Engraved, Pennington Punctate Incised, Spiro Engraved and Beaver Pinched, and plain wares including Smithport Plain, Sanders Plain, and Powell Plain (Bell 1984b; Brown 1971a). According to Brown (1971a:220), some of these pottery types appear because they were traded into the Arkansas River Valley from other developing regional culture centers. He notes in particular Smithport Plain, Arkadelphia Engraved, Holly Fine Engraved, and Powell Plain vessels found at Spiro that came from cultures to the south and northeast.

Stone tool industries are dominated by the local manufacture of chipped stone projectiles and cutting implements. Small projectile points, particularly the stemmed and notched types, Scallorn, Reed, Huffaker, Alba, Homan, Hayes, Morris, Agee, Sequoyah, Ashley, and Pocola are the dominant projectile types, although larger dart points of the Gary, Langtry, Ellis, and Edgewood types are still reportedly being used (Bell 1984b:233). Large bifaces used as cutting implements, flake scrapers, drills, chipped stone hoes, grinding stones, celts, and hammerstones are also part of the stone tool inventory.

Nonutilitarian stone artifacts that were probably part of costumes include stone beads, pendants, and earspools (ground stone cylindrical or spool-shaped ground stone objects, sometimes embellished with copper covering, shell insets or carved faces, that were worn in or on the ears). Ritual items and social symbols found include exotic cherts, and spuds or flaring bit celts.

Bone, shell, and wooden artifact technologies are also known for the phase. Utilitarian objects include bone awls, fishhooks, and deer jaw sickles. Mussel shells were hafted and used as hoes or grubbing tools. Carved wooden bowls have been found at Spiro. The fortuitous preservation of perishable remains at Spiro and in mortuary features at other sites indicate woven reed and cane matting, coiled basketry, and cordage were also important products.

Costumery made of materials other than stone include bone and shell beads, bone and copper covered wooden hairpins, wooden earspools and beads, copper beads and hair ornaments, and headdress elements. Ritual or status items include undecorated conch shell drinking cups, copper plates, a copper covered rattle, and perhaps quartz crystals, minerals, and pigments (Brown 1976b; Bell 1984b).

Aside from the burial mounds, the most noteworthy Harlan phase features are structures, both for mortuary purposes and domestic use. These buildings are defined by rectangular or square outlines of post stains, with a single entrance midway along one wall line marked by an extended enclosed entranceway set in a foundation trench. Structure roofs are supported by four interior support posts. Scattered posts inside the wall lines may indicate some buildings had internal construction features such as alcoves, benches, or partitions. Mortuary buildings are differentiated from dwellings by the absence in the former of centrally placed fireplaces, and the corresponding presence of posts along the wall line across the entranceway, thus indicating the entrance has been blocked by one or more vertical posts before the building had been demolished. Structure walls may have been mud plastered. Mortuaries had been demolished by burning after they were emptied of their contents.

Burial practices were varied, and depended on the status of the deceased and the schedule of mortuary or charnel house demolition. At the Harlan site, where these features are best recorded, they included flexed inhumations, deposits of the disarticulated and fragmentary remains of many individuals, cremations, bundles of bones, and isolated bones or single skulls (Bell 1984b). There appears to be some gradual change through time in the kinds of burial accompaniments, with elaborate artifacts and status markers more common in later interments.

Spiro and Harlan were not the only mound centers occupied during this phase although they are believed to have been the dominant sites. Near the confluence of the Grand and the Arkansas, the Hughes site is another representative of this site type. It consists of two large mounds plus a surrounding community area. One large mound was built in two stages, with a smaller platform edifice covered by a conical cap making a final earthwork ca 38 m in diameter and 6 m tall. The second large mound stood 400 m to the west and was unexcavated. North and south of the two stage mound were at least 15 structures that on the average were square, about 7 m on a side, containing four interior support posts and fireplaces. Cache pits were found inside buildings and clustered in the northwest part of the site. These contained domestic refuse, pipes and pipe fragments, ear spool fragments, scrapers, projectile points, sandstone abraders, awl sharpeners, drills, bison bone hoes, pottery handles, and red slipped potsherds (Bell 1974:8; Wyckoff 1980:278). On the north end of the site was a cemetery area with 18 flexed interments. Occasional grave offerings included pottery, awl sharpeners, scrapers, turtle shells, projectile points, and a diamond-shaped beveled knife. One burial was found to contain glass trade beads of European manufacture, indicating that not all of these features belong to the Harlan phase occupation. Radiocarbon dates on three houses from the site are 730 ± 80 B.P. (WIS-44), 1050 ± 150 B.P. (M-817) and 875 ± 100 B.P. (0-594) (Bell 1974:9).

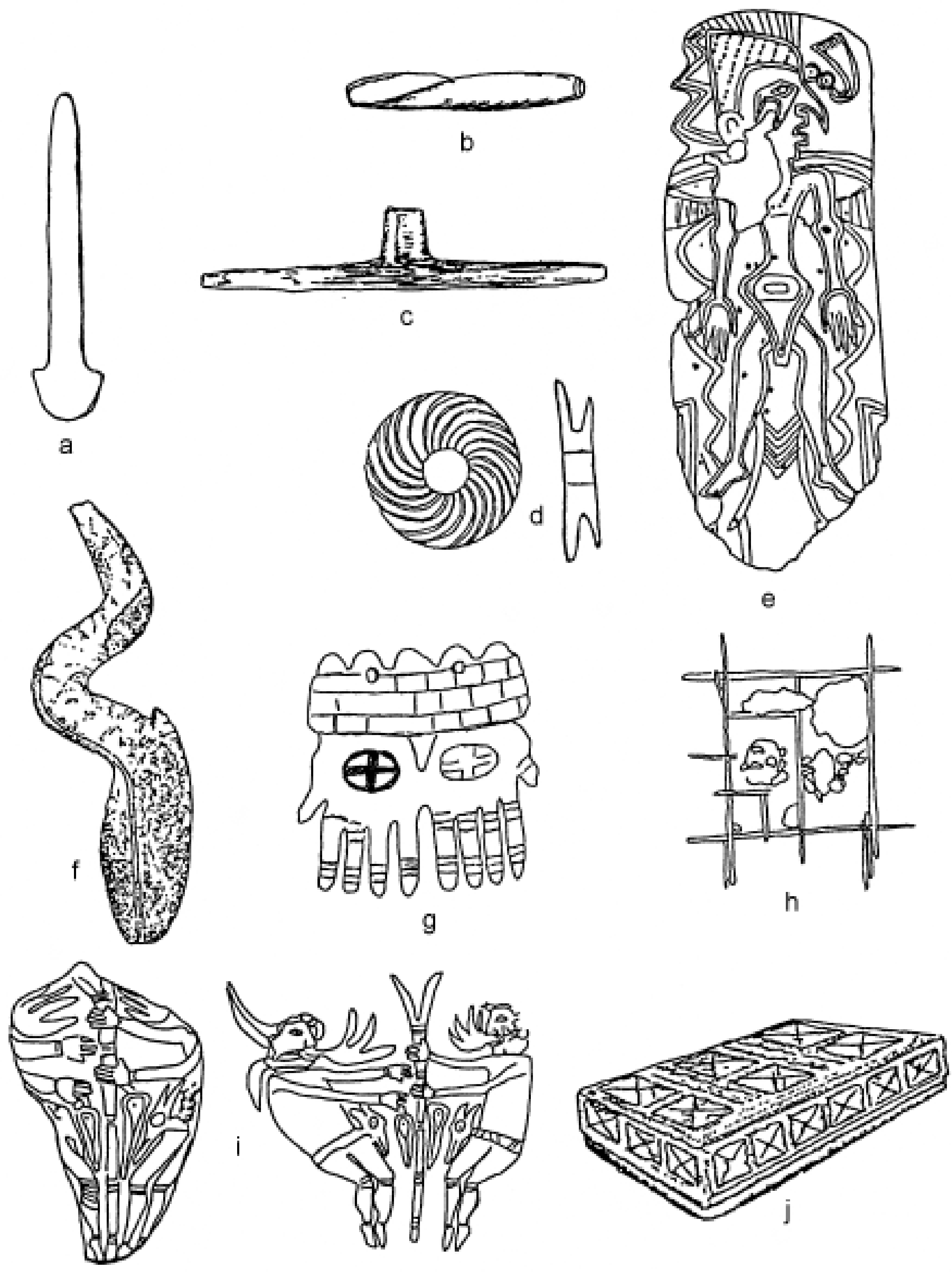

Figure 39. Mississippi period ritual and status artifacts from the Spiro site.
a. elongate celt; b. columella shell bead; c. T-shaped pipe; d. pulley-shaped earspool; e. embossed copper plate with hawk impersonator; f. copper headdress plume; g. shell gorget; h. litter burial; i. engraved shell cup; j. woven basket containing human burial (redrawn from Brown 1976a, 1984b; Hamilton et al. 1974)

The Eufaula (also known as Groseclose) Mound site on the bank of the Canadian River downstream from its confluence with the North Fork Canadian is the only Harlan phase center in this drainage. The site consisted of a single conical earthwork estimated to have originally been ca 55 m long, 32 m wide and about 3 m high. It was an accretion mound containing 139 primary interments and a few later historic period coffin burials. Mortuary goods were infrequent, but included arrowpoints, earspools, T-shaped and elbow pipes, pottery vessels including Crockett Curvilinear incised bowls, stone beads, chipped hoes, celts, large chipped bifaces, copper covered wooden blades, a copper covered wooden mask, and a copper bodkin (Off 1942). Domestic refuse and daub indicated the presence of structures in the "village" area of the site, but none were excavated. The site is undated.

Other settlement types are imperfectly documented for the Harlan phase, particularly since without the rare and exotic artifacts, domestic rubbish is difficult to distinguish from that of other cultural periods without associated radiocarbon or archeomagnetic dates. Wyckoff (1980) postulates that other types of sites include settlements, farmsteads, or hamlets, which were permanent residences, and an array of smaller transient base camps and secondary camps. He notes the increase in settlements in alluvial settings and in the northern tributaries of the Arkansas relative to settlement in earlier periods. It is noteworthy that settlements are now marked by the presence of substantial dwellings, indicating permanent residence, and distinguishing them from short term special purpose stations, camps, or activity areas.

The modal size and internal organization plan for settlements is uncertain. As Brown et al. note (1978:178–179), multiple overlapping and culturally distinct occupations of a single location may result in a surface scatter of debris that may be considerably larger than the areal extent of any one occupation. They postulate that the largest site of this type was the Spiro village, covering 8 to 10 ha, and sites between 2 and 4 ha are far more common. It should be emphasized that even if a collection of structures is uncovered, it is difficult to verify they were all occupied simultaneously. Radiocarbon is too coarse a dating technique to identify generational changes in the construction or use of structures. Finer methods of calculating contemporaneity such as archeomagnetic dating or detailed analysis of such time sensitive artifacts as decorated ceramics are needed to confirm the contemporaneity of dwellings and therefore the actual size of living communities at any one point in time. Overall, however, evidence indicates that the majority of the population was dispersed in relatively small sedentary habitations.

According to Brown et al. (1978), the Plantation site is an example of a Harlan phase settlement. Located on a hill spur in the Cherokee Prairie district between the Arkansas and Canadian rivers, it represents a settlement on the western margins of the study area. The site contained one rectangular postmold building, roughly 5 by 8 m in extent, and a small circular postmold outline nearby that was 2 m in diameter and was interpreted as a utility or storage structure ancillary to the dwelling (Briscoe 1977:37). Seven refuse pits and nine burials were associated with the structure. The pits contained an array of domestic refuse including sandstone pieces, flaking debris, potsherds, ground stones, charred plant remains, bone and chipped stone tools. The burials were flexed inhumations of one or more individuals placed in shallow pits and accompanied by only a few artifacts, including a pottery vessel and stone and bone beads. A scatter of sheet midden was located downslope from the structures.

Artifacts include both small arrowpoints and large dart points, although most of the latter were picked up on the graded surface of the site instead of in any features, and may have belonged to earlier occupations of the hill. Arrowpoints included Scallorn, Reed, Sequoyah, Morris, Fresno, Washita, and Keota types. Other stone tools included chipped stone cutting and scraping implements, chipped stone hoes and celts, preforms, gravers, modified flakes, cupstones, grinding stones, and hammerstones. Williams Plain and Woodward Plain and untyped incised clay-tempered ceramics are present. Botanical remains from only one feature at the site were studied and contained hickory, pecan, and walnut fragments. A sample of the faunal remains were identified and were dominated by deer remains. Opossum, turtle, skunk, rabbit, and raccoon were also present, as were small amounts of fish. Most of the deer bone were skull and limb elements, indicating that the deer were killed and field dressed elsewhere, and only some portions of the animals were returned to the settlement (Briscoe 1977:Appendix III and IV).

Radiocarbon samples were taken from four pits and one burial. According to Briscoe (1977:Table 15) two of the assays are reliable. One is from Feature 1 and has an uncorrected date of 935 ± 155 B.P. (UGS-1401). The second, from Feature 3 is 678 ± 70 B.P. (USU-1827).

In the Arkansas River alluvial valley the Fine site is an example of a small settlement. This midden scatter 30 m in diameter was situated on an area of low relief in the alluvial bottoms between Vian Creek and the Arkansas River. Testing revealed three areas of burned logs and fired clay interpreted as structures, although post mold outlines were not recorded. Six human burials accompanied by few grave offerings were also found in shallow pits. Artifacts recovered from the site included large Gary projectile points, small arrowpoints including Morris and Sequoyah types, flake debris, chipped stone cutting and scraping tools, preforms, celts, double bitted axes, sandstone awl sharpeners, grinding stones, hammerstones, and Williams Plain, Canton Incised, and Woodward Plain pottery types. Radiocarbon samples taken from burned logs in Trench 1 (Feature 3) were 500 ± 70 B.P. (TX-519), 620 ± 80 B.P. (TX-623), and 780 ± 60 B.P. (TX-621). Logs from Feature 1 in Trench C were dated at 840 ± 60 B.P. (TX-617). According to Eighmy (1969:44), if the two more recent dates are considered inaccurate, the remaining three placed the occupation in the time frame now attributed to the Harlan phase. An alternate interpretation, however, would be that the site was occupied as a small farmstead at two different times.

In addition to sedentary homesteads, the Harlan phase settlement system undoubtedly included an array of temporary camps and work sites where wild plant, animal, and stone resources were collected, prepared, and/or stored. Few of these smaller sites have been documented. One example may be the Goff Shelter (Schneider 1967). This east facing shelter is situated just west of the Arkansas River downstream from the confluence of the Arkansas, Grand, and Verdigris rivers. Over 7 feet of deposits from many separate occupations were found in the shelter, and midden debris extended outside the overhang as well. Among the artifacts found were Williams Plain and Woodward Plain pottery, arrow points, larger stemmed and notched dart points, and an array of other stone tools that included chipped axes, drills, grinding stones, and chipped cutting and scraping tools. Deer antler flakers, bone awls, fishhooks, and beads were also found, along with the remains of numerous animal species including bison, small mammals, fish, turtles, birds, and mollusks. The shelter deposits are undated, and although it appears the remains of several cultural periods are represented, the shelter seems to have served as a small base camp during this early Mississippi period.

In summary, then, the Harlan phase is marked by the appearance of a settlement pattern of sedentary habitation sites linked to a series of regional mortuary mound centers that are distributed in the alluvial valleys of major rivers. The habitation sites favor alluvial valley settings but are also found overlooking patches of bottomland. This settlement distribution and the presence of substantial dwelling structures are seen as evidence for a new economic orientation involving corn horticulture (cf. Wyckoff 1980; Brown et al. 1978; Bell 1984b). It is important to note, however, that direct evidence of corn growing is very limited. Of the above mentioned sites, corn cobs were recovered only from houses at the Hughes site, and the cultural context of this discovery by early excavators is not certain (Wyckoff 1980:Table 75). Corn horticulture may have been an addition to the economic base, but wild plant and animal products were still important dietary staples, as is indicated by bioarcheological evidence cited elsewhere in this report. Efforts to recover direct evidence of dietary constituents in the form of animal and plant remains must be carried out at the range of settlement types in order to obtain a clearer picture of the role tropical plant horticulture may have played in the development of this complex social pattern.

Social organization during this time is most clearly reflected in the burial behavior at mound centers and indicates an emerging pattern of social differentiation in which some groups of people, presumably members of particular lineages or family lines, took on important religious and political roles. Mound centers are scattered along major waterways at relatively regular intervals, indicating they were equivalent in rank, that is each center served a dispersed local population surrounding it, and no center exerted paramount authority over all the others (cf. Rogers 1983; Brown et al. 1978). This distribution pattern changed during the following Spiro phase, when the Spiro site became the single paramount ceremonial center in this portion of the Arkansas River basin.

Following the Harlan phase, social changes in the Arkansas River Valley in Oklahoma are marked by demographic shifts in the residential pattern of the regional populace and corresponding changes in the importance and configuration of mound centers. This period is known as the Spiro phase, after a group of features at the Spiro site, and is dated approximately between 700 B.P. and 500 B.P. Radiocarbon dates for Spiro and other sites of this phase are summarized by Brown (1984b:Table 11.1) and Rohrbaugh (1984:Table 12:1). As James A. Brown described it, the Spiro phase represents the Arkansas River Valley Caddoan tradition at the peak of social complexity and cultural elaboration (Brown 1984b:241).

At Spiro itself, two areas of the site received the most attention, the Craig Mound and the Brown Mound. At the Craig Mound location, mortuaries continued to be used for the elaborate program of curation and disposal of the dead. A large crematory basin, 4.9 m in diameter, with a recessed floor and access stairways, was used for some individuals (Brown 1966a:81–85, 1984b:252) early in this period, while others were housed in mortuaries and periodically interred in accretion deposits. Then, because of some historical event that we can no longer recover, the ritual formula was altered. A large ground level mortuary building approximately 17 by 12 m in extent was filled with a wide array of carefully prepared remains of elite individuals and a rich assortment of status symbols, trade goods, and costumery. Instead of being cleaned out and demolished, however, it was entombed within a flat topped mound. Subsequently, both this mound and the Brown Mound on the upland were used as platforms for ritual activity and further human burials. A series of mortuaries were constructed on them, demolished, and buried as the mounds were added on to until a final conical cap was applied to the Craig Mound and it achieved its historic period configuration. During this period of time it does not appear that the areas between the mounds were inhabited by a resident population. Spiro had become a special ritual center and the populace who supported it resided elsewhere in the valley.

Through a fortuitous set of circumstances, the interior of the feature buried within the main Craig Mound, known in the literature now as the Great Mortuary, was not crushed by the weight of the overlying soil. A natural cavity formed within which normally perishable articles such as clothing, fur, and wood were preserved. This cavity was discovered by the commercial looters of the site and was the source of the spectacular articles that came to light during the 1930s. The objects from the commercial and the later University excavations of the Great Mortuary are the source of much of our knowledge of Spiro phase technology, social organization, trade, and iconography (Phillips and Brown 1978; Brown 1971a, 1971b, 1975, 1983, 1984b; Rogers 1983).

> Resting on the floor were innumerable caches of artifacts and disarticulated burials, some of which were probably covered with small mounds of earth to give the appearance of ‘raised places’ or ‘alters’ that the relic miners observed when they entered the central cavity. On top of,

> or to the side of, these caches were three types of prestigious burials of the honored elite. The highest ranking, largest, and most spectacular were the cedar pole burial litters that were heaped with numerous and varied precious artifacts among which were a few small skeletal mementos of a single honored individual. The litters ranged in size from seven by six feet to two by two feet and contained most of the celebrated artifacts of the 'central cavity,' such as marine shell cups and gorgets, shell and pearl beads, and fabric robes as well as many other items of unusual rarity and value. Among the litter burials were partially disarticulated extended burials surrounded by a few artifacts. Among this class was evidently a burial covered with at least three large copper plates that became the source for the romantic tale of a 'copper-armored warrior.'... The third class consisted of disarticulated remains in basketry chests, also accompanied by copper plates. (Phillips and Brown 1978:13)

> The Spiro burials clearly contain a specially privileged group that were accorded an unusual degree of custodial care and wound up on or in exclusive facilities honoring the deceased. The grading of social status was so completely ramified throughout the Caddoan territory in the Arkansas Valley that to understand the elaborate burials in the Craig and Brown Mounds it is necessary to recognize that they represent the apex of a social pyramid whose base is the resident population spread throughout the whole region.

> The most spectacular burials at Spiro are the aforementioned elite burials on cedar pole litters. The bier itself is almost symbolic of an office since litters are intended to convey the highest ranking members of the community over the shoulder of the bearers. A litter is simultaneously a means of transportation when everyone else walks and a means of demonstrating the superior status of those borne. (Phillips and Brown 1978:17)

This period of mortuary burial ritual at Spiro marked the emergence of this site as the paramount political and religious center in the Arkansas River Valley. In contrast to the preceding phase, few other ceremonial centers were used during the Spiro period, and they were clearly subsidiary to Spiro. George Sabo has already described the Norman site, which was a regional center at the north end of the valley in the Grand River drainage.

Nearer Spiro were two sites consisting of a single platform mound each. One is Cavanaugh, 14 km east of Spiro in Fort Smith, Arkansas, and never studied, although an exposed profile in the mound indicates it was built in one stage. The mound is 7 m high and 60 by 50 m in extent. The other mound is Skidgel, 1.6 km west of Spiro on a ridgecrest. It is a conical earthwork about 6 m high and 60 m in diameter. Three rectangular structures were covered by the mound, and two others were located about 20 m to the west and south. These structures were rectangular postmold outlines with two central support posts and extended entranceways. One house was 7 m by 6 m, and the second was 8 m by 6 m in size (Wyckoff 1980:Figure 38; Wallace 1962:36). About 150 m north of the mound additional structures of similar construction stood, and ca 400 m to the northwest was a small cemetery with 20 interments (Off 1946; Wyckoff 1980). According to Wyckoff, domestic pottery and stone tools accompanied these individuals.

Philip Phillips and James A. Brown note that the three mound centers, Spiro, Skidgel and Cavanaugh are ordered in virtually a straight line a few degrees south of true east. This arrangement may signify the three form a single complex, with lines of authority and communication passing from the paramount center through the subsidiary centers to the populace which resided in scattered communities through this bottomland area (Phillips and Brown 1978:16).

The artifact assemblage of the Spiro phase, once separated from the special objects in the high status graves, included an array of ceramic and lithic implements and weapons. Arrowpoints come with triangular outlines and a range of notched base shapes and include Fresno, Washita, Reed, Morris, Keota, and Haskell types. The ceramic assemblage is dominated by plain utilitarian wares that are now almost entirely tempered with shell, and include Woodward Plain, the related slipped Poteau Plain, and Paris Plain. Decorated local wares are Woodward Applique, Braden Punctate, Poteau Engraved, Spiro Engraved, and Hickory Engraved. At the Spiro site trade wares from the Red River basin to the south associated with this phase include seed jars, Nash Neck Banded jars, Sanders Plain, Sanders Engraved, Friendship Engraved, Haley Engraved, Glassel Engraved, and Maxey Noded Redware. Vessel forms are more diverse and include legged jars, miniatures, rim effigy bowls, hooded bottles, and wide mouthed bottles as well as flat based jars and carinated bowls (Brown 1971a, 1984b).

The perishable materials found in the Great Mortuary give some indication of the wood, bone, and textile industries belonging to this phase. Cane was woven into baskets and mats. Textiles were woven of animal hair, including rabbit and bison, and vegetal fibers, and included both coarse and fine weaves. Elaborate costumes attest to such techniques as bobbin lace weaving, dye resistant cloth decoration, and the use of feather and fur combinations in fabrics. Bone implements include awls, sickles and digging tools. Bone, wood, and shell were also used as raw materials for an array of costume elements and status items and include bone pins and beads, shell beads, and wooden objects that were characteristically covered with thin sheets of copper. Utilitarian shell objects include hoes and scrapers.

Utilitarian stone tools used in daily food collection and preparation activities are characteristically found in more abundance at domestic sites than at ceremonial centers like Spiro. They include chipped siltstone hoes, choppers, bifacially chipped cutting tools, scrapers made of flakes, drills, Gary knife points, triangular lance points, manos, milling slabs, grinding basins, celts, adzes, and sandstone hones, files, and abraders (Brown 1984b:246–248).

In addition to ceremonial centers, other types of sites from this period are permanent residential sites of varying size referred to as hamlets, farmsteads, or villages, and an array of specialized collecting stations and temporary camps similar to those found in previous periods. These latter sites would include plant collection stations, hunting camps, rock collecting locations, salt making sites, rockshelters, and other short term activity locales.

Residential sites attributable to this phase seem to be clustered in alluvial bottomland localities, and are more common in the Arkansas River alluvial valley near the Spiro locality and in the lower reaches of the Grand and Illinois river valleys. Wyckoff (1980) interprets the pattern of settlement to indicate that populations were abandoning settlements along the northern and western borders of the Arkansas basin and were clustering not only in the bottomland area near Spiro, but also were establishing settlements in upland terrain overlooking river valleys. This change in settlement distribution may be attributable to a number of causes. Climatic fluctuations associated with the Pacific climatic episode mentioned previously by George Sabo are likely to have affected both soil moisture conditions and biotic community distributions. Permanent settlements at which gardening was at least part of the economic base would have been more secure in or near major alluvial settings. Brown et al. (1978:193–194) also note that as one moves from west to east in this part of the study area, greater subsistence security would be afforded as one moves toward greater rainfall and humidity gradients in the east. At the same time, the relationship between Spiro and its support population may have affected where the populace resided as well. Demands made by the social elite on the general population may have favored the clustering of settlements within easy reach of the ceremonial center. The exact nature of this relationship can only be speculated, but may have involved periodic attendance of the general populace at ceremonies, demands for tribute in the form of food, other raw materials, or finished artifacts, and periodic labor in the construction and maintenance of earthworks.

The Cat Smith site is an example of a settlement that is located on a second terrace of the Arkansas River at the Webber's Falls lock and dam. Although cultural material was scattered over 15 acres, the Spiro component consisted of two houses, two trash or storage pits, and two burials. One structure consisted of a rectangular post mold outline approximately 6.5 m by 5 m in extent with two central interior supports and a central hearth. The structure had been burned. The second structure was similar to the first in size and shape. Two child burials without grave offerings were also found on the terrace. The storage/refuse pits were shallow circular basins and contained domestic refuse comprised of a side notched arrowpoint, flake scrapers, Poteau and Woodward plain pottery, lithic debris, and limestone cobbles. Arrowpoints, Gary dart points, chipped bifaces and unifacial tools, chipped hoes, grinding stones, milling stones, cupstones, hammerstones, Woodward Plain, Maxey Noded Redware, Poteau Plain, and clay-tempered plain pottery were recovered from midden deposits (Wyckoff and Barr 1967).

Radiocarbon dates on the first structure are 560 ± 60 B.P. (Wis-254), 650 ± 60 B.P. (Tx-615), and 630 ± 60 B.P. (Tx-616). The second structure is dated at 770 ± 70 B.P. (Tx-493) and 800 ± 60 B.P. (Tx-614) (Bender et al. 1968:474; Valastro and Davis 1970:261; Valastro et al. 1968:391).

The Horton site is another settlement in the Arkansas River Valley in the Kerr Dam area. Evidence of two quadrilateral structures was found but distinct postmold outlines were not noted. Thirty-eight flexed human burials were encountered. Grave offerings were rare, and consisted of celts, two pottery vessels, an elbow pipe, an arrowpoint, a Gary dart point and scrapers. Three pits containing occupational debris and food remains were found. Two were in the area of the buildings. The third pit has radiocarbon dates of 780 ± 70 B.P. (Tx-618) and 440 ± 90 B.P. (Tx-627) (Valastro and Davis 1970:262). A midden deposit containing numerous animal bones, including portions of several deer skeletons, near a concentration of baked clay was dated at 1120 ± 110 B.P. (Tx-810; Valastro et al. 1972:475), which seems inconsistent with the other features at the site (Wyckoff 1970a; Shaeffer 1958).

The artifact assemblage reflects hunting, stone tool making, food processing and other domestic maintenance activities. Haskell, Reed, Keota, and Fresno arrowpoints and Gary dart points are the predominant projectiles. Chipped hoes, bifaces and unifacial tools, an adz, celts, grinding stones, abraders, hammerstones, and lithic debris are in the stone assemblage. Pottery types are dominated by shell-tempered, red filmed ,and Woodward Plain types, but include a small collection of engraved, incised, punctated and plain clay tempered sherds.

Corn and hickory nuts were among the food remains from the site, indicating both wild and domestic plants were used. Wyckoff (1970a:137) noted an area about 100 m from the main part of the site where Webber's Falls siltstone hoe chips were scattered, and he interprets this to indicate a possible garden area where digging tools were periodically repaired.

Animal remains indicate site inhabitants were using a wide range of animal species from riverine, forest, and forest edge habitats. Deer, small mammal, turkey, box and soft shell turtle, fish, and mollusks were taken. Deer skeletal elements consisted primarily of limb bones, pelves, scapulae, and skull fragments, indicating the animals were killed and butchered off the site (Wyckoff 1970a:138–139).

Closer to the Spiro site, several settlements were scattered in the bottomlands and on adjacent uplands. The Littlefield I site is the largest of these (Brown et al. 1978:190; Brown 1984b: 243; Wyckoff 1980:283; Orr 1946:242). Located 5 km from Spiro, the site appears to cover 4 ha (ca 10 acres) and contained at least 15 structures oriented primarily in alignment with the cardinal directions. The buildings were rectangular in outline with two internal support posts and baked clay fireplaces. A small number of refuse pits contained domestic debris that included potsherds, animal bone, shell refuse, grinding stones, and ash deposits. The artifact assemblage from the site included chipped and ground stone tools for food preparation and domestic activities, and chipped slate hoes that may have been agricultural tools. Four flexed human burials were encountered on the west edge of the site, with only turtle rattles as recorded grave accompaniments. The site is undated, and has not been reported in detail.

Downstream from the Spiro complex, few sites of this period have been identified, and it appears that the geographic extent of the Spiro phase may end below Fort Smith where the alluvial valley of the Arkansas narrows. In the vicinity of Fort Smith the McClure complex (Hoffman 1977a) may be the easternmost representative of this phase. This complex is named for the assemblage recovered from the McClure site, a burial area located on a low rise in the Arkansas River floodplain near Van Buren, Arkansas. Here one extended human burial was recovered, accompanied by 29 small Fresno (unnotched triangular) arrowpoints and a large chipped biface. Other burials were reportedly destroyed in previous bulldozing operations, and it is unknown whether other features such as structures or pits may once have been at the site (McCartney 1963). Other artifacts belonging to this complex recovered from the disturbed site and from the surface of sites in the nearby Ozark Reservoir are reportedly shell-tempered, slipped, incised, noded, and appliqued pottery, grinding stones, Reed arrowpoints, and unnotched leaf-shaped arrowpoints (Hoffman 1977a:41–42). The McClure site is undated, and the relationship of the complex to other cultural manifestations both up and downstream is still to be adequately determined.

Temporary camps and other special purpose sites belonging to the Spiro phase in the Arkansas River Valley are not well known, but are expected to be located, particularly in the uplands, overlooking stream valleys. These may include rockshelters, open camps and collecting areas. A considerable amount of basic research is needed to identify these smaller Spiro phase components and delineate their relationship to the large permanent settlements. Wyckoff (1980) postulates that base camps and other temporary sites were important parts of the total settlement system during this period.

The large inventory of exotic and ceremonial objects from the Spiro site has made it possible to explore the kinds of trade connections between Arkansas valley people and societies elsewhere in the southeast and midcontinent. Recently, James A. Brown has followed the pioneering study of Robert E. Bell (1947a) in looking at the different kinds of objects that were traded, and the source locations from which various classes of materials apparently came. It is important to note, as Brown emphasizes, that accurate identification of the source of objects requires rigorous analysis of their physical structure and comparison to samples from source locations, bedrock deposits or mineral outcrops. Few such studies have been conducted, and much more work must be done before the pattern of interregional trade during the Mississippi period is adequately understood. For example, copper objects are found in several forms in mortuary deposits in the Craig Mound. The best known source of copper used by prehistoric Native Americans in the eastern U.S. was the Great Lakes area in the upper Midwest. However, copper also occurs in the southern Appalachian mountains, and in the Ouachita mountains. The exact source of the Spiro copper is still unknown (Hamilton et al. 1974; Brown 1983), despite some attempts at physical analysis. Determining the origin of the copper will help delineate the pattern of trade in this very important material used in the manufacture of luxury ceremonial objects.

In his study, Brown distinguishes between low value goods, items that are functional but are made of exotic materials, and high value goods that are luxury items and ceremonial objects. The former include pottery vessels and small projectile points, while the latter are such things as conch shell drinking cups and gorgets, copper figures and plates, large chipped and ground stone bifaces, maces and badges of office, and minerals and exotic pigments. Brown found two different levels of trade. Low value goods came from sources within a radius of 450 km of the Spiro site, and were derived primarily from Red River valley Caddoan cultures to the southeast, and the Mississippi alluvial valley area of northeast Arkansas/western Tennessee to the east. In contrast, the large chipped stone bifaces, copper, marine shell, and a wide range of ceremonial objects made of exotic rocks and minerals that make up the high value trade items come from long distances, and from geographic regions primarily east and west of Spiro. Spiro was situated along an east-west trade corridor that may have extended from peninsular Florida, where marine shells may have originated, to the Rio Grande valley which may have been the source of cotton thread or cloth found at the Craig Mound (Brown 1983:148–152). One role of the elite population in the Spiro area was management of this trade and control over the distribution of various luxury goods. It is difficult to ascertain whether this group of people acted solely as middlemen in the network, or whether the Arkansas River Valley was a source area itself for materials, although Phillips and Brown suggest bison and rabbit hair may have been important trade commodities available locally (Phillips and Brown 1978:20). Stone pipes and earspools are also made of locally available sandstone.

There are several interesting aspects of the distribution of trade goods within the Arkansas River Valley. High value goods were controlled and possessed almost exclusively by only a small fraction of the population. Even within the Great Mortuary at the Craig Mound, only the highest ranking individuals were interred with engraved shell cups and copper headpieces and plates. These items are almost never seen outside this ceremonial center, testifying to the control that the highest ranking members of society had over the possession and distribution of these objects. These high value goods are also the objects bearing Southern Cult symbolism. That is, they are shaped in or embellished with decorative motifs bearing the set of symbols found in other special contexts in ceremonial centers elsewhere in the southeast (Brown 1975, 1983, 1984b; Phillips and Brown 1978).

In contrast to the very restricted distribution of high value goods, low value trade items are found in large quantities with lower ranking burials in the main ceremonial centers, and also find their way to some individuals in regional and local centers like the small mound centers in tributary drainages.

As Phillips and Brown note (1978:20), this pattern of limited distribution of some kinds of trade items is related to the role the social elite played in managing the resources of communities within the Arkansas River Valley area.

> This pattern of broad dispersal in limited quantities is obviously part of a system of exchange in which the Spiro elite controlled, or rather monopolized, the distribution of prestigious commodities in exchange for other materials. Such systems are thought to be the primary economic basis for chieftainship organization (Fried 1967). Certainly it is a sufficient basis for the social position of the Spiro elite.

In other words, during this period a complex multilevel system of exchange in goods was going on in the study area. Within the Arkansas River Valley region, social elites managed the distribution of durable goods, and probably food (Brown 1984b:252–253). This may have been carried out under the umbrella of ritual activity, and was accompanied by the distribution of some kinds of low value trade goods to local leaders, but high ranking members of society still possessed most trade goods which constituted a form of family or lineage wealth. At the same time, high ranking members of the society were engaged in long distance trade with numerous locations to the east and west of the paramount center at Spiro. Items passing along this route were primarily ritual objects or items of costumery bearing symbolic representations of a number of religious themes. These goods were strictly controlled by elite members of society, used in ceremonies that reminded observers of their place in the social order, and taken out of circulation during burial rituals. This last practice not only made the mortuary an important and sacred place, but also served to enhance the value of surviving high status items.

> Significantly for us, the circulation of valuables as records of exchange is susceptible to inflation if the valuables continue to accumulate. But this inflation by proliferation can be quite easily solved by the periodic destruction of a portion of the stock of valuables. Such items as feathers can be expected to lose their value in time, but marine shell and stone artifacts are much more durable. One of the historic solutions has been to bury the durables, and one of the more convenient occasions for doing this is the death of an individual who was important in maintaining the exchange. The result is recorded archeologically in the appearance of artifacts of exotic material and manufacture as grave goods, or as ritually destroyed caches....
>
> Sufficient evidence is available in the extraordinary archeological record to document the participation of Spiro in a sphere of interregional interaction. Artifacts of foreign design and exotic material appear in special mortuary contexts at Spiro. These valuables are treated in different ways roughly coincident with the distance it took to acquire them. All of the valuables were deliberately destroyed by their entombment on the floor of the Great Mortuary and in the graves used for disposal of items from the later Spiro mortuaries. Special pains were taken to destroy the chipped stone artifacts and the marine shell cups by smashing them and subsequently distributing them among contemporary burials in the Great Mortuary. Beads and other artifacts were frequently fire scorched, and the copper plates were folded and sometimes crumpled like tinfoil. (Brown 1975:27–28)

The hoard of artifacts from the mortuaries at Spiro and the burial features themselves offer some insights into the religious beliefs and ritual practices of these people. The most important and intriguing part of this data base are the engraved shell cups and gorgets and the copper plaques which bear a rich assortment of artistic designs and iconographic symbols. It is not possible to recapture the precise symbolism of these designs, or to understand yet how the various symbols were interrelated and expressed in living myth and ritual. We can, however, identify some basic themes expressed in these and other objects that must have been prominent in religious expression.

The most obvious and important local theme has to do with the relationship between living members of the social elite and their ancestors. Curation of physical remains of the ancestors in mortuaries was the focus of ongoing ritual activity, and, as mentioned previously, was important in validating the social position and prerogatives of living social leaders. Human masks, representations of skulls, limb bones, hands, and wooden human statues are seen by Brown (1984b:256–257) as representations of ancestors. Some objects may have been the focus of ritual while others were symbols used by the living to reinforce the legitimacy of their social position (Brown 1975:17).

A second important iconographic and ritual theme encompasses warfare and military success. Ceremonial objects like maces and large bifaces are representations of weaponry, and human figures are commonly depicted associated with these and other symbols of military prowess. The most pervasive symbolism involves the association of human and falcon figures. Copper plates and engraved shell depict humans with an array of falcon symbols, such as feathered capes or wings, grasping talons, and a “forked eye” design reminiscent of head marking on Perigrene falcons that appears as part of a mask or facial decoration. The falcon impersonators, as these figures are often called, are often depicted grasping weapons and/or human heads in their hands in representations that link falcon symbols with human military success. Falcon symbols such as the forked eye also appear independently in numerous contexts. Capes and costume parts found in the Great Mortuary indicate that some members of elite society became living representatives of this symbolism, presumably in public rituals (Brown 1975:19, 1984b:256). The role of actual military combat in Spiro phase society is difficult to determine; the dispersed pattern of small permanent settlements is a strong indication that there was little threat of attack to the local populace, and evidence of conflict with neighboring societies is not apparent.

Brown (1984b) notes that another important religious theme involved the interrelationship between animals and humans, and the efforts of humans to know and manipulate the power residing in animals. This form of religious practice, known as Shamanism, is recorded among Native Americans of the historic period, and is also present in numerous societies around the world where hunting is an important part of the economic base. Shamans are religious practitioners who seek to intervene between humans and animal (and supernatural) forces. This is carried out with the aid of spiritual or animal helpers, and with rituals employing costumes and paraphernalia imbued with supernatural power. Objects such as quartz crystals, fossils, and odd animal parts, some of which were found in the Craig Mound burials, are likely examples of such paraphernalia, and some masks, such as the human face surmounted by a pair of deer antlers, may have been part of shamanistic costumery.

The use of fire in human cremations, in the destruction of important buildings, and in ritual activity in mound centers, and the concern with solar phenomena described by George Sabo are indications that sun and fire symbolism were important additional components of religious belief systems during this time period.

Around 500 B.P. social and settlement changes occurred in the Arkansas River Valley in Oklahoma. Spiro and other mound centers were no longer used for elaborate mortuary ritual, and no new mound centers were constructed. Changes in the artifact assemblage indicate subsistence practices had altered, and subtle differences in features at settlements suggest residential patterns may have not been the same as in preceding periods. This period is known as the Fort Coffee phase (Brown et al. 1978:173; Rohrbaugh 1982, 1984) and it is the last prehistoric occupation of this region, lasting perhaps until 300 B.P.

Known Fort Coffee phase sites in the Arkansas River Valley are characteristically settlements and cemeteries. The former, of which the Tyler, Tyler-Rose, Robinson-Solesbee, Harvey, and perhaps the Sheffield and Choates sites are examples, are primarily small residential sites with structures, large storage pits and a few human burials. The artifact assemblage includes small notched and unnotched arrowpoints, particularly the Shelley and Talco types, an array of chipped and ground stone tools, and shell-tempered pottery dominated by the types Woodward Plain, Avery Engraved, Braden Punctated, Braden Incised, Emory Punctated, Hudson Engraved, Womack Engraved and Nash Neck Banded (Rohrbaugh 1982, 1984:280; Brown 1984a:20). The elaborate sumptuary and ceremonial artifacts associated with the preceding phase are largely absent, as is evidence of extended long distance trade with eastern cultures. One noteworthy addition to the assemblage, however, is the appearance of bison bone tools and the corresponding increase in bison bone among the food remains at settlements. In general, the Fort Coffee phase represents a society lacking the strong social hierarchy and associated ritual activity of the Spiro phase. Adaptation patterns now involve the regular use of bison as an important meat source, and a possible economic system featuring the periodic abandonment of settlements for bison hunting expeditions to the west. The orientation of society shifts from eastern connections to a lifeway with similarities to Plains oriented societies.

The reasons for this change are undoubtedly numerous and interrelated. Climatic fluctuations postulated for this period are seen as potential factors in widespread social changes (Baerreis and Bryson 1965a, 1965b). It is also likely that the eastern migration of bison from their Plains heartland may have brought increased availability of this food source to the western edge of the study area (Neuman 1983). The decreasing importance of a managerial elite and changes in the relationship between the study area and societies elsewhere in the southeast may also have been important cultural factors during this period. Determining what were the causes and processes of this significant social change is not possible at present. This will require better chronological control of both environmental and social events, and is an important area for future research.

Wyckoff (1980:327–334) notes that settlements of this period are distributed primarily in alluvial bottomlands settings and on terraces in the Arkansas River Valley between the Canadian and the Poteau river mouths on or near easily tilled silty loam soils. Settlements are characterized by fewer houses, many subterranean storage pits, and little surface midden accumulation.

The Tyler site is one example of a small settlement. Situated on low relief in the Arkansas River Valley, the site contained twelve trash filled pits, one sandstone lined hearth and a single flexed burial. Three of the pits are bell shaped, that is, they are larger at the bottom than at the top. All of the pits contained fire burned rock, animal bones, artifacts and charred plant remains. Radiocarbon dates from contents of two pits are 420 ± 79 B.P. (Tx-625) and 450 ± 110 B.P. (Tx-624) (Rohrbaugh 1984: Table 12.1). Artifacts included arrow points, shell-tempered pottery, a range of chipped stone cutting and scraping tools, celts, grooved sandstone abraders, cupstones and hammerstones. The tubular sections of two elbow pipes were also found. Bone and shell tools were bison scapula digging implements, a shell hoe, bison ribs with numerous transverse cut marks on them, sometimes called rasps, bone awls and tubes, and cut antler tines. Food remains from the site do not include domesticated plants, but horticulture is strongly suggested by the bone and shell digging implements. Walnut shells and seed fragments were recovered. Animals represented included bison, deer, small mammals, birds, fish and box turtle (Burton et al. 1969).

A similar artifact and feature assemblage was found at the Tyler-Rose site, on a high terrace in the Arkansas River Valley floodplain. Most of the bones from at least one bison were among the animal remains, indicating the animal was killed within a short distance of the site and almost all body parts were transported back to the settlement. Plant remains included corn grains and cob fragments, and one domesticated bean (Cartledge 1970:56–59).

Robinson-Solesbee site is on an area of low relief between the lower reaches of Sans Bois Creek and the Arkansas River in the alluvial valley. Thirty-three subterranean pits, some overlapping others and indicating a long term residence of the site, were found. Two roughly rectangular postmold outlines and an area of baked clay are identified as three possible dwellings. The postmold outlines did not have clearly indicated interior supports. The artifact assemblage is comparable to that from the sites mentioned above (Bell et al. 1969).

The Harvey site, on a terrace overlooking the confluence of Sallisaw Creek and the Arkansas River, had thirty-three prehistoric storage/refuse pits, two rectangular postmold patterns outlining dwellings, and two burials. Artifacts indicate a range of domestic activities similar to those carried out at the aforementioned sites took place here. Food remains included corn cobs and kernels, sunflower or squash seeds, nuts, and a wide range of animals that include deer, elk, bison, small mammals, turkey, box turtle, aquatic turtle, and mussels. Radiocarbon dates from one pit were 390 ± 60 B.P. (Tx-486) and 550 ± 60 B.P. (Tx-611).

The Sheffield site, located on two low rises in the Arkansas River alluvial valley yielded six prehistoric refuse pits, a gully filled with cultural debris, a shallow circular depression approximately 5 m in diameter that is identified as a house floor, a hearth inside the house floor, and eleven burials. A radiocarbon date from a refuse pit found inside the structure is 500 ± 60 B.P. (WIS-256) (Rohrbaugh 1984:Table 12.1). A second date from the contents of another pit was 440 ± 70 B.P. (Tx-489) (Prewitt and Wood 1969:10). Rohrbaugh (1984) has another context for this date. Charcoal from the floor of the house was dated at 790 ± 200 B.P. (Tx-489) and is considered by Prewitt and Wood to be in error. The cemetery at the Sheffield site contained flexed inhumations accompanied by small collections of grave offerings, most often pottery vessels, turtle shells, or a few stone tools.

The artifact assemblage from the site reflects its functional and cultural similarity to those previously mentioned. Projectile points and stone tools reflecting domestic food preparation and maintenance activities were found, along with shell-tempered pottery. Poor bone preservation made food remains rare, but deer, bison, small mammals, fish, tortoise, birds, and mussels were recovered (Prewitt and Wood 1969).

The circular house pattern at the Sheffield site is believed to be a Fort Coffee phase structure form in addition to quadrilateral structures found on some sites. At the Choates-Holt site, on a bluff overlooking the Spiro site, a circular house was constructed on top of the ruins of a rectangular structure. That house, and the appearance of some artifacts such as bison scapula hoes, argues for a Fort Coffee occupation at the site which followed an earlier Spiro phase component (Rohrbaugh 1984; Wyckoff 1980:312–314). The Choates-Holt site remains to be reported in detail or dated.

The Wybark site, located on a high terrace at the confluence of the Arkansas and the Verdigris rivers, offers some confirming evidence of the separation of Fort Coffee phase and earlier occupations in this part of the Arkansas River Valley. The site was essentially destroyed by the excavation of a large rectangular borrow pit, but traces of two periods of occupation were found in the walls of the excavation. Along the north face of the borrow pit embankment a thin occupation layer was exposed that contained clay-tempered punctuated pottery, two shell beads, and sherds of a Woodward Plain jar. On the east and south edges of the borrow pit additional cultural material was recovered from a stratigraphically higher horizon. Seven bell-shaped storage pits, a hearth, a human burial accompanied by bison scapula tools, and a large deposit of bison bone were found. Daub fragments indicated the presence of a structure, but no posts or floors were found.

The later occupation of the site is marked by an assemblage that includes Washita, Fresno, and other types of arrowpoints, chipped stone scrapers and bifaces, hammerstones, abraders, and grinding stones. Bone tools include the aforementioned bison scapula diggers, bison tibia diggers, a scapula pick, polished deer mandibles (sickles?), deer bone awls, antler tines, scored long bone rasps, and bone and shell beads. Pottery containers are primarily the Woodward and Poteau plain shell-tempered types. Food remains include corn kernels and bison, deer, small mammal, fish, turtle, and bird bone, and mussels. Bones of Plains Pocket Gopher, Hipsed Pocket Mouse and wood rat indicate the local environment of the site was at least in part a prairie plains open habitat during the late occupation. The occupations are not dated (Lopez 1973).

The stratigraphic separation of these two principal occupations of the Wybark site indicate significant ecological change had occurred in this locality before the late period occupation, perhaps related to a period of desiccation and encroachment of plains habitat. It is also a reminder that significant cultural occupations may lie buried in alluvial settings, not only from early Holocene cultures but also from later cultures right up into the Mississippi period.

Settlements are not the only kinds of sites associated with the Fort Coffee phase. Wyckoff (1980) postulates that base camps became more common during this period, especially in shelters along northern tributaries of the Arkansas like those already mentioned by George Sabo. In the southwestern part of the study area the Vian Creek shelter is mentioned as an example of this site type. It is a small double overhang overlooking the Arkansas River floodplain at the confluence of Vian and Negro creeks that has produced lithic debris, bifacially chipped artifacts, a hammerstone, and two bison scapula hoes (Miller 1977:467). The site is unstudied, has been vandalized, and is today on the edge of the R. S. Kerr Reservoir.

In addition to base camps, smaller temporary camps and work sites should be part of the Fort Coffee settlement systems. Wyckoff notes that few of these smaller sites have been located and none has been studied in detail (1980:337). He speculates that this may not be because these sites do not exist, but because survey and research in uplands on small sites has not often been undertaken. These sites should include temporary camps and bivouacs, hunting stations, and raw material collecting areas.

One other kind of settlement type may be cemeteries. In the vicinity of the Spiro site the Lymon Moore cemetery is a type site for the Fort Coffee phase. It is part of a large burial complex in the Arkansas River Valley bottoms southwest of Spiro. WPA excavations recovered numerous flexed and extended burials from this site, and from the Edgar Moore cemetery which is separated from Lymon Moore only by a railroad line. WPA excavations in and around these cemeteries noted the location of dwelling structures and numerous other features, according to Rohrbaugh (1982:49), but it is unclear how these burial areas related to other settlements and cemeteries in the immediate vicinity. At present it appears the Lymon Moore cemetery contained the remains of at least 54 individuals, and it may have been either a separate burial site or a part of a dispersed settlement in the Fort Coffee locale. The Lymon Moore cemetery seemed to be the latest of the sites in the area. Individuals were interred with grave goods that were primarily utilitarian items and included pottery vessels, projectile points, chipped stone bifaces, minerals, beads, and an array of bone tools. These latter included awls, antler tines, deer mandible sickles, bison scapulae, terrapin carapaces, and mussel shells. One individual was accompanied by a collection of turquoise beads that were trade items from the Cerrillos area of New Mexico (Weigand et al. 1977:31; Rohrbaugh 1982:76). According to Rohrbaugh, the cemetery shows an orderly arrangement of individuals, with burial orientation and grave offerings related to the sex of the individual and possibly to other factors as well. Radiocarbon dates on seven individuals in the cemetery are listed by Rohrbaugh (1984:Table 12.1) and range from 560 ± 200 B.P. (Tx-3931) to 290 ± 160 B.P. (Tx-3930) although five dates are after 430 B.P. Additional dates from three burials encountered in more recent salvage work at the site are 460 ± 90 B.P. (Tx-3931), 450 ± 190 B.P. (Tx-3914) and 320 ± 110 B.P. (Tx-3915) (also listed in Rohrbaugh 1984:Table 12.1). The Lymon Moore cemetery may simply represent the deceased members of a larger Fort Coffee community in this richer section of the Arkansas River Valley.

The northern Ouachita Mountains of Oklahoma were occupied during this period by populations related to the societies in the Arkansas River Valley proper, but not enough research on settlements of this time period has been done to delineate clearly how they may be related to the three phases just described.

In the Fourche Maline valley, for instance, there is evidence that the population actually increased during this period, with settlements located in the alluvial valley on or near the previously used midden mounds and in other topographic locations. Components are identified by the appearance of arrowpoints and shell-tempered ceramics in the upper levels of some midden sites, by the infrequent occurrence of postmold outlines on or in the vicinity of middens, and by the presence of decorated pottery types like Hickory Engraved, Maxey Noded Redware, Sanders Engraved and Spiro Engraved at various locations in the valley (Galm 1978a, 1978b). It is important to note, however, that most of the research in this drainage was devoted to earlier Archaic and Woodland period occupations, and most Mississippi period components remain undated and unanalyzed.

According to Jerry Galm, settlements of this period appear to be primarily small scattered domestic sites marked by house locations. Sometimes these houses seem to have been placed on middens, such as at the Sam site where two rectangular outlines and an array of scattered posts and cache pits were delineated in the upper levels of the midden mound (Proctor 1957). Structure outlines are more commonly found at some distance from the mounds on the same landform or on ridges overlooking the middens. At least five examples are known, and these are characteristically quadrilateral postmold outlines. Those at the Heflin and the Mackey sites had four center support posts like Harlan phase sites in the Arkansas valley. The structure at the Mackey site had a single radiocarbon date of 460 ± 50 B.P. (UGa-1512) (Galm 1978a:135).

Occupation of the midden sites during this period is marked by thin mantles of deposits with arrowpoints and shell-tempered and/or decorated pottery in the uppermost levels of some sites. Radiocarbon dates from the upper levels of the midden at the Williams I site were 850 ± 50 B.P. (UGa-1513) and 720 ± 60 B.P. (UGa-1514), and a Fort Coffee phase component was identified in the upper levels at the Curbs Lake site by the presence of shell-tempered pottery and triangular and side-notched arrowheads (Galm 1978b:52–53). Occasionally burials can be assigned to this late occupation, and they characteristically are flexed interments with a few grave offerings that are usually pottery vessels.

Although the kinds of settlement differ from earlier periods, Galm believes the economic base of Mississippi period societies in the Wister valley did not vary significantly from preceding periods. He notes in particular that no direct evidence of corn horticulture has been recovered from any sites in the valley, and postulates that hunting and gathering were still the primary economic pursuits (Galm 1978a:245–247). This view is compatible with that developed in the bioarcheological study presented elsewhere in this report.

In addition to settlements, there are other kinds of sites included in the Mississippi period occupation of the Wister valley. Three sites, the Holson Creek site, the Sol Thompson site and the unnamed 34Lf-6, appear to have been small ceremonial centers each with a single artificial earthen mound. Don G. Wyckoff (1980) reports two mounds at the Holson Creek site instead of the one described by Galm (1978)) and associated burials and structures. At the Sol Thompson site, three square structures stood to the side of the mound. One had an interior hearth area encircled with a raised clay ring, and the other two had raised platforms or benches of clay inside the buildings (Galm 1978a:222–227). The structures also had blocked entrances reminiscent of similar buildings designated as mortuaries in the Arkansas River Valley (Brown et al. 1978:187). Galm (1978a) notes that these three sites, none of which has been adequately reported or dated, are widely scattered in the valley, and their distribution indicates they served different parts of the valley as local ceremonial centers. These local centers were probably linked to the major socioreligious centers on the Arkansas River. One measure of the level of this interaction is the infrequent occurrence of artifacts reflecting trade or status positions found within the valley. Even during the Spiro phase, status items were limited to small numbers of low value trade goods indicating the interior mountain communities were socially as well as physically peripheral to the more populous societies on the Arkansas.

In contrast to the abundant research that has been undertaken in Oklahoma, almost nothing is known about the Mississippi period occupation of the Ouachita Mountains and Arkansas River Valley in the Arkansas part of the study area. In the mountains, only two mound centers are recorded. One was dug briefly in the 1930s by the University of Arkansas Museum and neither has been adequately studied or dated.

The Aikman Mound group, known also as the Bluffton Mound site, is located along the Fourche la Fave in Yell County. The site consists of two flat topped mounds and apparently an associated burial area. The southern mound is ca 46 m long, 23 m wide and 5 m tall and was built in a number of stages, each stage marked by a flat top that supported a building. The north mound has a similar configuration and internal arrangement and is ca 30 m long, 18 m wide, and 3 m tall. Excavations uncovered caches of corn cobs and cultural debris, but the surviving field notes are unclear about where these objects were found (Arkansas Archeological Survey files).

In the upper Petit Jean River valley in Logan County is a site with a single mound (3LO15) reported to have a sequence of stratified building stages and associated structure floors. The mound dimensions are approximately 16 m in diameter and 2.5 m high. Artifacts reportedly removed from burials at this site include a catlinite elbow pipe, a shell lizard effigy pendant, and engraved and incised pottery of the types Hodges Engraved and Keno Trailed. This small assemblage is similar to burial goods found in late Caddoan sites in the Red and Ouachita river valleys to the south (Arkansas Archeological Survey site files).

On this very slender evidence alone it is reasonable to assume that Mississippi period societies inhabited the interior drainage basins in the northern Ouachita Mountains, and that they were organized into settlements linked to local mound centers. The internal arrangements of the mounds just described, and the few artifacts described in the site files suggest these societies may have been more closely related to Caddoan cultures to the south than to the Arkansas River Valley Caddoan manifestations in eastern Oklahoma. Flat topped mounds used as supports for ceremonial buildings are the characteristic earthwork constructed in mound centers to the south, in contrast to the accretional burial mounds and buried mortuaries that dominate the sites in the Arkansas River Valley. This is particularly true after the first emergence of mound centers around 850 B.P. in the Red River basin. Although societies in both the Red and the Arkansas were organized into social hierarchies that used mound centers as ritual and political centers, the configuration of those centers and the kinds of activities undertaken at them became increasingly divergent through this period. The kinds of features to be expected at mound centers in the northern Ouachitas may be more like those found in sites to the south than to the northwest.

The distribution of Caddoan settlements in the Ouachita River valley, which is immediately south of the Fourche la Fave valley, may be a good approximation of settlement patterns to the north. Using information primarily from surface collections and old site descriptions, Early (1982) identified five kinds of settlements. There is one mound center in the drainage, the Adair site, that was made up of one pyramidal mound about 3 m tall and one or two low conical mounds that were never investigated. The pyramidal mound was built in several stages, each supporting a building that was burned and covered by a later construction episode. Around the mounds were cemetery areas in which large numbers of individuals were interred with an array of utilitarian grave offerings. A series of large circular postmold outlines marked the location of special purpose public buildings on the site, but there was no large resident population.

Scattered along the drainage were a series of small mound sites containing one or more low conical mounds that characteristically covered burned buildings. Some buildings apparently were residences, and still contained domestic debris when they were investigated in the early part of this century (Harrington 1920). Others were emptied of contents. Most appear to have been burned before they were buried. Occasionally individuals were interred within these low mounds, but they were not mortuary dump accretional mounds previously described for the Harlan and Spiro phase centers in the Arkansas River Valley. I proposed those sites with evidence of residence and burial were local political centers where important members of local families or lineages resided. Other types of settlements were short term camps such as bivouacs, food collecting areas and hunting camps to be found in a variety of environmental zones and open air cemeteries near water courses where much of the population was buried in extended position with a small number of grave accompaniments (Early 1982: 226–229). Corn and beans found at the Adair site indicate gardening was a part of the economy in the upper Ouachita River valley, although the collection of plant and animal foods also continued.

It should be emphasized that there is so little information on Mississippi period settlement in the northern Ouachita Mountains that the foregoing settlement pattern can be viewed only as a hypothetical model against which to measure new data which must be collected before we can make any reasonable statements about the kind of adaptive patterns in this part of the study area.

The only dated occupation from this period is at the Sliding Slab shelter. The upper levels of the shelter deposits contain a mixed assemblage of artifacts that include shell and clay-tempered pottery, small arrowpoints of the Maud and Fresno types, cutting and grinding implements and food debris indicating the site was used for short periods of time as a base camp. Radiocarbon dates from these levels cover a wide span of time and indicate considerable mixing of deposits occurred during this period. Two dates from the uppermost stratum 14 are 750 ± 60 B.P. (Tx-3349) and 280 ± 55 B.P. (UGa-2910) (Harden et al. 1981:136).

Rock art sites, mentioned previously in the review of archeological research, appear to have been created at least in part by Mississippian peoples. The geographic extent of these sites in the study area is currently unknown. However, Gayle Fritz and Robert Ray of the Arkansas Archeological Survey visited a number of sites previously reported in northwest Arkansas and collected information on other rock art locations seen by residents and reported in publications and in unpublished site files. The results of their survey indicate rock art exists throughout much of the Arkansas Ozarks and the northern Ouachita Mountains flanking the Arkansas River Valley. Many unreported sites are expected to exist throughout the study area wherever geological and topographic conditions favor their preservation.

Fritz and Ray (19822) examined the locations where rock art was found, the techniques used to create the images, and the subject matter depicted. They defined four subdivisions of their study area within which different kinds of art sites seem to exist.

In Crawford, Franklin, and Johnson counties in west Arkansas, where six sites were studied, most of the images are petroglyphs, that is, figures and designs pecked or inscribed into stone outcrops, bluff faces, and rockshelter walls. Many of the figures are humanlike or anthropomorphic forms, and they are often depicted wearing headdresses. Geometric forms such as circles, crosses, undulating lines and spirals are also found, as are zoomorphic or animal figures. A minority of these art sites contain pictographs, or painted forms. One particularly noteworthy figure found in Serpent Cave, in eastern Johnson County, is a serpent bearing a human head and wearing a headdress. Serpents were prominent in the cosmology and ritual of historic Southeastern Indians and were present on engraved shell objects found at the Spiro site. The two authors note that the majority of human figures found at sites in this area are similar to designs found in Plains Indian art, however (Fritz and Ray 1982:274).

In the Arkansas River Valley, near Dardanelle and Carden Bottoms, the authors define a new rock art style, Petit Jean Painted, that they believe is centered in this area and is found in shelters and on outcrops on and around Petit Jean Mountain. Of the 14 sites they recorded, all but one were composed of pictographs that were executed almost exclusively with red pigment. Geometric forms, both rectilinear and curvilinear, predominate but human and animal figures are also found. Most sites contain only a small number of individual drawings, and the works are placed most commonly on the walls and ceilings of shelters. Many of the design elements are stylistically similar to decorations found on late prehistoric Carson Red on Buff pottery found at sites in the Arkansas River Valley nearby (Fritz and Ray 1982:252).

A third concentration of rock art is found in the Little Red River drainage area. Both petroglyph and pictograph sites have been recorded in caves and shelters. The images are similar to others found both in the Petit Jean area to the southwest and the eastern Ozark fringe area near Batesville. Geometric figures with concentric circles, arrows, crosses, meandering lines or "snake" depictions are documented, along with human and animal figures.

The easternmost style area, where two sites were recorded, has petroglyphs that include footprints, and geometric and anthropomorphic figures found on horizontal slabs. Fritz and Ray (1982:269) compare these sites to the Mississippi Stylized rock art style designated by Campbell Grant (1967:137–144) and found in eastern Missouri and southern Illinois. They also suggest the sites are related to the Greenbrier phase described earlier in this chapter by George Sabo.

Determining the age and purpose of rock art sites is a difficult task. There are no physical analyses of the pigments or carvings that will yield an absolute measure of their age, and the sites where the pictures are found often contain deposits from many different cultural periods. The subject matter of the art, and comparisons with designs found on other kinds of artifacts, however, give some clues to their function and cultural affiliation. Fritz and Ray point out that in the moist humid environment of the study area pictographs are not likely to have great antiquity, because most are found in shallow overhangs and on outcrops where protection from the elements is only minimal. Many of the sites they visited had inconspicuous, faded designs, or contained decorative panels obscured by lichen growth and mineral deposits. For the most part, petroglyph sites contain the same decorative elements as those depicted in pictographs, and therefore are likely to be of the same age.

In the westernmost rock art subarea, the common depiction of anthropomorphic figures and the similarity with Indian art styles farther west suggests to Fritz and Ray that these sites are records of important events in the lives of their makers, who were probably late prehistoric or protohistoric people oriented to a Plains lifestyle, like the Osage or Arkansas River Valley Caddo. The other rock art sites, with small numbers of figures executed and a diversity of symbols represented, are more compatible with the notion of art produced through ritual activities conducted by single individuals or small groups of people. They may have recorded personal rites of passage or religious experiences, either made as mementos of the experience or created as part of the ritual activity itself. The similarity of design with pottery decorations found on Mississippi period sites in the river valleys and lack of emphasis on subject matter dealing with hunting suggest to Fritz and Ray that the makers of this art were from Mississippi period settlements in the alluvial valleys (Fritz and Ray 1982:274–275).

At the eastern end of the study area, a component of the Mississippi period is recorded at the Alexander site. Occupation on top of the previous Coles Creek period deposit consisted of a series of storage/refuse pits, at least three human burials, and a small amount of sheet midden. There is not evidence of a definite structure belonging to this occupation. The assemblage from this period is marked by the appearance of shell-tempered Mississippi Plain pottery, shell-tempered incised and red filmed pottery, arrowpoints of the Sequoyah and Keota types, and an unspecified number of bone, stone, and shell tools used for food preparation and other domestic activities. Noteworthy among this latter group are pierced mussel shells which have been identified in other contexts as hoes. Non-utilitarian objects assignable to this period are disk-shaped shell beads.

Radiocarbon dates from two of the pit features are 465 ± 145 B.P. (Gx-8829) and 825 ± 150 B.P. (Gx-8830). Dates taken from bone of burial 5 are 640 ± 150 B.P. (Gx-88430A) and 720 ± 120 B.P. (Gx-8833G) (Hemmings and House 1985:Table 7).

The Mississippi period burials include one infant buried with a Mississippi Plain jar, two adults interred in a single pit with part of a shell-tempered jar, and possibly another infant that had no grave offerings.

Food remains recovered from the site indicate that the Mississippi period inhabitants practiced a mixed economy that included corn horticulture and the collection of a wide range of wild foods. The only plant remains are corn and nuts, in particular hickory and black walnut species. Animal remains are similar to those used by the previous Coles Creek inhabitants and come primarily from river and forest habitats. Deer and turtle were favored, but a range of small mammals, birds, fish, and mussels were also taken (Hemmings and House 1985).

In summary, the Mississippi period occupation at Alexander appears to be either a multiseasonal camp or a small permanent domestic settlement. With no substantive information about contemporary sites in this vicinity it is not possible to determine how this occupation may relate to other parts of the local settlement system. It is likely that Alexander was linked to a regional sociopolitical center which may have been the Point Remove site where Mississippi period deposits have reportedly been found (Arkansas Archeological Survey site files).

A late prehistoric manifestation in the eastern Arkansas River Valley portion of the study area that has been linked to the historic Quapaw Indians is recorded at the Kinkead-Mainard site. Located on a natural levee of an old channel of the Arkansas River near the mouth of Maumelle Creek, the site reportedly covered an area approximately 100 m by 70 m in extent. The only features recovered from the site were 57 human burials that were excavated in 1932. Each burial was characteristically the interment of a single individual placed in an extended, flexed, sitting, or other position, and accompanied with an array of grave offerings dominated by utilitarian objects. The most common grave goods are pottery vessels, but other objects included mussel shells, chipped stone and antler arrow tips, pigments, shell or copper beads, and more rarely chipped or ground stone tools, such as a single example of a spatulate celt. Stone arrowpoints are the Nodena type.

In his analysis of the collections, Michael P. Hoffman identified a variety of pottery types, with Mississippi Plain, Wallace Incised, Old Town Red and Keno Trailed types the most common. The pottery is characteristically shell tempered. A wide range of vessel shapes such as bottles, globular jars, shallow bowls and a wide mouthed bowl referred to by Hoffman as a “German helmet bowl” are represented. The ceramic assemblage contains items related to Mississippi period assemblages elsewhere in the Arkansas and Mississippi river valleys such as Avenue Polychrome, Parkin Punctated, and Carson Red on Buff types, and vessels that are identified with Caddoan types found to the southwest such as Friendship Engraved, Hodges Engraved, and Taylor Engraved (Hoffman 1977d).

The pottery from Kinkead-Mainard is similar to ceramic assemblages from sites in the lower Arkansas River Valley that have been grouped into the Quapaw phase and attributed to settlements of the protohistoric and early historic Quapaw Indians (Phillips et al. 1951; Ford 1961; Phillips 1970). On the basis of these ceramic similarities, Hoffman identifies Kinkead-Mainard as a Quapaw phase site. Using historic descriptions of Quapaw settlements in the lower Arkansas River Valley and archeological data (mainly from work done early in the twentieth century in the Arkansas River Valley between Little Rock and the mouth of the river) Hoffman postulates that the site was a settlement with house structures and associated burials. The burials found at the site appeared to be grouped in five separate areas, and he equates the groups with separate families or kin groups who resided in individual dwellings (Hoffman 1977d:33–38).

There is little direct information regarding the economic base or settlement pattern of which the Kinkead-Mainard site was a part. As George Sabo describes below, the historic Quapaw were known to have a mixed economy based on corn agriculture and wild products when they were first encountered by French explorers in the seventeenth century. The only well described settlements were villages with permanent rectangular dwellings in which several related families resided. If the historic pattern of Quapaw society holds true for late prehistoric settlement in the Arkansas River Valley, then the Kinkead-Mainard site may be this type of site. Related short term and special purpose sites used by community residents can also be expected in the area.

In a more recent paper, Hoffman proposes that Quapaw phase sites are located south of the study area along the Arkansas River Valley between Little Rock and the mouth of the Arkansas, particularly on old riverbanks or natural levees overlooking old river channels. He goes on to predict that sites include habitations, low house mounds and mound centers, with communities made up of compact house clusters instead of dispersed residences or farmsteads (Hoffman 1983). Upstream from Little Rock he identifies a related but distinct Carden Bottoms phase which is an outgrowth of his earlier Carden Bottoms complex (Hoffman 1977d), and is based on the materials salvaged from the grave robbing operations in the Carden Bottoms area early in the twentieth century (Hoffman 1983:7; Clancey 1985).

Phyllis Clancey has recently described the University of Arkansas Museum collection from the Carden Bottoms locality in her master's thesis. Most of the artifacts are shell-tempered pottery vessels that came from an unknown number of cemeteries in this area. The most common pottery types represented in the collection, according to Clancey, are Mississippi Plain, Mississippi Plain, variety Nady, Old Town Red, Baron Incised, Carson Red on Buff and Keno Trailed. Wallace Incised pottery, which was noted downstream at the Kinkead-Mainard site, is represented by only a single vessel.

In addition to the above types, an assortment of other vessel types are present. Some, like Nodena Red on White, Hudson Engraved, Parkin Punctate, and Bell Plain, are related to ceramics found in Mississippian period sites to the east. Others, like Friendship Engraved, Hodges Engraved, and Blakely Engraved are Caddoan types found in sites in the Red and Ouachita drainages to the south.

An assortment of other objects also came from the area and include ceramic pipes, a single Nodena point, shell hoes, shell and copper beads, miscellaneous pieces of animal bone, copper tinklers (cone-shaped pieces of sheet copper that were used by Indians of the historic period for costume decorations), copper wire bracelets, and a Clarksdale bell (Clancey 1985: 247, 224–241). This last object is a spherical metal bell identified as a sixteenth century European artifact used in trade with Native American groups (Morse and Morse 1983:311–312).

Before discussing the significance of the Carden Bottoms collection, it is very important to remember that these objects are not necessarily all related. We do not know how many different sites they came from, which objects were found together, or what kinds of artifacts were also with them and failed to make it to the museum shelves. Speaking conservatively we can say that the Carden Bottoms phase represents a late prehistoric and perhaps protohistoric occupation of the Arkoma basin portion of the Arkansas River Valley with ties to contemporary societies downstream on the Arkansas and also to Caddoan cultures in the Red and Ouachita river valleys.

According to Hoffman, the Carden Bottoms phase is represented on at least 17 sites or localities in this portion of the Arkansas River Valley (Hoffman 1983:7), but no description of the kinds of sites or their assemblages is available because none of them has been adequately investigated. It is reasonable to assume that there were people residing in this part of the Arkansas River Valley, and that they followed in some fashion the Mississippian lifeway of stable settlements with a mixed collecting and farming economy. Beyond this, there is very little we can say until more work is done in the region.

There are a number of thorny and currently unresolved problems concerning Quapaw archeology. Most are outside the scope of this narrative but two need to be mentioned. To begin with, there is not a single well documented and adequately dated Quapaw or Carden Bottoms phase site known. We do not know how old this manifestation is in the study area, or what assemblages from nonburial sites would be, except in the most general terms. Without this information we cannot say how long a time period is represented by these collections, or whether there may be other Mississippi period occupations in this part of the study area that have simply not yet been identified.

A second but related problem regards equating the historic period lifeway of the Quapaw tribe with these two archeological manifestations. The first descriptions of the Quapaw tribe that are useful to us come from the seventeenth and eighteenth centuries when they were living near the mouth of the Arkansas River. Even if the Quapaw phase and Carden Bottoms phase are archeological representations of the late prehistoric ancestors of the Quapaw tribe (and this in itself is a matter of considerable debate), there is no certainty that the eighteenth century Quapaw were living just like their ancestors were 100 to 300 years earlier. The late Mississippi period encompasses a time when Hernando De Soto and his explorers traveled through much of Arkansas disrupting the populous Native American societies they found here (e.g., Swanton 1939; Morse and Morse 1983). Although the exact route of the De Soto party is still a matter of debate, scholars agree that the Spanish expedition had significant consequences for native societies. In eastern Arkansas this apparently included major populations losses and abandonment of late Mississippian communities between the late sixteenth and early eighteenth centuries. According to some investigators, like Dan and Phyllis Morse, the historic Quapaw tribe are an amalgam of Indian people who survived the De Soto disruptions (1983: 320).

Michael P. Hoffman disagrees, and cites Quapaw tribal oral tradition that suggests the tribe arrived in eastern Arkansas from a homeland on the Ohio River, although the timing of this migration is uncertain (Hoffman 1983, 1985a, 1985b).

Whichever argument is a more accurate portrayal of Quapaw tribal origins, the important point is that the ethnographic depiction of Quapaw life has not been measured carefully against the historic period aboriginal sites in the lower Arkansas River Valley with modern archeological investigations, and its applicability to earlier prehistoric manifestations upriver is undetermined.

In a recent paper Michael P. Hoffman (1987) raises the same concern. He questions the identification of the Quapaw and Carden Bottoms phases as settlements of the Quapaw tribe. Using historical documents, and information from Historic period Indian sites downstream in the Louisiana and Mississippi portion of the Lower Mississippi Valley, Hoffman suggests that the Quapaw phase, at least, is really the remains of early Historic period Tunican or Koroan settlements. He does not identify any alternative sites or recorded artifact assemblages, as ethnically Quapaw remains. Instead he suggests that artifacts marking Protohistoric and early Historic Quapaw settlements should be similar to those found on Oneota sites located north and northwest of Arkansas. Oneota is a regional variant of Mississippian culture that was located in the Prairie Peninsula, on the north and west margins of the Eastern Woodlands, from Wisconsin to Kansas. It is thought by some scholars to be ancestral to a number of Historic period tribes who spoke Dhegiha Siouan languages, and who are apparently closely related linguistically to the Quapaw. The artifacts cited by Hoffman (1987:3–19) are shell-tempered ceramics with simple shapes and trailed/incised shoulder designs, endscrapers, catlinite pipes, and the remains of long bark or mat-covered structures. Hoffman goes on to suggest that the Quapaw name should be removed from its association with an archeological phase and that an ethnically neutral term, Menard or Wallace, be used instead.

In summary, Mississippi period occupations in the eastern part of the study area along the Arkansas River Valley are very poorly known. A Carden Bottoms phase is postulated for the Arkoma basin part of the river valley, and a Quapaw phase for the lower valley as far upstream as Little Rock. Both these phases are known mainly from burial goods. Both phases are postulated to be related in some fashion to the historic Quapaw tribe that resided on the lower Arkansas River Valley in the eighteenth and nineteenth centuries. The exact nature of this relationship remains to be documented, as does the settlement and subsistence pattern of both aforementioned phases. Research on late prehistoric and protohistoric cultures in this part of the study area should be of the highest priority in order to address this and other questions.

HISTORIC NATIVE AMERICANS

George Sabo III

When the first Europeans entered the southern Ozarks, Arkansas River Valley, and northern Ouachita region, they encountered two linguistically related Native American societies, the Osage and the Quapaw. At that time the Osage generally controlled lands to the north of the Arkansas River. The Quapaw were concentrated around the confluence of the Arkansas and Mississippi rivers, but they evidently held claim to lands lying further west between the Arkansas and Red rivers. As the United States expanded its settlements and territorial claims during the eighteenth and nineteenth centuries, many eastern Native American groups were forced west of the Mississippi. At the turn of the nineteenth century, groups such as the Cherokee, Shawnee, Delaware, and Kickapoo were encouraged to settle in Louisiana Territory in a final attempt by the Spanish government to forestall British and American encroachment. Upon American acquisition of this territory soon after, other Native Americans including the Chickasaw, Choctaw, Creek, and Seminole were relocated west of the Mississippi, eventually to end up on reservation lands established in Indian Territory.

The purpose of this chapter is to provide a brief sketch of the settlement history of Native American groups who came into the OAO study area during the late eighteenth and early nineteenth centuries. The focus is intentionally narrow, and centers on the cultural landscapes of these groups up to the time of the Civil War. There has been relatively little archeological investigation of historic Native American settlement in the OAO study area. The few studies that have been published, though valuable for the information they do contain, hardly begin to provide adequate documentation of larger settlement systems and adaptations of these people. Therefore, it is necessary to rely upon historical sources to identify aspects of these cultural landscapes which might be represented archeologically. Although an extensive literature exists for some of these groups (particularly the nineteenth century immigrants), much of this deals more with political history and relationships between Native Americans and various white American cultural institutions. Comparatively little has been written specifically about the day to day experiences of these groups as they fought to persist and retain their cultural heritage. Yet there is much relevant information in both primary and secondary texts. Information derived from only a few of the major secondary sources is presented in this chapter, to illustrate the kinds of data pertinent to archeological considerations these sources contain. There is a great need for further research in this area.

INDIGENOUS GROUPS

The Osage, 1783–1872

Anthropologists include the Osage along with the Quapaw, Kansa, Omaha, and Ponca in the Dhegiha Sioux language family. During historic times these groups all lived west of the Mississippi River in the region between the Missouri and Arkansas rivers (Chapman 1974b, c). Osage legends refer to earlier migrations into this region from the Ohio River valley, but Chapman argues that there is little evidence to support an historic or cultural derivation from that area. Instead, he believes that historic Osage culture can be linked to indigenous late prehistoric populations whose archeological remains are distributed throughout southwestern Missouri, northwestern Arkansas, northeastern Oklahoma, and southeastern Kansas (Chapman 1959, 1974a).

The Osage may once have formed a single, unified group, but by 1717 two main divisions had emerged, known as the Big and Little Osage. From 1763 to 1804 these groups established a number of village sites between the Missouri and Arkansas rivers, and hunting parties ranged extensively throughout that area (Chapman 1974d). Between 1777 and 1804 Osage village sites were concentrated along the upper Osage River in Missouri and along the Neosho and Verdigris tributaries of the Arkansas River in what are now the states of Oklahoma and Kansas (Wedel 1959:56). During this period, occasional hunting and gathering excursions took the Osage into the upper White River valley (Foreman 1936:13), although most activities were concentrated in the prairie regions of western Missouri, southeastern Kansas, and northeastern Oklahoma (Chapman 1974c:289–293). Consequently, early nineteenth century travelers through the southern Ozarks observed that few Osage remained in the area (Schoolcraft 1819; see also Goodspeed 1889:34).

The subsistence economy of the Osage depended on a combination of hunting, gathering, and gardening. Maize, squash, and pumpkin were the most important crops. They were planted in the spring in garden plots prepared with hoes and tended sporadically throughout the summer. In August crops were harvested, dried, and preserved for use throughout the year. All of these agricultural activities were performed by women (LaFlesche 1921). To supplement the garden produce, a variety of native plant foods, including fruits, nuts and roots, were also collected.

Hunting, however, was the most important food-getting activity in terms of time expenditure, as well as in terms of the vigor with which the Osage pursued this activity. Sibley (1914) describes the annual hunting cycle during the mid 1850s, which indicates clearly that this was the primary endeavor around which other seasonal subsistence and settlement activities revolved. During the winter season, Osage families resided in permanent villages, living on stored agricultural products and locally hunted game. The spring hunting season began in March, at which time the entire group left the village first in pursuit of bear and then beaver. The families returned to the villages in April to plant their gardens and make preparations for the summer. The summer buffalo hunt took place from May to August (although Chapman 1974a:36 notes that this may have been primarily a late historic period activity, and that previously deer were probably the main summer quarry). At the end of August the families returned once again to their villages, at which time the crops were harvested, preserved, and stored. The fall buffalo and deer hunt commenced in September and took the families away from the villages one more time before winter set in.

The permanent villages of the Osage were large and well organized, consisting of rectangular longhouses with interior fireplaces, exterior fire trenches, drying racks, storage pits, and perhaps other food storage facilities scattered about the site (Chapman 1974a:45–53). Some of these villages apparently were fortified with earthen trenches and ditches surrounding the living area (Chapman 1974a:126–129). Circular or oval wigwams were the usual structures erected at temporary hunting camps, although longhouses might also be constructed at these camps for use by village chiefs or councils (Chapman 1974a:51–52). An interesting description of an abandoned Osage campsite is given by Schoolcraft:

> In pursuing up the valley of Swan Creek, about nine miles, we fell into the Osage trace, a horse-path beaten by the Osages in their hunting excursions along this river, and passed successively three of their camps, now deserted, all very large, arranged with much order and neatness, and capable of quartering probably 100 men each. Both the method of building camps, and the order of encampment observed by this singular nation of savages are different from any thing of the kind I have noticed among the various tribes of aboriginal Americans, through whose territories I have had occasion to travel. The form of the tent or camp may be compared to an inverted bird's nest, or hemisphere, with a small aperture left in the top, for the escape of smoke; and a similar, but larger one, at one side, for passing in and out. It is formed by cutting a number of slender flexible green-poles of equal length, sharpened at each end, stuck in the ground like a bow, and, crossing at right angles at the top, the points of entrance into the ground forming a circle. Small twigs are then woven in, mixed with the leaves of cane, moss, and grass, until it is perfectly tight and warm. These tents are arranged in large circles, one within another, according to the number of men intended to be accommodated. In the centre is a scaffolding for meat, from which all are supplied every morning, under the inspection of a chief, whose tent is conspicuously situated at the head of the encampment, and differs from all the rest, resembling a half cylinder inverted. (Schoolcraft 1955:107–108).

The following account of Osage burial practices was told to Featherstonhaugh in 1834 by Major Sibley, who obtained the information from an old Osage chief who said the events took place when he was a boy.

> A great chief of the Osage, who was a distinguished warrior and greatly beloved by the Indians (called Jean Woe by the French), unexpectedly died whilst all the men of his tribe were hunting in a distant country. His friends buried him in the usual manner, with his weapons, his earthen pot, and the usual accompaniments and raised a small mound over his remains. When the nation returned from the hunt, this mound was enlarged at intervals, every man assisting to carry materials, and thus the accumulation of earth went on for a long period until it reached its present height, when they dressed it off at the top to a conical form. The old chief further said that he had been informed and believed, that all the mounds had a similar origin; and that the tradition had been steadily transmitted down from their ancestors. (Featherstonhaugh 1844:287)

Osage society was divided into two major groups that anthropologists call moieties, whose primary purpose was to conduct numerous ceremonies dealing with initiation rites, warfare, and hunting. The two moieties were further subdivided into three phratries, each of which consisted of several patrilineal clans. These clans were the primary, kin-based social units of an elaborate social and political organization (LaFlesche 1921; Chapman 1974a:68–77). In daily affairs the most important social unit, however, was the family, and the status of an individual in society was largely determined by how well that individual fulfilled his family obligations. Chiefs were the formally recognized village leaders, and individuals were selected to this office on the basis of their hereditary lineage. However, the political power of the chief was limited, and usually his function was to act as head of the village council, whose consensus decisions established the civil order.

By the middle nineteenth century, Osage settlers in southeastern Kansas were beginning to feel the pressure of increasing encroachment of white settlers upon their lands. In 1860 the federal government declared the squatters trespassers, and troops were sent to remove them. Although the improvements of the white settlers were destroyed to discourage further incursion, this relief for the Osage was short lived, and in 1872 they were relocated onto reservation lands in Oklahoma after a brief period of resettlement along the upper Verdigris River in present day Montgomery County, Kansas.

The Quapaw, 1673–1880

The Quapaw, or Downstream People, lived in four villages at the confluence of the Arkansas and Mississippi rivers when they were first visited by Marquette and Jolliet in 1673. Some scholars believe that the Capaha and Pacaha villages visited by De Soto in 1541 were a proto-Quapaw population (e.g., Swanton 1911; Brain et al. 1974; Morse and Morse 1983), while others have suggested that the historic Quapaw represent post-De Soto migrants into the Central Mississippi Valley (e.g., Baird 1980; Hoffman 1985a, b). The significance of this debate for the OAO study area concerns the cultural affiliation of protohistoric populations distributed farther up the Arkansas River. If Hudson (1985) is correct in his recent suggestion that the river of the Cayas mentioned in the De Soto chronicles is the present-day Arkansas River, then it may be that the villages reported along that river represent Quapaw populations. If on the other hand, the Quapaw were only later migrants, then who else might these midsixteenth century people have been? Recently Hoffman (1987) has suggested that the late prehistoric/protohistoric occupants of the central and lower Arkansas River could have been Tunican speakers, representing either the Tunica or the Koroa subdivisions. Unfortunately, the archeological data we have for protohistoric occupations in this portion of the Arkansas River Valley are too few to permit conclusive interpretations to be made, although the current upswing in interest in the protohistoric/early historic period may help clarify this issue.

Later historical accounts are not much clearer as to the extent of Quapaw settlement in this area. When La Salle claimed lands west of the Mississippi for France in 1682, he awarded his lieutenant Henri de Tonti a tract of land upon which Arkansas Post was founded, for the purpose of engaging local native groups in the fur trade. Later, in 1721 Benard LaHarpe ascended the Arkansas to investigate the possibility of further developing trade relations with the Indians. Evidently the French were successful in this attempt, because several of their settlements were noted when Lt. James B. Wilkinson descended the Arkansas River in 1806. Documentary accounts of these events refer to the Quapaw as the primary inhabitants of the region, but the only village locations mentioned are those situated along the lower course of the Arkansas River, just upstream from its confluence with the Mississippi. However, Quapaw claims to large tracts of this territory were recognized when the United States obtained this land from Spain at the beginning of the nineteenth century.

> Between the Red River and the Arkansas, the Quapaw were recognized as the owners of the land for a distance of several hundred miles west of the Mississippi. At the time of the Louisiana Purchase they had dwindled to a weak tribe of a few hundred members who lived near the mouth of the Arkansas River, but although they were not strong enough to hold the country against new arrivals, the Government in 1818 by treaty recognized their ownership. (Foreman 1936:13)

Ethnographic sketches of the Quapaw are available in only a few sources (e.g., Dorsey 1884; La Flesche 1915; McGee 1894; Swanton 1946). The following brief account of the lifeways of the Downstream People is taken from Baird (1980).

The Quapaw were village farmers who lived in permanent settlements in which a number of families constructed long, rectangular dwellings. These dwellings consisted of long poles driven into the ground in parallel lines, the tops of which were arched and tied together in pairs. This framework was then covered over with bark. Platforms for sitting or sleeping were constructed along the inner walls of the houses, and hearths were set along the midpassage way. Each of the dwellings housed several families who were related through the male lineage. In addition to the dwellings, Quapaw villages also had large public structures used for meetings.

Corn, beans, squash, gourds, tobacco and various fruits were raised by the Quapaw in gardens scattered about their settlements. Domesticated animals were adopted upon the arrival of the Europeans. Hunting and fishing were very important to the economy of the Quapaw, and a variety of native plant foods were also collected. Deer and turkey were sought in the woods, but the most important game animal was the buffalo. The killing and butchering of buffalo was attended by a series of ritual acts.

The material culture of the Quapaw is not known in detail, but the Downstream People did produce distinctive and well made pottery some of which was widely traded. Late prehistoric "Quapaw phase" sites typically contain large amounts of a type known as Wallace Incised. Vessel shapes include a "helmet bowl," a bottle form with a globular body and hourglass neck, "teapots" and a particular variety of headpot (Hoffman 1977b, 1985b). Some vessels have a red slipped surface and others are painted in various designs.

Quapaw society was organized primarily around male lineages (patrilineages). Each village had its own leader and these villages maintained individual political autonomy. (Later, the Quapaw would recognize a single leader but even then separate groups or factions would be represented by lesser chiefs.) Political decisions were made by the hereditary chief in consultation with a village assembly. Transcending the various lineages represented in each village were several clans each named after an animal (Buffalo, Elk, Wolf, etc.) or a celestial phenomenon (Sun, Star, Thunder). Clans were grouped into two main divisions, or moieties. These clan and moiety organizations cross cut the individual villages thereby organizing them into a single society. Clans and moieties provided a basis for preferred marriage patterns as well as for a variety of social and ceremonial events, which were of great importance to the Quapaw. Many of these ceremonies were part of religious institutions incorporating belief in supernatural beings and forces which influenced the course of events in the world of the Downstream People.

Following acquisition of the Louisiana Territory by the United States in 1803, the Quapaw were forced to cede much of their lands for settlement by other Native American groups who were being removed west of the Mississippi River. Upon creation of the Arkansas Territory in 1819, efforts were undertaken to permanently remove the Quapaw and in 1825 they were forced to settle along the Red River in northwest Louisiana among Caddoan Indians. This situation proved to be particularly unfortunate for the Quapaw, who were designated no lands of their own in this region. As a result, between 1829 and 1830 several bands returned to Arkansas, but once again this move was only to be temporary. In 1834 the Arkansas Quapaw were removed to reserve lands in Indian Territory.

Quapaw lands in Indian Territory were designated on a 150 section tract of land in extreme northeast Oklahoma and southeast Kansas. The Arkansas contingent was led to this area by their agent Wharton Rector, and the following year they were joined by some of the Ouapaw who had previously remained along the Red River. It turned out, however, that Rector had mistakenly settled these groups on lands designated for the Seneca, so in 1838 the Quapaw were forced to leave their improvements behind and relocate on lands further to the north. At the same time, they were forced to abandon their traditional village settlement pattern and disperse into individual family farmsteads. Rather than submit to yet another enforced relocation at the hands of the government, many of the Quapaw chose at this time to settle among the Creek Indians in present day Oklahoma on ancestral lands along the Canadian River just above the confluence of the Little River.

Thus the Quapaw became divided in Indian Territory. Those remaining on the reservation were provided, like the other immigrant groups, with the services of blacksmiths, merchants, and other agents who were to assist the Ouapaw in their transition to a settled, agrarian lifeway. The Quapaw did indeed attempt to support themselves on their farms by means of agriculture, but they were only partially successful. Hunting and government annuities were necessary for the survival of these people. Because annuities were handed out at the Quapaw agency, many of the Canadian River settlers periodically traveled to the reservation and in some instances resettled there. This contact between the two Quapaw groups provided a mechanism for unity when the need arose; for example, the Quapaw were successful in obtaining a missionary school on the reserve so that their children would not have to be sent away for schooling. Cessation of annuities in 1853, however, resulted in large numbers of Quapaw abandoning the reservation and returning to the Canadian River settlements. Those remaining in the northern area found themselves increasingly hard-pressed as both agriculture and hunting failed to sustain them. Many began selling off their lands, and it was in this increasingly desperate situation that the Quapaw found themselves on the eve of the Civil War.

IMMIGRANT GROUPS

The Cherokee in Arkansas, 1794–1828

Cherokee settlement of Arkansas began in 1794 when a village chief named The Bowl led a small group of families into the St. Francis valley following an incident at their former home along the Tennessee River in which several white settlers were slain (Markman 1972:8). In 1795 and 1796 other Delaware and Cherokee Indians petitioned the Quapaw, who were then living along the lower Arkansas River, for rights to settle and hunt farther up the river above the Quapaw villages. The Quapaw initially denied these requests, but soon after, the governor of New Orleans directed the commandant at Arkansas Post to allow the Cherokee to settle along the St. Francis River and the Delaware to settle along the White River (Foreman 1926:27).

After the Louisiana Purchase of 1803, the Jefferson administration began to encourage members of the eastern Cherokee Nation to migrate west from their villages in Tennessee, Georgia, and Alabama and establish new homes along the Arkansas River. However, the lands to the north of the Arkansas River still belonged to the Osage, so as the Cherokee began to infiltrate, hostilities between the two tribes arose. In 1808 the federal government signed a treaty with the Osage in which the latter surrendered approximately 50,000 square miles of their land between the Arkansas and Mississippi rivers in what are now the states of Arkansas and Missouri (Foreman 1936:33–34; Markman 1972:17). Following this treaty larger numbers of Cherokee began to settle along the Arkansas and White rivers. However, Choctaw Indians from Mississippi now also began to come into the region, as did increasing numbers of white settlers, and further hostilities resulted.

Many of the Euramerican settlers who came into Arkansas during this period were engaged in the fur trade, and some of these traders sought to exploit the Indians by trading manufactured goods, such as firearms, tools, cloth, trinkets, and whiskey for the furs, peltries, oil, and other commodities the Indians derived from hunting (White 1931:53). In order to control the trade with the Indians, the United States government set up a factory system in 1795. The first factory in Arkansas was opened up in 1805 by John B. Treat, and was located at Spadra Bluff along the Arkansas River. This location was chosen specifically in order to serve the growing Cherokee settlements (Morris 1969:32–33).

However, private traders along the Arkansas and White rivers offered intense competition, and in 1810 the Spadra Bluff factory was closed down because it had failed to attract enough business (Morris 1969:33). In 1818 the factory was reopened, but by this time only a few Indians were engaged in hunting and so the factory was closed permanently in 1824 (Markman 1972:130).

In 1817 a treaty between the federal government and the Cherokee Nation was signed which formally established for the Cherokee a large territory between the Arkansas and White rivers. Cherokee lands in Tennessee and South Carolina were also ceded by the provisions of this treaty, so the major influx of Cherokee settlers to Arkansas now began. Also according to this treaty, white settlers living north of the Arkansas River were to have been removed.

As the Cherokee established their new homes in Arkansas they brought with them a way of life that was vastly different from that of the Osage and even their own former way of life. During the seventeenth and eighteenth centuries, the eastern Cherokee had been in close contact with British and American colonists, and as a result of this contact Cherokee culture was profoundly affected. A variety of Old World fruits and vegetables had been introduced, and rice and cotton farming had also been adopted by the Cherokee. Chickens, cattle, horses, and hogs were gradually acquired and livestock tending began to replace hunting as the primary source of meat. The addition of these new plants and animals, along with the introduction of European technology, encouraged a major reorganization of the aboriginal subsistence base. To these changes were added substantial modifications of value systems and world view, so that by the nineteenth century an entirely new set of ecological relationships emerged as part of a settled, agricultural lifeway (Goodwin 1977). These new ecological relationships were subsequently transported to Arkansas as the western Cherokee settled in villages scattered along the White and Arkansas rivers, each with their own village chief and semi-autonomous political organization. Along the Arkansas River, a series of villages extended for approximately 100 miles from Point Remove to the mouth of the Mulberry River near Fort Smith (Markman 1972:107).

The subsistence and settlement patterns of these Cherokee settlers were much like those of Euramerican pioneers throughout the frontier South; plantations and farms were established with neat log houses, run by the Cherokee immigrants who brought with them slaves, horses, wagons, plows, and a variety of agriculture and household implements (Markman 1972:132).

> Both banks of the river, as we proceeded, were lined with the houses and farms of the Cherokees, and though their dress was a mixture of indigenous and European taste, yet in their houses, which are decently furnished, and in their farms, which were well fenced and stocked with cattle, we perceive a happy approach towards civilization. Their numerous families, also, well fed and clothed, argue a propitious progress in their population. Their superior industry, either as hunters or farmers, proves the value of property among them, and they are no longer strangers to avarice, and the distinctions created by wealth; some of them are possessed of property to the amount of many thousands of dollars, have houses handsomely and conveniently furnished, and their tables spread with our dainties and luxuries. (Nuttall 1980:136–137)

Additional settlements were established along major tributaries of the Arkansas and White rivers. A chief named Dutch settled along Dutch Creek about 5 km (3 miles) north of the modern town of Danville. This village set out garden patches marked by cornerstones and claimed as their hunting territory all of the Fourche valley, now in Yell County (Goodspeed 1891: 117–118). A large Cherokee village known as Sequatchie was also established along the Buffalo River at the mouth of Spring Creek (Royce 1887:141–142; Pitcaithley 1976:54). Another local chief named Tolontuskee had a village along Illinois Bayou, 11 km (7 miles) upstream from the Arkansas River. Tolontuskee subsequently emerged as an important leader among the western Cherokee and it was he who petitioned the American Board of Commissioners for Foreign Missions in 1818 for establishment of a western Cherokee mission (Mooney 1975:131). In response to this request, Reverend Cephus Washburn and Reverend Alfred Finney arrived in Arkansas in 1820, and began to build the Dwight Mission along Illinois Bayou in the midst of the Cherokee settlements:

> When the Old Dwight Mission station was established on Illinois Bayou, the Cherokee settlement, under Chief Black Hawk, then extended for some five miles down the river, and at some distance from it. The settlement was like a town, of five miles in length. Each Indian family had its wigwam and patch of land, containing from one to five acres attached. All these patches adjoined each other, so that it was one continuous field, composed of patches of a few acres, in the midst of which was a wigwam or cabin, in which the families resided. (Goodspeed 1891:201–202)

A number of log buildings were erected at this mission over the next several years. The school served the Cherokee until their removal in 1828, at which point it became a school for local white settlers (Shinn 1967:223).

Although the Cherokee settlement of Arkansas had auspicious beginnings, a number of events combined to deny the western Cherokee their dream of establishing a new nation in the Arkansas Territory. Important among these factors were the continuing hostilities with the Osage, and also with the expanding population of white settlers in the area. The federal government continually failed to live up to its treaty obligations, and for several years evaded payment of annuities due the Cherokee emigrants. In the end, the Cherokee were removed once again, this time in 1828 to the newly established Indian Territory in Oklahoma. With the removal of the Cherokee in 1828 significant occupation by Native Americans in the region effectively ended.

The Cherokee in Oklahoma, 1828–1860

In 1828 a treaty was made between the United States and representatives of the Arkansas Cherokee in which the Cherokee would give up their lands in Arkansas in exchange for lands in Lovely's Purchase in what is now eastern Oklahoma. Although the Cherokee signers of this treaty lacked any authority to surrender the lands of their constituents, and despite considerable resentment toward the treaty on the part of many, a few families did move west that year. The continuing encroachment of white settlers in the central Arkansas River Valley soon encouraged many of the remaining Cherokee to join them. The western boundary of Arkansas was moved forty miles eastward to its present location at this time, and for moving west of that line the Arkansas Cherokee were also to have been paid for improvements made to the lands they were forced to abandon. Settlement of the new territory was mainly along the north side of the Arkansas River above Fort Smith.

> First there was the fertile bottomland along Lee's Creek, on which Sequoyah had his salt works, and which crossed

> the eastern Cherokee line before entering the Arkansas. Above that, at Skin Bayou, Sanders and one of the Rogers, probably James, made a considerable settlement. At the mouth of the Saliseau, now called Sallisaw, George Justice had his establishment. Chief John Jolly built his home on the east bank of the Illinois River about a mile above the mouth; Walter Webber's place gave his name to the falls near by in Arkansas River. Other Indians, who left no record, located between these on fertile lands of the river and its tributaries. From the mouth of the Canadian River west, the southern boundary line of the Cherokee country continued up and between the Arkansas and Canadian rivers a sufficient distance to make seven million acres. The Indians therefore proceeded to settle on both sides of the Arkansas above the mouth of the Canadian River; but as they neared the Verdigris, they found the river-bottom land on both sides already well occupied by the Creek Indians placed there by the government officials. This entailed much ill feeling and subsequent negotiation. Settlements were also made on the Illinois and Grand rivers. (Foreman 1936:227–228)

Having established this territory for the Arkansas, or western, Cherokee, the government next sought to remove to this location the remaining eastern Cherokee from their homes in Alabama and Tennessee. The western Cherokee resisted this, but to no avail, and soon additional immigrants began flowing into the area. The main body of eastern Cherokees arrived broken and destitute, having been forced along the Trail of Tears from 1838 to 1840. Many of those who came before the forced migration were able to bring some of their belongings, which eased their adaptation to the new land. Of those who subsequently were forced to follow, many perished along the way, and many more were deprived of or lost most of the goods they possessed. The following passage by Foreman illustrates the plight of many Cherokee immigrants, but also contains an account of how some were able to overcome their adversity through their knowledge of traditional skills.

> These unhappy people were delivered here upon the raw virgin soil, destitute, possessed of little besides the primitive instinct to live and protect the lives of their helpless children. They were compelled to start life anew, many of them fortunate to possess an axe with which to construct wherewith to shelter them against the storm and sun. One old woman who remembered that experience told the Author of her recollection. 'Very few of the Indians,' she said, 'had been able to bring any of their household effects or kitchen utensils with them and the old people who knew how, made what they called dirt pots and dirt bowls. To make them they took clay and formed it in the shape desired and turned these bowls over the fire and smoked them and when they were done they would hold water and were very useful. We could cook in them and use them to hold food. In the same way they made dishes to eat out of and then they made wooden spoons and for a number of years after we arrived we had to use these crude utensils. After a while as we were able, we gradually picked up glazed china ware until we had enough to take the place of the substitutes. We had no shoes and those that wore anything wore moccasins made out of deer hide and the men wore leggins made of deer hide. Many of them went bare headed but when it was cold they made things out of coon skins and other kinds of hides to cover their heads.' (Foreman 1934:282–283)

As had been the experience of many other immigrant Indians, the Cherokee soon found in their midst a large number of licensed traders and other contractors. These agents were supposed to supply the Cherokee with the goods they needed to gain a livelihood, but many of them sought instead to deprive the Cherokee of what little they had, or gain extra profit through fraudulent distribution of materials intended for the Cherokee. In addition to the traders and contractors, however, the government did provide eight blacksmiths (six of whom were Indians) and two wheelwrights who manufactured spinning wheels. Although the Cherokee did not have to pay for these services, according to at least one account the demand far exceeded the supply (Foreman 1934:369).

The Cherokee had adapted admirably after their earlier move to Arkansas Territory, and so they eventually did the same upon their removal to Indian Territory in Oklahoma. Inspections by military officers soon after the immigration revealed that the Cherokee were hard at work clearing land, planting fields, and building houses and fences. The lands they settled proved to be well suited for agriculture, and a variety of crops were raised. Many Cherokee had fruit orchards and raised livestock. Two reports quoted from Foreman further amplify the achievements made by the Cherokee.

> In 1837 it was said that the Cherokee were further advanced in agriculture than any other tribe. Those living in the western country had between 1,000 and 1,100 farms where they produced corn, oats, potatoes, beans, peas, pumpkins, and melons and raised horses, cattle, and hogs; some of them had taken and filled contracts for the garrison at Fort Gibson and for subsisting immigrant Indians to the amount of $60,000.00 John Rogers, a native Cherokee was manufacturing eighty bushels of salt a day at the Grand Saline on Grand River, then considered one of the greatest assets of the Cherokee Nation. Native traders were engaged in merchandising and transportation; others operated gristmills and sawmills of great importance to the tribe. Native Cherokee traders, guided by Kichai Indians, were seen as far from home as the forks of the Brazos River in Texas on their way to the Comanche Indians with powder and lead to exchange for horses and mules. (Foreman 1934:358)

> In his report for 1843 [Cherokee agent] Butler noted that 'immediately after their removal and settlement beyond the Mississippi, from causes incident to such a state of things, the Cherokees rather diminished than increased in population. They have devoted themselves with more

steadiness and industry to the cultivation of the soil; which may be regarded as their national employment, and which affords an easy and abundant subsistence; from this as well as from other causes, their numbers are rapidly increasing. In their houses, farms, and fixtures they have advanced in civilization. They generally live in double log cabins, and have about them the utensils relaxation and amusements, they are far from being improvident in their habits. This increasing disposition to provide for the future, instead of giving themselves up to the enjoyments of the present, strongly marks a tendency to raise themselves in the scale of intellectual and moral beings.... In the ordinary transactions of life, especially in making bargains, they are shrewd and intelligent; frequently evincing a degree of craft and combina-tion that strike the mind as remarkable.' (Foreman 1934: 364)

Another singular characteristic of the Cherokee was their emphasis on education. The Cherokee organized their own schools, and hired a number of native teachers. Sequoyah, inventor of the Cherokee syllabic alphabet, worked in the schools teaching young Cherokee how to read and write. The Cherokee also sought missionaries to set up additional missions and schools. Dwight Mission, which had been an important institution among the Arkansas Cherokees, was relocated in Indian Territory at Nicksville on Sallisaw Creek (Foreman 1934:356–357). Eventually it grew to include eleven log structures plus additional outbuildings in which 65 Cherokee students were housed.

Community affairs were an important part of Cherokee life in Indian Territory. Entertainments included the traditional ball games, as well as dancing and public orations. Often large groups congregated for these events. The Cherokee engaged actively in their own political affairs and they also played prominent roles in Pan-Indian movements. A tribal center was established at Tahlequah in 1839. At first only a few log cabins were erected, but later a planned town was built. In 1843 the Cherokee hosted an international Indian council at Tahlequah which was attended by representatives from eighteen nations. "The delegates exchanged views on the problems facing them and agreed on certain mutual obligations of great importance to the tribes attempting to adjust themselves to new associations and responsibilities forced on them by the recent emigration from the east" (Foreman 1934:367).

Shawnee, Delaware and Kickapoo, 1793–1887

The Shawnee and Delaware were granted a permit by the Spanish government in 1793 to occupy lands in southeast Missouri (Hodge 1907(I):386), although some sources indicate that these groups had begun to move into the territory even earlier (e.g. Houck 1908(I):208). The major immigration of Shawnee and Delaware into Missouri, however, occurred after the Treaty of St. Mary's in 1818 when Delaware groups living along the White River in Indiana sold their lands and agreed to move west of the Mississippi River. Arriving at Kaskaskia in November of 1820 in the company of some additional Shawnees, more than 1,300 Delaware were ferried across the Mississippi (Foreman 1946:41). These groups "spent the winter of 1820 along the Current River in Carter and Shannon counties, Missouri, and they remained in this vicinity a second winter, despite the failure of their corn crop" (Newcomb 1956:98). Other groups of Shawnee and Delaware settled further to the north, including several large villages along Apple Creek north of Cape Girardeau (Houck 1908(I):213; Foreman 1936:185). Within a very few years, however, the lands settled by these groups in eastern Missouri were ceded to the United States (Royce 1897:714–715), and the Shawnee and Delaware were moved further west, some settling along the White River in southwest Missouri.

A reservation for the Delaware was established along the James Fork of the White River, to which these groups moved, reluctantly, around 1822 (Foreman 1936:187–188). The Shawnee were established on a reservation just east of the Delawares at about the same time. Also about this time the Kickapoo were granted lands north of the Delaware reservation, their lands bounded on the east and north by the Pomme de Terre and Osage rivers (Gibson 1963). Settlements of Wea, Piankashaw, and Peoria Indians were also established on the Delaware and Shawnee reservations. Almost immediately these groups fell into hostilities with the Osage (Foreman 1936:188ff), and they also encountered resistance from whites who were interested in the lead resources of the region (Foreman 1946:43). As a result of these pressures the Shawnee, Delaware, Kickapoo, and other groups were forced once again to move, and by 1832 these groups had all fled to Oklahoma and Kansas. It was not until the 1860s, however, that the United States finally awarded reservation lands in Indian Territory to these groups.

Relatively little information is available concerning the nature of Shawnee, Delaware, and Kickapoo settlement in southern Missouri, so it is difficult to determine what their cultural landscape might have been like. Price et al. (1976:128) carefully searched the primary literature for the eastern Missouri region settled earliest, and found only a few bits of information. Their discussion is presented in full:

> Almost no data were found on the nature and extent of these scattered settlements or on the settlement systems in operation. The Apple Creek villages, which were most likely the largest, were reported to have had a population of about 300 to 400 persons (Flint 1828:159, James 1972: 520). The houses were built of logs after the American fashion, some being 2 stories in height. They had corn cribs and barns, and peach orchards (Stoddard 1812:215). They were principally farmers. Peck stated that they cultivated farms and set up a school in the village in St. Louis County (Babcock 1864:112) suggesting some permanence for at least some of the scattered villages as well as some size. Ashe (1808:269–275) described the villages in Ohio, this description being similar to that for the Apple Creek villages. At least some of the population left the villages during a part of the year to hunt (Schoolcraft 1955:27)

> establishing hunting camps away from the village. In one instance these camps were reported to be 8 to 12 miles above the town (Babcock 1864:113). Stoddard stated that those groups on Apple Creek hunted on the St. Francis and White Rivers, often going into Osage territory (Stoddard 1812:215). Frequently the villages were clustered as were those on Apple Creek. Schoolcraft described 2 villages 3 to 4 miles apart on the Osage Fork. (Schoolcraft 1955:27)

William Newcomb (1956) referred to this chapter in the history of the Delaware Indians as the "Decadent Period (1814–1867)" by which time acculturative changes had wrought wholesale transformation of traditional Delaware culture. His comments provide further insight into the lifeways of these groups when they were living in the Ozarks.

> It was during the Decadent Period that the aboriginal gardening techniques were finally abandoned. With the settlement of the main body of Delawares on reservations and with closer association of Indians and whites, the opportunity to become acquainted with the horse-plow complex and the small grains increased immensely. The government agents and missionaries did everything within their power to transform the Delawares into sedentary, farming people. The men were reluctant, however, to alter their traditional role as hunters and warriors and become farmers.... There was a special attraction to hunting since magnificent herds of bison still roamed west of the Mississippi. (Newcomb 1956:101–102)

Newcomb also points out that during this period Delaware Indians were actively engaged as trappers and scouts for fur companies as well as for the government. Acculturation had not, in this society, robbed the males of their skills in hunting, scouting, and tracking; at the same time, owing to their long association with colonists they shared some of the same economic motivations of the white traders. Consequently, the Delaware "appeared on the frontiers of the Indian nations... equipped and motivated much as the whites had been on their own frontiers a century before" (Speck 1943:322).

Much of Newcomb's (1956:106–122) description of Delaware lifeways in Indian Territory after 1867 probably applies as well to their short stay in western Missouri. By this time the Delaware were subsistence farmers planting gardens of corn, beans, sweet potatoes, onions, peas, and Irish potatoes. Farming was not a successful enterprise for these people, however, so many turned to hunting since game animals were still relatively plentiful. Deer and bison were primarily sought, but prairie chickens, quail, wild turkey, beaver, raccoon, and fish were also taken. Sometimes during the autumn communal bison hunts were organized, the object being to obtain large quantities of fresh meat which could then be preserved for later consumption. The manner in which the women prepared, preserved, and stored this meat, according to Newcomb (1956:1076), followed traditional patterns well into the present century.

In Oklahoma the Delaware Indians lived in log houses. Nearby smaller log structures were built to serve as cookhouses. Furnishings inside of these houses were generally of American origin and design. Wigwams constructed of saplings and bark were occasionally used as secondary dwellings. Little in the way of their dress or their manufactures resembled traditional forms. "In sum, Delaware technology and material culture since 1867 have increasingly approximated the American pattern, particularly that of the poorer, rural, white groups" (Newcomb 1956:108).

Although the extended kin networks which were a central feature of traditional Delaware social organization were attenuated by this time, membership in phrateries still persisted. However, in contrast to traditional patterns of descent reckoned through the female lineage, phratry membership after the late nineteenth century could be inherited through either the mother's or the father's line. The function of phrateries in the religious ceremonies of the Delaware were also more limited by this time, but certain traditional ceremonies, such as the Big House ceremony (Speck 1931), persisted with remarkable tenacity. Big House ceremonies were held in specially constructed structures (the ceremony in 1924 documented by Speck was held in an arbor rather than a house), where people gathered to invoke supernatural powers to act on the behalf of the Delaware. Newcomb (1956:110) notes that the Oklahoma Delawares did not camp out during Big House ceremonies, but instead traveled to the ceremonial center for the evening rituals.

One final aspect of historic Delaware culture should be mentioned. Newcomb (1956:118ff) discusses at some length the importance to these people of association in various "Pan-Indian" institutions, which combine elements derived from various Native American cultures as well as from white American culture, and synthesize these elements in ways that are novel and unique to recent and modern Native American groups. The Delaware and Cherokee in Oklahoma became closely involved in these associations, so Newcomb speaks of a "Cherokee–Delaware Pan-Indianism." The significance of Pan-Indianism for our purposes is that through these associations Native American groups who were otherwise extensively assimilated within white American culture, became involved in activities such as peyote cults, powwows, and craft production. Although few if any studies have addressed this possibility, it seems that such activities might well provide archeological traces which would help differentiate late historic Native American sites from the sites of their contemporary white neighbors.

Creek and Choctaw, 1820–1860

Various groups of Creek and Choctaw Indians, along with the Cherokee groups formerly living in Arkansas, settled after about 1820 in what is now Oklahoma along the Arkansas, Canadian, and Verdigris rivers and especially in the area near present day Lake Eufaula. Historian Grant Foreman has well summarized the cultural context into which these groups had been thrust by the continuing encroachment of white American society:

> By 1830, part of the Cherokee, Choctaw, and Creek tribes had found their way west of the Mississippi, to a land of strife and lawlessness, bitter jealousy, and bloodshed, in the midst of an elemental struggle for existence. Some of these Indians had come as stragglers, hunters, and adventurers in response to roving, restless spirit, others with the definite purpose of finding a place where they could sustain their families by hunting, and a very considerable part of them in quest of good farming and grazing lands where they could pursue peaceful, pastoral lives free from the rapacity and cruelty of white neighbors. The total constituted a considerable part of the tribes; some came by their own efforts and others with a small measure of ill-considered assistance by the Government. But the whole result had been achieved in a haphazard manner, wholly detached from any definite policy or plan on the part of the Government. (Foreman 1936:272)

In 1826 Colonel David Brearley was appointed agent (Foreman 1936:254) to a group of Lower Creeks who some two decades earlier had ceded their Georgia homelands to the United States. During the following year Brearley and a party of five Creeks traveled up the Arkansas River past Fort Smith to survey lands along the Arkansas and Canadian rivers between Fort Gibson and Fort Towson. The Creek delegates favored an area along the Arkansas west of the Grand and Verdigris rivers, and subsequently the Creek population agreed to move from temporary settlements in Alabama to this new territory. Brearley purchased buildings at Colonel A. P. Chouteau's trading post along the Verdigris River the following year to serve as the Creek agency, and between 1828 and 1829 more than twelve hundred Creeks made the journey. Almost immediately they encountered difficulties.

> These early immigrants settled compactly for a distance of ten or twelve miles along the Arkansas and the Verdigris, where they were conveniently near their agency and under the shelter of Fort Gibson. Here they were found by the Cherokee when the latter began removing under their treaty of 1828. Both tribes had valid claims to this fertile land, and much controversy and bitterness grew out of this blunder. (Foreman 1936:260)

Although the Lower Creeks were promised a variety of supplies, these were not provided until 1834. Even then, the boat carrying these supplies sank below Fort Smith. Rifles, powder, blankets, lead and iron, tools, and traps went down with the boat, although some of these were later recovered and were eventually brought up to the Creek agency in damaged condition (Foreman 1934:150). As a result of these early misfortunes many Creek suffered a very hard existence for several years. The land was good, however, and game plentiful so by 1837 the Lower Creeks were described as living in comfortable houses with fine gardens and orchards (Foreman 1934: 153). They were evidently able to raise a surplus of crops and animals which they sold to the commissary at Fort Gibson. Numerous traders also lived among them, two of whom were themselves Creek Indians (Foreman 1934:154). At least a few Creek were fairly well-to-do, and Chouteau's description of these families (quoted from Foreman) gives an impression of what many others were subsequently able to achieve.

> They have good log houses, many of which are double; and the fields according to the means of the individual. I know some who have under fence and culture about 150 acres of land. They raise all kinds of grains and vegetables common to the latitude; patches of cotton and tobacco and of upland rice, are common to them. Spinning wheels and looms are in use. Stocks of cattle, horses, hogs, sheep, and goats, are owned by these people. They have poultry, to wit: chickens, turkeys, ducks, and geese. Their women ride on side saddles, and dress according to their respective means to do so in the manner and fashion of the whites; the same remark will apply to the dress of the men.
>
> The furniture of their houses comprises chairs, tables, beds, bedsteads, and in some instances bureaus. The table in many houses is neatly set; and a good comfortable dinner, supper or breakfast is served. Tea or coffee are in general use. They supply the garrison [Fort Gibson], their agents, and traders with poultry, butter, eggs, wild geese, and other articles that are usually brought into market at our towns. In the last year (1930) the Creeks have raised a surplus above their needs of 50,000 bushels of corn. (Foreman 1934:149)

In 1836 more than ten thousand Upper Town Creeks arrived at Fort Gibson, "cold, suffering and destitute" (Foreman 1934: 152). Enmities between these Creek and the previously settled Lower Town Creeks traced back to the selling of lands in Alabama and to the killing of William McIntosh, former chief of the Lower Town division. Partly for this reason the Upper Town Creeks settled along the Canadian River to the south of their former kinsmen. Having been forced to leave their homes in Alabama without any preparation and arriving in this new land without any tools or provisions, their existence was precarious indeed for the first few years, helped along none by purveyors of liquor and other "white vultures who had preyed on the Creeks during their removal [and who] fastened on them in their new home to add to their misery" (Foreman 1934: 155). So destitute did these groups become that Congress in 1839 finally appropriated funds to feed them, after earlier attempts by the government to supply food and other goods failed due to poor planning and fraud on the part of private contractors.

Eventually the Upper Town Creeks gathered themselves around the confluence of the North Fork and Canadian rivers. Here the town of North Fork arose. However, Seminole Indians from Florida were granted these lands but by the time they arrived in 1836 the Creeks were well established, so between 1837 and 1842 the Seminole moved further west to settle along the Little River.

The Upper Town Creeks were for obvious reasons somewhat more resistant to whites than were the Lower Town Creeks, but even so the North Fork groups pursued the agrarian way of life which by this time had become common among the immigrant groups. There were differences in settlement and agricultural practices, however. Creek towns along the Canadian River had public fields in addition to private gardens. "When the members of the towns tilled their fields in common, each family was expected to do its share of fencing, plowing, planting and tending; it had its own crib, and these cribs were scattered about over the field" (Foreman 1934:201). Most families lived in small log houses; floors were of dirt or puncheons (segments of split logs), furnishings were few and hand made of wood, and roofs were covered with shingles held down with poles. As a rule windows, nails, sawn wood and metal hardware were unknown.

> A few standard domestic utensils sufficed; there was invariably the mortar made by hollowing out the end of a small log in which corn was crushed with the heavy wooden pestle, and with the corn they made their sofka or hominy. Shallow woven baskets for sifting and winnowing the grain; bowls and heavy spoons fashioned from wood. While they could cook over the fireplace in the house, that was usually done over an open fire out of doors. (Foreman 1934:201)

The Methodists established a large mission at North Fork in 1848, and a large, three story brick building was constructed. Stores were also built by white traders, and a few other whites lived in the area, some marrying Creek women (Debo 1941:140). Despite this physical encroachment of white settlement, some traditional aspects of Creek settlement patterns were maintained. At Tuckabatchee Town to the southwest of North Fork, Colonel Ethan Allen Hitchcock in 1842 observed a "round house," or chokofa "in which is Preserved the sacred fire." In another small house "are secured certain plates of brass and other implements used only in their Green Corn Dance which is their sacred festival and is held every year in July" (Foreman 1936:113).

Also in 1842 the Upper Town Creeks organized an intertribal Grand Council to discuss depredations the tribes resettled in Oklahoma were suffering at the hands of the Osage and other "wild" Plains tribes (Debo 1941:134). This council was attended by the Lower Town Creeks, Choctaws, Chickasaws, Seminoles, Quapaws, Delawares, Shawnees, Kickapoos, and a number of other groups (Foreman 1933:201). These groups, numbering some 2,500 individuals, camped in an area measuring two miles in circumference which was filled with fires and temporary shelters. Foreman (1933:202) reports that 20,000 pounds of beef and 10 barrels of flour were among the provisions consumed.

In their Mississippi homelands the Choctaw were organized into three groups known as the Six Towns, the Lower Towns, and the Upper Towns. When these groups emigrated to present day Oklahoma, each group settled within its own district. The Lower Towns people formed the Moshulatubee District which extended along the Arkansas and Canadian rivers, the Upper Towns people settled east of the Kiamichi River in the Apukshunnubbee District, and the Six Towns people were located west of the Kiamichi in the Pushmataha District. Upon settling in this new land the Choctaw began building their homes, and planting fields and orchards (Debo 1961).

The Reverend John Edwards reported in a contemporary account of the Oklahoma Choctaw that corn was the primary crop, but sweet potatoes and beans also were raised (Edwards 1932:406). Horses and plows were used to till the fields. Cattle and hogs were raised, but even so hunting remained an important subsistence activity, and the Choctaw also gathered a variety of wild plant foods. Houses were mainly constructed of logs although some of the more well-to-do families built frame dwellings (Edwards 1932:410). Corn was beaten into meal in wooden mortars made of tree trunks, using pestles also made of wood. These mortars were a common feature of Choctaw homes. Wood-splint baskets and sieves were used to winnow and separate the ground-up corn. Initially the Choctaw continued to make coarse, shell- tempered pottery but this was eventually replaced by Euramerican tablewares and implements (Edwards 1932:406). In their manner of dress, Edwards notes that although the Choctaw were increasingly adopting the styles of the whites, much traditional garb and ornamentation continued to be worn. Buckskin moccasins were worn by men and women. Men also frequently wore sashes decorated with beadwork, and coats decorated with brightly colored fringes. Feathers were often worn by men, "particularly when anything exciting is going on," and beads and rings were common. Interestingly, Choctaw women according to Edwards' description tended much more to dress after the manner of white ladies, usually wearing long dresses.

These Choctaw groups, like all of the other immigrants, were closely tied to white American society and its institutions (particularly military) in ways that had direct consequences upon their settlements and upon their cultural landscapes. The Choctaw agent appointed in 1825, Major William L. McClellan, constructed his agency along the Arkansas River fifteen miles above Fort Smith at a place later to become known as Skullyville (Foreman 1936:263). The government provided agricultural implements, tools, and firearms (although it seems that agricultural implements always arrived too late in the season for use in sowing the years' crops, and goods were frequently of poor quality); blacksmiths were also appointed to repair these items as needed. "A mill-wright was employed...and the Indians were to be directed to locate their little water mills upon durable streams, and at good sites" (Foreman 1934:25). The Choctaw were also encouraged to plant fields of cotton which could be sold and processed in cotton gins set up in the area, to be then shipped down the Arkansas and Red rivers. In 1838 a meeting house was constructed for the Choctaw along the upper Kiamichi River (Foreman 1934:30ff), and community buildings were erected in each of the three Choctaw districts. Houses were also constructed for each of the chiefs of the three districts.

As indicated above, a wide variety of material goods were introduced to the Choctaw as a result of government treaty obligations and in support of government efforts to transform the Choctaw into a settled, rural agrarian society. Agricultural implements which eventually made their way into the region included plow and hoes. Other tools including saws, knives, anvils, grinding stones, augers, axes, and blacksmith tools were provided. Rifles were also provided the Choctaw, who preferred the flintlocks and asked their agent to return the percussion rifles. Household goods included kettles, looms, and spinning wheels. Blankets and cloth were also supplied. In addition white traders were licensed who were "required to keep for sale stocks of goods suited to the use of Indians" (Foreman 1934:27).

Previously it was noted that Choctaw men seemed to retain a preference for traditional forms of dress and decoration, whereas the women were quicker to adopt the feminine styles of white society. The following passage by Foreman suggests that this difference too may have been the result of relations between the Choctaws and the government.

> Perhaps the most picturesque item provided by the Government for the Indians, under requirements of the treaty, was that calculated to enhance the pulchritude of the many headmen of the tribe. Nothing was done for the women, of course, but witness the amazing contribution to male vanity! Ninety-nine chiefs and headmen of the tribe were each provided with the following gaudy articles of raiment; a beaver hat with silver band, cockade and three scarlet plumes; one pair of calfskin puttees, a superfine blue frock coat with collars trimmed with silver lace, a superfine silver lace-trimmed vest, a superfine pair of pantaloons, one Irish linen shirt, patent leather stock and a morocco swordbelt with plates; eighty-seven of these brilliantly accoutered captains bore infantry officers' swords with bright scabbards, basket hilts with two guards and square ends, and the other twelve wore artillery officers' swords with plain bright-yellow scabbards, yellow bands and mounting, basket hilts, and two guards. They were shipped from Philadelphia to Fort Smith in July, 1832, and it may well be assumed Indian Territory never looked the same after these ninety-nine warriors blossomed out in their effulgent splendor. (Foreman 1934:30)

ARCHEOLOGICAL STUDIES OF HISTORIC NATIVE AMERICAN SITES

There have been relatively few archeological studies of historic Native American sites in the OAO study area. The two most important studies pertaining to the indigenous Native American groups were conducted at sites beyond the limits of the OAO study area. These studies are Carl Chapman's (1959, 1974a) excavations of eighteenth and nineteenth century Osage sites in southwest Missouri, and James A. Ford's (1961) excavation of the Menard site along the lower Arkansas River, identified on the basis of his research as the Quapaw village of Osotouy. A few sites attributed to historic Creek and Choctaw settlers have been reported in Oklahoma. Recently Hester Davis (1987) has also studied nineteenth century documents to evaluate the potential for the existence of historic Cherokee sites in Arkansas. These and other studies will be summarized briefly here, and a few general comments on the identification of historic Native American sites will be made.

In 1958 James A. Ford conducted excavations at the Menard site along the lower Arkansas River, just a few miles above its confluence with the Mississippi, as part of an effort to determine if this site was the Quapaw village of Osotouy mentioned in seventeenth century historical accounts (Ford 1961). A careful assessment of documentary accounts provided a framework for evaluating the archeological data. A single rectangular structure was traced in the excavations, indicated by a pattern of post molds which suggested internal partitioning of the structure. Three hearths and some pit features were found inside of this structure, and both primary and secondary burials had been interred beneath the floor of the dwelling. These and other archeological data (including a large assemblage of aboriginal ceramics but surprisingly few European trade goods) led Ford to conclude that the Menard site was indeed the village of Osotouy. Ford's characterization of the ceramic assemblage from this site and its attribution to the historic Quapaw has been widely accepted as the basis for a protohistoric "Quapaw phase" (Phillips 1970; Hoffman 1985a, b, 1987).

Carl Chapman's (1959, 1974a) excavations at five historic Osage sites along the Osage and Missouri rivers in southwestern Missouri were undertaken in the late 1940s and early 1950s. Chapman hoped to establish from these excavations (1) a definition of the archeological assemblage of the early historic Osage, and (2) an interpretation of the relationships of this assemblage to late prehistoric and protohistoric archeological complexes in the region. The sites excavated all dated between 1725 and 1825; two were attributed to the Little Osage and three had been occupied by the Big Osage. The archeological data from these sites along with some other collections were evaluated along with related historical and ethnographic accounts. In summary, the archeological assemblages from the Osage sites shared some similarities with prehistoric Oneota complexes, but the closest affinities were with late prehistoric assemblages from the southwestern Ozark region, particularly those attributed by Harrington to the Ozark Top-Layer culture, and those representing the Neosho focus. Upon this basis Chapman concluded that the "four state area of southwestern Missouri, northwestern Arkansas, southeastern Kansas and northeastern Oklahoma is... the hearth of late prehistoric Osage cultural origin" (Chapman 1959:219).

It is important to note that Chapman's conclusions summarized here were made a quarter of a century ago, when our understanding of the archeological complexes the Osage materials were being compared to were much less well known than they are today. Dr. Chapman continued his research into the cultural origins of the Osage until his untimely death in 1987. Future publications describing this research will undoubtedly provide many significant new insights.

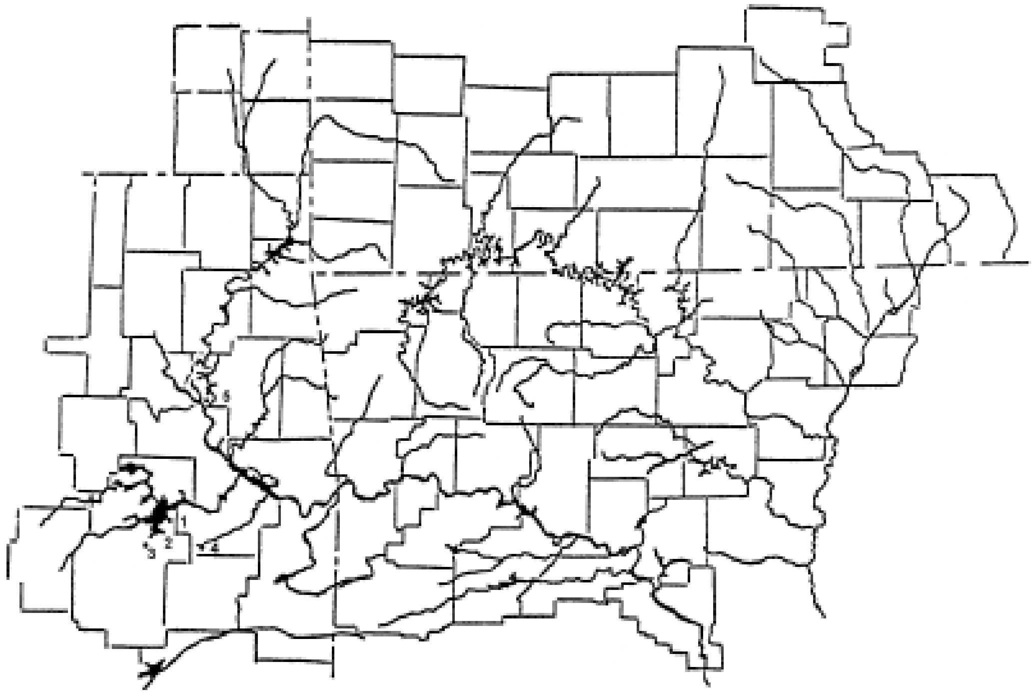

Figure 40. Locations of selected Historic Native American sites in the OAO study area 1. Longtown Creek; 2. Moody; 3. Ps-212; 4. Tucker's Knob; 5. Wealthy Indian

Two sites attributed to the historic Creek Indians were described by Proctor (1953) in his report of excavations in the Lake Eufaula reservoir. The Longtown Creek site was found at the juncture of the South Canadian River and Longtown Creek, on the first terrace and on a high rise above the terrace. At the time of excavation the site had been plowed for a number of years. No features were identified in the excavations but pottery was found scattered about the site, some of which included the historic Creek types McIntosh Smoothed and McIntosh Roughened. McIntosh Roughened pottery is grit tempered, and sherds are described as compact and medium to coarse in texture. Colors vary from gray-brown to reddish brown. The common vessel form is a jar with high, rounded shoulders, a short, flaring rim, and slightly constricted neck. The body of these jars below the shoulders are heavily brushed prior to firing, usually diagonally across the vessel. McIntosh Smoothed pottery is very similar, although somewhat finer in texture with smoothed instead of brushed surfaces. In addition to this historic Creek pottery some pieces of iron barrel hoop were found; one of these had been made into a projectile point with a flat, triangular blade and a rectangular stem. Two English gunflints were found, and a flattened lead ball which may have been used as a sinker for a fishing line.

The Moody site also reported by Proctor (1953), was found on a wide floodplain along Gaines Creek. This site also produced McIntosh pottery in addition to Euramerican ceramics, glass beads, other glass fragments, square nails, gunflints, and metal objects including a flatiron fragment and a brass harness ornament. Two historic burials also were excavated. The first was encountered only 6-1/2 inches below the ground surface, and though poorly preserved and somewhat disturbed it was identified as an adult male buried in a semifexed position. Two bullet molds and a triangular file were found behind the skull, and nearby were fragments of a large tin cup or pail. Near the right femur a ceramic elbow pipe with a conical bowl and stem was found. The pipe was made of well smoothed, black fired clay. The second burial was a child less than six months old. Beads were found in such a position around the skull as to suggest that they had been worn on a string placed about the neck. A tin pail and a small brass thimble were found nearby, but their association with the burial was uncertain. In fact, Proctor thought the infant burial might even have been a secondary interment. Prior to these excavations two other burials had been excavated from the site and were reported by Bareis (1952). These burials were both semiflexed; grave goods in-cluded Euramerican ceramics, a glass bottle, an iron pipe-tomahawk, a clay trade pipe, a bone-handled knife, a tin cup, and McIntosh Roughened pottery.

In a more recent survey of the Lake Eufaula shoreline, Perino and Caffey (1980) identify a number of surface; sites as historic Creek occupations based largely on the presence of Euramerican artifacts dating to the middle eighteenth century. Given the fact that very few white settlers were living in the area at that time, the identification of these sites as Creek is probably correct in most cases. At one of these sites (23Ps-212) an historic trash pit was excavated which measured roughly 1.6 m by 2 m and had a depth of slightly more than 70 cm. A large number of artifacts were found in this pit (Gettys 1980), including gun parts, gunflints, rolled metal arrowpoints, a wide variety of food containers and table utensils, a wide variety of Euramerican ceramics, glassware, hardware and tools, buttons, glass beads, various kinds of clothing fasteners and buckles, finger rings and other decorative jewelry, smoking pipes, marbles and other gaming pieces, a harmonica, and miscellaneous metal fragments. Gettys determined on the basis of several of these artifacts that the pit feature represented an occupation dating between 1840 and 1864. The inclusion of many expensive goods in this pit further suggested that the sites' inhabitant were of higher-than-average economic status. McIntosh ceramics were also included in the assemblage, and while Gettys accordingly attributes the site to Native American occupation (although a white cultural affiliation is not absolutely ruled out), a more specific attribution (that is, Creek or Cherokee) could not be made in this case. One of the reasons for this is the location of the site close to the border between the historic Creek and Choctaw Nations.

Accompanying the discussion by Gettys is a short summary written by Paul Parmalee (1980) of the animal bone found in the pit feature. The paragraph quoted below indicates the importance of these archeological data to our understanding of at least one historic Native American family's experience in Indian Territory.

> Animal remains from the trash pit...indicate that this family had undergone acculturation in relation to animal foods utilized; elements of domestic species, those of pig, cow, and chicken, dominated the faunal sample. Nearly 3,100 bones, representing at least 20 species, were recovered from the pit.... The paucity of remains of native species such as squirrels, the raccoon, skunk, and the cottontail suggests that little effort was expended in obtaining these animals and, at best, they provided only a minor supplement in the diet.

In a survey of the Hugo Reservoir area in eastern Choctaw and central Pushmataha counties, Rohrbaugh and others (1971) found the Pate-Roden site which they identify as an historic Choctaw settlement. This site is situated on a low knoll in the floodplain of a tributary of the Kiamichi River. Abundant Euramerican artifacts were found including a wide variety of Euramerican ceramics, other kitchen utensils, clothing and ornaments, gun parts and cartridges, smoking pipes, glass beads, a marble, a jews harp, and assorted other tools and hardware. Artifacts made by the Choctaw include sand tempered potsherds incised with a six pronged implement similar to the type Chickachee Combed, in addition to plain sherds with shell and clay tempering. There was also a decorated, two hole gorget made of shell. Dating of some of the Euramerican ceramics, a gun lockplate, and one of the glass beads indicated that the site was occupied between 1831 and 1850. Analysis of the distribution of artifacts across the site suggested that a house area might be represented, although no postmolds or other definite construction features were found. The two excavated pit features were thought to have served as refuse containers. Accompanying the description of this site, incidentally, is a short but informative summary of the Choctaw in Oklahoma.

John T. Penman (1983) has also recently examined native-made ceramic assemblages from a number of resettlement era Choctaw sites in eastern Oklahoma. Comparison of these ceramics with the wares produced in the aboriginal homelands of Mississippi indicated a persistence of ceramic making traditions in the new land. Although there was a change in the dominant tempering agent, design motifs remained little changed, suggesting a corresponding persistence of cultural identity. Penman's study is a useful demonstration of the import-ance of material culture in the adaptations of Native American groups as they were forcibly removed from their homelands.

One final site which needs to be mentioned is an historic burial site exposed in highway construction in the Three Forks area (Wilson 1968). Two burials were found here, although one was very badly damaged by road grading. The first burial was an extended interment of an adult, possibly a female. Accompanying this individual were two iron pots, saddle gear and a stirrup, a wash basin, Euramerican ceramics including plates, cups, saucers, and a tureen, a wine bottle, a fork, two tablespoons and a teaspoon, six silver vest ornaments, a hair ornament, earrings, and a necklace of silver tinklers. A number of glass beads were also found. The second burial, also an adult (male?), was buried with a bone handled knife, a clasp knife, an iron pot, a Euramerican ceramic bowl, vest ornaments, clay smoking pipes, a small bitters bottle, a key, a musket ball, a tinkler, some beads, and some other fragments of metal. The burials were thought to date around 1830 to 1840, and they were also thought to be Creek.

These sites are valuable archeological records but obviously they represent only a very small part of the picture which might be reconstructed of historic Native American settlement in the OAO study area. Apart from the studies by Ford and Chapman, most of the sites we know of have only been minimally evaluated. Additionally, most of these sites are clustered in one relatively small portion of the OAO study area, and they represent a very limited range of site types. Clearly there is a very great need for additional archeological studies of historic Native American sites in this region. For groups such as the Osage and Quapaw, some very basic questions regarding culture history need to be answered; here archeological studies can make very important contributions, especially when they are coordinated with associated documentary research. As mentioned earlier, much of what we know of the nineteenth century period of resettlement concerns political history and the many transactions Native American groups had with the United States government or other members of white society. Conversely, these studies seldom address the day to day affairs of the Native American people, or if they do these affairs are dealt with in a cursory manner. Here too archeology can add significantly to our understanding of the experiences of Native Americans during the historic period.

A widely recognized problem in the archeology of this era, however, is distinguishing Native American sites from contemporary sites occupied by Europeans and other Americans (see, for example, Davis 1987). Like their white neighbors, most Native Americans were sedentary farmers, living in log houses, utilizing a horse and plow agricultural technology, engaged in a market economy, and doing a little hunting on the side. But this characterization is superficial. As I have attempted to show in the preceding very brief settlement history, many significant differences existed, not only between Native Americans and their white counterparts, but also among different Native American groups. These differences existed in agricultural organization, in settlement patterns, in social organization, in traditional ceremonies and ritual practices that were retained, in newly adopted ceremonies, in other social activities, in the retention of traditional material culture, and in the adoption of Euramerican goods. Moreover, involvement in various Pan-Indian institutions had varying degrees of influence on many of these groups. All of these features of historic Native American culture may well have left a mark, or recognizable signature, in the archeological record. The identification of these cultural differences, however, will not always be possible within the confines of a single site. The archeology of historic Native American settlement must be pursued within a regional framework in which information can be incorporated concerning many different kinds of sites, for it is only at this level of investigation that cultural patterns attributable to specific groups are likely to be recognized. Prehistoric archeologists and historical geographers commonly study cultural expressions within similar regional frameworks; the archeological record of historic Native Americans also needs to be studied in this way.

HISTORIC EUROPEANS AND AMERICANS

George Sabo III

The archeological investigation of historic European and American settlement in the OAO study area has not been extensive or thorough. If we were to rely solely upon archeological studies to characterize historic cultural landscapes in this overview, the result would be terribly inadequate. This statement is not meant to belittle the efforts archeologists have made to study historic sites; these studies all provide valuable information and some represent high levels of scholarly achievement. However, as a group these studies treat only minimally the extensive and very complex cultural landscapes created by historic settlement. There is much yet that historical archeology can contribute to the understanding of the societies which produced these landscapes. Much of the information we do have on historic archeological sites is very limited, moreover, the product of generally superficial levels of investigation in the context of cultural resource management survey and evaluation projects. Only a few in depth studies of historic archeological sites have been undertaken in the OAO study area.

In reconstructing historic cultural landscapes for this overview, documentary rather than archeological sources were primarily used. My purpose is not to identify every aspect of historic cultural landscapes for every portion of the study area, but to document representative examples of the major, distinctive patterns of settlement and land use in the region. A number of historic works have been consulted to identify these patterns. Most of these are secondary sources, although several primary sources were also used. (It is important to note that many of the secondary sources I used are scholarly works based on thorough examination and evaluation of primary source materials). From these various sources information was derived on the form of cultural landscapes as well as their meaning to historic societies. This information provides a basis for making statements concerning what the archeological manifestations of these cultural landscapes should be. Evidence from archeological studies is summarized in light of the expectations derived from the documentary sources.

EARLY EUROPEAN EXPLORATION AND SETTLEMENT

Early European settlement activity in the midsouth region of North America was largely peripheral to the OAO study area. However, recent research by Charles Hudson (1985) and his collaborators suggests that the De Soto expedition of 1539–1543 may have passed through a portion of this area. French traders and trappers also must have ranged into the region during the seventeenth and eighteenth centuries. Subsequent Spanish influences were probably less direct.

The French, 1673–1762

In 1673 a small party of French explorers was led down the Mississippi River by Father Jacques Marquette, a Jesuit priest, and his fur trader companion Louis Joliet. These travelers did not stay long in Arkansas, however, and they returned north to Michilimackinac after only briefly visiting the Quapawwho were then living in villages at the confluence of the Arkansas and Mississippi rivers. However, keen interest in the fur trade potential of the Mississippi valley developed as a result of this trip, and this led to subsequent French expeditions. In 1682 LaSalle and de Tonti returned to the Quapaw village at the mouth of the Arkansas River, where LaSalle took possession of the entire Mississippi valley for France and named the territory Louisiana after King Louis XIV. LaSalle also gave de Tonti a tract of land along the Arkansas River above the Quapaw village, on which a trading post named Arkansas Post was established in 1686 (Herndon 1922:85–89).

By the early eighteenth century a small number of French settlers had established themselves along the Mississippi River at the northeastern edge of the Ozarks. The settlement at Ste. Genevieve was founded at this time, but it was not until the latter part of the century that French settlement really began to increase, due in part to cessation by France of lands east of the Mississippi to England in 1763 (Sauer 1920:78). Major occupations of the French colonists included salt making, lead mining, farming, and commercial trading centered at the entrepot of St. Louis. This latter activity promoted additional settlements of French traders in areas closer to the OAO study area; namely, at Cape Girardeau along the Mississippi and at another settlement along the Meramec River. French fur traders also established a series of settlements along the Missouri River on the northern border of the Ozarks, beginning about the same time that early settlements along the Mississippi River were founded. It is very likely that trading activities brought at least some of these early French settlers into the OAO study area (see, for example, Brakenridge 1814; Bradbury 1819). However, such excursions would only have been temporary, for as Sauer (1920: 90–91) has pointed out:

> The Missouri River settlements were concerned primarily with the fur trade. It was quite natural that a few half-wild French traders should locate on the great route to one of the most important fur districts of the New World.

> Their dependence was on the Missouri River rather than on the adjacent country, and so they selected sites at creek mouths, whence they could easily launch their boats into the river.

Price et al. (1976:131–134, Figure 21) report a possible French trading post near Buckskull along the Current River in southeast Missouri, in addition to posts or camps along the Black River near Pocahontas and Davidsonville, Arkansas.

An attempt to organize a colony along the Arkansas River was initiated in 1717 by John Law, who founded the Western Company and secured a large grant of land on the north side of the river above Arkansas Post. Law hoped to attract a large number of German settlers to his colony, and a few even arrived and began clearing land and building cabins and storehouses. However, Law went bankrupt in France in 1719 and the colony soon disbanded (Herndon 1922:94–95).

In 1721 another French explorer, Benard LaHarpe, ascended the Arkansas River to investigate the possibility of developing trade relations with the Indians. The Mallet brothers, who had been trading with Indians further to the west, also returned down the Arkansas River in 1739 to the Arkansas Post. As a result of their success Governor Bienville sent Fabre de la Bruyere and the Mallets back up the Arkansas in 1741 to open a trade route up the Canadian River (Foreman 1936:4–6). Evidently the French succeeded in their endeavors because settlements of "French traders" were noted as late as 1806, when Lt. James B. Wilkinson descended the Arkansas River with a small detachment of men from Lt. Zebulon Pike's Missouri River expedition (Coues 1895). Additional French trading activities were also conducted along the White River as far as the settlement at North Fork (Shiras 1939:84).

The Spanish, 1539–1803

Recently, Dr. Charles Hudson of the University of Georgia and several of his collaborators have retraced the route of the De Soto expedition, based on newly discovered accounts of other sixteenth century Spanish explorers which have provided, for the first time, some fixed points of reference for De Soto's interior travel route (see Hudson 1985). The details of this retracing need not be repeated here, but one important suggestion Hudson has made is that the "River of Cayas" identified in the De Soto chronicles, is probably the modern Arkansas River. Earlier reconstructions of the De Soto route identify the modern Ouachita River of southern Arkansas and northern Louisiana as the river of Cayas (e.g., Swanton 1939). If Hudson's interpretation is correct — and his corroborating evidence seems to be very compelling — then two important villages visited by De Soto, Tanico and Tula, would be situated within our study area. Tanico would be somewhere along the Arkansas River, perhaps in the Carden Bottoms. Tanico was also a town belonging to the chiefdom of Cayas, which would have extended further upstream along the Arkansas. Tula was described as being one and one half days travel upstream from Tanico, but Hudson believes this town or chiefdom was actually located along the Petit Jean or Fourche la Fave rivers.

These interpretations are likely to stir additional debate concerning the locations visited during this singularly important historical event (cf. Dickinson 1986). Whether Hudson turns out to be correct in his interpretations or not, he has brought forth strong evidence that the De Soto route may have crossed into the region examined in this overview, and future studies should be mindful of the potential that exists for archeological verification of these ideas.

The Spanish acquired the Louisiana Territory from the French in 1763, but they did not firmly establish control until 1769. Although it is unlikely that any Spanish ever settled in the Ozark region, a land grant system was instituted and Valliere, Commandant at Arkansas Post from 1786–1790, did receive a large grant in the northern part of the state along the White River. However, this grant was invalidated by United States courts in 1847 because the necessary settlements and improvements had not been made (Hempstead 1911:23–24). During the Spanish regime both Americans and the French were discouraged from settling the territory, but these restrictions were eased in the last decade of the eighteenth century and by 1803 several grants had been issued to French and American parties.

American Pioneer Settlement 1803–1860

Following the Louisiana Purchase of 1803, a number of expeditions were undertaken by the United States to explore the vast lands of this newly acquired territory. In 1805 Lt. Zebulon M. Pike left Fort Bellefontaine to investigate lands along the Missouri and Osage rivers. The following year a small detachment of Pike's men were led down the Arkansas River by Lt. James B. Wilkinson, and they arrived at Arkansas Post on January 9,1807. Along the way Wilkinson produced the first map of the Arkansas River and kept a journal containing descriptions of the region (Cones 1895).

French settlement of the northern part of the Ozarks was centered throughout much of the eighteenth century in the rich lead district surrounding Ste. Genevieve. To further assess the potential of the Ozarks for a United States mining industry, Henry Rowe Schoolcraft was dispatched from Potosi, Missouri in 1818. Traveling southwest through the Missouri Ozarks, Schoolcraft came into Arkansas via the Spring River. From this valley he traveled overland to the North Fork River, and then down that stream to the White River, where he reached a settlement near Lead Hill. After a brief excursion back into Missouri, Schoolcraft descended the White River to Poke Bayou (now Batesville), whence he returned to Missouri along the old Southwest Trail (Schoolcraft 1819). Schoolcraft's journal of this trip is without equal in its detailed description of the interior regions of the Ozarks and its inhabitants.

In 1819 the naturalist Thomas Nuttall ascended the Arkansas River from Arkansas Post, and he spent nearly a year studying the landforms and vegetation around Fort Smith. His journal (1819) provides a most thorough description of the Arkansas River Valley and southern flanks of the Ozarks.

These firsthand accounts are quite valuable for the information they provide concerning early historic settlements in the OAO study area. The entire region was at that time very sparsely inhabited, and as a result official sources of information are quite limited. For example, Shinn (1967:145) notes that the first original map of Arkansas — Watson's map drawn from military and general land surveys and dated December 6, 1820 — omits completely the entire northwest part of the state. In addition to locating and describing some of the earliest settlements, these sources also provide the first extensive descriptions of the natural environment as it was encountered by the early pioneers, and as it existed before later settlement and land use so profoundly altered the landscape.

Schoolcraft, for example, describes at length the forest vegetation of the White River bottomlands, and notes the changes in forest composition as he climbs from the valley to the uplands.

> Having descended along the shore of the river a considerable distance, I now determined to return through the forest, and along the mountain-bluffs which bound the valley at the distance of half-a-mile, and descending them toward the east, join my companions at the mouth of the North Fork before dark. One of the most conspicuous objects among the trees and vegetables which skirt the banks of the river, is the sycamore, (platanus occidentalis) rearing its lofty branches into the air, and distinguished from other forest-trees by its white bark and enormous size. This tree delights to grow on the immediate margin of the river, and overhangs the water's edge on both sides, but is never found to grow in the back part of the forest toward the bluffs, unless there happens to be a pond of water or a small lake there, in which case it is seen skirting its margin all around.
>
> Another vegetable, scarcely less conspicuous, and occupying a similar soil and situation, in the latitude in which it grows, is the reed, called cane in this region, and which I take to be the cinna arundinacea of botanists. This plant is common to all the streams of the valley of the Mississippi below the 38 deg. north latitude, and is first noticed on descending the Ohio, about the falls. These two species skirt the banks of this river from its largest and most remote northern tributary, as high as we have been on James River thus far, and probably continued to the Mississippi. The other forest-trees and plants noticed at this place, and which may be set down as composing the forests of White River generally, are the following: –
>
> Cottonwood (populus angulata), white elm (ulnus Americana), red elm (ulnus fulva), buckeye (aesculus hippocastanum), black walnut (juglans nigra), white walnut (juglans tomentosa), white ash (fraxinus acuminata), swamp-ash (fraxinus juglandifolia), white oak (quercus alba), red oak (quercus rubra), sugar maple (acer saccharinum), mulberry (callicarpa Americana), dogwood (cornus florida), sassafras (laurus sassafras), persimmon (diospyros virginiana).
>
> To these the valleys will add spice-wood, papaw, wild cherry, hemlock, several species of grapes, the wild pea, and the bluffs and highlands, white and yellow pine, mountain-ash, post-oak, and cedar. The wild hop is also indigenous to the river alluvion, and the crab-apple, red plumb, and black haw, upon the plains. Many others might be added, but these are the most conspicuous on passing through a White River forest, and such as would readily attract the eye. As I approached the foot of the bluffs, vegetation became more scanty; in my ascent, at the height of one hundred feet above the forest level, the rocks were entirely naked, presenting an almost perpendicular wall to the river, but the summit was covered by yellow pine and cedar, sustained by a deposit of oceanic alluvion. The height of this bluff may be estimated at three hundred feet above the water. It runs parallel with the river, at a distance of from a quarter to half-a-mile, and is much broken and interrupted by lateral valleys and streams. (Schoolcraft 1955:147–148)

The abundant game resources of the Ozark forests did not escape Schoolcraft's acute observation. In the Spring River valley large numbers of bear, deer, elk, and beaver are noted. Schoolcraft writes:

> I had an opportunity this day, while traveling across a very rocky branch of the river, to observe two large and beautiful beavers who were sporting in the water. They afterwards came out and sat upon a rock, occasionally changing position, and evincing great dexterity and quickness in their movements. (Schoolcraft 1955:61–61)

The broad Arkansas River valley and southern flanks of the Ozarks are thoroughly described in the detailed narrative of Nuttall. Having traveled for weeks along the lower course of the Arkansas River through the Mississippi alluvial plain, Nuttall finally reaches the fringe of the Ozark Plateau:

> After emerging as it were from so vast a tract of alluvial lands, as that through which I had now been traveling for more than three months, it is almost impossible to describe the pleasure which these romantic prospects again afford me. Who can be insensible to the beauty of the verdant hill and valley, to the sublimity of the clouded mountain, the fearful precipice, or the torrent of the cataract. (Nuttall 1980:117)

Upon closer inspection Nuttall observes that the vegetation of the uplands offers a stark contrast to the luxuriant growth of the river bottoms:

> This morning I walked out two or three miles over the hills, and found the land, except in the small depressions and alluvion of the creek, of an inferior quality, and chiefly timbered with oaks and hickories thinly scattered. Ages must elapse before this kind of land is worth purchasing at any price. Still, in its present state, it will afford a good

> range of pasturage for cattle, producing abundance of herbiage, but it would be unfit for cotton or maize, though, perhaps, suited to the production of smaller grain. (Nuttall 1980:127)

Continuing farther up the river, Nuttall was

> amused by the gentle murmurs of a rill and pellucid water, which broke from rock to rock. The acclivity, through a scanty thicket, rather than the usual sombre forest, was already adorned with violets, and occasional clusters of the parti-colored Collinsia. The groves and thickets were whitened with the blossoms of the dogwood (Cornus florida). The lugubrious vociferations of the whip-poor-will, the croaking frogs, chirping crickets, and whoops and halloos of the Indians, broke not disagreeably the silence of a calm and fine evening. (Nuttall 1980:141)

And finally, drawing close to Fort Smith, Nuttall observes an important change in the character of the landscape and vegetation:

> Not far from Lee's creek, Perpillon of the French hunters, a low ridge again comes up to the border of the river, in which is discoverable the first calcareous rock on ascending the Arkansa. From hence also the prairies or grassy plains begin to be prevalent, and the trees to decrease in number and magnitude. Contiguous to our encampment commenced a prairie of seven miles in length, and continuing within a mile of the garrison. The river, now presenting long and romantic views, was almost exclusively bordered with groves of cotton-wood, at this season extremely beautiful, resembling so many vistas clad in the softest and most vivid verdure, and crowded with innumerable birds, but of species common to the rest of the United States. (Nuttall 1980:155).

The first American settlers began to trickle into the Ozarks, Ouachitas, and Arkansas River Valley against this environmental backdrop, slowly at first, but with creation of the Arkansas Territory in 1819 larger numbers of people soon began to arrive (Shinn 1967:45; White 1931:28). Migration at first followed whatever overland and riverine travel routes were available. Some of the earliest pioneers traveled old Indian trails on foot or on horseback. By 1800, however, the old Southwest Trail or Military Road from St. Louis was open as far as Hick's Ferry in northern Arkansas, and by 1817 this road extended completely through the state (Shinn 1967:152–153). Emigrants from Pennsylvania, Kentucky, Tennessee and the Carolinas followed this road, and by 1820 towns were established along its route at Current View and Fourche de Thomas in southeast Missouri, and at Davidsonville and Poke Bayou (Batesville) in northeast Arkansas. By 1850 additional settlements had grown at Van Buren and Doniphan in southeast Missouri, and Pocahontas and Searcy in Arkansas (Johnson 1957:113; Price et al. 1975, 1976). The administrative center at Eminence along the Current River was also established at this time. Other settlers, traveling by canoe, raft, or keelboat, pushed up the White and Arkansas rivers from the Mississippi. A settlement grew up at "The Little Rock" on the Arkansas early in the nineteenth century, and in 1817 a military garrison (Fort Smith) was established further up the Arkansas.

Additional settlements sprang up as the pioneers pushed ever farther along these routes. By 1819 colonies were established along the Arkansas River between Little Rock and Fort Smith at Crystal Hill, Cadron, Dardanelle, and Mulberry (Shinn 1967:150). Poke Bayou had become an important trading post by the time Schoolcraft visited there in 1819, and soon after the settlement at the mouth of the North Fork River, then known as Liberty, became an important "jumping-off place" for inland-bound settlers (Messick 1973:60). In the northwest corner of the state, Cane Hill and Evansville were founded during the early 1820s (Goodspeed 1889:142). The emergence of overland routes leading west from St. Louis resulted in the development of Springfield, Joplin, and Neosho in the 1830s and 1840s. As these major towns coalesced, smaller settlements grew up in many intervening localities.

After these initial settlements were established along the major travel routes, people began to expand into the interior regions of the Ozarks and Ouachitas. Between 1820 and 1840 many new settlements grew up along the rivers and streams reaching far into the Springfield Plateau and Boston Mountains. Illinois Bayou, Mulberry Creek, Frog Bayou, and Petit Jean River were important tributaries along which settlements expanded from the Arkansas River (Goodspeed 1891; Shinn 1967; Eno 1951). From Cane Hill families traveled by wagon to settle along Richland Creek, War Eagle Creek, and King's River in Madison County (Sutton 1950:5–6). Several small communities also sprang up along the upper reaches of the White River and its tributaries (Schoolcraft 1819; Goodspeed 1889). The Buffalo River valley received its first settlers at this time (Pitcaithley 1976:70). The Current and Eleven Point rivers also began to receive increasing numbers of residents (Price et al. 1983:43–56), as did Fourche Creek (Price, Price and Harris 1976) and other Ozark streams. In general, the pattern of early nineteenth century settlement expansion proceeded from the major rivers up the principal tributaries, then extended along secondary waterways and finally into the uplands (e.g., Rafferty 1980:48–52).

The geographical characteristics of the Ozarks, Ouachitas and the Arkansas River Valley were obviously of considerable importance to this early pattern of American Pioneer settlement. In fact, a major dichotomy in settlement organization and cultural characteristics developed during the pioneer period between the Ozark and Ouachita uplands, on the one hand, and the Arkansas River Valley, on the other. Despite their separation by the Arkansas River, the Ozarks and Ouachitas witnessed very similar settlement adaptations, and historic populations inhabiting these two areas exhibited closely similar cultural features. As a result of this affinity many scholars in discussing these two upland regions have used a convenient label, such as the term "Ozarkia," to refer simultaneously to both (e.g., Randolph 1931:3–4; Rayburn 1941:15–16; Otto and Burns 1981:74). To avoid annoying repetition of the phrase "Ozarks and Ouachitas," and to rid the remaining discussion of the term

"OAO study area" — of which the reader by this point must be growing quite tired — I will henceforth use the word "Ozarkia," except when I am specifically referring to the Arkansas River Valley, in which case such reference will be clearly stated.

Robert Flanders has identified several national and international events of the early nineteenth century which also significantly influenced early settlement of this region (1979: 150–167). The first of these was a dramatic increase in population which took place in the eastern United States after 1800. During each decade of the nineteenth century population in the United States increased about 30%. However, Flanders notes, the most important factor here is not simply growth of population but increased demand for eastern farms, which periodically drove up the price of land. During periods of pronounced speculation in public lands (especially the years between 1815–1819, 1827–1837, and 1843–1861) increased outmigrations took place. Many residents of the eastern portions of the trans-Appalachian, "Upland South" region moved west during this era to settle land in Ozarkia. This lead to a second important factor, namely the geographical "kinship" that was perceived between the easterly upland regions and those further to the west, such as the Ozarks and Ouachitas. Flanders points out that this kinship was not so much the result of a simple geographic or environmental determinism as it was the product of cultural patterns exhibited by the Scots-Irish "hillman" populations predominating in these areas. Simply put, these people had an atomistic, strongly individualistic way of life. They had adapted this way of life to upland South environments in the east, and when pressed by population increases there they chose to maintain this way of life by moving to similar areas further to the west.

Other external events influencing the American Pioneer settlement of Ozarkia and the Arkansas Valley include its position astride the international boundary between the United States and Louisiana Territory, which prior to 1803 was held first by France and then by Spain. Prior to its acquisition by the United States these European powers encouraged settlement west of the Mississippi as a means to thwart Anglo-American encroachment. Also, in 1787 the United States government outlawed the practice of slavery in the Northwest Territory north of the Ohio River. The legality of this institution in Spanish Louisiana encouraged a number of American slave holders to resettle in the territory just across the Mississippi River. In addition to being an international boundary, however, the Mississippi was the major commercial corridor connecting north and south during this period via trade centers located, respectively, at St. Louis and New Orleans. As mentioned previously, an important fur trade also developed along the Missouri River. These major trade routes flanking the eastern and northern portions of Ozarkia also strongly influenced its settlement history.

When the United States purchased the Louisiana Territory from Spain in 1803, the international barriers to American settlement of the trans-Mississippi west were finally removed. This acquisition may be identified as perhaps the single most important international event promoting subsequent settlement of Ozarkia. Even so, another "barrier" of sorts existed in this area which forestalled widespread settlement, and this was the presence of various Native American groups, many of whom had only recently been relocated there from ancestral lands further to the east. As we saw in the preceding chapter, however, the solution to this "problem" facing the American Pioneer settlement was simply to continue shoving the Indians further and further west.

Like many areas throughout the South, American settlement of Ozarkia during the first half of the nineteenth century came about in two successive stages of immigration, each bringing into the region pioneers with new and different ways of life (Owlsley 1945; Johnson 1957:41). The first group may be referred to as "hunter-herders" because their lifestyle was organized around hunting and raising livestock in the open woods. The rich animal resources of the region, including bear, deer, beaver, buffalo, wolf, and fox, were especially attractive to these early settlers, as the furs, peltries, and oil were highly valued in the fur trade (White 1931:35). The later group of pioneers consisted primarily of agricultural settlers, who began to clear the land and establish more permanent ties to it.

This progressive settlement during the early nineteenth century has led many to characterize the region as a "frontier," a wild border land in the process of being tamed and brought within the sphere of civilization through pioneer settlement. Robert Flanders observes that if we equate the frontier with progress, only the agriculturalists could be considered true frontiersmen. According to Flanders, the hunter-herders represent another class of settlers, which he terms the "American Hillman."

> Descended from pre-Revolutionary immigrant stock, from forefathers planted in barbaric Ulster, North Ireland, in the 17th century (which Ulstermen were descended from forebears in the barbaric lowlands of medieval Scotland), they had become somewhat intermixed with English, Irish, and American Indian stock. But in the process they had mixed but little with modernity, with ideas of 'progress.' They, alone of all the European immigrants to British America on both sides of the water, had remained outside the pale of the European enlightenment, of rationalistic culture, and of the myriad influences of an emergent modern world. Their adaptation to a barbaric natural and social environment in Scotland and northern Ireland...was a prelude to a similar adaptation in the New World. 'Adaptation to the environment' is more accurate than 'conquest of the frontier,' because, in America at least, they did not really conquer anything. Their failure to modify significantly the environment along well-established progressive lines, thus bringing themselves into the mainstream of American frontier history, made them anomalous, little-known, little-understood, to be stereotypes along with other ethnic minorities.... A hillbilly cannot be thought of as a frontiersman any more than a Sioux warrior even in the magic world of popular entertainment. The presence of the hillman settler on the Ozarks frontier was to the mainstream

> American pioneer Ozarker something of an obstacle to progress. More devoted to clan loyalties than democratic institutions, to custom than to law, to tradition than to schooling, and lacking mainstream attitudes and values regarding work, thrift, property, money, and lifestyle, the Hillman class tended to remain outside the conformities of new frontier communities. (Flanders 1979:176–178)

During his passage through the Arkansas Ozarks, Schoolcraft had occasion to stay with some of these hunter-herder families, and he provides the following description.

> These people subsist partly by agriculture, and partly by hunting. They raise corn for bread, and for feeding their horses previous to the commencement of long journeys in the woods, but none for exportation. No cabbages, beets, onions, potatoes, turnips, or other garden vegetables are raised. Gardens are unknown. Corn, and wild meats, chiefly bear's meat, are the staple articles of food. In manners, morals, customs, dress, contempt of labor and hospitality, the state of society is not essentially different from that which exists among the savages. Schools, religion, and learning, are alike unknown. Hunting is the principal, the most honorable, and the most profitable employment. To excel in the chase procures fame, and a man's reputation is measured by his skill as a marksman, his agility and strength, his boldness and dexterity in killing game and his patient endurance and contempt of the hardships of the hunter's life. They are, consequently, a hardy, brave, independent people, rude in appearance, frank and generous, travel without baggage, and can subsist any where in the woods, and would form the most efficient military corps in frontier warfare which can possibly exist. Ready trained, they require no discipline, inured to danger, and perfect in the use of rifles. Their system of life is, in fact, one continued scene of camp-service. Their habitations are not always permanent, having little which is valuable, or loved, to rivet their affections to any one spot; and nothing which is venerated, but what they can carry with them; they frequently change residence, travelling where game is more abundant. Vast quantities of beaver, otter, raccoon, deer, and bearskins are annually caught. These skins are carefully collected and preserved during the summer and fall, and taken down the river in canoes, to the mouth of the Great North Fork of the White River, or to the mouth of the Black River, where traders regularly come up with large boats to receive them. They also take down some wild honey, bear's bacon, and buffaloe-beef, and receive in return, salt, iron-pots, axes, blankets, knives, rifles, and other articles of first importance in their mode of life. (Schoolcraft 1955:86–87)

In 1834 an Englishman named George W. Featherstonhaugh traveled with his son through the Arkansas Ozarks, and offered a similar, although more succinct, description.

> If the settler is merely a hunter and a squatter, you will find a poor cabin and no farm, a cow perhaps that comes in from the woods once every two or three days to get a little salt, and that then only gives a teacup of milk. In most cases the hunter won't be home, but you will find six or seven ragged wild-looking imps and a skinny, burnt-up, dirty female. (Featherstonhaugh 1844:337–338)

In commenting further upon the class of society represented by the hunter-herders, Schoolcraft had this to say.

> The hunter population in the territory, presents a state of society of which few have any just conception, and of which, indeed, I confess myself to have been wholly ignorant, previous to my tour through those regions where they have been located. Composed of the unruly and the vicious from all quarters, insulated by a pathless wilderness, without the pale of civil law, or the restraints upon manners and actions imposed by refined society, this population are an extraordinary instance of the retrogression of society. So far as is not necessary for animal existence, they have abandoned the pursuit of agriculture, the foundation of civil society, and embraced the pursuit of hunting, so characteristic of the savage state in all countries. (Schoolcraft 1819:174)

Schoolcraft may have been shocked but he was deeply impressed by the hunter-herders. Consequently, he observed them carefully, and recorded much about their character and habits. Indeed, Schoolcraft's texts are valuable ethnographies, important not only because of the descriptions they contain of this class of people, but also because they are classic examples of nineteenth century American anthropology. Ethnographic observations and descriptions cannot help but be colored by the cultural biases of the observer, especially in the context of a "foreign" culture, and the ethnographer's aims and intentions also strongly influence what is observed and how it is interpreted. These facts are true of Schoolcraft's accounts quoted here, but like all good ethnographies it is possible to identify these biases where they occur, and derive interpretations from the texts which the writer (in this case Schoolcraft) might not have fully appreciated. For example, we may consider the following description by Schoolcraft of the relationship between the hunter-herder and his dog.

> The hunter, although habitually lazy, and holding in contempt the pursuits of agriculture, so far, at least, as is not necessary to his own subsistence, is nevertheless a slave to his dog, the only object around him to which he appears really devoted. His horse, cow, and hogs, if he have any, living upon vegetable food, can subsist themselves in the woods; but the dog requires animal food, which he cannot himself alone procure, and to furnish which requires no inconsiderable portion of the hunter's time. (Schoolcraft 1819:174)

Schoolcraft goes on in this account to detail a particular hunting trip to provide meat for a pack of dogs, but the point I want to make concerns the oblique reference to a horse, cow, and hogs. Though of secondary concern to Schoolcraft in this particular passage, given his fascination with the huntsman aspect of hunter-herder lifeways, the raising of livestock did play an important (though not always visible) role in the adaptations of these hillfolk. A full appreciation of their way of life requires consideration of this aspect of their subsistence economy.

The historian Frank Owlsley has made the point that many contemporary observers consistently misinterpreted the lifestyle and economy of these early hunter-herders living in the forested South.

> Had they lived upon the plains, their livestock economy would have been apparent; but because of the great forests their herds of cows and droves of hogs were seldom to be seen by anyone passing hurriedly through the country. Nor could the economic importance of their subsidiary occupation of hunting and trapping be realized except by one who tarried long and learned the way of these taciturn folk. (Owlsley 1945:155)

Instead, men were described as shiftless and lazy in the extreme, and the wives and children were pitied as the unfortunate denizens of this uncivilized state.

A more accurate description would have emphasized several important points. First, the readily observed "huntsman" character of these settlers was, in fact, only one aspect of a dual subsistence economy in which livestock production was an equally important component. The fertile soils of the mountainous regions provided abundant forage for the sizable but unseen herds. The per capita production of cattle, hogs, and sheep in the Ozarks during the initial decades of the nineteenth century did, in fact, exceed that of lowland regions in Kentucky and Tennessee (Gray 1933:834). However, the highly dissected character of the terrain necessitated a grazing system far different from that used in lowland or open regions. In the Ozarks, early settlers tended to occupy tributary valleys extending up from the larger streams.

> Those who were fortunate enough, however, to gain control of the entrance of a high valley with ranges practically encircling it, had a natural pasture into which they might turn their cattle without danger of their straying. In May, cattle, horses, and sheep were turned into the mountains and allowed to remain there until October. The owners would visit their herds once a week and salt them to keep them gentle and prevent them from straying too far. In the fall they would drive them to market. (Owlsley 1945:161)

Schoolcraft did, in fact, describe the open range pattern of livestock raising in the early nineteenth century Ozarks.

> The farmer here encloses no meadows...cuts no hay.... The luxuriant growth of grass in the woods affords ample range for his cattle and horses, and they are constantly kept fat. Hogs also are suffered to run at large, and in the fall are killed from the woods; I have seen no fatter pork than what has been killed in this way. There is perhaps, no other country in the world, where cattle and hogs can be raised with so little trouble and expense as here; and this is an advantage this country possesses which is likely to be permanent; for the country will never admit of a dense population. (Schoolcraft 1819:34)

The resulting settlement pattern was thus apparent only as a string of cabin locations distributed at intervals along the major waterways. For example, traveling down the White River from the settlement at the North Fork, Schoolcraft (1955:151–154) noted cabins at the following intervals: 30 miles (Jeffreys's), 5 miles (Mr. Williams), 30 miles (Widow Lafferty), 5 miles (Mr. Jones), 15 miles (Hardin's Ferry), and 10 miles (Poke Bayou — "a village of a dozen houses").

A second point concerns the careful scheduling on a season-to-season basis of the major productive activities which comprised the dual economy of the hunter-herders. During the summer season the men looked after the livestock while the women tended the gardens. After the cattle were driven to market at the end of the summer, hunting became increasingly important during the fall and winter months (White 1931:37). A few head of livestock were kept through the winter in the protection of the thick canebreaks along the river bottoms, and in spring they were turned out to gaze in the uplands while new garden crops were put in and the cycle began anew.

Another point that is obvious even from the descriptions of Schoolcraft and Featherstonhaugh, is that the hunter-herder did, in the end, usually manage to provide only the basic subsistence needs of his family. Transportation facilities in Ozarkia were poor during the first half of the nineteenth century; this restricted commercial opportunities and thus prevented the development of a market oriented agricultural economy (White 1931:123). The earnings that an individual might realize from hunting and trapping were also small, although merchants and factors could sometimes make a handsome profit (White 1931: 37–39). But the hunter-herder pioneers did not themselves feel disadvantaged, for this was the life they had chosen, and the opportunity to create a livelihood at the edge of the newly expanding frontier was what brought them into the area in the first place. The frontier was expanding, however, and this gave rise to a final characteristic of the hunter-herder lifestyle — its transience. Many early settlers occupied their part of the woods only as long as the forage and game remained plentiful; when new arrivals began to crowd the area, these families sold their most cumbersome possessions and moved along to the newest edge of the frontier. Within only a few decades the once trackless forests of Ozarkia were increasingly opened by a new and different kind of settler. Some of the earlier pioneers also chose to remain, and they too became part of the second stage of settlement, which reflected a lifeway based on agriculture.

Agricultural settlement of the Ozark and Ouachita uplands did not begin until after the first quarter of the nineteenth century. Several factors may account for this. Most settlers coming from the eastern states traveled to the western lands via the Mississippi River, either coming down the river from St. Louis or up the river from New Orleans. As noted earlier this region happens to be situated roughly between these two points, and so it was the last area along the Mississippi to attract settlers. Those who did reach this area found roads into the interior absent and travel conditions generally difficult, so most settlement tended to occur along major rivers surrounding Ozarkia. The western part of this region was also, at this time, still occupied by Indians, which further discouraged settlement of the interior regions. Finally, as Pitcaithley (1976: 68–69) has pointed out, there may have been a less tangible but equally important hindrance to settlement in the widely read description of the area published by Timothy Flint in the late 1820s. Flint portrays the Ozarks as possessing somewhat less than idyllic characteristics including "broken land, unfit for cultivation," "rocky and sterile ridges," and "no inconsiderable surface covered with mountains." Moreover, the streams "have been known to rise forty feet perpendicular height, in a few hours. The standing corn and cotton are submerged and the hope of the year destroyed" (Flint 1828:571–573).

So, perhaps for all of these reasons, most early agriculturalists chose to settle elsewhere than Ozarkia. However, changes from 1820 to 1840 in the way the federal government disposed of lands in the public domain did much to stimulate interest in these lands and, in the end, encouraged a major influx of settlers into the region. Before 1820, lands in the public domain were sold off by the government at $2.00/acre in lots of 160 acres each (Donaldson 1884). The buyer had to pay one-fourth of the total price in cash, and received full title to the land. However, the Land Act of 1820 reduced the price of land to $1.25/acre and permitted the buyer to purchase as few as 80 acres at this price. This change did much to reduce speculation and made it easier for settlers with limited financial resources to acquire lands legally. However, in order to gain title within this system the land first had to be platted, and the federal land survey simply could not keep pace with the burgeoning influx of settlers into the western region.

In 1817 General William Rector was appointed Surveyor General of a large district including Arkansas, Missouri, and Illinois (Shinn 1967:106). During the following two years several extensive tracts of land were platted along the St. Francis and White rivers in eastern Arkansas, but these areas were primarily claimed by former soldiers who had been issued bounty certificates for their service during the War of 1812. By 1820, however, a land office had been established at Poke Bayou, and at that time a number of surveys were begun on public domain lands in northern Arkansas. The eastern and southern boundaries of townships in Ozarkia were measured between 1829 and 1834, but it was not until nearly 1850 that the interior sections were platted (Loberg 1976).

Many agricultural settlers came into Ozarkia before these surveys were completed, and apparently the majority of them lacked either the resources or the desire to acquire legal claim to their lands. As township plats were completed, relatively few tracts were sold and most of the settlers simply remained on their land as squatters (Shinn 1967; Pitcaithley 1976; White 1931). In fact, settlement on the public domain became so widespread throughout the frontier that a growing "squatter's rights" movement eventually won the support of Congress which in 1830 passed the first preemption law allowing settlers on public lands first right of purchase. This law was reenacted several times before a permanent preemption act was passed by Congress in 1841 (Sakolski 1957). Also by the 1830s, several other changes had taken place in Ozarkia which provided further impetus to settlement (White 1931:109). Land cessions by the Quapaw, Choctaw, and Cherokee made new lands available thereby enlarging the public domain. Increasingly liberal land disposal policies were put into effect by the federal government, so by 1832 a settler could purchase a 40-acre plot for just $60. The establishment of a line of military forts along the eastern boundary of the newly created Indian Territory in Oklahoma greatly reduced the white settlers' fears of Indian harassment. A road system encircled the Boston Mountains by the mid-1830s, and the establishment of postal offices throughout the area was beginning to create a network of postal roads reaching into the interior. So on the eve of Arkansas and Missouri statehood, Ozarkia as well as the Arkansas River Valley began to receive the largest influx of people these regions had ever experienced.

The migration of agricultural settlers into this region did not stem from random or widely distributed points "back east." Rather, these secondary pioneers were derived almost entirely from the southern Appalachian region of Kentucky, Tennessee, and North Carolina, as well as adjacent parts of South Carolina, Louisiana, Alabama, and Georgia. These settlers brought with them a distinctive complex of agricultural practices, settlement patterns, and social characteristics which enabled them to adapt successfully to their new surroundings and which also resulted in the establishment of a characteristic cultural landscape which persists largely intact to the present day. This cultural landscape is widespread throughout the Upland South and was first noted by geographer Fred Kniffen (1965; cf. Kniffen and Glassie 1966), who initially defined it as a particular architectural pattern consisting of double pen log houses (many of which were subsequently converted to the English "I" house design) and various German-derived barn styles. This architectural pattern was produced by Upland South populations whose agriculturally based economy also incorporated the two hallmarks of earlier pioneer lifeways: hunting and livestock production.

The origin and characteristics of the Upland South cultural system have been considered in detail by Newton (1967, 1974a, b), who suggests that a series of cultural traits arose in the eastern Piedmont region during colonial times which, when later transplanted throughout the trans-Appalachian frontier, proved to be fortuitously "pre-adapted" to conditions encountered there. Cultural preadaptation is defined by Newton as "a set of traits possessed by a particular human society or part of that society, giving that group competitive advantage in occupying the new environment, usually specific parts of the environment" (Newton 1974b:147). Newton further recognizes that preadaptation is a mechanism which explains success, not formation, of a particular frontier culture. That is, cultural practices such as building techniques, tillage practices, or kinds of social organization develop in a prior situation because they are appropriate there, but when these practices are transplanted to a different setting they may turn out, perhaps quite fortuitously, to provide important new adaptive advantages. Thus the reasons for the origin of these traits and the reasons for their persistence in new situations are often quite different.

Before the Revolutionary War a large number of Scots-lrish and German immigrants arrived in the colonies, and it was mainly these poor farmers who settled during the eighteenth century in a large and expanding frontier extending from Pennsylvania to South Carolina, and later into Virginia, North Carolina, Tennessee, and Kentucky (Newton 1974b:150; Rafferty 1980:47–48). As these populations adapted their subsistence practices to this frontier, a particular settlement pattern emerged that provided a set of culturally defined reference points and "a system of order that was familiar, flexible, local, and personal" (Newton 1974b:151). This settlement pattern was based on the county as a primary organization unit, and each county contained two distinct segments: a rural peasantry and a literate elite who were concentrated in courthouse towns where lawyers, merchants, bankers, publishers, doctors, and other professionals pursued their occupations. The courthouse town was the focal point of the county and, accordingly, it was laid out in a highly organized fashion with straight streets and regular blocks. The rural peasantry were tied to the courthouse towns via the market, the courthouse, and important political, civil, and social institutions. A countywide road network connected the rural settlements to the courthouse towns. Road locations were determined, however, by the landscape configuration and the needs of the rural settlers; farmsteads were established in suitable locations, and buildings soon grew up along both sides of the newly cleared roadway. A series of small farmsteads connected by a winding county road constituted a dispersed rural settlement. Hamlets often developed at mill sites, where the mill plus a store, post office, church, cemetery, and several houses might cluster around a crossroads. These communities, whether dispersed or clustered, were the basic settlement units of the rural peasantry.

> A single family lacked organizational depth during periods of stress; it lacked variety of personnel for many human situations. But the cluster of relatives and friends in the settlement provided deacons, curers, folk political leaders, and persons with greater skill in many of the homely crafts such as blacksmithing, weaving, meat curing, cattle management, farm equipment repairing, and basket making. It was the settlement that provided children with the models appropriate to peasants; it would also provide them with peers, a modicum of schooling, religious training, a mate, and possibly a foster home. (Newton 1974b:152)

Hamlets located in strategic spots might eventually grow in importance and become courthouse towns as new counties were established. This two part system, comprised of a rural population dispersed around a centrally placed town, was thus a very flexible system allowing counties to organize themselves around "natural" points of reference as they became apparent.

> The simple flexibility of this peasant system, together with a similarly flexible courthouse-town system, allowed for the sudden, far-flung occupancy of the Old West between 1775 and 1825.... Courthouse squares, I-houses, dogtrots, notched-log construction, open range, generalized grain and livestock economy, dispersed hamlets, and so forth, all were spread over a third of a nation in scarcely more than a generation, providing a historic datum for judging variations. (Newton 1974b:152)

Upland South culture is expressed in Ozarkia by a particular lifeway, a characteristic settlement pattern, and an associated material culture. An early description of the "squatter's life" in the Arkansas Territory in 1834 is given by Featherstonhaugh:

> These people occupied 160 acres of fertile bottomland, had 100 bushels of Indian corn harvested, 2-300 bushels of wheat, numerous cows, with a boundless range for them on the adjacent hills and bottoms that afforded excellent grass, great numbers of barn-door fowls, wild turkeys in profusion around them, deer to be had at an hour's notice.... These settlers are drawn from the poorest classes of Tennessee, Kentucky, and Louisiana where they are agriculturalists. They are hardworking, enterprising men, always busy fencing, ploughing, chopping timber, setting traps for wolves, hunting the panthers that destroy their calves and swine, and are continually occupied without a moment's relaxation. (Featherstonhaugh 1844:336–337)

The early Pioneer Agriculturalists were thus engaged primarily in clearing the land, cultivating gardens and fields, raising hogs and cattle, and hunting. Frontier farmers carefully selected the lands upon which they settled, the important factors considered included the fertility of the soil, accessibility to transportation (either roads or a navigable stream), availability of permanent water, ease with which the land could be cleared and cultivated, and risk of flooding (Johnson 1957:42).

Upon selecting a spot on which to settle, the pioneer farmer began to erect a log house. The pioneer cabin was typically made of logs, sometimes hewed on two sides, but often not trimmed at all. Cracks were chinked with smaller pieces of wood and mud. The form was almost always an oblong square, with a huge fireplace in one end. The fireplace was set back in a crib of logs, heavily lined with stone and mortar and sitting on a hearth of large, flat stones. On top of the stone and mortar lining was a stick and mud chimney which was always built on the outside of the cabin. The cabin was one story in height, and roofed with clapboards resting on poles which ran the length of the building, and were weighted down with other poles. One or two small openings were cut for windows, in which greased paper or sometimes glass was put. The floor was made of roughly cut puncheons laid down over log "sleepers." The door was made of lighter puncheons or heavy clapboards, fastened with pins and hung on wooden hinges (Goodspeed 1894:20). As additional space was needed, a similar log structure would be erected next to the original, with a connecting space in between, thus forming the double pen, or "dogtrot" design.

The tools needed to construct the pioneer cabin included a broadax, a froe, and an auger. Many early cabins were put together without nails; wooden pegs were used instead. These cabins were lighted mainly by the fireplace, but during the warmer seasons, crude oil or grease lamps, or tallow candles were used (Johnson 1957:152).

The typical Ozarkia farmstead was comprised of a variety of structures in addition to the log cabins (Hudson 1976:41–52; Dunahoo 1982:6–7). Because springs were the most common source of fresh water, many settlers erected log and stone springhouses on their farms through which the cool spring water could flow. Fruits, vegetables, and dairy products were usually stored in the springhouse. Other log structures included pole barns, corncribs, and smoke houses. As settlement density increased it became necessary to mark property boundaries and also to confine livestock within one's own field. Rail fences thus emerged as an additional component of the farmstead complex. Two of the most commonly used fence patterns were the worm fence and the straight rail fence, and in areas where stones were plentiful, rock fences could be constructed. As nails became available, picket fences were built, usually to enclose smaller areas such as yards and gardens.

Corn was at first the most commonly raised field crop and it provided bread for the family as well as feed for the livestock and barnyard animals. Prior to the establishment of watermills, cornmeal had to be ground either in small, steel handmills or in homemade "stump and pedestal" mills (Goodspeed 1889:31–32). Garden produce included beans, peas, pumpkins, Irish and sweet potatoes, turnips, cabbages, and other items. Drying, pickling, and preserving were important methods of processing garden produce for use over extended periods. The gardens were usually tended by women while the men tended the livestock and worked the fields. At first the fields were turned with simple, homemade plows which consisted of nothing more than a forked, hardwood sapling cut into shape with an axe. Later these were replaced by bull tongued plows, plows with wrought iron shares, and mould boards (White 1931:119). As agricultural technology improved and as commercial grist mills were built, wheat began to be raised in addition to corn (Johnson 1957:49). Cotton was also grown on the farms to be spun by the women and made into cloth on homemade looms. Tobacco was grown initially for home use but later it became an important cash crop (Goodspeed 1889). Vineyards and orchards were planted to provide grapes, apples, peaches, pears, plums, and cherries.

Relatively little has been written about the agricultural practices of these early pioneers. Their basic methods and techniques were, in fact, essentially the same as those of the hunter-herders, the major difference being the greater investment of time and resources in the production of crops so that a marketable surplus could be produced. The best summary of early agricultural practices in Ozarkia is the account by Otto and Burns (1981) derived in part from interviews with descendants of Arkansas pioneers. The oral history pertains to Hardy Banks, a slaveholding, antebellum settler living in Yell County.

> Along the creek bottoms, Hardy Banks cleared his patches for corn and cotton — 'just a few bales.' Since the creeks were often flooded by silt-bearing freshets, the bottoms patches could be cultivated longer than the patches on the upland slopes, where Banks planted his potatoes, his sorghum cane for syrup, and his peanuts for fodder. 'Peanuts [and] potatoes [were planted] on sandy land [on the uplands]. You can't raise peanuts or sweet potatoes in the bottoms, because you just can't do that here. Sorghum on sandy land. It'll always do better.'
>
> To cultivate their crops, Banks used heavy iron hoes and an ox drawn 'bull tongue' plow with a narrow iron share that resembled a bull's tongue. (Otto and Burns 1981:81)
>
> When the patches declined in fertility, they were abandoned, becoming fallow pasture for the range cattle and horses. After a patch was 'rested' for a decade or more, it was reforested and restored so it could be cleared and farmed again if necessary. (Otto and Burns 1981:83)
>
> Although Hardy Banks was an atypical Highlander since he owned slaves, his agricultural practices were highly typical. Hardy Banks achieved self-sufficiency in foodstuffs as well as a small marketable surplus by relying on two traditional agricultural practices — open-range herding and 'patch farming' (or slash-and-burn cultivation, as it is known today). Although many scholars of the South have regarded these practices as 'backwards and unscientific,' open-range herding — allowing free-ranging livestock to subsist on natural forage for most of the year — was nearly universal in the Old South; while slash-and-burn farming — the clearing of temporary fields by chopping and firing the forest growth, planting crops for a brief time, and allowing the fields to return to long-term fallow to restore the soil — was found throughout the Old South. And in the Southern Highlands, these practices did not disappear after the Civil War but persisted into the twentieth century. Even today, the long-term fallowing of abandoned fields can be found in parts of Appalachia and Ozarkia. (Otto and Burns 1981: 84–85)

Several cultural geographers (e.g., Evans 1969; Hart 1977) have suggested that traditional Upland South agricultural practices were derived from Old World antecedents, for example the "outfield" cultivation practices developed by lowland Scots who settled in northern Ireland after 1610. (Many of these Ulster Scots emigrated to Pennsylvania in the early eighteenth century). However, Otto and Burns note important environmental differences between the Old and New Worlds — particularly the primary forest environment of the latter — and present an alternative interpretation that traditional Upland

South agricultural practices were mainly adaptations of techniques learned from Native Americans.

> The Scotch-Irish who settled in colonial Pennsylvania knew little of forest fallowing. Their Lowland Scots ancestors had lived in a virtually treeless landscape. And after settling in Ulster, the Scots had quickly deforested the land. Ulster Woodlands which were cleared to provide fuel or raw materials had been turned over to sheep pastures.
>
> When they emigrated to southeastern Pennsylvania, where they confronted extensive woodlands, many Scotch-Irish settlers adopted the forest-farming techniques of the native inhabitants, particularly the Delawares–Coastal AIgonquians who practiced slash-and-burn cultivation and forest fallowing. In late prehistoric times, the Delawares cleared their garden patches in creek and river valley bottoms by burning the undergrowth and girdling the bark on large trees. They then planted corn, beans, squash, and pumpkins in hills among the trunks and roots. When the fertility declined, the Delawares cleared new patches, allowing old gardens to revert to forest. Significantly, the Delawares did not cultivate the upland slopes, although they were suitable for tillage by the Europeans.
>
> When the Scotch-Irish and other Pennsylvanians adopted the Delaware practices, they found that burning undergrowth and girdling trees required far less labor than felling trees and grubbing up stumps — a decided advantage in a colony where labor was scarce. And surprisingly, back-woods settlers who practiced burning and girdling often enjoyed better crop yields than those who thoroughly cleared their fields. (Otto and Burns 1981:87–88)

Cattle and hogs were the most important livestock raised in addition to horses, oxen, and sheep. Cattle provided milk, cheese, meat, and leather, as well as tallow for making candles. Horses and oxen were used as beasts of burden and for transportation. Sheep were raised to provide wool for clothing. Hogs were by far the most important source of meat for the pioneer farmers. Hogs ran loose in the woods and foraged mainly on acorns, although some corn was often provided around the farm to keep them from straying too far into the woods. Sufficient quantities of pork were usually cured during the winter months to last the entire year (Johnson 1957:52).

Hunting was also an important activity and the “hog meat and hoe cake” diet of the pioneer farmer was frequently supplemented with bear, venison, turkey, or other wild game. Wild grapes, plums, muscadines, persimmons, pawpaws, walnuts, hickory nuts, chinquapins, and pecans were several native plant foods also frequently collected by the early settlers.

During the pre-Civil War era slavery was relatively unimportant in this region, at least in comparison to the delta regions of the state. The typical farmer owned very few slaves if he owned any at all. In northwest Arkansas, the average slaveholder owned just three or four slaves, but only 1.6% of the white settlers were slaveholders (Pitcaithley 1976:99). The primary reason accounting for the fact that there were so few slaves on Ozark farmsteads was apparently that cotton production for much of the area was never important beyond domestic levels of consumption (cf. White 1931:142). In some areas, such as Yell County, cotton did become an important cash crop supplementing the otherwise subsistence oriented agricultural economy.

> The uplands were the domain of the small slaveholders and the slaveless farmers. These uplands farmers, nevertheless, grew over half the cotton crop. Cotton production was not concentrated in the hands of a few but was widely dispersed among scores of farm families. Given the problems in hauling their goods to market, uplands farmers produced valuable items like cotton bales or cattle hides, hauling them overland to trade in Dardanelle. A cotton bale or two sufficed to pay the land taxes or buy a year’s supply of salt, coffee, and ammunition, since uplands farmers produced most of what they needed on their own farms. In addition to raising food and fodder, they often made clothing, tanned leather, and fashioned handicrafts. (Otto 1980:50)

But even in situations such as Otto describes there appeared to be no direct relationship between cotton production and slaveholding; in 1850 one-half of the farmers in Yell County grew no cotton at all, but among this group one-third were slaveholders (Otto 1980:43). Rather, as Otto points out, slavery in the highlands existed primarily within the setting of the family farmstead, where the main occupations were growing crops, tending livestock, and hunting.

> The white and black families worked together, went hunting together, and lived in adjoining log cabins. Banks, his wife Susan, and their three young sons lived in a ‘dogtrot’ house with windows of scraped deer skin. His slave family, which he inherited from his father, Alex, who died in 1852, lived in a ‘dogtrot’ cabin which had its own well, corn crib, and smokehouse. (Otto 1980:52)

In addition to the scattered farmsteads that began to dot Ozarkia river valleys, a number of other elements were added to the cultural landscape. Although Schoolcraft wrote in 1819 that “schools are unknown, and no species of learning cultivated,” by the time the pioneer farmers came some interest in education had been kindled. The first schools were private and often were sponsored by communities of locally dispersed farmsteads. The local community might hire someone as a teacher or, in some cases, an itinerant scholar would convince the populace of the need for educational instruction, which he would supply in exchange for room and board. In 1843 the state legislature passed a school law to establish a system of common schools throughout the state, but this effort failed due to inadequate funding (Herndon 1922:537). Johnson notes that “as late as 1860 there were only 25 common schools that were organized and supported by the common school fund; the other schools were private institutions supported by local communities and individuals” (Johnson 1957:81).

Here and there local school houses were built, most probably resembling the one described by Gerstaecker.

> We passed a school as we went along. One of the usual log houses — but with a plank inserted between two logs to serve for a desk. The more distant scholars come on horseback, and tied up their horses to the fence during school hours. (Gerstaecker 1881:235)

Early religious activity in the region tended to conform to the Methodist and Baptist faiths, primarily because of the religious heritage of the settlers, plus the fact that both of these churches were so organized as to be able to serve the scattered and isolated farming communities (Sechler 1961). The first "churches" in Ozarkia were loosely organized congregations of people who often met in each others' homes. The Methodists assigned itinerant preachers to circuits — large geographical territories — throughout which they traveled and gathered together congregations where they could. By 1816 the Missouri Conference had two circuits in northern Arkansas, one along the Spring River and one along the White River. Shortly after these were established, several Baptist ministers also began to establish churches in the area (Sechler 1961:2–4).

An important aspect of religious activity in this region was the camp meeting. These affairs were held frequently by Baptist, and especially Methodist, congregations although camp meetings actually originated with the Presbyterians. Campgrounds were situated in large groves with nearby springs or creeks. A brush arbor or shed would be built to contain the large numbers of participants. Since camp meetings often lasted for several weeks during the summer, cabins were sometimes constructed to house families during their stay. Clara Eno recalls the campground near Natural Dam in Crawford County.

> There was also a campground nearby with log cabins all around. During annual camp meetings many of those living in the settlement would move into one of the log cabins with enough food for two or more weeks and remain until the close of the meeting. (Eno 1951:384)

During the fast half of the nineteenth century, church buildings were usually not constructed differently than the typical log house. When community school houses were built, these often were used for church services as well (Sechler 1961:81). Thomas Estes recalled going to church in Newton County when he was a child "in a little unhewed log house, without floor, window or door shutter and seats were round logs. 'Frank' Treat preached and his wife Rebecca exhorted." (Estes 1928:4).

As agricultural settlements expanded into the Ozarks, Ouachitas, and Arkansas River Valley, a variety of local service centers emerged. Perhaps the most important, and certainly the first to become established, were the water-powered grist and saw mills which ground the farmers' corn and wheat and sawed the boards used to build their homes and barns. Sutton notes that in Madison County "excepting the church there is no other institution more prominent than the water mill" (Sutton 1950:17). Shiras adds that "in the early days there was a water mill on practically every stream where corn and wheat was ground weekly" (1939:90). The most common type of water mill had a large "overshot" wheel with several buckets attached around its circumference. The water spilled out of a chute at the top of the wheel and as it was caught by the buckets the weight of the water turned the wheel around (Estes 1928:2). However, this type of mill required a high waterfall, and where this could not be arranged an "undershot" wheel was used which was turned by water rushing beneath the wheel and pushing against paddles (Rayburn 1941:134). Another type of mill was powered by a water turbine rather than a wheel. These various water mills also usually incorporated log dams with adjacent raceways, or flumes. Where adequate water sources to power these types of mills was unavailable, treadmills were constructed which were powered by horses or oxen.

The earliest merchants in the region were frontier peddlers who traveled from settlement to settlement, usually leading a horse drawn wagon or mule laden with household goods for sale. The typical stock of these itinerant merchants included needles, jewelry, clocks, watches, cloth, buttons, hand mills, cotton and wool cards, small cooking utensils, dishes, ribbons, silks, handkerchiefs, neckties, reading glasses, cutlery, and dye (Johnson 1957:62). George W. Featherstonhaugh recalled being often mistaken for a peddler by frontier housewives and

> upon one occasion a woman screamed out most lustily to us from her door, and as we would not stop she ran after us, and finding we obstinately persisted in giving an unsatisfactory account of ourselves, she said, 'Well, then, if you ha'ant got nothin' to sell, I reckon you must be tailors, and that you are goin' about tailorin'. (Featherstonhaugh 1844:26)

As local communities coalesced, the frontier store emerged as an important service center. The crossroads store was not only a place where the farmer could obtain his supplies, but it was often the only outlet for his produce. Usually the first post offices were operated out of the local store; and, as the community grew, the store became an important center for news, political affairs, and general sociable gatherings. The importance of the local store as a supplier of goods is underscored by the fact that as early as 1820 roughly one-half of the goods consumed in Arkansas were imported (White 1931:153). The major sources of these goods included New Orleans, Pittsburgh, Philadelphia, New York, Boston, Louisville, and Cincinnati.

> From New Orleans came various kinds of dry goods as combs, leghorn hats, boots, ready-made clothing, muslins, cambrics, ribbons, velvets, calicoes, broadcloths; cotton and wool cards; dried fruits, coffee, sugar, salt, spices, and other forms of groceries; whiskey, French wines, brandy, Jamaica spirits, Holland gin; window glass, iron nails, hardware cutlery, and saddles. From Pittsburgh primarily articles of heavy domestic manufacture as hardware, machinery, cutlery, and glass. From Philadelphia came various forms of dry goods as shirtings, sheetings, Irish linen, bandana handkerchiefs, sew-

> ing silk, looking-glasses, combs, garden seeds, calfskin boots, and umbrellas. From Cincinnati came furs for trimming hats, flour, whiskey, feathers, bacon, hams, strawberries, plums, peaches, pears, apples, sideboards, tables, and furniture of all kinds. From Louisville came beer and pork. (White 1931:152–153)

Other important frontier service centers included the blacksmith shop, the tannery, and the distillery. The blacksmith produced a variety of necessary items for both domestic and agricultural use. Nails, hinges, and fireplace accessories were forged for the household, while a large variety of tools, implements, wagon parts, and other items were made for use in the barns and fields. Blacksmiths also shoed horses, made and repaired guns and accessories, and engaged in probably countless other activities. Tanyards consisted of open vats constructed near a spring or river, where hides would be tanned using locally available materials such as lime, oak bark, and lye. Often the tanner was also a producer of leather goods including shoes, clothing, saddles, harnesses, and other items. Even during the earliest years of settlement there were actually a few commercially licensed distilleries in the Ozarks. Schoolcraft (1819) mentions one north of Batesville, and Lackey (1950: 123–124) describes licensed stills along Wells Creek and Big Hurricane Creek in Newton County. None of these distilleries operated on a large scale, however, and it is likely that they did not differ substantially from the unlicensed stills, which probably occurred in far greater numbers throughout the Ozarks.

Early travel on rivers and streams in Ozarkia was slow and difficult. The pirogue, or dugout canoe, was the craft most often used for transporting light loads and for traveling up the smaller streams and creeks. Flatboats, keelboats, and rafts or barges were used to carry heavier loads up larger rivers including the Arkansas. To ascend a stream, oxen, mules, or horses had to be used to pull the boats against the current, or if these were unavailable ropes would be looped around trees and the travelers themselves would pull the boats along.

Overland travel was at first confined to old Indian trails or those few roads that had been built prior to the Civil War. Gerstaecker described the construction of one such road.

> When a county road has to be cut, a director is appointed, who is authorized to assemble all the male population of the county from the age of eighteen to forty-five; and these stout sons of the forest soon make a clearance among the trees, and roll their trunks out of the way. But holes and other hindrances are left in a state of nature, if there is the slightest chance that a wagon can pass. (Gerstaecker 1881:235)

Wagons and oxcarts were the primary vehicles hauled along these early traces. However, as roads began to improve after the 1830s, horse buggies became more common and soon stagecoaches began to offer a commercial means of transportation. The coaches used on the early stage routes varied in size from small four-passenger vehicles drawn by two horses to larger coaches drawn by four horses and holding nine passengers (Moffatt 1956:192). As stagecoach travel became common, taverns and waystations were opened up along the routes to provide travelers with food and lodging. Travel across any great distance, however, inevitably meant crossing rivers and streams, and so ferries became important links connecting overland transportation routes. Featherstonhaugh describes crossing the Eleven-Mile Point River by ferry in an "awkward flatboat conducted by a girl about 16" (Featherstonhaugh 1844:3). In general, "travel on the Arkansas frontier remained slow, dangerous, and uncertain until the advent of the railroads. The traveler was at the mercy of the rivers if he went by boat and at the mercy of the weather if travel was overland" (Johnson 1957:118).

Poor roads and slow travel conditions throughout Ozarkia inevitably meant that communication with the outside world was poor and this only exacerbated the isolation of the region. Post offices were established slowly, however, and during the 1840s and 1850s they became linked by a network of postal roads which began to greatly improve the speed and efficiency of communication (Williams 1911). In 1858, the Butterfield Overland Mail began operating along a route from St. Louis, Missouri that passed through Springfield and then Fayetteville before continuing on the "Old Wire Road" to Van Buren (Rose 1956; Lemke and Worley 1957).

The preceding review of the pre-Civil War era in Ozarkia and the Arkansas River Valley has focused rather specifically on the subsistence practices, settlement patterns, and environmental relationships of American Pioneer settlers. Despite the limited scope of the discussion, it should still be apparent that sociocultural factors exerted a strong influence on pioneer subsistence-settlement adaptations. Since for much of this period, local populations were semi-isolated because of poor transportation and communication facilities, local patterns of socioeconomic cooperation were indeed critical to the survival of dispersed communities. These patterns of cooperative association went far beyond the commonly cited "house raisings," however, and provided a form of social insurance upon which a person or family could depend in times of hardship.

> Those pioneer settlers took a great interest in each others welfare, and the different settlements met together from a distance of 15 to 40 miles and adopted rules and customs binding each other to aid and assist in helping any person who met with any misfortune in the way of sickness, death or other causes that might occur. (Monks 1907:12)

It should not be unexpected, then, that certain aspects of social organization might have played an important role in the development of Pioneer settlement patterns in Ozarkia (e.g., Hackbarth 1980). In an analysis of Pioneer settlement adaptations in the War Eagle Valley of central Madison County, Arkansas, Joyce (1981) found that social factors, particularly kinship relations, were important in addition to environmental variables in determining agricultural settlement locations. Joyce's study is particularly revealing in that it assesses both commercial and agricultural location-choice strategies in relation to several cultural and environmental variables. The result of this analysis is a model of Pioneer Agriculturalist settlement preferences which influenced commercial and agricultural settlement during two occupation stages — colonization and spread (cf. Hudson 1969). Joyce defines the colonization stage as the initial period of settlement of an uninhabited region.

> In this stage kinship ranks above the physical factors if the entry is within 1.25 miles of the kin group. Ranked below kinship are a range of physical factors which are considered the most desirable. They are ordered horizontally because of the obvious interrelationships between the variables.
>
> Location of a stream within the property boundaries is very important in location-choice and it seems preferable to have at least two streams, or possibly a stream junction, present within the boundaries. There is also a preference for the nearest stream to be of the highest order. Soil selection is primarily from the most productive capability units, II and III. The preferred terrain is flood plain followed by sloping uplands and flat uplands. Finally there is a preference for wooded areas over non-wooded areas.
>
> The second stage, spread, includes entries after the first wave of settlement and after the primary land is already claimed. This introduces another factor into the system, other habitation, which was not a factor in the first stage since the land was uninhabited. The optimal preferences in this set may be the same as in the first, but since those preferences cannot be fulfilled a second ranking of preferences is necessary.
>
> In the second stage there is still a high priority placed on a stream within the property boundaries; however, this is more often a first order stream. There is a selection of a variety of different soil capability units with fewer entries on the best soils and substantially more on the worst soils. Most entries are made on sloping uplands followed by flood plain and flat uplands. There is still a selection for wooded areas over non-wooded areas. Kinship appears to be an even more important factor in location-choice judging from the large number of kin-related entries within 1.25 miles of a kin member. It is difficult to determine if kin propinquity is selected over better physical factors because of the general low quality of the land remaining. The Swamp Act, the Graduation Act, and the Homestead Act are not settlement determinants but they provide a stimulus to the settlement of less favorable areas due to their reduced property cost. (Joyce 1981:90–91)

In contrast to the preferences defined for Pioneer Agricultural settlement, commercial settlement appears to incorporate a more limited set of considerations, with proximity to service centers and to major roads being of primary importance. Joyce's model is depicted graphically in Figure 41.

In the preceding discussion of Pioneer American settlement in Ozarkia and the Arkansas River Valley, two lifeways were summarized: the hunter-herder lifeway and the agriculturalist lifeway. Since the adaptations of each of these groups to their environments differed primarily in degree rather than in kind, it is possible to interpret these lifeways as simply representing variations on a theme, or points along a continuum. While this would be a fair characterization, it runs the risk of overlooking very significant differences in the cultural landscapes produced by these groups. The cultural landscape of the hunter-herders was a simple one, comprised of very few elements. In contrast, the agriculturalists developed a fairly elaborate cultural landscape, which in fact established the base upon which the modern cultural landscape of the region has been built. And this brings us to another important point: the hunter-herders although tenacious were ultimately unable to persist in the face of the more dynamic economic and social institutions which blossomed with the advent of a settled agrarian cultural system. The hunter-herder way of life eventually faded away, while that of the agriculturalists not only remained viable but formed the basic structure of modern society in the region. Even though it was eventually replaced, however, the hunter-herder lifestyle and cultural landscape continued alongside that of the agriculturalists for some time, persisting in some parts of Ozarkia into the early decades of the twentieth century. Thus the settlement history of Ozarkia should not be viewed in terms of monolithic patterns but in terms of the diversity exhibited by the many societies which made this region their home. If for no other reason than this, I believe for our present purposes it is useful to evaluate separately the cultural landscapes of these two pioneer societies.

Very few archeological studies have focused on Pioneer American settlement in the Ozark, Ouachita, Arkansas River Valley area (Figure 42). For more than a decade, however, Cynthia and James Price have been investigating early nineteenth century settlement and subsistence adaptations in the eastern Ozarks, and several projects they have carried out in that region warrant discussion here.

In 1975 the Prices began the Widow Harris Cabin site project which was supported in part by a grant from the National Endowment for the Humanities (Price and Price 1978). Intensive archeological, documentary, and oral history research was centered on the Widow Harris Cabin site, occupied roughly from 1815 to 1870 and mentioned in Featherstonhaugh's account of his excursion through the Ozarks in the mid-1840s. However, the project had broader goals than the investigation of a single site. The Prices were interested in identifying factors influencing early nineteenth century settlement patterns in the Ozark border region, and coupled with this they hoped to gain information on the subsistence patterns and resources used by early pioneer settlers. Through excavation of historic sites they hoped to learn more than documents told concerning the placement of structures, how and where trash was disposed, where various activities were carried out on the homestead, and what a typical inventory of household goods consisted

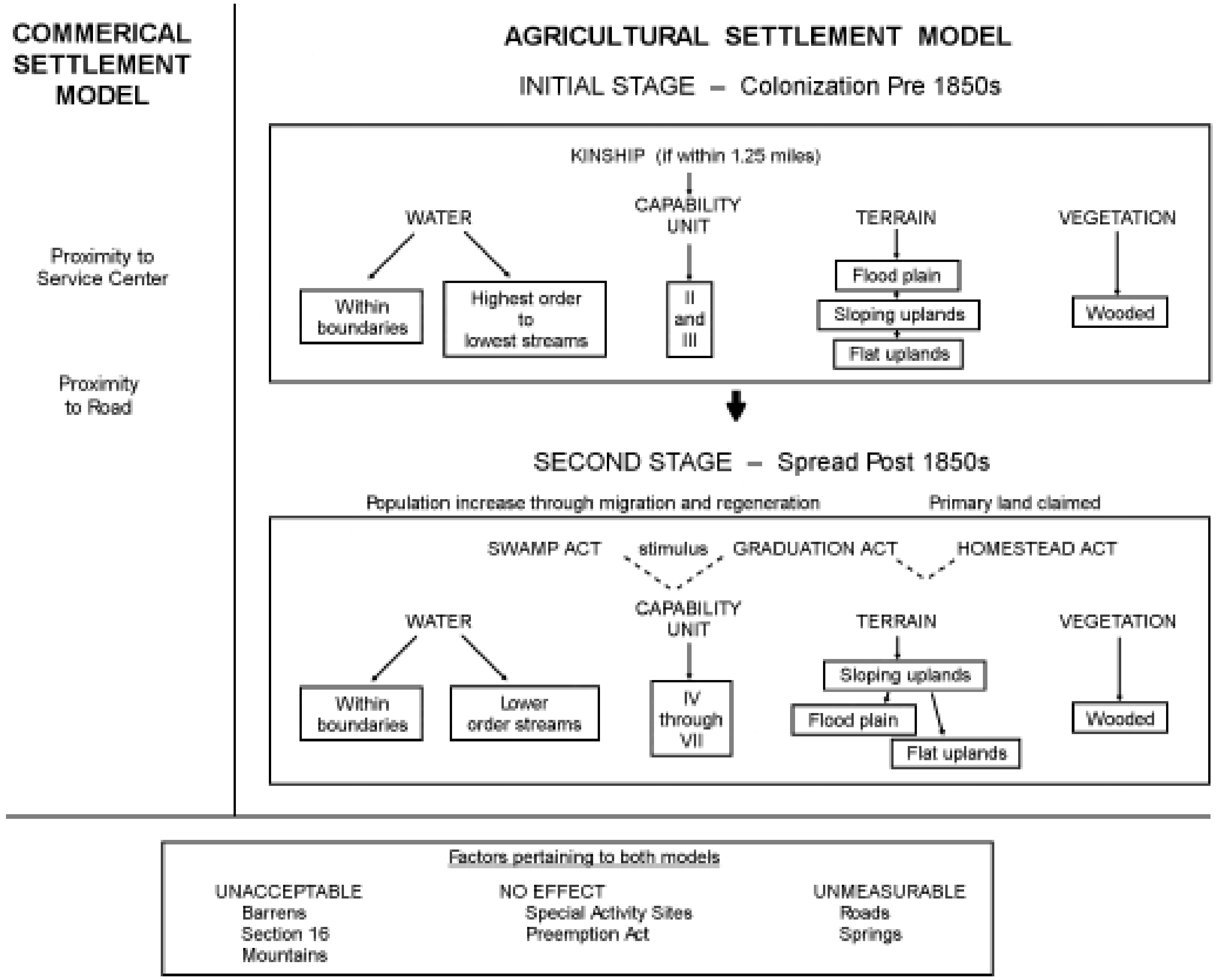

Figure 41. Settlement pattern for Pioneer Agriculturalist period (Joyce 1981)

of. By studying the artifacts found at these sites they also hoped to identify where goods acquired by frontier families originated from, and finally the Prices sought to develop a picture of early historic settlement in the Ozarks border area that could be compared to contemporaneous settlement of the western lowland region of the central Mississippi Valley.

Excavations at the Widow Harris Cabin site were supplemented by surveys to locate additional historic sites in the area, documentary and oral history research, and studies of the natural environment. These investigations were integrated as part of an overall research design. Studies of historic cultural resources can and should incorporate multidisciplinary approaches such as the one developed for this project.

The site excavations produced a large assemblage of artifacts and faunal remains. These were associated with features on the site indicating that two or three successive dwellings had been constructed. The first was a two-crib cabin inferred on the basis of two low platform mounds separated by a depression filled with artifacts, refuse, and debris from a burnt wood structure. The depression was interpreted as a cellar or storage area beneath the dogtrot or breezeway of the structure, and artifacts found in this feature dated from the 1820s to the 1850s. This structure had a fireplace constructed at least partly of field stones. No window glass was found, but a few pieces of door hardware were recovered. The platform mounds presumably supporting the double cribbed cabin were built on top of habitation debris containing artifacts dating to the 1820s, so it was assumed that an earlier structure had been built, the details of which were obliterated by subsequent construction. A separate mound feature containing sandstone slabs, brick fragments, and artifacts dating to the 1840s to 1870s, was interpreted as a possible third dwelling built on the site.

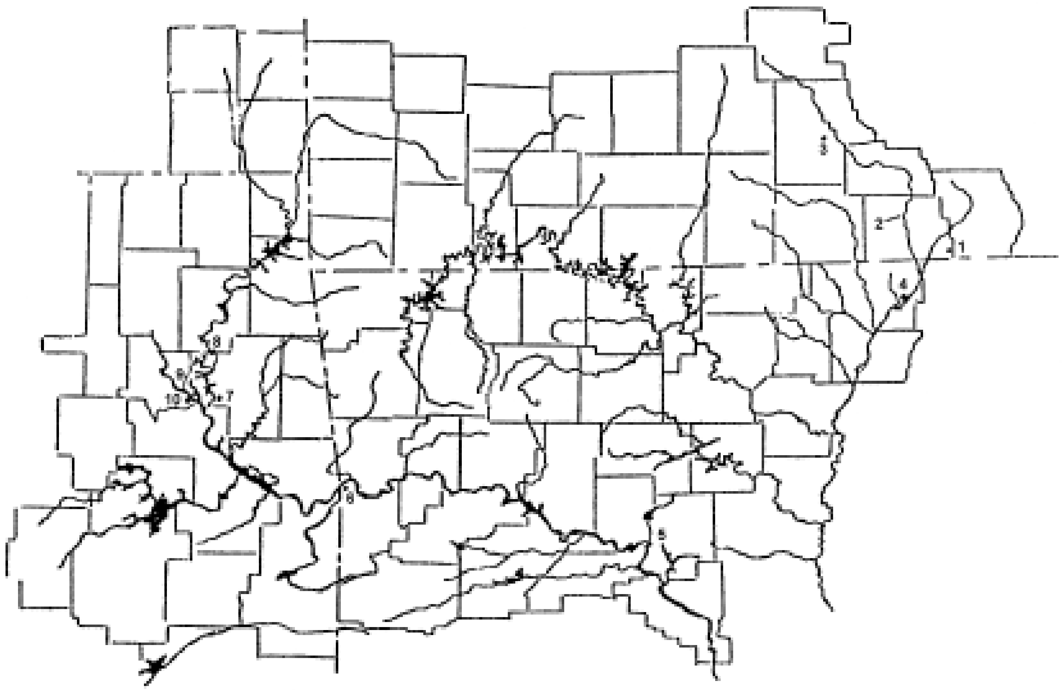

Figure 42. Location of selected Pioneer American sites in the OAO study area
1. Widow Harris site; 2. Ozark National Scenic Waterways sites (Woods Mill, Isaac Kelley, Culpepper, Phillips Bay Mill); 3. Old Eminence; 4. Davidsonville; 5. Cadron; 6. Fort Smith; 7. Fort Gibson; 8. Ross site; 9. Posey, 10. Vandever-Haworth site

Much additional information relative to the broader questions addressed in the study was gained during the archeological and environmental surveys and historical research phases of the project. Three separate early nineteenth century subsistence-settlement systems were identified: the hunter-squatter, the subsistence farmer, and the planter. The Widow Harris site occupants were subsistence farmers, and documentary evidence was drawn together to develop a model of this subsistence-settlement system which could be used to guide further archeological research. This model predicted, among other things, initial settlement in stream valley locations near trace crossings, with later settlement expanding along the lower reaches of these streams. Upland ridge tops would be the last areas settled. “Settlement is predicted where the best set of critical resources occur together providing maximum access to trade and natural resources with the least energy expended. Later settlement would occur where the next best set of resources occur together” (Price and Price 1978:62).

Analysis of animal bone preserved at the Widow Harris Cabin site indicated that although a wide range of animal species was eaten, the single most important species was the hog. Other domestic species identified were chickens and cattle, and wild species included deer, rabbits, and squirrel. Fish and birds were eaten. A single piece of bone from a mountain lion was also identified.

Although plant remains were few, identifiable specimens of many wild species including nuts, wild grapes, wild plums, and berries were found along with corn, beans, peaches, and sorghum seeds.

In addition to identifying the probable locations of structures at the Widow Harris Cabin site, excavations revealed that refuse was commonly scattered about the site, particularly in areas adjacent to the structures. Large animal bones, however, were deposited away from the dwellings and several trash pits had also been dug and filled in across the site. Depressions frequently were filled with trash; this may have resulted naturally or it may have been an intentional effort to keep the surface of the homestead relatively level. An ash dump area was also identified on the site, and it was apparent that the cellar feature beneath the two-crib structure served as a receptacle for floor sweepings after it ceased to function as a storage area. A single concentration of artifacts at the site including a whetstone, a flintlock rifle lockplate, gunflints, lead balls, and lead waste was interpreted as a “craft activity area” where firearms were repaired, knives and tools sharpened, and rifle balls molded and trimmed.

The artifact assemblage found at the Widow Harris Cabin site did indeed provide valuable information on Pioneer household inventories. Major functional categories represented included household items, building hardware, livestock accouterments, wagon hardware, firearms, clothing hardware and items of personal adornment, items for clothing manufacture and repair, articles representing food processing, serving, and consumption, furniture hardware, a variety of hand tools, smoking pipes, jews harps, medicine bottles, slate pencils, and a variety of other, miscellaneous items. These items compared well with local records listing early nineteenth century household goods. Almost all of the items found at the site were commercially manufactured and therefore imported via trade and market networks connecting the eastern Ozarks with other parts of the United States and Europe. The immediate points of trade for the Harris site occupants most likely included itinerant peddlers as well as stores in the local area or at places like Davidsonville.

From this cursory review of its results we can see that the Widow Harris Cabin site project provided much important information on nineteenth century Pioneer lifeways in the eastern Ozarks. As is typical of projects addressing broad research questions, however, complete answers were not produced and many new questions were raised. Additional work on historic sites in the area has attempted with much success to build upon these initial results.

In an assessment of cultural resources in the Little Black watershed (Price et al. 1975), evaluation of documentary sources for the 1820s to 1850s period (including General Land Office survey plats) revealed several potential historic sites in the area including cabins, small farming settlements, towns and villages, and old roads. Field surveys identified four sites probably dating to the early 1850s; no earlier sites were found. These sites represented farmstead settlements; three were located on bluffs or terraces overlooking stream valleys and the other was situated on a high terrace at the mouth of a hollow. Freshwater springs were found adjacent to these sites. Pioneer settlement of the Little Black watershed was characterized in this way:

> In general, sites of the first half of the 19th Century tend to be located earliest along the existing communication routes in high areas above stream valleys of a certain size. Major subsistence considerations included a readily available source of fresh water, land suitable for raising at least corn and garden vegetables, and wild foods for the domestic animals. As settlement increased the dispersed pattern prevailed at least through the 1840s and 1850s. There was a tendency for sites to cluster within a mile or so of one another. The spacing in the early period is probably a factor of subsistence requirements dictating the minimum spacing and communication needs dictating the maximum spacing. More data is needed on highland site locations, subsistence data from excavation, and any correspondence that might exist between site location and soil type, plant communities, or stream size. Sites tend not to be located between sand ridges in the Lowlands or up small tributary stream valleys in the Highlands. (Price et al. 1975:160)

In a similar evaluation of cultural resources in the Fourche Creek watershed, documentary sources were again used to identify two early nineteenth century settlement systems, a hunter system and an agriculturalist system (Price et al 1976). A model of these settlement systems was developed, and several hypotheses concerning Pioneer settlement were suggested. For example, hunter settlements were expected to be dispersed throughout the uplands whereas agricultural settlements would be more clustered along the lower stretches of upland streams. Hunter cabin sites would be occupied only for comparatively short periods of time and therefore have lower artifact densities than sites reflecting more permanent, agriculturally based settlement. Field surveys succeeded in locating only a few sites dating to this period, however, so the archeological data gathered during the project were insufficient to test these hypotheses. Still, the model provides a useful framework for organizing subsequent archeological investigations.

Several reports have been prepared summarizing archeological investigations in the Ozark National Scenic Riverways area along the Current, Eleven Point, and Jack's Fork rivers in southeastern Missouri (Price et al. 1983, 1984, 1985). In the report for 1981–1982 research (Price et al. 1983), documentary sources were used to identify potential site locations reflecting pre-1860s settlement. These were primarily early agriculturally based settlements. Field surveys located several sites dating to this early period, some of which were not reported in the documentary sources.

One of the sites located during the survey was thought to date prior to the 1830s (23SH157). The Woods Mill site, reportedly founded during the 1830s, was located and several features including a stone mill dam, the mill race, and the mill foundation were identified and mapped. Through surface examination and shovel testing a number of artifacts were found, including a cobbler's hammer and a piece of iron sawmill carriage, but very few domestic artifacts were found. Two farmstead settlements established during the early nineteenth century were also located, but no evidence of the early historic occupations at either of these sites was found.

Historical data for the eastern Ozarks region indicates that in addition to individual family farmsteads, agricultural plantations were also established during the early nineteenth century. Excavations conducted in 1982–1983 at the Isaac Kelley site along the Current River sought to investigate the archeological characteristics of one of these early plantations (Price et al. 1984). This site had been discovered during earlier field surveys and magnetometer surveying on the site had indicated the existence of subsurface features. The primary objective of this work was a better definition of the archeological correlates of the plantation mode of agricultural production in the region.

Twenty-seven excavation units, each one meter square, were excavated across the site. Two features were encountered; one feature representing a prehistoric house was only partially excavated, while the second feature dating to the historic period was excavated completely. This feature turned out to be a pit measuring 22 cm by 18 cm and extending to a depth of 12 cm below the plowzone. This pit was filled with ash, charcoal, small pieces of burned clay, charred corn cobs, and burned seeds. There was no evidence that these materials had been burned inside of the pit. Test excavations in areas earlier identified as exhibiting magnetic anomalies did not disclose additional subsurface features.

Excavations in the other test units produced a considerable number of historic artifacts. These artifacts were classified into functional groups as shown in Table 10. Dating of the artifacts indicated that the site was occupied for a long period of time beginning in the first or second quarter of the nineteenth century. The distribution of artifacts in the structure-architecture category suggested that one or more structures, probably of log construction, were formerly located in the central site area. The distribution of nonstructural artifacts (excluding bottle glass) exhibited a concentration to the south of the area where the structures were thought to have been located. Animal bone refuse was concentrated in the same area. Two lesser concentrations of debris were identified closer to the structure area. Bottle glass, in contrast, was distributed more evenly about the site although concentrations did occur at the presumed structure location. The distributional pattern of artifacts at the Kelley site, particularly the association of refuse with evidence of structures, indicated that the structures were probably domestic in nature.

Although the results were not conclusive, the data obtained in excavations at the Isaac Kelley site did not support designation of the site as a plantation. There was no clear indication of numerous structures which would be expected at a plantation site; rather it appeared that there was only a single area where one or more structures had been built. Neither were extensive quantities of artifacts associated with agricultural activities or livestock production found; instead, artifacts associated with the structure area reflected domestic habitation both in functional categories represented as well as in their distribution. On the other hand, the ceramic assemblage found at the site represented larger proportions of costly, transfer printed wares suggesting that the socio-

Table 10. Artifact classes assigned to particular artifact groups at the Isaac Tolley site (after Price et a1. 1984:35)

Artifact Group	Artifact Class
Kitchen/Domestic	ceramics, glass containers, metal containers, tableware, cooking vessels and implements, glassware
Furniture–Household Furnishings	furniture hardware, stove parts, lamps, clocks, brass tacks
Clothing and Adornment	buttons, beads, jewelry, pins, hook and eyes
Personal Use	pipes, coins, keys, spectacles, combs, mirrors, watches, pencils, jews harps
Firearms	gun parts, lead bullet–lead balls, percussion caps, gun-flints, bullet molds, powder containers, cartridges
Trapping–Fishing	fish hooks, traps
Agriculture	agricultural implements and parts
Animals	harness parts, horse shoes, mule shoes, ox shoes, ox yoke parts, curry combs, gizzard stones, shears
Clothing Production/Care	thimbles, needles, scissors, loom parts, spinning wheel parts, cards, hatchets, awls, leather tools, irons
Tools	woodworking tools, cooper tools, blacksmith tools
Children	toys, marbles, dolls
Vehicles	wagon parts, automobile parts, carriage parts
Structure–Architecture	nails, brick fragments, window glass, daub and chinking stones, stones, building hardware
Manufacturing	mill stones and machinery, logging tools and equipment, sawmill machinery, kiln furniture, moonshine still parts

economic status of the Kelley site occupants was above average, comparable to that of the residents of the Harris site who were known to be upper middle class.

During 1982–1983 excavations were also conducted at Old Eminence, the original county seat of Shannon county, Missouri founded in the early 1840s (C. Price 1984). Previous investigations in 1980 had disclosed a number of features on the site including a rectangular stone foundation, a rectangular depression, a surface scatter of stone, and an abandoned roadbed and footpath (C. Price 1980). Old Eminence is best described as an isolated political center, originally laid out according to a symmetrical plan. Oddly, Old Eminence evidently did not serve as a center for other social and economic institutions in the early nineteenth century Ozark frontier; these institutions were centered elsewhere. The 1982–1983 excavations were therefore undertaken to provide further archeological data on this particular aspect of the Ozark frontier settlement system.

Excavations at the site were conducted in 59 test units, each measuring one meter square. These units were distributed across the site in relation to the features evident on the surface as well as in relation to magnetic anomalies disclosed in a previous magnetometer survey. The excavations in the areas of magnetic anomalies identified no cultural features that had not already been noted as a result of the surface inspection.

Excavations in the area of Feature 1, the stone foundation visible on the surface of the site, produced further evidence of a structure evidently built of logs. No clay chinking was found but since nails were present in the deposits it is likely that this log structure had been covered with plank siding. Window glass fragments were distributed in such a way as to indicate two windows, one on the north side and one on the south side of the structure. Small hinges were also found suggesting that these windows may have had wood shutters.

Feature 2, the surface scatter of large stones, was excavated but only a few artifacts were found in association. No other evidence suggesting a function for this feature was encountered. Excavations in the rectangular depression, Feature 3, disclosed four parallel footing trenches over which a building — again probably built of logs — had been constructed. Small pieces of limestone were interpreted as chinking, and the nails associated with this structure were of a size most often used for shingling rather than to fasten siding. Only a single piece of window glass was found, but a door knob and lockplate were recovered. These latter two artifacts did not fit together further suggesting not one but two doors. These data all suggest that the Feature 3 structure may have been constructed somewhat differently than the Feature 1 structure.

Numerous artifacts were also found in the excavations. Date ranges determined from several classes of artifacts indicated occupation of the site between the 1830s and 1860s. By far the most frequent categories of artifacts represented the structural–architectural category. Other artifact categories included kitchen–domestic items, furniture–household furnishings, clothing and personal adornment, other personal items, and tools. No artifacts representing firearm, trapping–fishing, or agricultural categories were found. In other words, the artifact assemblage at this site does indeed bear out the documentary accounts describing this as a limited activity administrative center. The two structures, Features 1 and 3, were interpreted on the basis of architectural evidence as representing, respectively, the courthouse and jail.

Archeological investigations at pioneer sites in the Ozark National Scenic Riverways were continued in 1983–1984 with excavations at the Culpepper site, a middle nineteenth century farmstead, and at the the Phillips Bay Mill site, a sawmill and habitation complex dating from the early to middle nineteenth century (Price et al. 1985).

At the Culpepper site a systematic surface collection was made of 35 ten meter square blocks (of which three along the edge of the site were only partially collected). This was followed by excavation of 21 test units each measuring 1 x 0.5 m, two test units measuring 1 m square, and partial excavation of a large pit feature measuring 2.9 m by 2.0 m and extending to a depth of 65 cm below the ground surface. This pit feature contained stratified deposits in which a number of artifacts were found, mostly of fairly large size. It was interpreted as a storage facility beneath or adjacent to a log structure. Window glass was found at the site but this may have been from a later occupation. The paucity of brick fragments suggests that the structure may have had a stick and clay chimney. Artifacts found in association with this structure represented functional categories such as the preparation, serving, consumption, and storage of food, fabrication and repair of clothing, and manufacture of lead rifle balls. Personal items such as smoking pipes were also found. These artifacts suggest that the structure was a dwelling. Dating of artifacts indicated that occupation took place between the 1830s and the 1860s. In addition to the artifacts representing domestic activity, a few tools and agricultural implements were also found.

Documentary sources indicate that the Phillips Bay Mill site is the location of the Kelley and Dearing sawmill which operated prior to 1850. A patent for the land was actually issued in 1830. An 1890 map of the Current River shows a Phillips mill at the approximate location of this site, but records do not indicate when the mill ceased operation. Presently observable at the site are the mill dam, the mill race, a large pit, the log pond, and an earthen platform projecting out into the mill race which is thought be be the location of the mill structure. A small test unit (0.5 x 1 m) excavated in the latter area did not produce any evidence of a structure, however. A series of two test units measuring 1 m, 16 test units measuring 0.5 m, and one test unit measuring 0.25 m were excavated along the upper terrace above the mill race in the habitation area of the site. These test units disclosed a sheet midden deposit along the upper terrace, in addition to a large pit feature containing stratified deposits. This pit feature was considerably deeper than those representing storage areas beneath dwellings at other historic sites. Alternatively it might have been a well or cistern; this interpretation was supported by the fact that perishable artifacts including paper and unburned wood were preserved. The majority of artifacts found in this area of the site indicated occupation between the 1830s and the 1860s. The distribution of these artifacts further suggested separate functional areas. The artifact assemblage also included a wide variety of functional categories. In addition to items suggesting domestic residence along the upper terrace, artifacts representing agriculture, the tending of domestic animals, and smithing were found.

The town of Davidsonville, platted in 1815 or 1816 as the "seat of justice" for Lawrence County in Arkansas Territory, is another important pioneer settlement which in recent years has been investigated by the Arkansas Archeological Survey (Dollar 1977; Stewart-Abernathy 1980). Abandoned by 1830, this town site should prove to be an exceptionally important time capsule reflecting Pioneer settlement adaptations on the Ozark frontier. Clyde Dollar's research on this site focused on documentary sources pertaining to the original survey of Davidsonville and its settlement and commercial history. In assessing its historical significance, Dollar interprets Davidsonville in the context of the American frontier experience.

> It is this frontier 'beach head' nature of the site of Davidsonville that makes it of major importance above and be-yond the more mechanical aspects of excavating the site in order to find locations of buildings and streets. As Americans of what was at that time a young nation moved into the trans-Mississippi West, they brought with them a material culture and concepts of social institu-tions closely rooted to an older and more eastern culture. Once arriving on the frontier, and in the process of estab-lishing themselves in the new environment, they modi-fied both their material culture and social institutions to better meet the challenges they found there. In so doing, they created a system of existence that became the frame-work for expanding the American nation across a wide continent, and many of the institutions brought into be-ing on the frontier of Arkansas and the trans-Mississippi West have proven of value and are still with us. The site of Davidsonville offers a truly unique opportunity to correlate both the historical and archeological findings at the site in order to study the environmental impact of the frontier on early American material and social culture, and thus better understand the institutions still operative in our own age. (Dollar 1977:56–57)

In 1979 archeological investigations were undertaken at Davidsonville under the direction of Leslie C. Stewart-Abernathy. The primary objectives of this work included assessing disturbances to the site resulting from more than a century of farming, logging, relic hunting, and park development activities. Test excavations were undertaken in selected areas to determine the condition and extent of subsurface remains. Finally, it was hoped that the 1815 plat map drawn by James Boyd could be correlated with present day ground features. A combination of intensive surface examination, auger transects, test excavations, and backhoe trenching was employed in this investigation of the site.

Several structural features were identified. In the post office mound area of the site, brick rubble probably representing the location of the post office was found, along with a filled-in well and a collapsed brick chimney column associated with a house predating 1845. In the courthouse mound area of the site the courthouse foundation of dry laid dolomite slabs was located. This foundation had been laid in a builder's trench excavated through a prehistoric midden deposit. Tests in three other areas of the site disclosed a few other features, some possibly related to the early historic occupation of Davidsonville. These excavations also included an extensive collection of historic artifacts representing Davidsonville foodways, building materials and methods, and clothing and personal decoration. One notable feature of the artifact assemblage is that it demonstrated that the town's early residents "had access to most if not all of the goods available to anyone in the English speaking world" (Stewart-Abernathy 1980:25).

Evaluation of site condition afforded by these investigations indicated that the site of Davidsonville though disturbed particularly by activities of the preceding three decades remains in excellent condition. Subsurface remains of the town appeared to be extensive and varied; both artifacts and other features reflecting early settlement represented a valuable archeological record. Attempts to fix the location of the 1815 plat on the ground were less successful, and addition study of documents pertaining to the plat were recommended.

A third Pioneer era town, also investigated by the Arkansas Archeological Survey, is the early nineteenth century settlement at Cadron along the Arkansas River upstream from Little Rock. Cadron was settled initially in the late eighteenth century by French traders who evidently had established some sort of post there for trade with the Osage Indians (Smith 1974:8). When Thomas Nuttall traveled up the Arkansas in 1819 he described a "Cadron Settlement" consisting of five or six families. But, like Eminence, Davidsonville, and other frontier towns, Cadron was "an early town that failed" (Ross 1957) and was abandoned by 1831.

Excavations were conducted at the site in 1973 by Samual D. Smith under a contract between the Survey and the Corps of Engineers. The objectives of this investigation were to locate and evaluate archeological remains in an 80-acre tract scheduled for development as an historic park. Specifically, there was a need to know if any features dating to the early settlement remained in areas where park development would modify the terrain.

The entire tract was intensively surveyed, and block excavations were opened up in an area where an interpretive shelter was planned to be built. Eleven units each measuring 2 m square were dug, but no intact eighteenth or early nineteenth century deposits were encountered. Artifacts dating to the period of early occupation were found, including Euramerican ceramics, glass, beads, gunflints, rifle balls, smoking pipes, nails, buttons, and other miscellaneous items. One area containing collapsed house ruins was found but not excavated, a small cemetery and a second possible grave area were identified, and excavations were placed across an old wagon road. The results of the project indicated that the site was highly significant and had much research potential, but additional investigations will be necessary to provide interpretations beyond those offered by Smith.

> From as early as the 1770s, the Cadron locality seems to have been used primarily as a point for trade with the Indians, first the Osage, later the Osage and the immigrant Cherokee. Though the exact configurations of this trade network remain to be defined, it does seem to have been based largely on the exchange of furs, especially deerskins. Perhaps there are historical records (and if the site still exists, an archeological record) for the tannery located near Cadron, which could provide some clues. At any rate, we strongly suspect that there is more than coincidence to the fact that Cadron was considered abandoned by 1831, not too long after the removal of the Arkansas Cherokee to Oklahoma. (Smith 1974:59–60)

Archeological investigations have also been undertaken at the chain of military forts established in the early nineteenth century along the border of present day Arkansas and Oklahoma. At Old Fort Smith (1817–1832), excavations and documentary research were undertaken by the National Park Service primarily for the purpose of locating buried foundations of early fort structures and providing information upon which to base reconstructions of some of these buildings (Bearss 1962; Moore 1963; Dollar 1966, 1976). More recent investigations have sought to obtain archeological information from the site of the Old Commissary building (Dollar 1983), as well as from other areas within the present boundary of the Fort Smith National Historic sites. Although much archeological and historic data about early Fort Smith has been amassed as a result of these studies, the information has not been analyzed or interpreted within the broader framework of Pioneer American settlement of the region.

Ongoing archeological investigations by the Oklahoma Historical Society are being conducted at Fort Towson (1824–1865). Log structures were originally erected at this site along Gate Creek, but in the early 1840s these were replaced by more substantial log structures with stone foundations. Excavations at the sites of the fort's well and powder magazine are reported by Scott (1975). In 1971 additional excavations were undertaken in the area of the barracks first constructed in the 1830s and then rebuilt in 1943 (Lewis 1972). The purposes of these investigations were to positively identify the barracks remains (which would aid in the finding of other structures whose locations were known only in relation to the barracks), to obtain information on the architectural detail of the barracks, and to collect a sample of artifacts which could shed additional light on the range and duration of activities associated with this area of the fort. These objectives were successfully achieved, and in particular a large and varied collection of artifacts was obtained. Items dating to the early to middle nineteenth century reflected cooking, eating, and household maintenance, "artifacts one might expect from kitchen and messroom" (Lewis 1972:80). Some architectural artifacts were found, as were military uniform trappings and other accouterments. Some animal bones were recovered which indicated that in addition to the documented soldier's daily ration of beef, pigs were kept as a source of meat, and wild game, particularly deer and bison, sometimes supplemented the domestic fare.

Recently, the site of Fort Gibson on the Grand River in Oklahoma was surveyed, and several possible building locations were inferred from the distribution of artifacts on the ground surface and a few visible structural features (Cheek et al. 1977). A large number of artifacts were found, including domestic, personal, military, and architectural artifacts, some datable to the early to middle nineteenth century. Only preliminary descriptions of this material are currently available, pending additional proposed research at the site.

The final class of Pioneer era sites that have been investigated archeologically are early nineteenth century trading posts. Three sites, all related to the activities of the famous Chouteau family, have been excavated in the Three Forks area of eastern Oklahoma. Two of these, the Ross and Posey sites, were discovered during surveys and test excavations in the Markham Ferry Reservoir area (Wyckoff and Barr 1964). No structural features were identified at the Ross site, but artifacts, including Euramerican ceramics, clay smoking pipes, and glass beads were datable to the early nineteenth century, and were attributed to the Chouteau trading post known historically to have been located in the area. More extensive excavations were undertaken at the Posey site, where the remains of a well, a forge, and a house foundation were uncovered (Wyckoff and Barr 1968). Artifacts datable to the early nineteenth century included Euramerican ceramics and other household articles, wagon parts and harness equipment, a variety of trade goods including beads, firearms, smoking pipes, tools and utensils, and Native American artifacts including sherds of McIntosh Roughened pottery. Buttons from civilian and military clothing were also found. This site was more positively identified as the Chouteau trading post established at Three Forks from 1823 to 1827. This is also the post which served from 1828 to 1835 as the Creek Indian agency.

The Vandever-Haworth site was discovered initially during survey of the Webber's Falls area (Schneider 1967), and later excavated and reported on by Timothy Baugh (1970). Structural features identified at this site were somewhat less distinctive than those found at the Posey site, but designation of three areas as a blacksmith, a residence, and a commercial center was possible. A large artifact assemblage was recovered containing many items datable to the 1830–1850 period, and representing the same general categories of goods found at the Posey site. Analysis of the material centered on the question of whether the site did in fact represent a trading post location. The Vandever-Haworth site was tentatively identified as Colonel Hugh Love's trading post established in 1831 or 1832 after he left the employ of the Chouteaus.

It should be noted that the archeological data from these trading post sites can be used to address questions not examined in the published reports, particularly concerning relations between Native Americans and white American institutions during the early historic period.

The historic sites discussed above were dated by their investigators by means of various classes of artifacts which are sensitive indicators of chronology. Ceramics and bottles produced in mass quantities in European and American factories are among the most useful artifacts for establishing the ages of historic sites. Building hardware, clothing accessories, firearms and their accouterments, household furnishing of various kinds, smoking pipes, tools, wagon hardware, and a host of other kinds of artifacts also frequently provide important chronological information. The bibliographies of the archeological reports singled out for discussion here identify the references most often used in dating historic artifacts. Two additional references of specific pertinence to the OAO study area should also be mentioned. One of these is Cynthia Price's (1979) monograph on nineteenth century ceramics in the eastern Ozark border region. Refined earthenware ceramics from eight historic archeological sites (including the Widow Harris Cabin site) were examined and a ceramic sequence for the 1810 to 1870 period is proposed. This sequence, reproduced here as Figure 43, is a valuable reference which has general applicability to the entire study area addressed in this overview. The other reference which should be of considerable use in evaluating historic archeological sites is the chapter by Stewart-Abernathy and Watkins (1982) in the Arkansas state plan (Davis 1982), which summarizes field diagnostics for several "activity periods" corresponding to the Pioneer American settlement era identified in this report.

THE CIVIL WAR PERIOD 1860–1875

Although the Ozarks never became a major theater of Civil War activity, the effect of the war between the states upon settlement in the region was extensive. Following the secession of Arkansas from the Union in 1861, the populace of the northwest part of the state quickly divided according to their sentiments, with somewhat more than half acknowledging loyalty to the Confederacy. During the first year and a half of the war, Confederate forces did indeed maintain control of the area (Pitcaithley 1976:105). Southwest Missouri Ozarkers exhibited stronger loyalties to the Union. A few battles were fought in the region; these include Wilson's Creek (1861), Carthage (1861), Pea Ridge (1862), Prairie Grove (1862), Fort Wayne (1862), and Honey Springs (1865). The strategic position of the Ozarks between contested regions of the South partially accounts for these encounters between opposing Union and Confederate forces. Another important factor was the existence of a key military route along the road from St. Louis through Springfield and Fayetteville to Fort Smith in

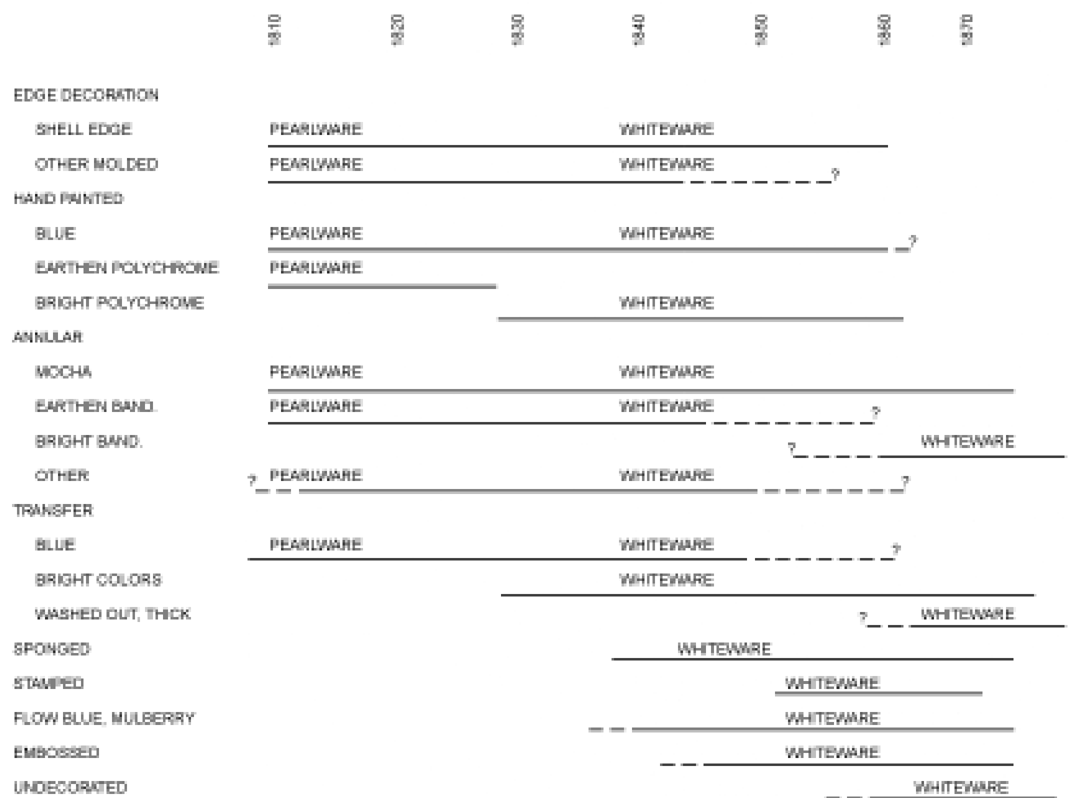

Figure 43. Proposed sequence for ceramic types in the Ozark Border area ca 1810 to 1890

the Arkansas River Valley. Most of the battles fought in the Ozarks were along or nearby this route.

The most critical effects of the Civil War upon settlement in the Ozarks, however, did not result from the battles, but from a chain of smaller scale and more localized events which ultimately led to the destruction of many settlements and a significant depopulation of the area. This history is well summarized in several sources (Rafferty 1980; see also Flanders 1979; Catalfamo-Serio 1979). Discussion here will center on the impacts of the Civil War and its aftermath upon Ozark cultural landscapes.

As the Ozark region was drawn into the war, large numbers of Union sympathizers began to leave the state and seek refuge in southern Missouri, where the Union army had control (Tatum 1934:38–39). Those who favored the Confederate cause remained in Arkansas where forces were beginning to be organized. Yellville became a Confederate stronghold where a large number of troops were gathered along with a large store of munitions, several warehouses of supplies, and a nearby saltpeter works (Britton 1890:383–384). However, in November of 1862 Yellville was attacked and fell to Union forces (Pitcaithley 1976:108–109).

The defeat of Confederate forces at Yellville began a period of lawlessness and strife in the Ozarks that lasted until the end of the war. Independent military units, both Union and Confederate, roamed through the area and engaged in occasional skirmishes, but neither side exerted strong military control. A typical encounter of this period took place along Richland Creek in Searcy County in May 1864, where a Confederate unit ambushed a federal supply train killing 37 soldiers (Pitcaithley 1976:115; McInturff 1963:61–62). These independent companies also did their share of harassing the remaining local populace, but the most extensive marauding was perpetrated by roaming bands of criminals commonly known as "bushwhackers" or "jayhawkers." Devoted to pillaging isolated farmsteads and indiscriminant murder, the bushwhackers held the remote, rugged Ozark area in a reign of terror until order was finally restored after the war had ended. Many farmsteads were burned, and the lives of many families were destroyed as roving gangs, under the control of neither Union nor Confederate forces, committed scores of violent acts across the Ozarks for no purpose other than to satisfy their wanton, selfish greed. Vivid and horrifying accounts of these atrocities are presented in Flanders (1979:208–210) and Catalfamo-Serio (1979:131–139). Effects on the cultural landscape are well summarized by Flanders:

> In the Ozarks, much of the country was returned to wilderness, but now a wilderness of destroyed farms, burned cabins, dead livestock. Continuity with the past was interrupted. In the Ozarks the frail, tenuously constructed societies of neighborhoods and counties were impaired or destroyed. Not only were towns, courthouses, county records destroyed; more important, the civility of society was dissolved in hatred and suspicion. Politics and the pursuit of justice for many became feuding and the pursuit of vengeance. Men sometimes spent the best remaining years of their lives pursuing wartime enemies — sometimes old neighbors — until they killed or were killed. Bushwhacking and marauding did not stop with Appomattox; it only assumed the identity of its true character, namely, organized rural crime.... Local hatreds remained so strong that united action was difficult to achieve. (Flanders 1979:214)

The overall effects of the Civil War in the Buffalo River valley are summed up by Dwight Pitcaithley in similar words:

> By the end of the war [the region] had become a desolate, ravaged, and forlorn area abandoned by many of its former inhabitants. Homes had been destroyed, livestock run off, fields neglected, and sizable numbers of the resi-dents killed. Because of the quantity of marauders, inde-pendent companies, and regular military units which operated within its confines, forage was non-existent. (Pitcaithley 1976:117)

These commentaries by Flanders and Pitcaithley suggest a profoundly important research opportunity. The conclusions drawn here suggest the dissolution of a society, which should be prominently reflected by discontinuities in pre- and post-Civil War cultural landscapes. Historical archeologists and cultural geographers have here an unparalleled opportunity to examine the material consequences of the effects of civil war on a regional subculture.

One aspect of Civil War activities in the Arkansas Ozarks with interesting archeological possibilities is that during the early part of the war, potassium nitrate or saltpeter used to make gunpowder was mined extensively in Ozark caves by the Confederate Army. Pitcaithley suggests that saltpeter mining in the Ozarks was done mostly on a small scale, with numerous mines and niterworks scattered throughout the hills (Pitcaithley 1976:116–117). One of the larger niterworks was located along the Upper Buffalo River south of the modern town of Boxley, and it consisted of fourteen permanent buildings, two steam engines, three boilers, a large iron safe, and other assorted mining paraphernalia (Pitcaithley 1976:117). Although Union forces regularly destroyed mining facilities when they were discovered, it is likely that at least a few were overlooked.

Another aspect of the Civil War archeologists might be able to address is the effects it had on Native American societies in northeast Oklahoma and southeast Kansas. Caught between the opposing factions of white American society and occupying lands coveted by increasing numbers of white settlers, this was indeed a period of great stress, thrust upon Native American societies just as they were rebuilding their cultures after the trying times of enforced resettlement. Civil War and Reconstruction wrought yet further changes within these cultures only a portion of which are known through historical accounts.

The few civil war sites that have been investigated archeologically are all battlefield sites. For example, Robert Bray (1967a, 1967b, 1975) conducted a series of investigations for the National Park Service at Wilson's Creek National Battlefield. Relatively little archeological evidence of the battle itself

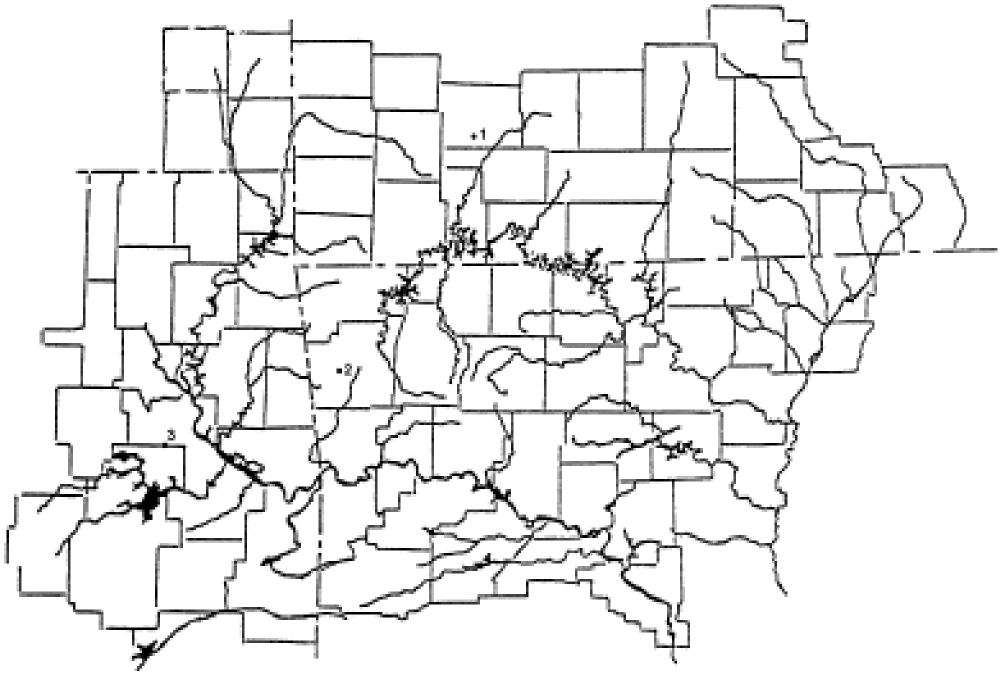

Figure 44. Locations of selected Civil War period sites in the OAO study area. 1. Wilson's Creek; 2. Borden House; 3. Honey Springs

was found, but several contemporary house sites were located, and some of these were extensively tested. Also found was a mill site that was in operation during the Civil War but evidently burned around the turn of the century. This mill had been powered by a water turbine, and documentation of its remains provided the only archeological data we have on this type of site. The purpose of these investigations was primarily to locate and document sites within the boundaries of the National Battlefield, so analysis and interpretation beyond these goals are limited. However, the information collected on these sites represents a valuable body of data which can be used as a basis for further research.

Limited test excavations were also carried out at the Borden House in Prairie Grove Battlefield State Park in northwest Arkansas (Martin 1982). These excavations were undertaken to determine if the presently standing Borden House had been constructed on the site of a house that was destroyed during the engagement at Prairie Grove. Most of the artifacts recovered during these investigations dated to the late nineteenth and twentieth centuries, but no evidence of an earlier structure destroyed by fire was identified.

In 1980 the Oklahoma Archaeological Survey conducted a survey of Honey Springs Battlefield Park during which 37 historic sites were located, including a toll bridge and nearby toll house, segments of the Texas Road along which troops marched to battle, and a number of other features dating to the Civil War era (Yates et al. 1981).

Clearly, there is a great need for additional archeological studies of Civil War era sites.

DEVELOPED SETTLEMENT PERIOD 1875–1930

In the decade following the end of the Civil War in 1865, agricultural settlers began to return to their Ozarkia homes and farms. This began a subsequent era of expansion and growth during which new settlers came into the area, roads were improved and extended, and new towns sprang up where formerly none had existed. Steamboats began to ply the White River, and by the end of the nineteenth century railroads began to link rural Ozark and Ouachita communities via the Arkansas River Valley and other adjacent regions, with external market and industrial centers. These new developments stimulated many changes that affected the daily lives of the formerly isolated hill and valley folk. Agricultural production diversified and, for some, subsistence agriculture gave way to more specialized and profitable (although not always secure) agricultural pursuits. The growth of towns stimulated local industrial development, especially in the Arkansas River Valley, and better transportation facilities made possible the expansion of extractive industries such as mining and lumbering. The increased accessibility of the region along with the growing popularity of the automobile in the twentieth century, led also to the emergence of a tourist and resort industry.

During the Developed Settlement period, these aspects of change and growth each enjoyed a period of florescence but many subsequently faltered and declined. The failure of many enterprises to endure was closely connected to the rise and decline of other circumstances upon which they depended. The construction of railroads, for example, for a time stimulated specialized agricultural production, growth of towns, growth of local industry, and expansion of extractive industry. But subsequent failure to improve railroad facilities in many areas made it difficult for local businesses to compete with larger commercial interests outside of the region; consequently, many of these dependent enterprises failed. Nonetheless, the developments characterizing this era contributed to the diversity of an emerging cultural landscape, which persists today throughout the region.

Following the Civil War, populations once again expanded into Ozarkia, this time in larger numbers than previously. Returning settlers were able to bring about a speedy recovery of the region as they rebuilt their farms and once again began to cultivate the land. Since a major characteristic of upland agriculture was its self-sufficiency, fewer problems had to be overcome as life in this area was restored, in comparison to more densely settled, urbanized areas of the South where plantations had to be reorganized, industries rebuilt, businesses reestablished, and social order restored. To some extent these latter conditions pertained to the Arkansas River Valley. Concerning the post-Civil War era in the Ozarks, Goodspeed provides the following observation.

> Ever since the War there has been a constant stream of home-seekers flowing in this direction from other states as well as from other counties in this state. New towns are growing up...where a dozen years ago the solitude was almost unbroken.... Railways have contributed largely to this advancement. All parts of the country are now settled, and schools and churches are everywhere. (Goodspeed 1891:203)

As population density increased in Ozarkia, some changes in settlement and agricultural practices resulted. One important change was the cessation of annual burning of the open range, which formerly kept down the growth of underbrush and maintained the native bluestem grasses. However, with the advent of fencing to demarcate private property holdings, this practice had to be abandoned. As a result, thick, dense underbrush grew up and eventually choked out the native grasses. Increased settlement and larger areas under cultivation also contributed to the drastic reduction in open rangelands that occurred during this period. These environmental changes were accompanied by increasingly intensive agricultural land uses.

A second factor influencing the development of agricultural pursuits during this era was the advent of railroads. By the latter part of the nineteenth century railways were extended throughout many areas of Ozarkia connecting key points with external market centers. This form of bulk transportation was considerably cheaper than former modes available in the region, thereby making possible an expansion of the agricultural market. Now, in addition to livestock, wheat, corn, cotton, and other produce could be shipped from the individual farmsteads via local railroad towns.

These two important changes were well emplaced by the final quarter of the nineteenth century and they brought about a third change, a transition from the Pioneer era subsistence and livestock farming to what Milton Rafferty has referred to as “general” farming. The specific characteristics of general farming include the production of diverse crops and livestock on small farms, using improved technology, and shipping products to market by rail (Rafferty 1980:150). The primary field crops were corn (used primarily to fed livestock) and wheat (the standard cash crop). Oats, barley, feed sorghum, and other forage crops were grown for livestock feed. Livestock included cattle and hogs, horses, mules, goats, and sheep. Two types of cattle were commonly raised, those used for meat and those raised to produce dairy products. In addition to the use of improved farm implements during this period, more advanced agricultural and livestock husbandry techniques were also adopted.

Some regional variations in general farming developed in Ozarkia and in the Arkansas River Valley. In many of the upland areas, fruit production emerged as an important agricultural sideline. Tobacco became an important cash crop in some of these same areas, in addition to the more commonly raised crops such as barley, buckwheat, Indian corn, oats, rye, wheat, orchard products, hay, cotton, Irish potatoes, and sweet potatoes (Goodspeed 1891:57). Livestock were also raised, including horses, mules, oxen, cattle, hogs, and sheep. Animal products sent to market commonly included wool, butter, cheese, and cream. North of the Arkansas River tobacco was an important upland crop while in the lowlands cotton was grown instead. Along the Arkansas River and in the northern Ouachitas cotton was important as a source of extra cash, and was grown on both upland and lowland settings (Goodspeed 1891:114). Livestock were less important here, and lack of transportation facilities in the Ouachitas restricted the production of fruits to levels commensurate with home consumption. Despite these regional differences, however, a general pattern of agricultural settlement did emerge in Ozarkia during this era.

> People in the uplands are generally thrifty and prosperous. These farms are small — 40 to 160 acres.... General comforts of life are more equally distributed among the people than elsewhere. Owning their own homes, they produce for their own consumptions, having little orchards and a variety of luxuries so essential to the comfort and happiness of the people. They have good society, church and educational facilities. (Goodspeed 1891:196)

The production trends that brought about the emergence of general agriculture also hastened its subsequent demise.

Shortly after the turn of the century farmers began to depend more and more upon specialized agricultural products such as orchard fruits, cotton, and dairy products. This shift towards increasing agricultural specialization also corresponded with improvements in transportation facilities. General farming could not remain economically competitive with larger and more specialized operations and as a result, most farmers eventually switched to specialized farming unless they lived in areas far removed from suitable transportation to market centers (Rafferty 1980:154). This shift in emphasis witnessed a substantial decrease in the acreage committed to corn and wheat, the two largest products of the general farming economy.

The shift of agricultural activities away from general farming was initially brought on by an increased focus on fruit growing. Between 1910 and 1940 orchard products in the Ozarks generally exceeded the value of other products sent to the market (Rafferty 1980:157). Railroad companies encouraged fruit production and during the 1880s and 1890s thousands of trees were planted along railroad routes in southern Missouri and northwestern Arkansas. During the first years of the twentieth century drought conditions brought about widespread failure of farm crops, but the orchards did well and the thriving apple market encouraged many farmers to concentrate on the production of these fruits. By 1905, small orchards of 500-3,000 trees each were common throughout the Ozarks (Rafferty 1980:157).

In Ozark counties where cotton could not be grown in commercial quantities, fruit production instead became quite important. In Benton County “fruit growing has...become one of the leading activities of the county, having received great impetus from the completion of the ‘Frisco’ railroad” (Goodspeed 1889:57). The best areas for fruit growing were in the mountain plateau and mountain slope areas, where orchards covered over 200,000 acres and included as many as 70,000 apple trees and 30,000 peach trees (Goodspeed 1891:274). Several varieties of apples were grown, including Arkansas Beauty, Arkansas Queen, Rome Beauty, Peerless, Shannon, Wine Sap, Jonathan, Limber Twig, Dwight, Ben Davis, Shockley, Winter Pearmain, Stevens’ Pippin, and Ozone. Pear trees produced Bartlett, Duchess D’Angouleme, Seckel, Virgaliens, Bergamot, and Winter Viels varieties. Several kinds of peaches were grown, including Hale’s Early, Amsden’s June, Alexander, Early Beatrice, Amelia, Crawford’s Early, Great Eastern, Lemon Cling, Heath’s Cling, and Eaton’s Golden. In addition to these fruits other varieties of quince, plums, cherries, and grapes were grown (Goodspeed 1889:485; Goodspeed 1891:274). A typical fruit producing farm during this era may have been like the one owned by Thomas H. Reynolds in Johnson County (Goodspeed 1891:314). Reynolds had 160 acres on Mulberry Mount in Low Gap township, of which 23 acres were devoted principally to raising fruit. In 1889 he exhibited some prize specimens at the Fort Smith Fair, including Roman Beauty apples measuring 15-1/2 inches in circumference. During the apple era much of the produce was shipped by rail to St. Louis. Consequently, apple barns were built along the railroad trucks in many places throughout the Ozarks, where the apples were sorted and graded prior to shipment (Rafferty 1980:157).

In some parts of Ozarkia truck farming developed at the turn of the century as an alternative form of speciality agriculture. The two most important crops in northwestern Arkansas were tomatoes and strawberries, along with other kinds of berries, green beans, potatoes, okra, and greens. Truck farms were concentrated in areas surrounding local canneries, and usually fell within an 8- to 10-mile radius of these centers (Hewes 1953). One important aspect of truck farming was that all members of the family could engage in the necessary labor, thereby freeing the men to pursue additional money-making activities such as lumbering.

Women and girls also could find part-time, seasonal employment in the local canning factories. Given the economic viability of truck farming, this form of specialty agriculture became very important to many families during the initial decades of the twentieth century.

Unfortunately, between 1930 and 1940 several factors arose that brought about a decline of the orchard and truck farm industry. A series of alternating drought and wet years caused much damage to crops, and apple worm infestations further affected the orchards. The economic depression of this decade also brought about a restriction of markets, one result of which was that small scale farmers were not able to compete with larger commercial growers. By 1940 labor shortages also affected the local canning industry, which further decreased the demand for truck farm produce. As a result of these conditions, only a few commercial orchards and truck farms were able to endure (Rafferty 1980:160).

Two other forms of specialty agriculture which emerged during the twentieth century include dairy farming and poultry farming. Around the turn of the century markets for dairy products existed in St. Louis, Kansas City, and other nearby centers (Rafferty 1980:162). Because of the accessibility of these market centers by rail, dairy farming grew to assume considerable importance in many parts of Ozarkia. Initially, most dairy farms were situated near the railroads. As county road networks were improved and as trucks began to be used to transport dairy products, these farms became more widely distributed. However, after 1940 there was a shift toward concentration of dairying at a few large, mechanized dairy farms (Rafferty 1980:164).

Poultry farming developed contemporaneously with dairy farming in Ozarkia, and initially many agriculturalists devoted their efforts to both of these activities. At first eggs were the primary market commodity gathered at the farm, but by 1920 broiler production began and by 1930 more organized systems had been developed to raise chickens and also to increase their egg production (Rafferty 1980:165). Most poultry farms began as small, family size operations, but in time larger, highly specialized production systems became common. Today long, low, modern poultry barns dot the landscape.

Cotton farming was important for short periods of time in a few places in the Ozarks, and somewhat greater production of this crop characterized the Arkansas River Valley and adjacent portions of the northern Ouachitas. Cotton was grown extensively in the lowland areas of Crawford County during the early part of the twentieth century, for example, but as soon as market prices began to fall and the soil became depleted, fruit and vegetable farming was substituted (Eno 1951:94–113). In the Buffalo River valley, there was a "cotton boom" during the 1880s when this was the major commercial crop grown (Pitcaithley 1976:123–126). Here as well, falling cotton prices and soil depletion, along with inadequate transportation facilities, brought about a return to general farming in this area.

Agricultural settlement and land use in Ozarkia during the Developed Settlement period continued to follow trends initiated by the earlier Pioneer Agriculturalists. Settlements continued to occur primarily in river valley lands, although new forms of specialty agriculture made it possible for many farmers to occupy upland areas formerly considered unsuitable. Two laws passed just prior to the Developed Settlement period also stimulated expanded settlement of areas formerly regarded as unfavorable. In 1849 to raise money for levee construction, the federal government passed the Swamp Land Act that made available at very cheap prices extensive tracts of swamp and overflow lands (Donaldson 1884). In 1854 the Graduation Act provided a scale of reduced prices on lands remaining in the public domain after a certain number of years. All lands that had gone unsold for 10 years could be purchased for $1.00 per acre; after 15 years, 75 cents per acre; after 20 years, 50 cents per acre, and so on. Some idea of how lands were categorized and ranked as to their suitability during the late nineteenth century can be gained from the following list taken from Goodspeed (1889:273).

Improved river land: $30-50/acre

Improved creek land: $10-25/acre

Improved upland: $7.50-12.50/acre

Unimproved upland: $2.50-7.50/acre

Improved mountain land (no orchard): $7.50-12.50/acre

Unimproved mountain land: $1.25-5.00/acre

During the Developed Settlement period small rural hamlets and communities sprang up throughout Ozarkia and became a major feature of the cultural landscape. Some of these communities were located along important transportation corridors, while others grew up around important rural service centers such as mills. Others were established in areas where local industries could develop. The construction of railroads stimulated the growth of additional towns along these routes. Wherever they occurred, these communities functioned as important service centers to adjacent rural populations.

> Magazine, 12 miles southwest of Paris, is beautifully situated on a high plateau, just west of Magazine Mountain, in the center of a fine farming community, and does a large business. It is connected with Paris by telephone and a daily mail line. It has 5 general stores, 2 drug and 1 grocery store, a gist mill, cotton gin, and woodworking establishment combined, 3 blacksmith shops, l school house, 2 churches (Baptist and Methodist) and 5 Physicians. The forest residence in the county, that of Mr. E. D. Hooper, merchant and farmer, is at this place. (Goodspeed 1891:334)

> Cove City is an inland village of about 150 inhabitants situated on Sec. 36, T12 R32. Two live merchants, a blacksmith and wagon shop, and a grist mill and saw and cotton gin combined. One physician. The town was laid out in 1880 and covers 30 acres in the form of a square, with 108 lots. The land was entered at an early date by Clem Moberly and the first store was established about 1854, and later on a blacksmith shop and post office. Cotton and corn are the chief shipments, and Van Buren is the market. The village has a school house erected in 1882. Also two fraternities. The place has about 27 buildings. (Goodspeed 1889:553)

With the establishment of these towns came an increase not only in commercial establishments but also in churches and schools. After the Civil War had ended many communities began to build schools, and by the turn of the century most towns had a school house of one sort or another. Churches and accompanying cemeteries were also common to most communities. In Witt's Spring the first church was "an old mill house worked over and dedicated May, 1895" (McInturff 1963: 131). One of the more important institutions, however, was the country store. Stoffle (1972) suggests that the country store played an important role in the economic adaptations of rural communities during this era. The functions of the country store were several, including the acquisition and redistribution of general foodstuffs and basic material items, providing a credit system for local residents, and providing a place for social gatherings. Thus country stores provided to the rural populace many services that otherwise would have to be obtained from merchants, bankers, and other individuals in the more distant courthouse towns.

Although many rural communities exist today in Ozarkia, a substantial number of the former towns no longer remain. Some of these towns declined as nearby forest or mineral resources were used up, and changes in market centers and transportation routes caused other communities to fold. As migration to urban centers has increased during the latter part of the twentieth century, a decrease in the demands of isolated farmsteads for the services of these rural centers has brought about the closing of still other scattered communities. Finally many towns, such as Advance, Casteel, Culp, Lone Rock, and McPherson, all situated in the Leatherwood Mountains on the south side of the White River, came to an end when they were bypassed by construction of the railroads which brought to life other, newer communities (Messick 1973:85)

The improvement of transportation facilities in Ozarkia has already been identified as one of the major factors promoting increased settlement and economic expansion during the Developed Settlement period. The three primary areas in which these improvements took place are the construction of railroads first surrounding and then penetrating into the Ozark interior, the expansion and diversification of the road network, and the commencement of steamboat travel along the Arkansas and White rivers.

The advent of railroads in Ozarkia at the end of the nineteenth century marked a period of substantial development in agricultural production and local industrial output, accompanied by significant additions to the cultural landscape.

By 1860 railroads were being extended south and west from St. Louis, and in the following decades connections were established with Kansas City, Springfield, Tulsa, Fort Smith, Newport, Poplar Bluff, and Cape Girardeau encompassing the Ozarks. The Ouachitas were less accessible by rail, but a line through the Arkansas River Valley extended from Little Rock to Clarksville by 1873, and a few years later extended to Fort Smith. The St. Louis and San Francisco Railway was completed through the westernmost counties of northwest Arkansas to Fort Smith in 1882. In 1883 the Missouri and North Arkansas line ran from Joplin, Missouri to Eureka Springs, and by 1909 this track was extended completely to Helena on the Mississippi River. The Missouri Pacific railroad connected Fort Smith with Little Rock in 1874 (Herndon 1922:573). Thus by the end of the nineteenth century, the Boston Mountains were completely encircled by railroads. Along these routes new towns sprang up, and many older communities bypassed by the track folded. Those towns situated favorably with respect to the railroad and local farming communities became important trade centers for shipment of produce out of the region and goods and materials into the region.

The railroads were constructed primarily to carry agricultural, mineral, and timber products out of the area, and bring needed supplies to isolated farms and communities. Therefore, decisions were eventually made by the railroad companies to extend branch lines into the interior areas, primarily for the purpose of removing mineral and timber resources at high profit. A branch of the Frisco line was extended from Fayetteville along the West Fork of the White River to St. Paul in Madison County in 1886. This line was known as the Fayetteville and Little Rock. The following year the Fayetteville and Little Rock was extended to Pettigrew, which soon became an important center for the hardwood logging industry with more than a dozen lumber and sawmills, and subsequently acquired the nickname "Hardwood Capital of the World" (Rafferty 1980:176). Stations were established at intervals along the route from Fayetteville to Pettigrew, and soon new towns grew up at these points: Baldwin, Harris, Elkins, Durham, Thompson, Crosses, Delaney, Patrick, Combs, Brashears, and Dutton. Although the major concern of the Fayetteville and Little Rock branch was to transport hardwood timber out of the upper White River valley, it also proved to be the only reliable means of transportation in that area and thus regular passenger service was provided beginning in 1904 (Winn 1973).

In 1915 the Black Mountain and Eastern Railroad extended service from the station at Combs to the town of Cass on the Mulberry River (Hull 1969:354). This branch line was constructed solely for the purpose of transporting lumber from the heavily timbered Mulberry valley region. However, hauling lumber through this rugged, mountainous terrain was a task not without substantial problems.

> To span the deep gulches reaching up the sides of the rugged mountain slopes, several wood trestles were constructed. Of the timber-bent type, they were more than 125 feet high. The bents were formed on the ground, then tilted to vertical position and secured. There is a report that the grade was so steep at the end of the road that a locomotive couldn't negotiate it with a train of logs, so the individuals cars were snaked, one at a time, up the track by ox team to the crest of the grade. (Hull 1969:354)

As timber stands were logged out these lines were eventually abandoned; the Black Mountain and Eastern Railroad closed in 1926 and the Fayetteville and Little Rock in 1937 (Hull 1969).

In southwest Missouri, several lines were constructed by the Atlantic and Pacific, and the Missouri Pacific railroads to connect with interior mining and timber areas. So necessary were these transportation facilities that some companies, such as the St. Joseph Lead Company, constructed their own lines to transport raw material products out of isolated wilderness tracts (Flanders 1979:222–223).

Although railroad construction was not extensive through Ozarkia, a distinctive set of landscape features did result along their routes. These landscape features are summarized below as described by Winn (1974). The trains were pulled by coal burning engines that required large amounts of water to generate steam for power, so water towers were built, usually at or near many of the stations at which the train would stop. As noted in the passage quoted above, bridges were another important element of the railroad system; these were normally built of wood prior to the turn of the century. Where the track passed over smaller hollows and ravines, culverts were constructed of native stone cut and chiseled by hand. Fill material to provide a foundation for the track across the hollows and ravines was borrowed from adjacent mountain slopes, often resulting in rather sizable cuts.

There was another even more far reaching impact railroads had upon the development of late nineteenth century cultural landscapes. Robert Flanders sums this up well in the following commentary.

> Railroads were much more than a means of communication and an efficient device for moving goods. They were high-technology industries, complex social institutions, and expenders of immense quantities of money, all imported from outside the region. To build and operate a railroad required skills of engineering and management which were almost unknown and virtually unimagined in the Ozarks previously. The Civil War armies, and especially the Union Army and Navy, provided, in a sense, the first school for the training of large numbers of civil and mechanical engineers who had had to build the railroads required by the war. Those engineers then built the nation's railroad system in the succeeding decades. The same may be said of thousands of corporation

> managers and executives whose first experience with complex forms of corporate organization, and of personnel and resources management, were gained as Civil War officers. The technology, the money, the management expertise, and the spirit of enterprise were all new 'immigrants' into the Ozarks after the war, and a very great many of their bearers were veteran officers and soldiers of the Grand Army of the Republic from Illinois, Ohio, Pennsylvania, New York, Connecticut, Massachusetts. Such men were builders of the New South Ozarks, a second 'Yankee invasion' of the South. (Flanders 1979:223–224)

As settlement of the Ozark interior progressed during the Developed Settlement period, the road network connecting rural settlements and towns was significantly expanded. As mentioned previously the locations of many country roads were the result of two factors: the needs of rural farming communities and topographic constraints on where roads actually could be built. Thus, early road networks followed preexisting trails or else wound their way along passable ridge crests and valley bottoms. As the federal land surveys were completed, an additional rectangular road grid was superimposed on the earlier organic network (Rafferty 1980:11). In very dissected areas, of course, this rectangular road system was precluded.

At first roads were constructed simply by felling trees along a path in such a manner that the axles of passing buggies, wagons, and coaches would clear the stumps. These "public highways" were supposed to be maintained by local adult males, who were required to contribute up to five days labor per year plus equipment (Pitcaithley 1976:134). Improvements done under this system were, however, slow and gradual. The impact of the automobile in the early twentieth century did finally succeed in stimulating further improvement and expansion of the road network in Ozarkia, but only after a lengthy period of govemment deliberation. In 1915, for example, the Arkansas legislature passed the Alexander Law (Thomas 1930: 439) which established the first road improvement districts throughout the state, and in 1916 Congress passed an act providing federal assistance to state road construction projects. During the following decade, many trial attempts were made to implement this source of funding in Arkansas, all of which failed. In 1923 the Harrelson Road Law succeeded in setting up a system of state highways for the first time (Thomas 1930: 439). Initially, 10,782 km (6,700 miles) of paved state highways were constructed, and subsequent expansion of this system has brought Arkansas's main trunk system to its present extent, thus adding a third overlay to the network of paved and unpaved roads which now crisscross the Ozarks.

The advent of steamboat travel during the Developed Settlement period provided a great impetus to riverine transportation in Ozarkia, and greatly increased the accessibility of many interior regions to goods and services not otherwise available. After the Civil War steamboat commerce grew rapidly, mostly along the Arkansas River. However, regular trips were made up the White River, and a few attempts were even made to navigate some of the White River's major Ozark tributaries.

Before construction of the railroads, the major rivers and streams provided the primary transportation routes throughout the region. Flatboats and barges were used primarily on the smaller waterways to carry mineral ore, logs and ties, and agricultural produce to major shipping points. During the latter half of the nineteenth century, steamboats regularly plied the White River and made calls at Batesville, Buffalo, Chastain, Shipp's Ferry, McBee's Landing, and Norfolk (Shiras 1939:87). Steamboat travel was not without hazard. The boiler engines occasionally exploded, wreaking havoc among the boats and giving rise to grisly tales recounting the torn and mangled bodies of passengers. More often, though, fluctuating river levels delayed scheduled passages, and sometimes a boat would be caught in the middle of a run, snagged on submerged timbers, brought to a halt on a rising sandbar, or bashed by a protruding rock. Steamboat wrecks were not common, but they did occur.

The flatboats, barges, and steamboats used to transport people and goods up and down the Arkansas and other Ozark and Ouachita waterways were supported by a series of facilities at points along the rivers. Landing sites and loading docks were constructed at towns, shipping centers, and trading posts along the routes of travel. Many farmsteads that remained fairly isolated into this period were situated directly alongside the larger rivers to avail themselves of these natural transportation facilities. Finally, the steamboats traveling the largest rivers required huge amounts of wood for fuel, so woodyards were frequently established at major stopping points as well as in some locations in between.

One attempt was made in 1896 to ascend the Buffalo River in the steamboat *Dauntless* (Pitcaithley 1976:138–140). This venture was unsuccessful but it stimulated sufficient interest in the possibility that attempts were made by the U.S. Army Corps of Engineers to remove snags and rock outcroppings from the river. Previously in 1880 the Corps had built a series of spur dikes at the mouth of the Buffalo River to increase the water level at the shallow points, in hopes of making steamboat travel possible. However, the unpredictable fluctuations of the stream ultimately prevented the realization of this dream.

The improvements to transportation and communication resulting from the preceding developments in railroads, overland roads, and riverine travel not only stimulated the growth of rural communities and towns in Ozarkia and along the Arkansas River. They also promoted the expansion of local industry to levels formerly beyond hope of attainment. For the preceding Pioneer period, a number of local service centers were noted including mills and general stores. Few service centers were engaged in manufacturing, however, and where goods were produced, such as at blacksmith shops, tanneries, and distilleries, these items were intended almost entirely for local consumption. Indeed, prior to the advent of railways, industrial activity throughout Arkansas was characteristically confined to household and neighborhood businesses.

Bigham (1930:403–407) identified the period from 1880 to 1927 as the era of factory development in Arkansas. Initially, small factories turned out a variety of goods that were easily transportable and could be produced at relatively low energy costs. These products included hats and caps, pig iron, cotton and woolen goods, beer and ale, carriages, agricultural implements, brick and tile, men's clothing, machinery, newspapers, and cigars. Most of these factories were located along the Arkansas River and other densely populated parts of the state. Boat and shoe shops, cabinet making shops, grain mills, harness and saddlery shops, lumber mills, tanyards, tin shops, and wheelwrighting and blacksmith shops were scattered over a broader portion of the state.

The earliest lumber mills were water powered "sash" mills which used a straight, up-and-down cutting, or reciprocating, saw blade. These were replaced during the Developed Settlement period by steam powered circular saws. Steam power provided many advantages over water powered mills. Mill waste could be used as fuel and because steam powered mills were not as dependent upon a water source they could follow timber cutting crews into the woods as the men worked their way back from the rivers.

The Van Winkle mill was a large sawmill established in 1851 along War Eagle Creek in Benton County. Lumber from this mill was used extensively to build most of the older towns in northwest Arkansas. In 1856 the mill was moved about 6.5 km east to a location along the Little Clifty Branch of the White River. Shortly after this move the mill acquired a steam engine, and became the first mill to use steam power in this part of the state (Black 1975:130).

The post-Civil War logging boom spurred the growth of many new industries based upon the hardwood resources of the Ozark forests. These included carriage and wagon shops, cooperages, handle factories, and furniture shops (Bigham 1930; Eno 1951). The era of cotton production in some parts of the Ozarks and in the Magazine Mountain region led to the construction of many cotton gins throughout these areas (Pitcaithley 1976:125; Otto 1980). Following the depletion of timber and soil resources, new industries arose including fruit and vegetable canning (Hewes 1953), clothing manufacture, and glassworks (Bigham 1930:415–416).

It seems that from the inception of this post-Civil War industrial expansion, many individual service and manufacturing enterprises were frequently combined under one roof. For example, William T. Nolan was a blacksmith and wagonmaker who moved to Bellville in Yell County in 1882 (Goodspeed 1891:173). He soon teamed up with a Mr. May, and the resulting firm, Nolan and May, advertised themselves as wagonmakers, cabinet makers, and blacksmiths, and they also operated a planing mill plant. The growth of these various local industries also encouraged the development of retail outlets. The Benton County Hardware Company was the first chain store set up in northwestern Arkansas, opening up in Bentonville around 1892. Additional branches were later opened in Siloam Springs and Rogers, and the company maintained controlling interest in many other local hardware stores in Arkansas, Oklahoma, and Missouri (Black 1975:136).

The improvement of transportation facilities in Ozarkia also made possible the profitable development of two extractive industries, mining and lumbering.

Lead and zinc were the most heavily mined ores in the Ozarks. The need for ammunition by early settlers stimulated limited mining of exposed lead veins as early as the 1830s (Thomas 1930:388). Some of the scattered slag piles undoubtedly attributable to these early settlers are sometimes mistaken for the legendary gold and silver mines of De Soto's sixteenth-century explorers (e.g., Shiras 1939:73). The first zinc smelter opened up at Calamine in Sharp County in 1857 (Thomas 1930: 388). Also during the 1850s some small scale lead mining was done in Boone County (Branner 1900; Owen 1858). The Civil War spurred lead production somewhat, but it was not until the construction of the railroads at the end of the nineteenth century that extensive lead and zinc mining actually got underway.

Most of the lead and zinc mines in Arkansas are concentrated in the north-central part of the Ozarks in Boone, Marion, Newton, Johnson, and Pope counties. The deposits in this region tend to be small and scattered, and as a result mining and milling operations remained small and unconsolidated. Pitcaithley attributes the failure of large scale mining to develop not to a lack of mineral resources, however, but to the lack of adequate transportation facilities (Pitcaithley 1976:156).

Lead mining in the Ozarks was carried out most intensively during the 1870s, in scattered localities throughout the mining district (McKnight 1935; Branner 1900). However, by 1880 much of the interest shifted to zinc. In the early 1880s a party of investors led by John Wolf constructed a small stone smelter at a zinc deposit along Rush Creek in Marion County. However, their aim was to mine silver and, finding none, the claim was sold to George W. Chase of Fayetteville. Chase organized the Morning Star Company in 1891, and a larger smelter was built on the site along with the installation of other machinery. The Morning Star mine eventually became one of the largest producers of zinc in the state (Potter 1971:5).

The zinc industry continued to grow through the turn of the century, and although mines were set up across the entire mining district the most intensive activity was centered in the Buffalo River valley (Pitcaithley 1976:165). Portions of Baxter County were also heavily mined, especially in the area around Mountain Home. Shiras reports that during the first two decades of the twentieth century about 500 claims were made along Leatherwood Creek, Jenkins Creek, Bruce Creek, and around Three Brothers, Bald Dave, Pigeon Creek, and Trimble Flat (Shiras 1939:78). World War I stimulated the zinc mining industry in northern Arkansas, but after the end of the war most of the mines were quickly closed.

A variety of incidental mining activities developed in several localities throughout the Ozarks. Marble was quarried in Baxter County (Shiras 1939:68). Clays for brick and tile were mined from Johnson County (Thomas 1930:385). Building stone and lime were also mined throughout the Ozark and Magazine mountain areas (Thomas 1930:384) and coal mining in the Arkansas River Valley flourished briefly during the last decades of the nineteenth century and the first decades of the twentieth century.

The logging industry in Ozarkia began with the construction of the railroads, which at once created a demand for ties and provided a relatively economical means to transport timber products to market. Although sawmills were common throughout the Ozarks during the nineteenth century to supply the local needs of settlers, it was not until the final quarter of that century that commercial firms entered the region and began cutting extensive stands of cedar, walnut, and oak (Pitcaithley 1976:131). Following completion of the Frisco line through Fayetteville in 1882, a branch line was extended to St. Paul and Pettigrew which promoted intensive logging operations in the upper White River valley (Hull 1969:350). During the early part of the twentieth century, logging for red cedar was carried out in the Ozarks by the Houston, Ligett, and Canada Cedar Company, the Eagle Pencil Company, and others (Lackey 1960:361).

The tie industry of the late nineteenth century concentrated on the virgin stands of hardwood timber in the upper White River valley and other localities. Large tracts of land were leased and companies set up tie camps until all the timber was cut in that locality, at which point the camp was moved to a new location (Cole 1953:265). Timber cutting was also done by private individuals on their own land or on accessible government property. Initially, only white oak trees were felled for tie making but later other species of oak plus sassafras, sycamore, and hickory were used (Cole 1953:266). Tie hackers used broad axes to hew ties that were 2.44 m (8 feet) long, 15.2 cm (6 inches) thick, and as wide as possible. The ties were then transported through the woods to tie banking sites, where they were split into finished ties 20.3 cm (8 inches) wide. Here the finished ties were stacked and on designated days buyers and inspectors came to inspect and purchase the ties. As they were bought the ties were branded with a blow from an iron marking hammer (Cole 1953:266).

The ties were then transported by floating down a river to the nearest mill or rail head. Transferring the ties into the rivers was a critical affair and consequently tie banking sites were chosen carefully.

> In selecting bank sites there were three things to consider: first, the steepness of the shute, it must be so that ties would not bounce and burst nor fly out and endanger the raft makers below; second, the condition of the landing, it must be so that, though the water was shallow enough for the men to work in, it was still deep enough to float the tie blocks off; and third, the room at the tie banking, it must be sufficient to store enough ties to keep the crews busy when the rustling (shoving the ties down the chute) took place. (Cole 1953:267)

Although ties were the major product shipped out of the upper White River valley, a number of mills including some specialized stave mills were established in St. Paul and Pettigrew, and soon bridge timbers, lumber, wagonbows, fellows, hubs, and spokes were shipped to Fayetteville (Hull 1969:350).

In the early part of the twentieth century red cedar stands were cut throughout Ozarkia, especially in the Buffalo River valley (Pitcaithley 1976:131–132). Company crews were set up in the forests at tent camps that, like the earlier tie cutting camps, were moved from site to site as the stands were logged out. Teams of fellers worked in the woods cutting trees that were then snaked out by mule to convenient riverside locations or to bluffs where they could be rolled off the edge (Lackey 1960:363). The logs were cut into 12-foot lengths and stacked in huge piles along the river at a spot well above the flood level. After several thousand logs were yarded up in this manner, the logs were then transferred to the water and nailed into long rafts, while other preparations were made for extended float trips down the river.

> Supply boats were made ready and loaded with tents, camping equipment, and other necessary food to last part of the way. Bacon, eggs, and other food could be bought along the way at each day's camp. Select men were chosen to have charge of the boats and supplies. The disagreeable work on any float and the risk of life that went with it prompted the company to give some of their key men $2.00 per day or twice what the timber cutters and haulers received. The supply boat and cook stayed ahead of the float and with a very accurate estimate of the distance the float would travel, noon meals were prepared for the crew on arrival, and at the end of each day camp meals were provided likewise. It took about 18 days to complete the float, approximately 57 miles. (Lackey 1960:366–367)

From the mouth of the Buffalo River, the logs were floated down the White River to Batesville, where they could be shipped by rail.

By the early 1920s most of the easily acccessible cedar and walnut stands had been cut over and the lumber industry declined. Small scale logging continued, mostly to provide local mills with hardwood for barrel staves, handles, and other items.

The effects of the lumbering industry on the cultural landscape were significant. Destruction of extensive tracts of forest cover led to depletion of game species, accelerated soil erosion, and alteration of the hydrology of the timber regions as springs were plugged with eroding slope debris. Most of the cutover land was converted to agricultural uses, which were largely unsuccessful and resulted in only further soil depletion and erosion. As a result of these factors many people could no longer make a living off the land and population densities declined as movement to urban areas increased. It was during this era that vast tracts of land were acquired by the federal government, and national forests were organized to implement modern forest management practices.

Robert Flanders has characterized railroad development in the Ozarks as representing a transforming “New South” institution borne on the arrival of postwar Yankee capitalism, and so has he interpreted the development of some extractive industry enterprises, particularly mining and timbering. The Missouri Lumber and Mining Company, for example, was organized in the 1870s by a group of western Pennsylvania lumbermen who had profited from the discovery of oil on their lands (Flanders 1979:216–231). These investors bought up extensive tracts of tax delinquent land in Ripley and Carter counties, Missouri, and subsequently hired an ambitious local businessman to operate their newly organized firm. The Missouri Lumber and Mining Company over the next two decades constructed mills and rail lines, employed hundreds of local Missourians, cut thousands of acres of timber, and produced millions of board feet of lumber. Other outside companies followed, such as the Ozark Land and Lumber Company of Kansas City, and the St. Joseph Lead Company incorporated in New York City in 1864. According to Flanders, these high technology and capital intensive industries established by outside concerns played a major role in transforming the Pioneer era Ozarks, and produced a cultural landscape embodying the “New Spirit of progress and modernity” he refers to as the New South Ozarks.

The scenic character of Ozarkia was one of the factors that led to the emergence of a tourist resort industry during the Developed Settlement period. Additional stimulus resulted from the discovery of mineral springs during the late nineteenth century, the waters of which supposedly possessed healing properties. These mineral waters were of several types: muriatic, containing primarily sodium chloride or common salt; alkaline, containing sodium carbonate and some times magnesium carbonate; salfatic, containing one or more sulfates; and finally chalybeate, containing ferrous (iron) carbonate, magnesium carbonate, and sodium carbonate (Rafferty 1980:193).

One of the earliest and best known spas developed at Eureka Springs in Carroll County, after Judge L. B. Sanders of Berryville was miraculously cured from a skin ailment called erysipelas. As early as 1881 resort facilities were built, culminating in the construction of the opulent Crescent Hotel in 1886. Soon other resort spas were developed at mineral springs in Bentonville, Sulphur City, and Siloam Springs in northwest Arkansas, followed by other establishments in the eastern Ozarks area. At the turn of the century a large hotel complex, complete with dancing pavilion, was built on the top of Magazine Mountain by the Choctaw, Oklahoma, and Gulf Railroad Company (Green 1980:40). A resort town subsequently grew up around this development, and summer homes, tourist cabins, and a swimming pool were added. As the use of the automobile for recreational purposes increased during the early decades of the twentieth century, many additional scenic localities became favored tourist spots, and in time most towns had at least one or two hotels to accommodate guests.

By the end of the Developed Settlement period, Ozarkia had gone full cycle through a series of developments that began with the subsistence-settlement system established by the earlier Pioneer Agriculturalists. Post-Civil War increases in settlement density, town growth, agricultural diversification, industrial expansion, and resource exploitation were all made possible by significant improvements in transportation networks affording faster and cheaper transportation by means of rail, overland, and riverine routes. Although these improvements were sufficient to promote rapid economic expansion during this period, they unfortunately lacked the wherewithal to sustain it. In the end, many of these endeavors failed or were reduced to strictly local or even household levels of productivity. As a result, much of the region today supports a population density considerably less than other parts of Arkansas and Missouri, and self-sufficient, noncommercial agricultural activities are combined with part-time farming and only a few larger commercial concerns. Settlement patterns are remarkably unchanged from earlier times, with dispersed rural farmsteads and hamlets tied to more centralized courthouse towns. Pitcaithley notes that

> With the exception of the 20th century modifications such as steel bridges, asphalt highways, and scattered modern buildings, the face of the country has not changed excessively since the turn of the century. (1976:182)

Flanders, however, warns against a monolithic interpretation of the Ozarks, and suggests multiple overlapping cultural patterns.

> In the Ozarks, critical [post-Civil War] events included modern industrial timbering and mining; through (and branched) railroads; a wave of new immigration including Yankees and newly-arrived Europeans; new towns; the selective emergence of commercial agriculture, with associated processing and merchandising industries; the increased circulation and utilization of money; the tourist/resort industry, a system of public schools; and the increased institutionalization of religious and secular societies. The Old Ozarks Frontier did not end, however. Rather than being replaced by the new order, the two coexisted. The Old Ozarks was among the most resilient sections of the South in face of the new age sweeping in upon it. Old and new began to intertwine, as the culture of frontiersman and Hillman had intertwined earlier, to form yet another complex Ozarks amalgam. (Flanders 1979:216)

Although a large number of historic archeological sites representing the Developed Settlement period have been identified in recent cultural resource management surveys, only a few of these studies have addressed these sites in a meaningful way, and even fewer of these sites have been intensively studied. Here only the more significant of these investigations will be summarized (Figure 45).

Cynthia Price has gathered together extensive documentation concerning the presence in the eastern Ozarks of the many kinds of historic sites discussed above. Using local and county histories and other archival records, the accounts of early travelers, census records, and General Land Office and other map sources, she has identified hundreds of potential archeological sites in the Little Black watershed (Price et al. 1975), Fourche Creek watershed (Price et al. 1976), and the Ozark National Scenic Riverways (Price et al. 1983). Field surveys undertaken in each of these areas have verified many of these sites but few of these, other than the Pioneer era sites discussed earlier, have been examined in any detail. In the summary of 1981–1982 investigations in the Ozark National Scenic Riverways (Price et al. 1975), intensive surveys of several late nineteenth century sites are reported. The sites of an early twentieth century tenant house and farmstead are briefly described in the Fourche Creek report (Price et al. 1976). Since her research of historic settlement adaptations in the eastern Ozarks is an ongoing project, the models of settlement which are summarized in these reports will undoubtedly be periodically updated as new data are acquired. In the meantime the reports cited here as well as others listed in the annotated bibliography, are valuable references.

Similar treatments of potential historic sites indicated in documentary sources, along with field verification of some of these sites, appear in cultural resource management reports for the Lee Creek area (e.g., Raab 1976; Trubowitz 1980; Muto et al. 1980) and the Garrison Creek watershed (Wallis 1983). The latter study will be discussed below.

One of the more extensive and valuable studies of historic sites representing the Developed Settlement period in Ozarkia is Lawrence G. Santeford's (1980) treatment of "log house society" in the Cypress Creek basin of Conway County, Arkansas. This study combines data from archeological survey and test excavations, local oral history, and pertinent secondary sources to address a number of questions concerning late nineteenth century socioeconomic patterns in the area.

Eight log houses identified in the Cypress Creek basin were evaluated with respect to corner notching, house form and size, the use of stone piers, and structure orientation. A comparison is made between the Cypress Creek houses and other studies in which the temporal and spatial distribution of these attributes is traced throughout the eastern United States. On the basis of this comparison Santeford concludes that "families residing in the project area in the early to late nineteenth century were restricted in their contact with outside areas" (1980:157). Most of these contacts were directed south to communities along the Arkansas River, prior to the construction of a railway into the area just before the turn of the century.

Test excavations conducted at these sites produced artifact assemblages indicating that the houses were probably built in the 1850s to 1860s, and were occupied into the 1930s or 1940s. Most of the artifacts dated to the period from 1880 to 1940, suggesting this as the era of most intensive historic occupation in the basin. The distribution of artifacts across the sites was also examined to see if significant patterns of refuse disposal could be identified. A model of refuse disposal around house structures developed by Stanley South (1979)

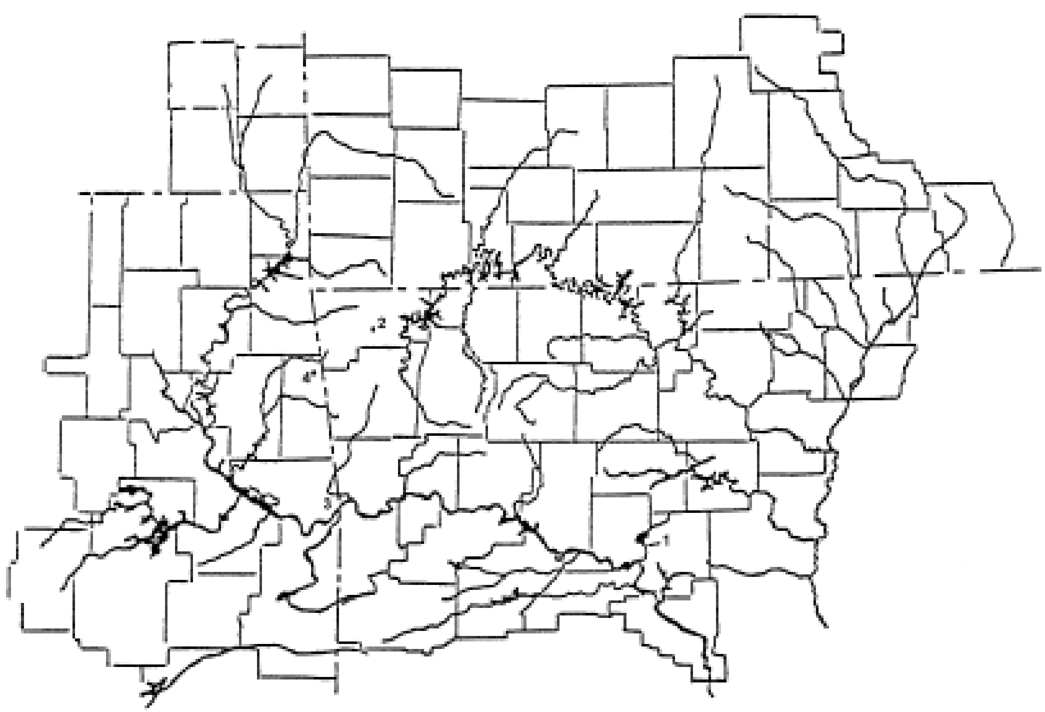

Figure 45. Locations of selected Developed Settlement period sites in the OAO study area 1. Cypress Creek basin sites; 2. Moser site; 3. Garrison Creek watershed sites; 4. Chance site

which distinguishes central, adjacent, and peripheral areas was used as a basis for comparison. However, such discrete patterning was not as evident among the Cypress Creek sites, suggesting that there might have been local or regional variation in refuse disposal practices.

Turning to consideration of socioeconomic issues, Santeford focused on a comparison of sites occupied by two families, the Wilders and the McKindras. Charles L. Wilder moved to the Cypress Creek basin from Ohio in 1849, purchased 40 acres of land from some neighbors, and married three years later. Wilder made his living as a farmer, stockraiser, and mechanic, and he eventually expanded his land holdings to some 200 acres. Even so Wilder, and later his son James, remained subsistence farmers participating only marginally in the local market system. Eventually the farm passed out of family ownership and by the turn of the century James Wilder was renting a farm elsewhere. The archeological evidence supports this historical interpretation of the Wilder site. Animal and plant food remains found at the site provide evidence of consumption of farm produce in addition to a few game animals presumably obtained by hunting. Domestic artifacts were comparatively few and of limited variety, mostly representing items involving the preparation, consumption and storage of food.

A few years after James Wilder lost the farm through indebtedness, it was purchased by the McKindra family, freed slaves who had moved to Arkansas from Tennessee in 1887. The McKindras subsequently built a house some distance south of the Wilder log house. Frank McKindra became a prosperous farmer, expanding his land holdings to over 240 acres. This land was worked by five sharecroppers in McKindra's employ. Cotton was the primary cash crop. Thus, a farming system significantly different from the subsistence operations of most Cypress Creek residents developed on the McKindra property. This was not a true plantation system, but what has been labeled a "fragmented plantation" by the geographer Merle Prunty (1955). Comparison of the archeological characteristics of the Wilder and McKindra sites does, indeed, portray differences consistent with the respective socioeconomic statuses of the two families. The McKindra log house grew through additions to a much larger size than the Wilder house or any of the other log houses identified in the area. Some rooms in this house functioned as sitting rooms and parlors. The addition of exterior weatherboards was another uncommon feature of the McKindra house. Large windows paned with cylinder glass were a further indication of high status, and the inside of this house even had wallpaper and wainscoting.

Artifacts found at the McKindra site further indicate the occupants achieved elevated socioeconomic status. Greater variety and better quality of items were found at this site. Some classes of artifacts were also unique to this site, such as recreational items (checkers) and playthings (marbles, toys).

By carefully integrating information derived from archeology, oral history, and documentary accounts, Santeford was able to derive an interpretation of the experiences of one black family in Arkansas which is significant and probably indicate other potential cases.

> Most of the Euramerican [i.e., white] landowners in the area continued to live on subsistence-based farms, although increased production was devoted to cash crops, particularly cotton. At the same time, the McKindras [sic], a Black family that came to Arkansas in the late nineteenth century, [were] able to purchase land and... support five sharecroppers when they established a small plantation in the Cypress Creek basin. The sharecropper families generally lived in log houses once occupied by Euramerican settlers...and the owner/manager built a house similar to the traditional pattern.... But, as he prospered, he apparently made substantial changes in the house which reflected his increasing status. In addition, the assemblage of cultural materials preserved at the site...reflect...activities associated with a more affluent lifestyle. (Santeford 1980:190)

Additional excavations at the Wilder site by Santeford in 1981 permitted further analysis and interpretation of log cabin society. These excavations were performed under a contract with the Corps of Engineers, to provide mitigation via data recovery, of adverse effects this site would suffer through inundation by the Conway Water Supply project (Santeford et al. 1985).

Excavation of the Wilder House kitchen cellar plus excavation of trenches through two other areas of the site produced artifact collections relating to the Charles Wilder occupation (ca 1860–1893), occupation by an unidentified tenant farm family (ca 1900–1909), and occupation by the Griggs family, black tenant farmers who moved into the area from Greenville, South Carolina. An important change in the sequence of this occupation took place when the property was sold by Wilder to Arthur D. Malone in 1898, who then sold it to M. C. and Frank McKindra in 1909. During the Wilder occupation prior to 1900, the site functioned as a simple, family-based farm. After it was sold at the turn of the century, the site became a tenant farm within the "fragmented plantation" system of land use identified in the earlier study with the McKindra ownership. The focus of the 1981 investigations, then, was on the archeological differentiation of these two systems, the "yeoman farm" and the "tenant farm."

The yeoman or family based farm may be defined in terms of several characteristics or attributes. A yeoman farm economy is small scale and diversified, and largely self-sufficient though a variety of goods are usually produced for the market. Landholdings, therefore, tend to be small, usually less than 100 acres. The actual area of production is considerably less than the total farm size, as large areas are typically left as woodlots, wasteland, pastures, cemeteries, or for other uses. A variety of structures may be found on yeoman farms, including a log house, barns, a smokehouse, and perhaps a corn crib. Wells, garden areas, and cellars or other food storage facilities are also necessary. Often these structures, usually built of logs, are clustered together on the farm rather than being dispersed about the land. The material inventory of the yeoman farm represents a mixture of simple agricultural technology and basic domestic goods. In the latter category are items for food preparation, clothing, and other household furnishings. Around the farm various implements are employed in the care of livestock, production of crops, and construction and repair of buildings and other farm facilities. And since yeoman farmers are tied to a market economy, many if not most of these goods represent commercial manufacture (Santeford et al.1985:147–151).

The tenant farm system is found in Arkansas in a variety of forms. There are, however, several important features which distinguish these from yeoman farms. First, the tenant system is based on a socioeconomic hierarchy of participants, with owner-managers occupying the uppermost positions, followed by cash renters, sharerenters, sharecroppers, and wage laborers (Hoffsommer and Pedersen 1950:24). Status and prestige also correspond to position within these hierarchies. Another distinction is that land holdings are large by comparison to yeoman farms; one general source for Arkansas cited by Santeford gives an average cotton farm size during the early nineteenth century as 616 acres (Blalock 1937:6). Like the yeoman farms, only a portion of these holdings are actually in production at any given time, and individual tenants live on and work areas roughly the size of yeoman farms. The layout of the tenant farm depends on its size and complexity, but the houses of the farm occupants are usually cheaply built, and accompanied by only one or two service buildings (a barn, for example) and a garden area. Other service buildings may be scattered about the land holding. Some large tenant farms also include a combination church/school/community center, as well as a commissary or general store. Material goods found on tenant farms are similar in type to those found on yeoman farms, but historical information suggests that the quality of these items is generally poor. Interestingly, Beverly Watkins' study of Cypress Creek area probate records in connection with this project indicated little difference, other than land holding, in the personal property of tenants and landholders. Finally, although tenant farmers were engaged primarily in the production of a cash crop (cotton, in this case), a certain amount of gardening, hunting, and domestic food preparation was carried out on a regular basis to supplement purchased foodstuffs. In terms of basic diet and subsistence, the differences between yeoman and tenant farms probably were not great (Santeford et al.1985:151–156).

The problem, then, is to determine if these two types of farm systems present in the Cypress Creek basin during the late nineteenth and early twentieth centuries can be archeologically differentiated. To see if this can be done, Santeford used models of yeoman and tenant farms developed by Cynthia Price (1980) from nineteenth century documentary accounts. These models attempt to specify the distinctive attributes of each farm type with respect to five features: (1) types of structures, (2) status or class differences of the farm residents, (3) spatial arrangement of structures and facilities, (4) range of domestic and and agricultural activities, and (5) farm size.

The extensive artifact inventory from the Wilder site excavations was analyzed using a functional classification in which the major categories identified were personal items, domestic goods, architectural artifacts, transportation, and commercial/industrial products. Animal bones were identified by species and skeletal element, and discussion centered on which of these species might have been used for food. Next, the artifact inventory from the McKindra House site (discussed above) was presented using the same classification.

It is important to reiterate here that the type of farm system represented in both cases is known from historic sources (documentary sources and oral history accounts). The analysis, therefore, provides a controlled archeological test of the models proposed by Price. Santeford reviews in great detail the evidence from the Wilder and McKindra sites. His analysis led to the following conclusion.

> Based on archeological, documentary, and oral history investigations conducted in the Cypress Creek Basin and in contrast to Price's models, a number of the characteristics are not unique to either system, and, further, archeological approaches alone would probably not provide the type of information necessary to distinguish the yeoman farm from the tenant farm. (Santeford et al. 1985:193)

These conclusions are not necessarily contradictory of Price's models — her models are representations of the two systems insofar as can be derived from documentary source materials alone. What Santeford has shown is that such documentary summaries are not by themselves sufficient to account for the archeological record of historic settlement. Nor is the archeological record by itself a sufficient source of information on the historic period. The fact plainly revealed by Santeford's research is that it is necessary to carefully integrate information from *all* available sources if we hope to achieve a thorough understanding of historic cultural resources. And as the exemplary work of Santeford and his collaborators has shown, such an integrative approach will often require very detailed study of archeological, documentary, and oral history data.

Intensive archeological investigations at another turn of the century farmstead, this one in northwest Arkansas, provide further insights into rural Ozark culture. In 1983, Leslie C. Stewart-Abernathy directed excavations at the Moser site, occupied by a succession of families from about 1875 until 1919. The farmstead was demolished during the 1920s and 1930s, and since that time had been largely forgotten. Discovered in the path of proposed highway construction, testing revealed that the site contained several buried and sealed archeological features filled with artifacts from the historic occupation. Excavations were concentrated in these features, which included the main cellar beneath the house, a separate storm cellar, a cistern, a smokehouse cellar, and a buried trash midden. Over 15,000 artifacts were recovered from these areas.

In addition to the excavations, supplementary information was obtained through extensive interviews with two former residents of the site, one of whom had assisted in the demolition of the farmstead. This oral history enabled Stewart-Abernathy to fully reconstruct the ground plan of the farmstead, to which the archeological features could be correlated. Components of the farmstead included a one story frame house with seven rooms, a log smokehouse, two frame chicken houses, a privy, a barn, and a wagon barn. Cellars had been excavated beneath the house and smokehouse, and a cistern and well had also been dug. The eighty acres comprising the farmstead were divided into separate areas for gardening, keeping livestock, rowcropping, and pasturage. This information combined with data from other historical sources permitted an in-depth analysis of the farmstead as a dynamic, self-sufficient entity operating within the context of agricultural market systems extending throughout the Ozarks during late historic times.

Analysis of the extensive artifact assemblage focused on the participation of the Moser site occupants within this market system. Hogs and mules were raised specifically for market sale, as were chickens and eggs. The primary crop raised on the farm was corn to feed the animals. As a result of their involvement in a market economy, the families living at the Moser farmstead acquired an extensive variety of consumer products. A wide array of purchased goods were found on the site, representing virtually every category of domestic and agricultural necessity. Maker's marks on ceramics, glass medicine bottles, canning jars, and other artifacts indicated that these goods were produced in nine states as well as England, Germany, and the Far East. Table ceramics and glassware were also purchased in sets, and the frequent replacement of these sets suggests that the Moser site families wasted little time in keeping up with the latest trends in consumer goods.

Stewart-Abernathy suggests on the basis of these data that by late historic times inhabitants of the Ozarks, even rural farmers, were no longer isolated from mainstream American society and values. They were in fact quite active participants in this cultural system, as is illustrated most forcefully by a souvenir found at the Moser site from the 1893 World's Fair in Chicago. An interpretation of Ozark society during the Developed Settlement period must therefore seek a balance between the stereotypical notions of isolation and self-sufficiency and alternative views of progress and modernity.

> Analysis of the Moser data has clearly shown that at least at this site, independence does not necessarily imply isolation. The recovery of thousands of fragments of industrial age products, ranging from buttons to dishes, is strong evidence of participation by the Moser family in the wider world. Such finds do not make the Moser farmstead unique, but without similar finds from numerous other sites, it is difficult to dislodge the widely held belief in the isolation of the Ozarks. The archeological excavations, oral history, and this survey all indicate that indeed the Moser farmstead was not unique but was very much like many if not most of the upland farmsteads of the Ozarks during this period. The evidence at the Moser site and the other data does not fit the commonly held view of the Ozarks as backward and isolated. Instead it emphasizes the interconnections that joined Moser to a much wider arena. (Stewart-Abernathy 1986:160–161)

In addition to rural farmsteads like the Moser site, a number of cities and towns sprung up on Ozark landscapes. Jerry Hilliard (1983) has been investigating the early development of Fayetteville in northwest Arkansas. Documentary sources examined by Hilliard indicate an important role played by social-political elites in the establishment of this city as a territorial center, a factor which does not appear to be typical of the development of smaller towns throughout the Ozarks. Archeological surveys have begun in Fayetteville to locate the residences of these elite individuals, in order to determine if their size, complexity of special purpose areas, and/or artifact contents are distinctive. If so, the residential sites of the social-political elite may serve as indicators of a pattern of development restricted to this special class of urban center.

Another project meriting discussion here is Charles S. Walks' (1982) investigation of sites in the Garrison Creek watershed in Sequoyah County, Oklahoma. A survey of archeological sites in the watershed located 26 historic sites dating primarily to the period from 1920 to the early 1940s. By the late 1940s, however, this area had been abandoned. Examination of historical records indicated that the area had been occupied primarily by black families, primarily freedmen, who evidently worked as tenant farmers. Wallis attributed the abandonment of the watershed to two primary causes: the occurrence of a series of major floods beginning in the early 1940s, and changes in farming practices in the region. The latter involved a shift from individual farmsteads and small scale sharecropping to large scale, mechanized farming. In the course of this transition most of the black farmers were forced to sell or move off the lands they occupied. By combining archeological data with pertinent information from documentary sources, this study provides an insightful and significant contribution to our understanding of the experiences of blacks in Ozarkia during the recent historic period.

One final excavation at a nineteenth century house site can be identified. In 1979 Catherine Yates conducted test excavations at the Chance site, which had been occupied by at least 1888 by William Crowder and Polly Foreman Crowder, who were Cherokee. The Chances, who now own the land, are the Crowder's descendants. Excavations uncovered the remains of two dwelling structures. Artifacts associated with one of the structures indicated that it could have been occupied as early as the 1820s. The site had been occupied at least to the turn of the century, and evidently had functioned as a farmstead (Yates 1979). Although it has not been established with certainty that the site actually represents the Crowder occupation, further documentary and archeological research may clarify the affiliation of the site and thereby permit archeological investigation of an historic Cherokee site of the Developed Settlement period.

BIOARCHEOLOGY OF THE OAO STUDY AREA

Jerome C. Rose, James P. Harcourt, Barbara A. Burnett

The purpose of this chapter is to provide a guide for the incorporation of bioarcheology into the cultural resource management process of the Southwestern Division of the U.S. Army Corps of Engineers. Bioarcheology is the study of human biological remains within their prehistoric cultural (archeological) context. This interdisciplinary field of research developed through the mutual interests of biological anthropologists and archeologists. From a historical and theoretical perspective, bioarcheology is the logical and progressive outgrowth of the meeting of the "New Physical Anthropology" (Washburn 1951) and the "New Archeology" (Binford 1962) in the application of evolutionary theory to the study of human skeletal remains. Bioarcheologists have made significant progress in understanding prehistoric biocultural processes by focusing their research efforts on major problem areas such as the origins and adoption of agriculture. Despite this success in the academic arena, the development of bioarcheology in the cultural resource management context has been more sluggish.

This chapter consists of four sections, including the introduction, organized into a developmental sequence. The next section is a short history of American bioarcheology presented within the framework of the history of archeology. Evaluating the scope of bioarcheology and the problems inherent in its application to cultural resource management requires an examination of its historical development. The third section provides a short history of the recovery and analysis of human skeletal remains in the OAO study area. This review is necessary to understand the nature of both the available skeletal resources and the data derived from them. The last is a description of the available human skeleton data base and an analysis of the distribution of the samples within the OAO study area.

HISTORY OF AMERICAN BIOARCHEOLOGY

An examination of the history of American archeology (e.g., Willey and Sabloff 1974) clearly demonstrates that each step in the development of both methodology and theory is firmly founded upon the previous research stage and that both progress and problems are the result of preceding historical events. Since bioarcheology is the product of both archeological and osteological research, its present condition can only be understood within the historical contexts of both fields. Consequently, the discussion of the development of bioarcheology employs the historical sequence of archeology as the guiding structure.

The period from 1840 to 1914 is titled classificatory-descriptive and is characterized by the discovery, excavation, and description of archeological sites and materials (Willey and Sabloff 1974). Archeologists in their search for well preserved ceramics and other material objects focused much of their attention on mortuary components and sent both artifacts and skeletal material back to their sponsoring museums and institutions (e.g., Charles Peabody, W. K. Moorehead, and C. B. Moore). Many of these skeletal remains were examined by osteologists and the tradition of the descriptive (e.g., age, sex, metrics, and pathology) osteological report/appendix was established (e.g., Hrdlicka 1908, 1910). During the same period paleopathologists were intent upon describing and diagnosing prehistoric diseases and were quick to apply modern medical technology such as radiography (Petrie in 1897, see Jarcho 1966) and histological observation of mummified tissue (Ruffer in 1910, see Ubelaker 1982).

Other paleopathologists, such as Jones, were interested in particular problems (e.g., the origin of syphilis) and were conducting their own excavations in the American southeast (Jarcho 1966). Osteologists in general (e.g., Morton in 1839), maintained their interest in the use of cranial shape to formulate racial taxonomies and thus developed standardized measurements and instruments for refining the existing racial classifications (Armelagos et al. 1982). Osteologists were actively working with archeologists to explain the origins and migrations of the Native Americans (Buikstra 1979). During this period, large skeletal samples were accumulated and a tradition of cooperation between archeologists and osteologists was established.

During the classificatory-historical period (1914–1940), major archeological achievements included the development of chronologically controlled cultural histories (Willey and Sabloff 1974). Excavation of mortuary sites proceeded at a rapid pace and archeologists (e.g., Walker and Harrington) continued to return skeletal collections to their home institutions for curation. This was a period of great interest in the diagnosis of prehistoric diseases (as gauged by the number of paleopathology publications) and application of modern technology to problems of diagnosis continued (Jarcho 1966). Examples of these developments can be found in such works as Moodie's 1923 synthesis of paleopathology and Hooton's work on the Pecos Pueblo skeletal material (1930). The production of descriptive osteological reports continued, but the primary focus of research remained confined to cranial typology and classification (Buikstra 1979; Armelagos et al. 1982).

A theoretical split between osteologists and archeologists begins to develop in many parts of the United States during this period. As the cranial typologies became more complex, the interpretations of proposed migrations became less acceptable and intelligible to the archeologists (Buikstra 1979). As time eventually proved, the contribution of these elaborate cranial typologies was of little value (Buikstra 1979; Armelagos et al. 1982). This split between archeologists and osteologists widened as the descriptive reports often contributed little or nothing to the archeological research of the period (i.e., chronology). Even when skeletons were studied the interpretations were often flawed because the osteologists either did not have access to the chronological assignment of the burials or had no appreciation for temporal differences (Buikstra 1979). All of these factors promoted the attitude that little could be learned from the skeletal remains and the only obligation of the archeologists was to curate the remains, if they were in good condition.

The second phase of the classificatory-historical period (1940–1960) continued the emphasis upon cultural chronology, but the first stirrings of concern with context and function began (Willey and Sabloff 1974). One important consequence of this reorientation of research priorities was the production of numerous regional chronologies such as *Archaeological Survey in the Lower Mississippi Valley* 1940–1947 (Phillips et al. 1951) and regional syntheses of archeological data such as *Archeology of Eastern United States* (Griffin 1952). The emerging interests in settlement pattern and ecology required extensive knowledge of broad geographic areas and regional syntheses were routinely produced to fill these needs. Similar chronological syntheses of osteological research were not produced as the research goals of archeologists and osteologists had previously diverged (Buikstra 1979; Gruber 1981). For example, the only osteological report contained in Griffin's edited compendium (1952) was a chapter on cranial shape and taxonomy (Neumann 1952).

Paleopathological research continued in a desultory manner because no new technologies or diagnostic procedures were developed to hold the interest of the diverse practitioners of this endeavor. Osteologists were turning away from the study of prehistoric human remains and focusing their attention on more "main stream" biological problems, such as growth and development. Part of this change in osteological research interests can be attributed to the biological anthropology profession holding traditional prehistoric osteology in low esteem because it was not attempting to achieve the goals of the "New Physical Anthropology" (Gruber 1981). Despite this shift in emphasis, osteology made great methodological progress as forensic osteologists refined aging and sexing procedures using war dead and reference skeletal collections from modern populations. The use of large prehistoric skeletal series continued as osteologists required large skeletal samples for testing new techniques (Buikstra and Gordon 1981), but since the archeological context was of little importance, few systematic contributions to archeology were made. As in previous periods, standard descriptive osteological studies continued to be appended to site reports whenever a consenting osteologist or student could be found to do the work.

The explanatory period (1960–present) was marked by the "reemergence of evolutionary concepts" as archeologists attempted to explain cultural processes and employed hypothesis formulation and testing to guide their research (Willey and Sabloff 1974). Paleopathology experienced a reawakening of interest as indicated by an increase in the number of synthetic publications in the early part of this period (e.g., Wells 1964; Jarcho 1966; Brothwell and Sandison 1967). Osteology, in general, experienced a technological revolution as sophisticated equipment and computers were applied to data acquisition and interpretation. Examples of a few of these new procedures include: multivariate sexing techniques, studies of bone morphometrics using both light and electron microscopes, trace element and stable isotope analysis for dietary reconstruction, paleodemography, and indicators of childhood stress, to name a few (see Buikstra and Cook 1980; Armelagos et al. 1982; Huss-Ashmore et al. 1982; Ubelaker 1982; Gilbert and Mielke 1985).

These historical-theoretical developments resulted in a coalescence of archeological and osteological interests. The use of mortuary data for the reconstruction of social organization promoted a renewed interest by archeologists in obtaining age and sex data from skeletal material (e.g., Brown 1971b). Interests in population dynamics and ecology fostered an interest in paleodemography and the publication of research conducted by biological anthropologists in archeological journals (e.g., Weiss 1973; Swedlund 1975). Similarly, osteologists sought to apply their sophisticated methodologies to the solution of biocultural problems. This required access to skeletal series with good archeological context and further encouraged cooperative research ventures. The emergence of this combined interest in prehistoric human skeletal remains, and, in a sense, the birth of bioarcheology, can be symbolized by a symposium titled "Biocultural Adaptation in Prehistoric America" presented at the 1976 meetings of the Southern Anthropological Society (Blakely 1977).

The appearance of bioarcheology was not a sudden event, but in fact a gradual development of interest in mutual problems and maturation of the two disciplines. The recognition that human skeletal remains should be preserved from destruction, curated, and analyzed has a long history in archeology. For example, in the late fifties William Bass was hired by the River Basin Surveys (Bureau of American Ethnology and Smithsonian Institution) to analyze Plains skeletal material curated in various museums, and to excavate and analyze human remains threatened by reservoir construction (Bass 1964). Many early osteological appendixes are not simply compilations of observations, but have a problem orientation, such as "Are there... differences in skeletal remains—evidence of pathology, deformation, or injuries—attributable to differences in diet, or way of life?" (Hoyme and Bass 1962:330). There are also examples of major cooperative projects which have produced spectacular results. Under salvage circumstances, during the construction of the Aswan Dam, the University of Colorado expedition to

Sudanese Nubia produced an excellent series of biocultural process studies (see Armelagos 1968; Martin et al. 1984). The analysis of large museum collections, where samples derive from different temporal periods which cross major changes in cultural adaptation (e.g., adoption of agriculture) have produced important results (e.g., Goodman et al. 1984b). Bioarcheology is at its best when archeologists and osteologists focus their cooperative efforts on limited geographic domains (e.g., Lower Illinois Valley, Buikstra 1984 and Cook 1984; St. Catherines Island off the Georgia coast, Larsen 1982).

There is no question that good bioarcheology can be done in an academic setting and even under adequately funded mitigation circumstances (e.g, Milner 1983). There are, however, major problems associated with the incorporation of bioarcheology into the routine of cultural resource management programs. The disparity between the comparative ease of managing archeological and bioarcheological resources is a product of the divergent histories of the two fields previously discussed. The inherent limitations of cultural resource management bioarcheology can be best illustrated by reference to a regionally focused bioarcheology research design.

Buikstra (1977) provides an example of an interdisciplinary research design for the bioarcheology of the Lower Illinois Valley. The first research phase is to conduct a survey designed to inventory the mortuary components and assign them to their appropriate temporal/cultural contexts. This step provides the necessary data for selecting the appropriate sites for excavation and analysis, which will be used for testing the previously specified hypotheses. Each excavation phase is followed by analysis of both the cultural and biological data to determine the appropriateness of the samples (e.g., complete demographic profile, social organization, etc.) for hypothesis testing. This permits the excavation and analysis strategies, as well as hypothesis formulation, to be altered during the progress of the long term excavations.

There is an expectation that similar research designs should be employed in cultural resource management archeology (Fowler 1982). The requirement is frequently made very explicit in many of the state plans for the conservation of archeological resources (e.g., Davis 1982). Compilation and inventory of the available resources, designation of salient research goals and priorities, regional syntheses of the current archeological information are all necessary to manage the resources, determine significance of an individual resource, and to set priorities when there are financial constraints. Archeology's historical development has made this process possible (although not always easy), while in contrast, the traditional research orientation of osteology produced impediments for the development of effective management plans for prehistoric human skeletal remains. The long hiatus in the mutual cooperation between archeology and osteology (in some areas more than 40 years) has left the development of most osteological data bases back in the classificatory period.

During the course of this century, most states have initiated a site file system for recording the existence and location of archeological resources. These systems range from very complete and sophisticated to very poorly developed, but they do exist. Similar inventories of sites which have produced skeletal resources are rare, and when they do exist, they are grossly inadequate. Inventories of curated skeletal collections are often incomplete. For example, an attempt was made to provide a complete listing of human skeletal remains available in museums for osteological research, but only 1,082 individuals were listed for the three states considered in this overview (El-Najjar 1977). This represents only 27% of the individuals reported in the present study which covers only portions of these three states. It is not uncommon to find that large skeletal collections cannot be associated with their archeological contexts because the cultural and skeletal materials are frequently separated in the field for shipping to different institutions for analysis and curation. Even when the excavated materials are sent to the same institution, they are frequently the responsibility of different curators (e.g., Smithsonian Institution). It is true that artifacts from the same study area can be found distributed throughout North America (and even world wide), but a similar dispersion of the more rare skeletal remains creates a more serious research problem. For example, significant and unique skeletal series from Arkansas are known to be curated in Alabama, Arkansas, Illinois, Indiana, Massachusetts, New York, Oklahoma, and Washington D.C. This lack of comprehensive inventories makes it virtually impossible to assess the significance of potentially impacted bioarcheological resources.

Archeology has a long history of regional syntheses going back more than a century (Squier and Davis 1848). Each resynthesis builds upon its predecessors and provides us with cumulative knowledge about an area. Such syntheses of osteological knowledge are rare and, when they do exist, they are products of the exceptional osteologist who maintained a life long interest in an area (e.g., Bass 1964, 1981). Without such syntheses it is not possible to identify the research problems necessary to assess significance, develop management strategies, or prepare cost effective and relevant scopes of work for bioarcheology.

The preparation of bioarcheological syntheses and literature reviews during the mitigation process are both difficult and costly. This situation is a direct consequence of the ambiguous status of prehistoric osteological research. Most descriptive reports are included as appendixes to archeological monographs and site reports and, as a result, are seldom indexed or available in regional bibliographies. It is also common for such studies not to be published and remain available only as manuscripts stored in museums and anthropology departments. Published osteological analyses can be found in a great diversity of sources, which are not accessible through any single bibliographic index. For example, studies of Arkansas skeletal remains have not only been published in the local and regional archeological journals and newsletters, but also in biological and medical journals such as *American Journal of the Medical Sciences*, *Australian Dental Joumal* and *American Journal of Physical Anthropology*. Finally, the majority of excavated skeletal remains have never been studied at all.

If bioarcheological resources are to be effectively managed, then the regional bioarcheology data bases must be upgraded to the same level as those of archeology. Two advantages of this upgrading for cultural resource management agencies, such as the Corps of Engineers, are a reduction in the cost of bioarcheological mitigation and an increase in quality. It is not implied by the use of this historical approach that bioarcheology must repeat archeology's historical development. This discussion is presented only to aid in comprehension of the problems inherent in the bioarcheological data base and to serve as a guide for its improvement. This historical perspective and a regional bioarcheological research design (Buikstra 1977) are used to prepare guidelines for conducting bioarcheological research and resource management. The guidelines are presented as a series of research and management phases which are provided below.

I. Descriptive-Inventory Phase.

A. Collect all data concerning sites which have produced human skeletal remains.

This information is necessary to assess the existing resource base and to provide projections concerning potential undiscovered osteological resources (i.e., those particular site types known to produce burials). Eventually these data can be used to develop predictive models.

B. Systematically assign the skeletal samples to their proper temporal/cultural contexts.

This must be accomplished because both archeologists and osteologists frequently neglected to make these assignments for all of the individuals recovered from multicomponent sites, at least in the published reports. In older studies, such assignments were not possible or have since been shown to be incorrect.

C. Assess the distribution of the human skeletal remains by the appropriate temporal, cultural, social status, and ecological parameters.

This assessment of sampling bias is crucial to the interpretation of the biological data. For example, if we only have samples from one component (e.g., habitation burials) of a complex mortuary program (e.g., full status individuals buried in mounds), then the results and interpretations derived from the bioarcheological analyses would be biased and it would not be possible to extrapolate the interpretations to the entire population (i.e., Charles and Buikstra 1983).

II. Compilation-Synthesis Phase.

A. Compile all previously collected osteological data within the appropriate temporal/cultural units defined during the previous phase.

There are numerous osteological reports and appendixes which contain basic data such as age, sex, and metrics, as well as descriptions of pathological lesions of bones and teeth. Although these data were not collected within the modern framework of bioarcheology, pathological lesions can be rediagnosed and other transformations can be made which will enable these data to be used in regional syntheses and preliminary hypothesis testing. These descriptive reports must serve as the foundation of regional bioarcheological research and management, for it would be unreasonable to ignore data on hundreds or even thousands of burials and it certainly would be prohibitively expensive to restudy all these collections.

B. Synthesize and analyze the previously compiled bioarcheological data.

The previously compiled data should be integrated into regional bioarcheological syntheses. Hypotheses derived from the regional syntheses can be preliminarily tested and modified if necessary using the extant data. The most productive outcome of this activity will be the identification of salient research domains and the generation of new testable hypotheses.

C. Develop appropriate research designs.

Once salient research problems have been identified the appropriate research designs can be constructed. The most important result of this process is establishing sampling requirements for each problem domain. The identification of gaps in both data sets and sample availability can be used in the next activity phases which include ranking of research priorities and the management of existing and undiscovered resources.

III. Research and Management Phase.

A. Establish research priorities.

Regional research designs are the appropriate vehicles for evaluating research priorities. This is an ongoing process which will require constant updating as hypotheses are tested and resyntheses are constructed. Success in this activity will depend entirely on coordination of research in both the academic and resource management environments.

B. Establish significance criteria.

Regional research designs and research priorities form the basis for establishing significance criteria, which is an ongoing process. The criteria must consider both the research priorities and the availability of extant, but possibly unstudied, resources (i.e., curated skeletal collections). For example, the addition of data from three individuals from a cultural or temporal category with an available sample of a hundred or thousand individuals may have a low priority for analysis during mitigation and be judged of little significance. In contrast, the same three individuals from an early Archaic context, with zero sample size, may have a high priority for analysis and great scientific significance. It should be pointed out that all human remains have a certain emotional and ethical significance. It is very likely that responsible and cost effective management practices will include the evaluation of appropriate extant resources concurrently with planning, site survey, and mitigation.

C. Establish mechanisms to ensure continuous resynthesis, research design modification, and evaluation of significance criteria.

It must be recognized that all phase three activities will initially be at a most rudimentary level. With the historical equivalent of forty to fifty years of research to be accomplished it will take some time for research designs, research priorities and significance criteria to reach a mature stage of development. Thus, continuous development and modification must be assured by incorporating these activities within the management structure and requiring that they be included within the scopes of work for all bioarcheological mitigation projects.

HISTORY OF BIOARCHEOLOGY

OAO STUDY AREA

This section will explore the nature of the osteological collections and investigations in the OAO study area. In particular, it will examine how research interests and strategies have evolved and impacted the nature of the samples collected. It is important to understand the approaches and biases of past work, if meaningful research conclusions are to be derived from their restudy. Of special concern is that the Ozarks are not characterized by large burial populations, and large alluvial cemeteries, such as Carden Bottoms, appear to be rare in the project area. However, current investigative methodologies based on a populational approach require large sample sizes, and it will be necessary to amalgamate small burial samples into regionally cohesive and demographically representative units for analysis. However, this process will require knowledge of excavation, collection, and curation techniques in order that biases, which are inherent in the skeletal sample, be understood and corrected.

The history of bioarcheological investigations in the Arkansas and Missouri Ozarks are similar, with most researchers considering this portion of the two states as a single coherent area. Their histories are also similar, with neither state having extensive WPA projects, and both states having to cope with saving a largely unknown resource base during reservoir salvage operations in the late fifties and sixties. Eastern Oklahoma, on the other hand, has historically been treated as culturally distinct, experienced large WPA projects, and attracted the interest of archeologists interested in different kinds of sites and artifacts. Consequently, the history of the Missouri and Arkansas Ozarks will be considered together and distinct from eastern Oklahoma.

The observation of the osseous remains within the OAO study area began with the clearing of the land. Family histories reference finding burials while house-raising (Howard 1949), and nineteenth century periodicals report on burials found in shelters and caves. These reports seldom describe the burial in detail and the material was not kept. Early scientific work in Arkansas and Missouri took the form of "expeditions" from eastern institutions for the purpose of building museum collections. They were compelled by a crisis attitude to explore, describe, record, and acquire as much information as possible before it was lost (King et al. 1977). Graves were viewed largely as repositories for pots, although mortuary analysis (the study of status, cultural customs, and ideology through the arrangement and content of the burials) was developing, The bones themselves were often discarded with the occasional exception of crania or bones with unusual pathological lesions. Many early collections consist only of such bones.

The first expedition into the Ozark region was sponsored by the Phillips Academy of Andover, Massachusetts under Charles Peabody and W. K. Moorehead. In 1903, the Academy examined several caves and shelters, including Edens Bluff (3BE6) where five or six burials were reported "at different times." At McElhaney Cavern, one fragmentary skeleton was excavated. A major excavation was undertaken in Jacobs Cavern, McDonald County, Missouri. Six burials, ceramics, lithics, and faunal material were discovered and recorded (Peabody and Moorehead 1904). Peabody made several more trips into the Ozarks and, in 1915, commissioned E. H. Jacobs to do a shelter survey in which several sites, thought not to have been excavated, were mentioned as containing human bone. In 1915, Moorehead turned to the lowlands and investigated the Arkansas River Valley from Dardanelle to Fort Smith. C. B. Franklin was commissioned to conduct further site survey. Sites containing burials and bone are mentioned, but no indication of any osteological collections were made (Moorehead 1931).

C. B. Moore briefly entered the Southwest Division region, sailing up the White and Black Rivers almost to the Missouri line. He turned back because of the paucity of artifacts (Moore 1910) and labor problems (Howard 1963). Moore also ascended the Arkansas River to the town of Natural Steps in Pulaski County. Moore gave up the quest because the human remains were so decayed as to be "worthless for scientific investigation" and that the mounds and cemeteries were "insignificant" in terms of recoverable ceramics (Moore 1910: 481–482). While other regions benefited from the expeditions of C. B. Moore, his impact in the OAO project area of Arkansas and Missouri is slight.

Gerard Fowke made two early incursions into the Missouri Ozarks on behalf of the Bureau of American Ethnology. The expedition of 1906 to 1907 stayed just north of the OAO project area, but selected material was presented to Ales Hrdlicka of the Smithsonian Institution for analysis (Fowke 1910). Incidentally, Hrdlicka responded with a tirade against prevailing methods of excavating burials and noted pathological lesions (including "possible" syphilis) while recording bone measurements (Hrdlicka 1910). The second expedition entered Shannon, Texas, and Dent counties. While only reporting on rumors of burials in the latter two counties, his paradigm proves interesting. Fowke and his colleague, W. H. Holmes, have typed the Ozark Bluff-Dwellers as having "low mentality" based largely on observations of skull form. These Ozark dwellers were suspected of having "never advanced from savagery or else...retrograded" (Fowke 1922). This viewpoint has not been substantially challenged until this decade (Brown 1984a).

The Museum of the American Indian began archeological investigations of the Ozarks in 1922 under the direction of Mark R. Harrington (Harrington 1924b, 1960). Noting that "nine-tenths" of the aboriginal assemblage is usually lost, one can understand his excitement when feather robes, sandals, and other "perishable" items were found. While not to denigrate his contribution to Ozark archeology, his investigations were designed to maximize the acquisition of perishable items. He bypassed shelters with "abundant signs of ancient occupation" if they were too damp for the preservation of perishables. Given the rate of loss in bluff shelter sites from uncontrolled human activities, his sense of priority cannot be faulted. Between 1922 and 1923, at least 23 shelters were visited, tested, and reported on by Harrington and his crew (Harrington 1924a, 1960). A large number of burials were recorded, their orientation and position noted, grave goods inventoried, and demographic data (age and sex) collected. His work remains a basic text for understanding the Ozark region.

In 1931, the Smithsonian Institution began an investigation of the Ozark "Cave Culture" along the Buffalo River in Marion and Searcy counties, Arkansas under the direction of Winslow M. Walker (1932). A major excavation was made at Cedar Grove Cave which yielded 10 burials and probably 12 individuals. The individuals were aged and sexed. The skulls were found to be "dolichocephalic tending toward mesocephalic ...[with] a slight indication of asymmetrical occipital deformation." The skulls were recorded as free from disease and containing well preserved teeth with little attrition. Associated artifacts, grave offerings, and body orientation were discussed.

The archeological investigations by out of state institutions sparked the patriotism of S. C. Dellinger, curator of the University Museum and Arkansas chauvinist (Dellinger 1930; Hoffman 1981). Dellinger's primary concern was to keep Arkansas material in the state and safe from vandalism. Dellinger involved the University Museum in active acquisition of archeological material, which led to one of the most extensive periods of collection in the Arkansas Ozarks. Dellinger received informal instruction in correct archeological methodology from Carl Guthe, then chairman of the Anthropology and Psychology Division of the National Research Council (Hoffman 1981). In 1930 Dellinger was awarded a grant of twenty-thousand dollars from the Carnegie Foundation for a period of three years. Dellinger trained several students as field directors, notably Wayne Henbest and Charles Finger, and excavations were conducted around the state. Between 1931 and 1934, almost 100 shelters and caves were tested or excavated in the Ozarks. While in some cases he appears to have just collected the crania for study (Dellinger 1928), Dellinger and his crews generally sought a representative sample of the population. Dellinger with Elmer Wakefield and John Camp (Wakefield et al. 1937a) pioneered bioarcheology in Arkansas. They removed paleofeces from Ozark mummies for dietary reconstruction and to check for parasites. Bones were studied for evidence of disease and trauma. General lifeways were interpreted and they were involved in testing the concept of adaptive efficiency. On the latter point, Wakefield et al. (1937b) argued that because the processes of ossification and bone formation are influenced by factors such as nutrition, the Ozark dwellers were well adapted to their environment. Children's bones were studied for evidence of "deficiency diseases." Selected tibiae and fibulae were radiographed and "dense transverse lines" were observed. These lines are now understood to represent periods of stress followed by recovery. Dellinger was also interested in learning which diseases were present in prehistory (e.g., such as syphilis). The field techniques of Dellinger and his field directors included extensive photography of excavations and mapping site plans. Burials were sketched to show position, bones present, and artifact associations. These records provide the key to understanding the museum collections. While all artifacts were retained, various selective biases have been noted in bone collection. First neither all burials nor all bones within a burial were retained. Comparison of burial records to collections indicate that the preservation of the bone was the major criterion, while size of the bone and degree of fragmentation appear to be secondary factors. Other than its differential effect on preservation, the age and sex of the individual did not appear to have been a factor. Additionally, Dellinger only sampled many sites, frequently excavating only 20 to 50% of the cultural deposits (Hilliard, personal communication). The primary documentation combined with careful curation provide a tremendous opportunity for restudy of the material in light of current research questions. A number of bioarcheological papers have emerged from Dellinger's bequest (e.g., Fritz 1979).

With the exhaustion of the Carnegie money, the pace of Arkansas archeology continued with money allocated by the Works Progress Administration (WPA). While many areas of the southeast saw a tremendous amount of fieldwork done between 1938 and 1941, little work was conducted in northwest Arkansas and southwest Missouri. One major site just beyond the OAO study area, the Adair Site, was excavated by the University of Arkansas in 1930 and again in 1939 with WPA help. The site was well documented by field books, monthly and quarterly reports, and correspondence between Dellinger and his crews.

In the 1950s and 1960s, creation of reservoirs in Arkansas and Missouri threatened thousands of square miles with inundation. With financial aid and cooperation from the National Park Service, large regional surveys and salvage excavations were conducted. Rather than just selecting rich sites for excavation, large areas were examined to discover the range and nature of sites within the project area. This regional perspective represented a significant departure in strategy. The short term goals of excavation were "directed toward the solution of no particular archeological problem... just salvage" (Bray 1957). Analysis was hampered by lack of money for analysis and publication, as they were not required by law (P.L. 86-523). Given the size and number of projects, time also was at a premium. Archeological journals in the respective states helped fill this need, and preliminary and progress reports were published. If burials were encountered, descriptions were presented. These often included age, sex, measurements, and pathological data. Standard osteological techniques, such as the McKern-Steward method of aging were used. Presentation of data, such as was done for the Table Rock Reservoir (Wallace 1960), can be used both directly in future research and to pinpoint the availability of additional data. Not only did the Reservoir Salvage projects produce a tremendous amount of osteological material and data, but the generally good recording techniques created a wealth of untapped information.

Prior to cultural resource management legislation, highway salvage operations tended to consist of the archeologist learning of an exposed site and running to salvage what was left. It was often a heartbreaking task. Road construction under Tie Bluff and Schoonover Bluff, for example, exposed skeletons and intact archeological deposits, that were rendered useless by construction and collectors prior to the arrival of archeologists (Adams 1958). Highway salvage did not receive legislative support until the Department of Transportation Act of 1966 (P.L. 89-670) and the Archeological and Historic Preservation Act of 1974 (P.L. 93-291) and is more closely related to cultural resource management (below) than the era of reservoir salvage.

Nonprofessional archeologists have always played a key role in the preservation of osteological material through reporting burials to appropriate agencies, excavating them with proper records, or utterly destroying them in the quest for "Spanish" or "Indian" treasure. As early as 1914, Jacob's notes to Moorehead contain frequent references to shelters being pitted by collectors. Harrington (1924c) visited Carden Bottoms, a large cemetery in Yell County, and reported seeing "skeletons chopped to pieces with hoes and dragged ruthlessly forth to be crushed under foot." Perhaps hundreds of burials were lost without study (Clancy 1985). Burials are particularly vulnerable because of their associated artifacts and the rate of destruction has steadily increased with market value. On the other hand, the boy scouts of Van Buren, Missouri, on a site survey, discovered a burial at 23CT9 and carefully recovered the bone, recorded associated artifacts, and published their results (Lowe 1940). A number of osteological analyses have resulted from bones being taken to the local doctor, who in turn provided pathological and demographic data (for example: Tong 1957; Johnson 1966). Amateur training programs, such as the Arkansas Archeological Society's program, provide training in osteological identification and recovery techniques. The history of archeology in both states is replete with examples of amateur groups saving archeological and osteological resources from destruction. Amateurs have also devoted thousands of hours to washing, labeling, and analyzing curated skeletal material.

Academic institutions, in particular departments of anthropology and museums, are responsible for the bulk of osteological research. Much of it, including individual and osteology class projects on previously unstudied collections often seem to fall into a "black-hole" where they are unknown outside the department or lost. Research papers, especially those given at smaller meetings, may also fall out of circulation. More widely known and available are various theses and dissertations which address osteological subjects. Academic projects have greater freedom than cultural resource management-funded research to go into the old collections and fill gaps in our knowledge of the past. While often short on funding, such projects have used sophisticated equipment and are often on the cutting edge of scientific progress.

Trends in cultural resource management, particularly the pragmatic acceptance of "conservation archeology" (Lipe 1974), have led to a major decrease in the number of skeletons recovered in the last two decades. Current projects tend to be narrow transects of the landscape (e.g., pipelines, transmission lines, or development parcels) without the areal extent of the reservoir projects. Survey strategies are designed to locate sites and their methodology is constrained in the detection of deeply buried deposits, which include most mortuary components. Blufflines, elevated erosional remnants, mounds, and occurrences of intact midden are avoided by slight realignments in the right-of-way whenever possible. Various State Plans and working documents have done little to clarify the archeological, research, ethical, and curational status of skeletal remains produced by cultural resource management archeology. Thus, while cultural resource management provides an indirect mechanism for the recovery and study of osteological material, its application in the Ozarks has been minimal.

The history of Oklahoma bioarcheology begins with an initial period of unrecorded site destruction as the land was opened up for white settlement. The first work again took the form of expeditions by eastern institutions (Albert 1984:45).

Harrington (1960) canoed down the Grand River in eastern Oklahoma in the fall of 1914. He skirted the western flank of the Ozarks to reconnoiter shelters for perishable remains. While noting shelters with evidence of prehistoric occupation, Harrington decided the potential for perishable objects was low and he turned his attention to the central Ozarks.

The excavations of Joseph Thoburn (1931) were among the first to record the presence of skeletal remains. During the height of his career, he observed mounds while traveling through "Indian Territory" and speculated on their origins. As a historian and archeologist, Thoburn's first archeological question was to settle the debate over natural or cultural origins for the many low mounds in eastern Oklahoma. While these mounds had been ascribed at various times to ant hills, eolian deposits, glacial features, or gas vents, Thoburn demonstrated that they were the remains of prehistoric occupation (1931). His next step was to discover their content and place them in a cultural and chronological sequence. In 1916–1917, Thoburn excavated in the Ward Mound I at the Spiro site, Leflore County. A number of burials were found. In 1925, Thoburn, with support from the Oklahoma Historical Society and private subscription, undertook several excavations in Delaware County. Starting in May, the group worked in several caves or shelters. Many of the deposits were sifted in order to build "a good collection of stone age arts and crafts." Charred and fragmentary human bone and teeth were recovered and their condition was "suggestive of cannibalism" to Thoburn (1926). Thoburn and the Oklahoma Historical Society dug the remaining one-third of a mound on the line between Delaware and Ottawa counties after it had been damaged by at least two episodes of commercial and private pothunting. Some burnt human bone was found in the mound's center, but surface interment was the primary practice, with at least 50 graves estimated for the entire mound. On the basis of grave goods, the mound was assigned to Siouan stock left during a migration to the Mississippi River Valley (Thoburn 1931). While Thoburn (1938) was concerned with migrations and diffusions of racial "stocks" and artifact styles, populating the area with migrations from the "racial swarming-grounds of Mesoamerica," he did not use craniometrics to bolster his model.

Oklahoma osteoarcheology separates from its counterparts in Arkansas and Missouri during the 1930s as a result of WPA work. A number of factors were involved. Oklahoma's WPA archeology was directed by Dr. Forrest E. Clements, a physical anthropologist with a strong interest in ethnography. WPA projects included the creation of several reservoirs (notably Grand Lake of the Cherokees, Lake Wister, and Tenkiller Ferry Reservoir), and associated salvage archeology yielded large mortuary samples with good preservation. Thus, a combination of the magnitude of the burials, their good preservation, and the direction of a physical anthropologist insured the excavation of skeletal remains by Oklahoma archeologists. For the University of Oklahoma students who became field directors under Clements, the collection of human bone became a tradition.

Also with roots in the Depression, the Pocola Mining Company was formed to mine the burials in the Craig Mound (Spiro) for marketable artifacts (Albert 1984). Items with no commercial value, including wood, textiles, and subsistence remains were thrown asunder and lost. Fifteen to 20 known burials were destroyed. One was found to be "charred... somewhat mummified and still intact." It was said to have been wearing a cane hat and had nine bows and thirty spears on its chest. The body was carried to the edge of the site where it disintegrated (Hamilton 1952:31). Dellinger visited the site several times to make purchases, including a skull with hair remaining (Hamilton 1952:32). The despoliation of Craig Mound resulted in the leasing of Spiro with contributions and funds channeled through the Oklahoma Historical Society. Excavations by WPA crews, which were conducted from 1936 until 1941 under Clements' direction, recovered almost six hundred burials. The Pocola operations also stimulated Oklahoma to pass an antiquities law in 1935.

Additional WPA projects focused on the black mounds which dotted the landscape along the Poteau River and the Fourche Maline Creek. These were targeted for excavation because of their varied and copious assemblages. The high organic content of the midden countered the generally acid nature of local soils and thus bone preservation was generally good (Wyckoff 1984). In the three years after 1932, 24 sites were dug in the Wister valley, and burials composed the most frequent feature (Galm 1984:212). WPA archeologists dug a number of cemeteries, including the Lymon Moore cemetery near Spiro which held over eighty individuals (Rohrbaugh 1984). Questions addressed by the analysis included the nature and range of burial patterns and use of mortuary analysis to examine status differences. Because of the interests of a physical anthropologist who directed excavations, coupled with a large well preserved burial sample, Oklahoma accumulated a substantial resource of osteological materials.

The Second World War brought a halt to archeological work, and many, including Clements, left Oklahoma to work for the war effort. With peace, eastern Oklahoma entered a second period of reservoir construction. These were of more limited extent as salvage excavation projects replaced WPA crews with volunteer labor and a few professionals paid through the River Basin Surveys and the University of Oklahoma. A second postwar current was a concerted effort to publish the WPA excavations to provide comparative data. A National Science Foundation funded project was undertaken in Delaware County to examine the WPA collections for "an understanding of the interrelated patterns of biological and cultural change" (Baerreis and Freeman 1959). Complete raw data were deposited in the Archives of Archeology for future use (Baerreis and Freeman 1959). In the early 1950s, Alice Brues, a physical anthropologist, joined the department of anthropology at the University of Oklahoma. She organized osteological collections and wrote detailed analyses of the burials from the Horton, Morris, and Spiro sites. Burial samples were analyzed by site and the data were often integrated into the archeological interpretations. Brues and Snow, also a physical anthropologist, worked with both amateurs and professional archeologists. Their informal observations often found their way into articles written for Oklahoma archeological journals. Osteological analyses became a normal part of archeological projects in Oklahoma due to the influences of these physical anthropologists. This sense of importance does not become integral to the archeology of Arkansas and Missouri until the 1970s.

The early rapport between archeologists and the Oklahoma Historical Society provided organizational and financial support for "amateur" archeology for most of this century. In 1952, the Oklahoma Anthropology Society was founded, which undertakes several excavations a year, has an impressive publishing history, and provides excellent support for professional management activities in the state. Both organizations have made important contributions to Oklahoma bioarcheology.

Contributions to Oklahoma's osteology resources have been made by the Highway Salvage program, a cooperative venture between the U.S. Bureau of Public Roads and the State Highway Department. Overall, reports from these salvage projects include burial descriptions, demographic information, and pathological data. Most of the highway salvage has been west of the project area. The Sparks site in Latimer County, however, yielded a skull which was turned over to Brues for analysis. Cultural resource management surveys and excavations helped preserve many significant resources from loss. Much of this work was done in connection with reservoir construction and surveys and excavations were conducted in high probability areas for human burials.

The intensity of Oklahoma bioarcheology continued despite a fissioning process. When David A. Baerreis left Oklahoma he continued his interest in the area and papers, articles, and student theses have been produced at the University of Wisconsin. James Brown took his enthusiasm with him to Northwestern University and involved Jane Buikstra and her students in the skeletal analysis of Oklahoma (e.g., Buikstra et al. 1971). Thus, fueled by a tradition of osteological investigation and the support and interest of amateurs, academicians, and resource managers, bioarcheology has been a long and profitable tradition in Oklahoma.

DISTRIBUTION OF MORTUARY COMPONENTS AND TOTAL SKELETAL SAMPLE SIZE FOR THE OAO STUDY AREA

Following the research and management protocol for bioarcheology established in a previous section, the first step in the preparation of this overview was to prepare a descriptive inventory of human skeletal resources. The goals of the descriptive-inventory phase include: (1) an inventory of all mortuary components; (2) assignment of these components to their proper temporal, cultural, and ecological contexts; and (3) analysis of the distribution of the skeletal remains for assessing sampling biases prior to synthesis. Minimum data categories required for this phase of analysis were defined as follows: site number, site name, drainage, cultural designation, number of individuals excavated, status of osteological analysis, burial context type, adaptation type, and literature citations. This information was entered into a data base system for sorting and analysis. Because the overview area crosses state lines, collection strategies were customized for each state and are described separately. The Arkansas portion of the area was selected for testing different collection strategies because the proximity of the office and resources of the Arkansas State Archeologist made this task feasible. Although the data collection strategies focused on the published literature for all three states, the Arkansas site files were searched to assess the extent of the unpublished information.

Seven repositories of information were investigated in Arkansas for osteological citations and data. In addition to published sources, the project had access to a variety of manuscripts, files, and primary resources not specified for review in the Scope of Work. Given that most states contain files of similar nature, this literature was examined to ascertain its role in bioarcheological research.

1. State Site Files: These files were examined for osteological references on a site-by-site basis for the counties included in the OAO study area. The historical structure of the Arkansas Site Files provided a unique opportunity for assessing the nature and extent of the state's skeletal resources. Because the majority of forms are filled out by the general public and not by archeologists, the files were found to contain information with considerable historical interest. Reminiscences, second hand reports, and burials otherwise unknown to archeologists are often recorded. While the bone is generally not curated, this information yields data on burial location, preservation, frequency of distribution, and erosion of the data base. Occasionally, reports reference local collections and/or knowledgeable individuals. The individual site entries record site revisitation which provides a mechanism for estimating the extent of data loss and site deterioration. Environmental data, archeological information, and literature citations were obtained from the files and used in the bioarcheological interpretation.

2. Published Literature: The literature review was conducted in two phases. First, regional journals, *The Arkansas Archeologist*, *Field Notes*, and various occasional publications, were searched manually article by article. Coeval with this was a search of the major monographs concerned with Arkansas archeology. Osteological citations were noted and data extracted for the data base file. The bibliographies of these publications were checked and pertinent articles examined. This was an efficient method to access literature in *The American Anthropologist*, *American Antiquity*, *Plains Anthropologist*, *Central States Archeologist*, and the journals of adjoining states.

3. Contract Reports: All available contract reports were scanned for references of an osteological nature. Data were incorporated into this study and bibliographies were checked for additional sources.

4. Laboratory Records: Stepping into the unpublished realm, all files in the University of Arkansas Osteological Laboratory were checked for data within the OAO study region and for significant comparative collections. These files contained numerous unpublished bioarcheological studies.

5. Museum Files: The records of the University of Arkansas Museum were examined Three significant resources were discovered. The "Skeletal Analysis File" was examined and found to contain basic osteological data. Even when not directly usable, it clarified the nature of a collection. A second file consisted of manuscripts and correspondence related to particular excavations or collection episodes. These provided both raw data and understanding of the method and rationale behind the collections. The Museum's photographic archives was found to be a major resource. The images can be used to identify the presence of human remains not otherwise mentioned in the literature. The Dellinger era excavations are well represented, consisting of in situ views and close-ups of features. The old adage that a picture is worth a thousand words certainly applied here.

5. Academic Contributions: Papers, honors theses, master's theses, dissertations, class projects, and other sources of "in house" data were examined and included whenever appropriate.

7. Rumor: A last source of data was the checking of rumors. Reports of burials found in "gray" sources or informally mentioned by a variety of individuals were investigated when feasible. For example, the recollection that a large mortuary site was located in a particular stream valley. While results

tended to be meager, locational data was obtained in several instances.

Moving from Arkansas into Missouri, our access to the resources decreased. This resulted in an increased reliance on the published literature because state site files could not be searched specifically for burials.

1. Museum Catalog: An inventory of site numbers known to have produced human remains was kindly provided by the Anthropology Museum at the University of Missouri, Columbia. This list included only those sites with which the University of Missouri was recently involved. These site numbers had to be located in the literature prior to obtaining the other data categories.

2. Journals: The *Missouri Archeologist* and *Memoirs* were checked on an article by article basis, subject to availability in the Mullins library on the University of Arkansas campus. The *Missouri Archeologist Newsletter* was sampled. Searching the bibliographies located in the local journals provided access to the regional and national journals used during the Arkansas search.

3. Published monographs and archeological syntheses such as Harrington (1960) and Chapman (1975, 1980) were searched line by line for mention of osteological material. The bibliographies also proved helpful in locating potential mortuary sites.

4. Personal Communication: We communicated with Missouri institutions and individuals to obtain leads, especially for burial information not yet published. Manuscripts and limited circulation documents, such as the documentation on the Table Rock burials, were provided from Missouri upon request. The stumbling block was learning which specific manuscripts to request. Two important theses, however, could not be obtained prior to completion of the overview.

5. Reports: A final source of data consisted of limited distribution cultural resource management reports. These were helpful because they referenced previous discoveries of burials and rumored burials in their project areas. Information was generally limited to presence, with occasional burial descriptions and demographic data.

The search for Oklahoma remains was aided by a more comprehensive publication of osteological data.

1. Literature Indexes: Oklahoma is perhaps the best indexed state in the OAO study area and bibliographies such as Bell (1984a) provided both titles and abstracts. Indexes of the *Oklahoma Anthropological Bulletin* were utilized. Within the limits of availability, leads from these sources were tracked down.

2. Journals: The *Oklahoma Anthropological Society Bulletin* proved to be a major source of osteological data, conveying the findings of amateurs, students, and professionals. The *Oklahoma Anthropological Society Newsletter* was also searched, although with less spectacular results. Bibliography searches were used to gather information from national journals.

3. Major Syntheses: Monographs and syntheses of Oklahoma archeology were examined (e.g., Wyckoff and Brooks 1983; Wyckoff and Holman 1983). While these provided some site location data for osteological material, they were generally not productive in terms of osteological data.

4. Cultural Resource Management Reports: This class of reports, extended to include salvage reports and other sponsored research proved most productive in terms of sites with burials, burial descriptions, and bioarcheological data.

The quantity and quality of bioarcheological data varied considerably between states and areas within states. Comparison of the range of data with the history of bioarcheological investigations (see previous discussion) clearly establishes that the extent of bioarcheological knowledge is directly related to archeological pursuits and historic events. The information gathered during this search is used for making a number of recommendations for conducting similar bioarcheological inventory searches in the future. Because manual examination of the Arkansas Site File increased the number of sites known to have contained human skeletal remains by greater than 100% above the number identified in the literature, site files must be searched. Examination of museum photographic files and excavation notes will identify mortuary components not located during a search of the site files, especially for the early years of this century. Since searches of both the state site file and museum records produced bioarcheological data from analyses of human skeletal remains, they must also be used in locating bioarcheological data. Until recently, very few bioarcheological analyses were available in the published literature. The greatest amount of biological data will be obtained from unpublished master's and honor's theses (which are neither indexed nor abstracted as are dissertations), unpublished student papers (both for classes and independent study projects), and unpublished professional analyses stored in individual faculty, laboratory, and museum files.

It is intended that the mortuary component data to be presented next will help streamline this process in the future and that this data base will be continuously updated. It is estimated that between 80 and 90% of the archeological mortuary components have been identified.

The area surveyed in this overview (Figure 46) varies slightly from the boundaries of the OAO study area of the Southwestern Division of the Corps of Engineers defined in the scope of work. This divergence resulted from the decision that whole counties had to serve as the minimum search units and thus when the division boundary passed through portions of counties the entire county was included. As a result, some sites are discussed here (e.g., Poole, Adair, Standridge, etc.) that exist in the Ouachita drainage that is actually part of the Arkansas–Louisiana overview study area. The total bioarcheological resource base organized by site number is presented in Table 11. Table 12 provides a cross reference to site numbers arranged alphabetically by site name. The number of sites in the tables listed above differs slightly from the analysis and analysis tables provided below, because sites were added, as discovered, up until final editing of this overview.

Figure 46. Map of the bioarcheological study area

The data base survey of 84 counties identified 330 mortuary components which had produced a minimum of 4,018 prehistoric human skeletons. The mean frequency is 3.2 sites per county with a minimum of 0 and a maximum of 40. These same counties contain a total of 16,792 archeological sites and it was thought that the frequency of mortuary components per county might be related to the total number of sites per county (i.e., intensity of archeological research). However, the low correlation (Pearson's r = 0.39) between total sites and mortuary components suggests that the intensity of site identification is not the primary factor in the discovery of mortuary components. This relationship becomes only slightly stronger when the states are considered separately (i.e., Arkansas, r = 0.38; Missouri, r = 0.53; Oklahoma, r = 0.50).

As illustrated in Tables 13 and 14, the distribution of mortuary sites and burials are unequally distributed between the three states. Arkansas and Missouri are very similar with about 16 individuals per county and four individuals per site. Only 1.7% of all archeological sites contain a mortuary component. In contrast, Oklahoma averages 137 individuals per county producing any burials. Analysis of these data by county (i.e., number of sites, site types, site locations, number of mortuary sites, number of individuals, etc.) produced no systematic relationships between archeological site type characteristics and the number of mortuary components and individuals per county. The geographic distribution of mortuary components appears to show the greatest relationship with historical events. For example, the number of individuals per site is relatively small in most shelters, and the shelter was the primary site type sought by the early archeologists in the northern tier of counties in Arkansas and the southern tier in Missouri. Other clusters of mortuary site types in these two states are the product of reservoir salvage and modern cultural resource management projects. Oklahoma, on the other hand, experienced: (1) an interest in mounds and other site types by the early archeologists, (2) a number of WPA projects focused on large mounds, (3) large reservoir salvage projects with better funding and organization, and (4) academic research focused upon sites with large mortuary components. One important environmental variable which explains the larger Oklahoma skeletal samples is the better bone preservation which encouraged a greater interest in mortuary site excavations. The Oklahoma data are also biased by the fact that 40% of the mortuary sites and 66% of the individuals come from LeFlore County.

The major ecological variable is the distinction between sites in the uplands and broad alluvial valleys (Table 15). In the total OAO study area, 70.6% of the sites and 53.7% of the individuals are from upland locations. This distribution differs considerably by state. The largest area of Missouri has no broad alluvial valleys and thus only upland sites. In Arkansas, 13.0% of the sites and 21.7% of the individuals derive from alluvial sites (Arkansas Valley). One significant factor in this distribution is the difference in the size of the mortuary

Table 11. Bioarcheology data base for OAO study area

Site Number/Name		Period/Phase	Adaptation/	Drainage	Burials/	Analyis	Context/	Provenience
Arkansas								
3BA0000	Toul Creek	Mississippi	-	White River	1	none	Open	F
3BA0001	Buffalo	Woodland/Mississippi	3	White River	2	none	Cemetery	F
3BA0004	Clyde Bryant P1	-----------	-	White River	-	none	------	F
3BA0006	McClellan	Mississippi	3	Norfork River	-	none	------	F
3BA0007	Shipps Ferry	Mississippi	3	White River	1	none	Open	F
3BA0008	Pinkston	-----------	-	White River	-	part	Shelter	B
3BA0020	Young	Mississippi	3	White River	1	none	Open	F
3BA0028	Lyle House	Mississippi	3	White River	1	none	------	F
3BA0057	Sweat Shelter	-----------	-	White River	2	none	Shelter	B
3BA0065	Elmo Hurst	Archaic	-	White River	1	none	Open	F
3BE0000	McElhaney Cave	-----------	-	White River	11	none	Cave	U
3BE0001	Allred Bluff Sh	-----------	-	White River	3	none	Shelter	G
3BE0002	Bushwhack	Archaic/Wood/Mississ	-	White River	9	none	Shelter	C
3BE0003	Butler Shelters	Woodland/Mississippi	3	White River	9	part	Shelter	G
3BE0005	Butler Cave	-----------	-	White River	3	part	Shelter	G
3BE0006	Edens Bluff	Woodland/Mississippi	3	White River	17	part	Shelter	C
3BE0008	Indian Creek	Woodland/Mississippi	3	White River	3	none	Shelter	C
3BE0011	Red Bluff	Woodland/Mississippi	3	White River	7	none	Shelter	C
3BE0012	Morrison Sh	Woodland/Mississippi	3	White River	4	none	Shelter	C
3BE0013	Mallory Bluff	Woodland/Mississippi	3	White River	1	none	------	C
3BE0018	Salts Bluff	Woodland/Mississippi	3	White River	15	none	Shelter	C
3BE0021	White Bluff	Woodland/Mississippi	3	White River	8	none	Shelter	G
3BE0052	Siloam Burial	Mississippi	-	Illinois River	1	none	Shelter	C
3BE0174	Albertson	-----------	3	White River	2	none	Shelter	G
3BE0183	Alum Cave II	-----------	-	White River	1	none	Shelter	G
3BE0187	Prall Shelter	Mississippi	3	War Eagle River	4	none	Shelter	C
3BE0189	Blowing Springs	-----------	-	White River	6	none	Shelter	-
3BE0205	Butler Shelters	Woodland/Mississippi	3	White River	9	part	Shelter	G
3BE0212	Landigen	-----------	-	-----------	1	none	Shelter	E
3BO0001	Hangover Bluff	-----------	-	Crooked Creek	-	none	Shelter	F
3BO0102	Erwin East Sh	Woodland/Mississippi	3	-----------	-	none	Shelter	F
3BO0198	Shrimp Block Sh	Mississippi	3	Cove Creek	-	none	Shelter	F
3CE0001	------------	-----------	4	Little River	1	none	Open	F
3CE0009	Dean Stark Coll	-----------	-	Little Red River	1	none	Open	-
3CE0012	------------	-----------	4	Little Red River	2	none	Open	F
3CE0026	------------	-----------	-	Little Red River	5	none	------	-
3CE0029	Greers Ferry	-----------	4	Little Red River	1	part	------	F
3CN0004	Point Remove Md	-----------	4	Arkansas River	1	none	Mound	P
3CN0014	------------	-----------	4	Arkansas River	5	none	Open	P
3CN0117	Alexander	Coles Crk/Marksville	3	Arkansas River	9	comp	Open	F
3CN0117	Alexander	Mississippi	4	Arkansas River	4	comp	Open	F
3CR0002	Breckenridge Sh	Mississippi	3	White River	4	none	Shelter	C
3CR0005	Buzzard Roost	-----------	-	White River	2	none	Shelter	C
3CR0006	Waterfall Bluff	-----------	-	Kings River	1	none	Shelter	C
3CR0007	Walden Shelter	-----------	-	-----------	2	none	Shelter	C
3CR0008	Trigger Hill	-----------	-	Kings River	1	none	Shelter	C
3CR0010	Gregg Bluff	Woodland/Mississippi	3	Osage River	2	none	Shelter	C
3CR0011	Sisco Shelter	-----------	-	Osage Creek	2	none	Shelter	C
3CR0070	Red Rock	Archaic	-	North Fork River	2	none	Shelter	C
3CR0084	Collins	-----------	-	Osage River	1	none	Shelter	C
3CR0085	Myers Shelter	-----------	-	Piney Creek	1	none	Shelter	C
3CR0091	Dry Creek Val	-----------	-	White River	5	none	Shelter	C
3CW0005	Jones Bluff	Mississippi	3	Mountain Fork Cr	3	none	Shelter	C
3CW0006	Tidwell Hollow	Mississippi	3	Lee Creek	1	none	Shelter	C
3CW0007	Swearingen Farm	Woodland/L. Mississ	3	Lee Creek	5	none	Shelter	F
3CW0009	Frank Lee Bluff	Woodland/Mississippi	3	Mountain Fork Cr	1	none	Shelter	E
3CW0011	Beaver Bond B1	Mississ/Fort Coffee	3	----------	9	part	Shelter	F
3CW0025	Engineers Mound	Late Woodland	3	White River	1	none	Open	P
3CW0034	McClure	Mississippi/Spiro	4	Arkansas River	1	none	Open	P
3CW0070	Hale Cave	-----------	3	Cove Creek	1	none	-------	C
3CW0075	-----------	Late Archaic	-	Frog Bayou	0	none	Open	F
3CW0076	Arnold	Late Woodland	3	Arkansas River	0	none	Open	P
3CW0079	-----------	Mississippi	3	----------	1	part	Shelter	C
3FA0019	Mayflower	-----------	-	Palarm Creek	-	none	-------	F
3FR0001	Spinach Patch	Woodland/Gober Compl	3	Arkansas River	3	comp	Habitation	P
3FR0004	Trotter Place	L. Wood/Fourche Mal	3	Arkansas River	-	none	-------	P
3FR0058	-----------	Woodland/Mississippi	3	Big Mulberry Cr	-	none	-------	F
3GA0000	Hodges Farm	-----------	-	Arkansas River	1	none	-------	-
3GA0000	Ouachita River	-----------	-	Ouachita River	1	none	-------	-

Site Number: 0000 is unknown or unassigned; ZZ is county and site number unknown.
Adaptation Types: 1 Pleistocene/Holocene Transition; 2 Early to Middle Holocene; 3 Late Holocene Semi-Sedentary; 4 Late Holocene Sedentary
Burials: The total number of individuals are recorded here;Dash is used if skeletons were present, but the number could not be determined.
Provenience: A Alluvial Valley; B Hill; C Ridge; D Plain/Plateau; E Stream Valley/Floodplain;
F Stream Valley/Floodplain Upland; G Upland Intermediate; P Stream Valley; U Upland

Table 11, continued

Site Number/Name		Period/Phase	Adaptation/	Drainage	Burials/	Analyis	Context/	Provenience
3GA0001	Adair	Mississippi	4	Ouachita River	12	part	Cemetery	F
3IN0008	Magness	Woodland/Mississippi	-	White River	4	none	Open	P
31Z0013	Strawberry	Mississippi	4	Strawberry River	1	none	-------	F
31Z0016	-----------	-----------	-	White River	1	none	Shelter	C
3JA0000	Military Graveyd	Historic/European	1	White River	-	none	-------	-
3JA0465	Reynolds	Woodland/Baytown	6	White River	3	none	-------	-
3JO0000	Ilhoff	Mississippi	-	Illinois River	3	comp	Shelter	-
3JO0001	Toms Brook Grotto	Mississippi/Archaic	3	Little Piney Cr	1	none	Shelter	G
3LN0042	Toltec	Baytown/Coles Creek	3	Arkansas River	2	comp	Mound	P
3LN0119	Bill Carr	Mississippi/Dalton	-	Arkansas River	4	part	Habitation	P
3LO0015	Page	Mississippi	-	Petit Jean River	-	----	-------	-
3LO0031	River Mtn Indian	Archaic	-	Arkansas River	1	none	Habitation	F
3LW0044	Wagner III	Mississippi	-	Cache River	1	none	Habitation	P
3LW0094	Suttles II	Mississippi	4	White River	5	none	Open	P
3LW0106	Johnny Wilson	Mississippi	4	Cache River	19	comp	Habitation	P
3MA0000	Unknown Child	-----------	-	White River	1	none	--------	-
3MA0002	Pine Creek Sh	Mississippi	3	Piney Creek	3	none	Shelter	C
3MA0007	Dick Fitch Place	-----------	-	War Eagle River	1	none	Shelter	C
3MA0009	Scott Shelter	-----------	-	Kings River	1	none	Shelter	C
3MA0027	Marshall Farm	-----------	-	Kings River	2	none	Shelter	C
3MA0034	Holman	Mississippi	3	White River	1	none	Shelter	B
3MA0042	Poole Shelter	Woodland/Mississippi	3	White River	1	none	Shelter	C
3MA0053	Loy Walton II	Archaic	-	Richland Creek	1	none	-------	F
3MA0113	-----------	-----------	-	Kings River	3	none	-------	C
3MA0127	-----------	-----------	1	Kings River	-	none	-------	-
3MA0158	Henderson Creek	-----------	2	Kings River	-	none	-------	-
3MR0013	Newton	Mississippi	3	White River	3	part	Open	F
3MR0034	Tipps Sublette	Woodland/Mississippi	3	Johnnie Creek	6	part	Shelter	F
3MR0053	White Eagle	-----------	-	Rich Creek	3	none	-------	-
3MR0056	Wilkerson	Mississippi	3	White River	3	part	Open	F
3MR0102	Indian Shawnee	-----------	-	----------	-	none	-------	F
3NW005	Thompson Shelter	-----------	-	White River	1	none	-------	F
3NW0012	Raney	-----------	-	Mill Creek	1	none	Shelter	F
3NW0029	Hales Cave	Mississippi	3	Buffalo River	1	none	Shelter	F
3NW0254	Dr. Gayland Cave	Woodland/Mississippi	3	Harp Creek	5	none	Cave	F
3PP0017	Howell Farm	Woodland	-	Arkansas River	19	comp	-------	-
3PP0040	Falling Water	-----------	-	Buffalo River	-	none	Shelter	F
3PP0105	George W. Sheek	Woodland	-	Arkansas River	7	comp	Habitation	-
3PU0000	Keo	-----------	-	-----------	1	none	-------	-
3PU0002	Kinkead-Mainard	Mississippi/Quapaw	4	Arkansas River	57	part	Cemetery	P
3PU0205	-----------	-----------	-	Arkansas River	2	none	-------	P
3RA0019	Scatters Hidden	Archaic	-	Fourche Creek	4	none	Open	G
3RA0058	Cox	-----------	1	Black River	-	none	-------	-
3SC0002	Wilson Farm	Woodland/Mississippi	4	Poteau River	3	none	Open	F
3SC0004	Fuller Judy P1	Archaic/Woodland	4	Poteau River	3042	none	Cemetery	F
3SC0007	Strickland Is.	Archaic/Woodland	3	Poteau River	5	none	Open	F
3SE0000	Cedar Grove Cave	-----------	-	Buffalo River	12	none	Cave	U
3SE0001	Marble Bluff	Archaic/Woodland	3	-----------	5	none	Shelter	F
3ST0012	Mill Creek	Mississ/Greenbrier	4	White River	3	part	Cemetery	F
3WA0000	------------	-----------	-	White River	2	none	Cave	-
3WA0001	Collins Mound	Mississippi	3	White River	20	none	Mound	-
3WA0004	Putnam Shelter	Mississippi	3	War Eagle River	20	none	Shelter	C
3WA0005	Ricart	Mississippi	3	Illinois River	7	none	Shelter	C
3WA0006	Watts Farm	Mississippi/Loftin	3	White River	1	part	Shelter	C
3WA0007	Peterbottom Cave	Mississippi	3	War Eagle River	2	none	-------	C
3WA0008	Noahs Garden	-----------	-	-----------	1	none	-------	C
3WA0010	Brown Bluff	Mississippi	3	-----------	3	none	Shelter	C
3WA0014	Klondike Bluff	-----------	-	Hollow Creek	1	none	-------	C
3WA0016	Hulet Cave	Mississippi	3	Illinois River	1	none	Shelter	C
3WA0019	Gibson Shelter	Woodland/Mississippi	3	War Eagle River	2	none	Shelter	C
3WA0020	Morres Creek	-----------	-	Illinois River	1	none	Shelter	-
3WA0062	Thomas Cave	Woodland/Mississippi	3	Illinois River	5	none	Cave	C
3WA0097	Mayes	-----------	-	War Eagle Creek	3	none	Shelter	C
3WA0122	------------	-----------	-	Beaver Lake	1	part	-------	-
3WA0128	Shiloh Shelter	Archaic/Woodland	3	War Eagle River	1	part	Shelter	C
3WA0143	Lynch Shelter	-----------	-	Illinois River	1	comp	Shelter	C
3WH0001	------------	-----------	-	-----------	1	none	-------	-
3WH0002	Hollingsworth P1	-----------	4	Little Red River	5	none	Open	-
3WH0004	------------	Mississippi	3	White River	12	none	Mound	P

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Provenience: A Alluvial Valley; B Hill; C Ridge; D Plain/Plateau; E Stream Valley/Floodplain;
F Stream Valley/Floodplain Upland; G Upland Intermediate; P Stream Valley; U Upland

Table 11, continued

Site Number/Name		Period/Phase	Adaptation/	Drainage	Burials/	Analysis	Context/	Provenience
3WH0034	Soc	-----------	-	Little Red River	2	none	Habitation	P
3YE0006	Delaware Creek	-----------	-	Delaware Creek	1	none	-------	-
3YE0014	Carden Bottoms	Protohistoric	4	Arkansas River	4	none	-------	P
3YE0015	Aikman Farm	Mississippi	4	Fourche La Fave	7	part	Mound	F
3YE0020	Bullock	-----------	-	-----------	1	none	-------	-
3YE0024	Jeff Davis P1	-----------	-	-----------	1	none	-------	F
3ZZ0000	Gilbert Shelter	-----------	-	-----------	1	none	Shelter	-
3ZZ0000	Randolf Landing	-----------	-	-----------	1	none	-------	-
Missouri								
23BU0010	------------	-----------	-	Black River	4	none	-------	U
23BU0021	Turner	-----------	-	Black River	5	none	-------	U
23BY0000	Montgomery Farm	Woodland/Mississippi	3	White River	26	comp	Shelter	U
23BY0000	------------	-----------	-	Owl Creek	5	none	Cemetery	-
23BY0001	Ash Cave	-----------	-	White River	1	none	Cave	U
23BY0002	McDowell Cave	-----------	-	White River	1	none	Cave	U
23BY0003	Rock House Cave	-----------	3	White River	1	none	Cave	U
23BY0004	Lower Rock House	-----------	-	White River	5	none	Shelter	U
23BY0005	Natural Bridge	-----------	-	White River	1	none	Shelter	U
23BY0009	Shallow Bluff	-----------	3	White River	1	none	Shelter	U
23BY0157	------------	-----------	3	White River	-	none	Cairn	U
23BY0161	------------	-----------	3	White River	2	none	Cairn	U
23BY0162	Roaring River	-----------	-	White River	-	none	Cairn	U
23BY0175	------------	-----------	-	White River	-	none	Cairn	U
23BY0189	------------	-----------	-	Kings River	1	part	-------	U
23BY0323	------------	-----------	-	Kings River	18	part	-------	U
23BY0365	------------	-----------	-	Kings River	-	none	-------	U
23BY0365	Epperly Cairn	-----------	-	White River	-	none	Cairn	U
23BY0380	------------	-----------	-	White River	1	none	-------	U
23BY0383	------------	-----------	-	White River	18	part	-------	U
23BY0388	Jackie Shelter	Multiple Component	2	Kings River	53	part	Shelter	U
23BY0388	Jackie Shelter	Multiple Component	3	Kings River	-	part	Shelter	U
23BY0449	------------	-----------	-	Kings River	-	none	-------	U
23BY0471	------------	-----------	-	White River	1	none	Shelter	U
23BY0476	------------	-----------	3	White River	1	none	Shelter	U
23BY0523	------------	-----------	-	White River	7	none	-------	U
23BY0530	------------	-----------	3	White River	1	none	Shelter	U
23CE0148	Umber Point	Bolivar Complex	3	Sac River	18	comp	Mound	U
23CE0150	Sorters Bluff	Bolivar Complex	3	Sac River	12	comp	Mound	U
23CE0152	Bowling Stone	Bolivar Complex	3	Sac River	7	comp	Mound	U
23CE0154	Sycamore Bridge	Bolivar Complex	3	Sac River	3	comp	Mound	U
23CN0013	Delaware Bridge	Woodland	3	James River	12	part	Cairn	U
23CN0064	Patterson Spg	Middle Woodland	3	James River	2	none	Village	U
23CN0652	Finly Rock	Late Woodland	3	White River	2	none	Shelter	U
23CT0009	------------	Mississippi	3	Current River	1	none	Cave	U
23DA0201	Morgan Mound	Fristoe Burial Compl	3	Little Sac River	3	none	Mound	U
23DA0207	Taler Cave	------------	-	Little Sac River	1	none	Cave	U
23DA0221	Comstock Mound	Late/Protohistoric	4	Little Sac River	1	comp	Mound	U
23DA0222	Tunnel Bluff	Bolivar Complex	3	Little Sac River	11	comp	Mound	U
23DA0225	Bunker Hill	Bolivar Complex	3	Sac River	13	comp	Mound	U
23DA0226	Divine Mound	Bolivar Complex	3	Sac River	13	comp	Mound	U
23DA0246	Paradise Tree	Bolivar Complex	3	Sac River	10	comp	Mound	U
23DA0250	Eureka Mound	Woodland/Mississippi	3	Sac River	4	comp	Mound	U
23GR0113	Doling Cave	------------	-	James River	1	none	Cave	U
23GR0402	Indian Spring	Archaic or Woodland	-	James River	6	none	Open	U
23MD0000	------------	------------	-	Neosho River	-	none	-------	U
23MD0000	Scenic Bluff	------------	3	Neosho River	3	none	Shelter	U
23MD0000	------------	------------	-	Neosho River	1	none	-------	U
23MD0000	Bone Brake	------------	3	Neosho River	4	none	Shelter	U
23MD0000	------------	------------	-	Neosho River	1	none	-------	U
23MD0000	Christman Sh	------------	-	Neosho River	1	none	-------	U
23MD0000	Elk Spring	------------	3	Neosho River	1	none	Shelter	U
23MD0000	------------	------------	-	Neosho River	13	none	-------	U
23MD0000	Jacobs Cavern	------------	-	Little Sugar Cr	6	none	Cave	U
23MD0001	Hall Bluff	------------	-	Neosho River	1	none	Shelter	U
23MD0002	Brittle Hollow	------------	3	Neosho River	3	none	Cave	U
23MD0008	Tie Bluff	------------	-	Neosho River	3	none	Shelter	U
23MD0009	Schoonover Bluff	------------	-	Neosho River	1	none	Shelter	U
23MD0043	Brontke Shelter	------------	-	Neosho River	1	none	Shelter	U
23OR0000	------------	------------	-	Loutre Creek	6	none	Mound	U

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Table 11, continued

Site Number/Name		Period/Phase	Adaptation/	Drainage	Burials/	Analyis	Context/	Provenience
23OR0043	Marked Mound	------------	3	Eleven Point Ri	2	none	Mound	U
23OZ0001	------------	Mississippi/Loftin	3	White River	-	none	-------	U
23PO0306	Slick Rock	Bolivar Complex	3	Little Sac River	14	comp	Mound	U
23RI0159	Lepold	------------	-	----------	-	none	-------	U
23SH0000	------------	Early Mississippi	3	Current Eleven	3	part	-------	U
23SH0010	Owls Bend	Early Mississippi	3	Current River	3	comp	Open	U
23SH0012	Childers Cave	------------	-	Current Eleven	1	none	-------	U
23SH0019	Round Spring	Middle Mississippi	-	Current River	-	none	Cemetery	U
23SH0024	------------	-----------	-	Current River	-	none	Cairn	U
23SN0000	------------	-----------	-	White River	3	none	-------	U
23SH0000	------------	Mississippi	3	James River	1	comp	Open	U
23SN0000	------------	-----------	-	James River	1	part	Open	U
23SN0001	Hay Cave	-----------	-	White River	1	none	Cave	U
23SN0002	------------	-----------	-	James River	1	none	Cave	U
23SN0042	Loftin I	Mississippi/Loftin	3	White River	1	none	Mound	U
23SN0095	Haggard	-----------	-	White River	1	none	Open	U
23SN0189	Lander Shelter	Mississippi	3	White River	1	none	Shelter	U
23SN0200	Rice	Archaic	2	White River	2	none	-------	U
23SN0200	Rice	Woodland	3	White River	4	none	-------	U
23SN0200	Rice	Unassigned	-	White River	10	part	-------	U
23SN0201	Fitzgerald	-----------	-	White River	2	none	-------	U
23SN0203	Vaughn I	Mississippi/Loftin	-	White River	6	none	Village	U
23SN0204	------------	-----------	-	Kings River	1	part	-------	U
23SN0205	Lewellyn I	-----------	-	White River	1	none	Open	U
23SN0211	Lewellyn II	-----------	-	White River	3	none	-------	U
23SN0275	Townsend Shelter	-----------	-	White River	1	none	Cave	U
23SN0284	Dotson Shelter	-----------	-	White River	2	none	Shelter	U
23SN0564	------------	-----------	-	White River	2	none	Cairn	U
23SN0565	------------	-----------	-	White River	2	none	Cairn	U
23TA0000	------------	-----------	-	White River	2	none	-------	U
23TA0000	------------	-----------	-	White River	1	none	-------	U
23TA0000	------------	-----------	-	White River	1	none	-------	U
23TA0000	------------	-----------	-	White River	1	none	Mound	U
23TA0002	------------	-----------	-	White River	2	none	Open	U
23TA0008	------------	-----------	-	White River	2	none	Open	U
23WR0018	Farr Cairn	Fristoe	3	Gasconade River	3	none	Cairn	U
23ZZ0000	White Bluff	-----------	-	-----------	2	none	-------	U
Oklahoma								
34AD0008	Owls Cave	Mississippi/Spiro	3	-----------	3	none	Cave	U
34CG0005	Vinita Springs	Mississippi/Spiro	4	Grand River	1	none	-------	U
34CG0015	Lundy	Mississippi/Spiro	3	Little Cabin Cr	19	comp	-------	U
34CK0006	Harlan	Mississippi/Harlan	4	Neosho River	195	none	-------	A
34CK0012	Cookson	Mississippi/Spiro	4	Illinois River	4	none	-------	-
34CK0012	Cookson	Mississ/Fort Coffee	4	Illinois River	1	none	-------	-
34CK0030	Swimmer	Mississippi/Spiro	4	Illinois River	-	none	Cemetery	A
34CK0032	Vanderpool	L. Wood/Fourche Mal	3	Illinois River	3	none	Habitation	A
34CK0039	Morris	Mississippi/Spiro	4	Illinois River	75	part	Cemetery	A
34CK0043	Brackett	Mississippi/Spiro	4	Illinois River	27	none	Cemetery	A
34CK0044	Smullins Shelter	Mississ/Fort Coffee	3	Illinois River	9	part	Shelter	-
34CK0094	Barren Fork	Mississ/Fort Coffee	-	Barren Fork Cr.	4	comp	Open	-
34DL0000	Delaware	-----------	-	-----------	-	none	--------	-
34DL0001	Reed Center	Mississippi/Harlan	4	Elk River	46	none	-------	A
34DL0012	Huffaker	Mississippi/Harlan	4	Elk River	26	none	Cemetery	A
34DL0030	Copeland I	Mississ/Fort Coffee	3	Woodward Hollow	-	none	Shelter	-
34DL0042	Smith II	Mississ/Fort Coffee	4	Arkansas River	5	none	Shelter	A
34DL0047	Copeland II	Mississ/Fort Coffee	3	Neosho River	6	part	Shelter	-
34DL0048	Copper Shelter	Archaic/Woodland	-	Grand River	50	none	Shelter	-
34DL0055	Smith I	Mississippi/Neosho	3	Grand River	3	part	Shelter	A
34DL0055	Smith I	Archaic/Grove Focus	2	Grand River	13	part	Shelter	-
34DL0057	Guffy IV	Mississ/Fort Coffee	3	Cowskin River	5	none	-------	-
34DL0065	School Land	Mississippi/Harlan	4	Grand River	1	none	-------	A
34HS0011	Tyler	Mississ/Fort Coffee	4	Arkansas River	1	none	-------	A
34HS0019	Bill Ross	Mississippi/Harlan	4	----------	-	none	-------	A
34HS0024	-----------	Mississ/Fort Coffee	4	Arkansas River	3	none	-------	A
34HS0025	Otter Creek	Wood/Fourche Maline	3	Sans Bois Creek	4	none	Midden	A
34HS0055	-----------	Wood/Fourche Maline	3	Sans Bois Creek	-	none	Midden	A
34HU0061	Bohannon	Mississippi/Harlan	4	----------	4	none	-------	-
34LF0001	-----------	Mississippi/Spiro	4	Poteau River	-	none	-------	A
34LF0009	Holson Creek	Mississippi/Spiro	4	Holson Creek	-	none	Mound	A

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Table 11, concluded

Site Number/Name		Period/Phase	Adaptation/	Drainage	Burials/	Analyis	Context/	Provenience
34LF0010	Ward	Wister/Fche Maline	3	Poteau River	3	none	-------	A
34LF0011	Scott	Wood/Fourche Maline	3	Fourche Maline	27	comp	-------	A
34LF0013	Henry Heflin II	Wister/Fche Maline	3	Poteau River	14	none	-------	U
34LF0014	Henry Heflin I	Wister/Fche Maline	3	Poteau River	52	none	-------	U
34LF0015	Lee Redwine II	Wister/Fche Maline	3	Poteau River	18	none	-------	U
34LF0017	S O DeHart II	Wister/Fche Maline	3	Fourche Maline	34	none	-------	U
34LF0018	S O DeHart I	Wister/Fche Maline	3	Fourche Maline	35	none	-------	U
34LF0019	Mrs Hooks	Wister/Fche Maline	3	Fourche Maline	93	none	-------	U
34LF0020	Copeland	Wister/Fche Maline	3	Fourche Maline	89	none	-------	U
34LF0021	N E Conner	Wister/Fche Maline	3	Fourche Maline	35	none	-------	U
34LF0022	John Smith	Wister/Fche Maline	3	Fourche Maline	32	none	-------	U
34LF0023	Henry Peck	Wister/Fche Maline	3	Fourche Maline	13	none	-------	U
34LF0024	Williams I	Archaic/Wister	3	Fourche Maline	149	none	Cemetery	U
34LF0025	J W Williams II	Wister/Fche Maline	3	Poteau River	17	none	-------	U
34LF0026	Bennett Monroe	Wister/Fche Maline	3	Fourche Maline	8	none	-------	U
34LF6027	Wann	Wood/Fourche Maline	3	Fourche Maline	37	comp	-------	U
34LF0028	Sam	Mississippi	4	Holston Creek	5	comp	-------	U
34LF0028	Sam	Wood/Fourche Maline	3	Holston Creek	67	comp	-------	U
34LF0029	Raymond Mackey	Wister/Fche Maline	3	Poteau River	204	none	-------	U
34LF0031	Lymon Moore	Mississ/Fort Coffee	4	Arkansas River	54	part	Cemetery	A
34LF0032	Dan Akers	Wister/Fche Maline	3	Poteau River	204	none	-------	U
34LF0033	Troy Adams	Mississippi/Harlan	4	Poteau River	77	none	Midden	U
34LF0039	Shippey	Wister/Fche Maline	3	Fourche Maline	1	none	-------	U
34LF0040	Spiro	Woodland/Evans	3	Arkansas River	67	part	Cemetery	A
34LF0040	Spiro	Mississippi/Harlan	-	Arkansas River	225	part	Mound	A
34LF0040	Spiro	Mississippi/Spiro	4	Arkansas River	290	part	Mound	A
34LF0042	Gertrude Bowman	Mississippi/Spiro	4	Arkansas River	26	none	Cemetery	-
34LF0043	J J Phillips	Wister/Fche Maline	3	Poteau River	61	none	-------	U
34LF0045	Sy Watkins	Wister/Fche Maline	3	Poteau River	3	none	-------	U
34LF0060	Littlefield I	Mississippi/Harlan	4	Arkansas River	4	none	-------	A
34LF0067	Granville Bowman	Mississ/Fort Coffee	4	Arkansas River	19	none	Cemetery	A
34LF0069	Skidgel I	Mississippi/Spiro	4	Arkansas River	20	none	-------	U
34LF0077	Braden	Mississippi/Spiro	4	Arkansas River	13	none	Cemetery	A
34LF0080	Ainsworth	Mississ/Fort Coffee	4	Arkansas River	12	none	-------	A
34LF0082	Littlefield IV	Mississippi/Harlan	4	Arkansas River	1	none	-------	U
34LF0117	-----------	Mississippi/Spiro	4	Black Fork Cree	-	none	Midden	U
34LF0137	Kaiser Tucker	Mississippi/Harlan	4	Arkansas River	1	none	-------	A
34LF0222	Shady Point	Wood/Fourche Maline	3	Arkansas River	-	none	Midden	U
34LT0003	-----------	Wood/Fourche Maline	3	-----------	1	none	-------	A
34LT0011	McCutchen-McLaughlin	Wood/Fourche Maline	3	Fourche Maline n	47e	comp	Midden	U
34LT0014	P Johnson	Wood/Fourche Maline	3	Gaines Creek n	-e	none	Midden	A
34LT0054	The Runner	Mississippi/Spiro	4	Fourche Maline	3	none	Midden	U
34MI0045	Eufaula Mound	Mississippi/Harlan	4	Canadian River	139	none	Mound	A
34MI0063	Plantation	Mississippi/Harlan	4	Arkansas River	9	none	Habitation	U
34MS0005	Hughes	Mississippi/Harlan	4	Arkansas River	18	none	Cemetery	A
34MS0052	Cat Smith	Mississippi/Spiro	4	Arkansas River	2	none	Habitation	U
34MS0076	Wybark	Mississ/Fort Coffee	4	Arkansas River	1	part	Habitation	A
34MS0114	Greenleaf	Wood/Fourche Maline	3	Arkansas River n	-e	none	-------	A
34MS0130	Brewer Bend	Mississippi/Harlan	4	Arkansas River	-	none	-------	A
34MS0136	Travesty	-----------	-	Arkansas River	2	comp	Grave	A
34MY0054	Pohly	Mississ/Fort Coffee	3	Salina Creek	5	none	Shelter	U
34MY0077	Shetley Shelter	Late Archaic	3	Grand River	-	none	Shelter	A
34NW0002	Craig	-----------	-	Verdigris River	5	none	-------	-
34OG0010	-------------	Historic/Creek	1	-----------	4	none	-------	-
34PU0116	Bug Hill	Wood/Fourche Maline	3	Jackfork Creek	6	comp	Midden	U
34PU0116	Bug Hill	Mississippi	3	Jackfork Creek	2	comp	Habitation	U
34PU0116	Bug Hill	Archaic/Wister	3	Jackfork Creek	16	comp	Midden	U
34SQ0013	Horton	Mississippi/Spiro	4	Arkansas River	42	part	Cemetery	A
34SQ0013	Fine	Mississippi/Harlan	4	Arkansas River	6	none	Habitation	A
34SQ0018	Harvey	Mississ/Fort Coffee	4	Arkansas River	3	none	Midden	U
34SQ0022	Sheffield	Mississ/Fort Coffee	4	Arkansas River	12	none	Habitation	A
34SQ0290	Applegate Cove	-----------	-	Canadian River	1	comp	-------	-
34TU0038	------------	Historic/Creek	1	Lake Keystone	-	----	-------	-
34WG0002	Norman Center	Mississippi/Spiro	4	Grand River	72	none	Mound	A
34WG0002	Norman Center	Mississ/Fort Coffee	4	Grand River	59	none	Mound	A
34WG0025	Three Forks Local	Historic	4	------------	3	none	-------	-

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Table 12. Mortuary site components with site names organized alphabetically

ARKANSAS	
3GA0001	Adair
3YE0015	Aikman Farm
3BE0174	Albertson
3CN0117	Alexander
3BE0001	Allred Bluff
3BE0183	Alum Cave II
3CW0076	Arnold
3CW0011	Beaver Pond Bluff
3LN0119	Bill Carr
3BE0189	Blowing Springs
3CR0002	Brackenridge
3WA0010	Brown Bluff
3BA0001	Buffalo
3YE0020	Bullock
3BE0002	Bushwhack
3BE0005	Butler Cave
3BE0003	Butler Shelters
3BE0205	Butler Shelters
3CR0005	Buzzard Roost
3YE0014	Carden Bottoms
3SE0000	Cedar Grove Cave
3BA0004	Clyde Bryant Place
3GA0000	Clyde Hodges Farm
3WA0001	Collins Mound Group
3CR0084	Collins
3RA0058	Cox
3CE0009	Dean Stark Collection
3YE0006	Delaware Creek
3MA0007	Dick Fitch Place
3NW0254	Dr. Gayland Cave
3CR0091	Dry Crock Valley
3BE0006	Edens Bluff
3BA0065	Elmo Hurst
3IN0025	Engineers Mound
3BO0102	Erwin East Shelter
3PP0040	Falling Water
3CW0009	Frank Lee Bluff
3SC0004	Fuller Judy Place
3PP0105	George W. Cheek
3WA0019	Gibson Shelter
3ZZ0000	Gilbert Shelter
3CE0029	Greers Ferry
3CR0010	Gregg Bluff
3CW0070	Hale Cave
3NW0029	Hales Cave
3BO0001	Hangover Bluff
3MA0158	Henderson Creek
3WH0002	Hollingsworth Place
3MA0034	Holman
3PP0017	Howell Farm
3WA0016	Hulet Cave
3JO0000	Ilhoff
3BE0008	Indian Creek Shelters
3MR0102	Indian Shawnee Cave
3YE0024	Jeff Davis Place
3LW0106	Johnny Wilson
3CW0005	Jones Bluff
3PU0000	Keo
3PU0002	Kinkead-Mainard
3WA0014	Klondike Bluff
3BE0212	Landigen
3MA0053	Loy Walton II
3BA0028	Lyle House
3WA0143	Lynch Shelter
3IN0008	Magness
3BE0013	Mallory Bluff
3SE0001	Marble Bluff
3MA0027	Marshal Farm
3WA0097	Mayes
3FA0019	Mayflower
3BA0006	McClellan
3CW0034	McClure
3BE0000	McElhaney
3JA0000	Military Graveyard
3ST0012	Mill Creek
3WA0020	Morres Creek
3BE0012	Morrison Shelter
3CR0085	Myers Shelter
3MR0013	Newton
3WA0008	Noahs Garden
3GA0000	Ouachita River Find
3LO0015	Page
3WA0007	Peterbottom Cave
3MA0002	Pone Creek Shelter
3BA0008	Pinkston
3CN0004	Point Remove Mound
3MA0042	Poole Shelter
3BE0187	Prall Shelter
3WA0004	Putnam Shelter
3ZZ0000	Randolph Landing
3NW0012	Raney
3BE0011	Red
3CR0070	Red Rock
3JA0465	Reynolds
3WA0005	Ricart
3LO0031	River Mountain Indian
3BE0018	Salts Bluff
3RA0019	Scatters Midden
3MA0009	Scott Shelter
3WA0128	Shiloh Shelter
3BA0007	Shipps Ferry
3BO0198	Shrimp Block
3BE0052	Siloam Burial
3CR0011	Sisco Shelter
3WH0034	Soc
3FR0001	Spinach Patch
31Z0013	Strawberry
3SC0007	Strickland Is.
3LW0094	Suttles II
3CW0007	Swearingen Farm
3BA0057	Sweat Shelter
3WA0062	Thomas Cave
3NW0005	Thompson Shelter
3CW0006	Tidwell Hollow
3MR0034	Tipps Sublette
3LN0042	Toltec
3JO0001	Toms Brook Grotto
3BA0000	Toul Creek
3CR0008	Trigger Hill
3FR0004	Trotter Place
3MA0000	Unknown Child
3LW0044	Wagner III
3CR0007	Walden Shelter
3CR0006	Waterfall Bluff
3WA0006	Watts Farm
3BE0021	White Bluff
3MR0053	White Eagle
3MR0056	Wilkerson
3SC0002	Wilson Farm
3BA0020	Young
OKLAHOMA	
34LF0080	Ainsworth
34SQ0290	Applegate Cove
34CK0094	Barren Fork Burial
34LF0026	Bennett Monroe
34HS0019	Bill Ross
34HU0061	Bohannon
34CK0043	Brackett
34LF0077	Braden
34MS0130	Brewer Bend
34PU0116	Bug Hill
34MS0052	Cat Smith
34CK0012	Cookson
34DL0047	Copeland Shelter II
34LF0020	Copeland
34DL0048	Copper Shelter
34NW0002	Craig
34LF0032	Dan Akers
34DL0000	Delaware County
34MI0045	Eufaula Mound
34SQ0013	Fine
34LF0042	Gertrude Bowman
34LF0067	Granville Bowman
34MS0114	Greenleaf Rec.
34DL0057	Gruffy IV
34CK0006	Harlan
34SQ0018	Harvey
34LF0013	Henry Heflin II
34LF0014	Henry Heflin I
34LF0023	Henry Peck
34LF0009	Holson Creek
34SQ0011	Horton
34DL0012	Huffaker
34MS0005	Huges
34CH0112	Hugo Dam
34LF0043	J J Phillips
34LF0025	J W Williams II
34LF0022	John Smith
34LF0137	Kaiser Tucker
34LF0015	Lee Redwine II
34LF0082	Littlefield IV
34LF0060	Littlefield I
34CG0015	Lundy
34CH0001	Mahaffey
34LT0011	McCutchen-McLaughlin
34CH0089	McKennie
34LF0031	Moore
34CK0039	Morris
34LF0019	Mrs Hooks
34LF0021	N E Conner
34WG0002	Norman Center
34HS0025	Otter Creek
34AD0008	Owls Cave
34LT0014	P Johnson
34CH0053	Payne
34MI0063	Plantation
34MY0054	Pohly
34LF0029	Raymond Mackay
34DL	Reed Center
34LF0017	S O DeHart II
34LF0018	S O DeHart I
34LF0028	Sam
34DL0065	School Lane II
34LF0011	Scott
34LF0222	Shady Point
34SQ0022	Sheffield
34MY0077	Shetley Shelter
34LF0039	Shippey
34LF0069	Skidgel I
34DL0055	Smith I
34DL0042	Smith II
34CK0044	Smullins Shelter
34LF0040	Spiro
34CK0030	Swimmer
34LF0045	Sy Watkins
34LT0054	The Runner
34WG0025	Three Forks Local
34MS0136	Travesty
34LF0033	Troy Adams
34HS0011	Tyler
34CK0032	Vanderpool
34CG0005	Vinita Springs
34LF0027	Wann
34LF0010	Ward
34LF0024	Williams I
34MS0076	Wybark
MISSOURI	
23BY0001	Ash Cave
23MD0000	Bone Brake Bluff
23MD0043	Bontke Shelter
23CE0152	Bowling Stone Mound
23MD0002	Brittle Hollow Cave
23DA0225	Bunker Hill Mound
23SH0012	Childers Cave
23MD0000	Christman Shelter
23DA0221	Comstock Mound
23CN0013	Delaware Bridge
23DA0226	Divine Mound
23GR0113	Doling Cave
23SN0284	Dotson Shelter
23MD0000	Elk Spring
23BY0365	Epperly Cairn
23DA0250	Eureka Mound
23WR0018	Farr Cairn
23CN0652	Finly Rock Shelter
23SN0201	Fitzgerald Shelter
23SN0095	Haggard
23MD0001	Hall Bluff
23SN0001	Hay Cave
23GR0402	Indian Spring
23BY0388	Jackie Shelter
23MD0000	Jacobs Cavern
23SN0189	Lander Shelter
23RI0159	Lepold
23SN0211	Lewellyn II
23SN0205	Lewellyn I
23SN0042	Loftin I
23BY0004	Lower Rock House
23OR0043	Marked Mound
23BY0002	McDowell Cave
23BY0000	Montgomery Farm
23DA0201	Morgan Mound
23BY0005	Natural Bridge
23SH0010	Owls Bend
23DA0246	Paradise Tree Mound
23SN0200	Rice
23BY0162	Roaring River
23BY0003	Rock House Cave
23SH0019	Round Spring
23MD0000	Scenic Bluff
23BY0009	Shallow Bluff
23PO0306	Slick Rock Moun
23CE0150	Sorters Bluff
23CE0154	Sycamore Bridge
23MD0009	Schoonover Bluff
23DA0207	Taler Cave
23MO0008	Tie Bluff
23SN0275	Townsend Shelter
23DA0222	Tunnel Bluff
23CN0064	Patterson Spring
23BU0021	Turner
23CE0148	Umber Point Mound
23SN0203	Vaughn I
23ZZ0000	White Bluff

Table 13. Distribution of individuals and cultural components by county

	Arkansas	Missouri	Oklahoma	Total
Individuals	557	396	3020	3973
Components	138	96	93	327
Counties	35	26	22	83
Individual/Component	4.0	4.1	32.5	12.1
Individual/County	16.0	15.2	137.3	47.7
Component/County	3.9	3.7	4.2	3.9

Table 14. Number of burials by county

State	County		Number	State	County		Number	State	County		Number
Arkansas	BA	Baxter	19	Arkansas	ST	Stone	3	Oklahoma	AD	Adair	3
	BE	Benton	113		VB	Van Burn	0		CK	Cherokee	13
	BO	Boone	0		WA	Washington	72		CG	Craig	20
	CR	Carroll	24		WH	White	20		DL	Delaware	150
	CE	Cleburne	10		YE	Yell	14		HS	Haskell	8
	CN	Conway	19						HU	Hughes	4
	CW	Crawford	21						LT	Latimer	51
	FA	Faulkner	0						LF	LeFlore	2036
	FR	Franklin	3						MY	Mayes	5
	FU	Fulton	0	Missouri	BA	Barry	144		MI	McIntosh	111
	GA	Garland	14		BU	Butler	9		MS	Muskogee	23
	IN	Independence	5		CT	Carter	1		NW	Nowata	5
	IZ	Izard	2		CN	Christian	16		OM	Okmulgee	1
	JA	Jackson	0		DA	Dade	56		OT	Ottawa	0
	JO	Johnson	4		DE	Dent	0		PS	Pittsburg	0
	LW	Lawrence	23		DG	Douglas	0		PU	Pushmataha	24
	LO	Logan	1		GR	Greene	7		RO	Rogers	0
	LN	Lonoke	6		HL	Howell	0		SQ	Sequoyah	63
	MA	Madison	14		JP	Jasper	0		TU	Tulsa	1
	MR	Marion	15		LA	Lawrence	0		WG	Wagoner	34
	MN	Montgomery	3		MD	McDonald	33		WN	Washington	0
	NW	Newton	8		NE	Newton	0				
	PE	Perry	0		OR	Oregon	2				
	PO	Polk	0		OZ	Ozark	0				
	PP	Pope	26		RE	Reynolds	0				
	PU	Pulaski	60		RI	Ripley	0				
	RA	Randolph	4		SH	Shannon	7	Kansas	CH	Cherokee	0
	SA	Saline	0		SN	Stone	48		CR	Crawford	0
	SC	Scott	50		TA	Taney	7		LA	Labette	0
	SE	Searcy	5		TE	Texas	0				
	SB	Sebastian	0		WE	Webster	0				
	Sh	Sharp	0		WR	Wright	3				

Table 15. Distribution of individuals and cultural components by location

		Arkansas	Missouri	Oklahoma	Total
Upland					
Individual	(N)	353	396	1384	2133
	(%)	63.4	100.0	45.8	53.7
Component	(N)	98	96	37	231
	(%)	71.0	100.0	39.8	70.6
Individual/Component		3.6	4.1	37.4	9.2
Alluvial Valley					
Individual	(N)	121	0	1451	1572
	(%)	21.7	0.0	48.0	39.6
Component	(N)	18	0	42	60
	(%)	13.0	0.0	45.2	18.3
Individual/Component		6.7	0.0	34.5	26.2
Unassigned					
Individual	(N)	83	0	185	268
	(%)	14.9	0.0	6.1	6.7
Component	(N)	22	0	14	36
	(%)	15.9	0.0	15.0	11.0
Individual/Component		3.7	0.0	13.2	7.4
Total					
Individual	(N)	557	396	3020	3973
Component	(N)	138	96	93	327
Individual/Component		4.0	4.1	32.5	12.1

Table 16. Distribution of individuals and components by burial context

			Arkansas	Missouri	Oklahoma	Total
Cave						
	Individual	(N)	12	12	3	27
		(%)	2.2	3.0	0.1	0.7
	Component	(N)	3	10	1	14
		(%)	2.2	10.4	1.1	4.3
Shelter						
	Individual	(N)	227	108	91	426
		(%)	40.8	27.3	3.0	10.7
	Component	(N)	65	19	9	93
		(%)	47.1	19.8	9.7	28.4
Habitation						
	Individual	(N)	34	3	2	39
		(%)	6.1	0.8	0.1	1.0
	Component	(N)	6	2	1	9
		(%)	4.3	2.1	1.1	2.8
Hidden						
	Individual	(N)	0	0	83	83
		(%)	0.0	0.0	2.7	2.1
	Component	(N)	0	0	7	7
		(%)	0.0	0.0	11.8	2.1
Open						
	Individual	(N)	71	21	0	92
		(%)	12.7	5.3	0.0	2.3
	Component	(N)	23	9	0	32
		(%)	16.7	9.4	0.0	9.8
Mound						
	Individual	(N)	42	118	715	875
		(%)	7.5	29.8	23.7	22.0
	Component	(N)	5	16	7	28
		(%)	3.6	16.7	7.5	8.6
Cemetery						
	Individual	(N)	116	8	542	666
		(%)	20.8	2.0	17.9	16.8
	Component	(N)	5	2	11	18
		(%)	3.6	2.1	11.8	5.5
Grave						
	Individual	(N)	0	0	0	2
		(%)	0.0	0.0	0.0	0.0
	Component	(N)	0	0	0	1
		(%)	0.0	0.0	0.0	0.3
Cairn						
	Individual	(N)	0	21	0	21
		(%)	0.0	5.3	0.0	0.5
	Component	(N)	0	10	0	10
		(%)	0.0	10.4	0.0	3.0
Unassigned						
	Individual	(N)	55	105	1582	1742
		(%)	9.9	26.5	52.4	43.8
	Component	(N)	31	28	56	115
		(%)	22.5	29.2	60.2	35.2
Assigned						
	Individual	(N)	502	291	1438	2231
		(%)	90.1	73.5	47.6	56.2
	Component	(N)	107	68	37	212
		(%)	77.5	70.8	39.8	64.8
Total						
	Individual	(N)	557	396	3020	3973
	Component	(N)	138	96	93	327

components between the uplands and alluvial valley. The Arkansas ratio of individuals per component doubles from 3.6 in the uplands to 6.7 in the lowlands. In Oklahoma, the individual to component ratio is roughly the same for upland (37.4) and alluvial valley sites (34.5).

A total of 56.2% of the individuals and 64.8% of the sites have been classified by burial context. This varies between the states with the following percentages of site assignments: 77.5% in Missouri, 70.8% in Arkansas, and 64.8% in Oklahoma (see Table 16). The distribution of site types varies between the states and appears to be associated primarily with land form variation. Shelter burials are more common in Arkansas (40.8%), than in either Missouri (27.3%) or Oklahoma (10.7%). Mound burials are more common in Missouri (29.8%) and Oklahoma (23.7%) than in Arkansas (7.5%). The geographic distribution of mound sites in Missouri indicates that 12 of the 15 recorded mound sites are located just north of the district boundary in Cedar, Polk, and Dade counties, which, when eliminated, removes the distinction between the Missouri and Arkansas Ozarks. It should be noted that the number of individuals per mound are similar in Arkansas (7.4) and Missouri (8.4), while Oklahoma is distinctive with a much higher ratio (102.1). Similarly, cemetery components in Oklahoma tend to have a higher proportion of individuals (49.3), than cemetery sites in Arkansas (23.2). In

Table 17. Distribution of individuals and components by adaptation type

		Arkansas	Missouri	Oklahoma	Total
Type B					
Individual	(N)	0	55	13	68
	(%)	0.0	13.9	0.4	1.7
Component	(N)	0	2	1	3
	(%)	0.0	2.1	1.1	0.9
Individual/Component		0.0	27.5	13.0	22.7
Type C					
Individual	(N)	248	185	1425	1858
	(%)	43.1	46.7	47.2	46.6
Components	(N)	55	37	42	134
	(%)	39.8	38.5	45.2	41.0
Individual/Component		4.5	5.0	33.9	13.9
Type D					
Individual	(N)	176	1	1260	1437
	(%)	30.6	0.2	41.7	36.0
Component	(N)	19	1	42	62
	(%)	13.8	1.0	45.2	19.0
Individual/Component		9.2	1.0	30.0	23.2
Unassigned					
Individual	(N)	151	155	322	6256
	(%)	26.3	39.1	10.7	15.7
Component	(N)	64	56	8	128
	(%)	46.4	58.3	8.6	39.1
Individual/Component		2.4	2.8	40.2	4.9
Assigned					
Individual	(N)	424	241	2698	3363
	(%)	73.7	60.8	89.3	84.3
Component	(N)	74	40	85	199
	(%)	53.6	41.7	91.4	60.8
Individual/Component		5.7	6.0	31.7	16.9
Total					
Individuals		575	396	3020	3991
Components		138	96	93	327

contrast, the number of individuals per component are roughly the same for cave, shelter, habitation, and open sites in all three states. These data suggest that mortuary sites such as mounds and cemeteries are more likely to be found in Oklahoma and, when found, produce many more burials per site than in Arkansas and Missouri.

A total of 84.3% of the individuals and 60.8% of the sites have been assigned adaptation types (Table 17; see Chapter 9 below, for a discussion of adaptation types in the OAO area). Only 1.7% of the individuals and 0.9% of the sites are assigned to the Early to Middle Holocene adaptation type. These few sites are located in Barry and Stone counties in Missouri and Delaware County in Oklahoma. The near absence of mortuary sites from these adaptation types represents the most significant bias in the skeletal samples.

The Semi-Sedentary adaptation type is represented by 46.6% of the individuals and 41.0% of the sites. The distribution is relatively equal between the states. In Oklahoma the distribution is somewhat uneven with 66.1% of all individuals assigned to this adaptation type being from LeFlore County.

The Sedentary (dispersed) adaptation type is represented by 36.0% of the individuals and only 19.0% of the sites. Only one site of this type is found in Missouri and all of the Arkansas sites are located in alluvial valleys along the fringes of the Ozarks. These sites also have a limited distribution in Oklahoma with 38.1% of all individuals from LeFlore County and the bulk of the remainder from McIntosh, Wagoner, and Cherokee counties. The greatest bias in the representation of the Sedentary (dispersed) adaptation type is their virtual absence within the interior of the Missouri and Arkansas Ozarks.

The distribution of burials by adaptation type and burial site type also reveals some biases which may reflect some combination of changes in the burial program and site excavation selection (Table 18). Virtually all cave and shelter burials have been assigned to the Semi-Sedentary adaptation type in all three states. Open habitation site associated burials (i.e., habitation, midden, and open) are distributed equally between Semi-Sedentary and Sedentary (dispersed) adaptation types in both Oklahoma and Arkansas. In Arkansas, the proportion of individuals per mortuary site shift from more individuals per mound in the Semi-Sedentary adaptation type to fewer per mound in the Sedentary. In contrast, Oklahoma's individuals per mound increases between the Semi-Sedentary and Sedentary types by a factor of six. The number of Oklahoma cemetery sites increases between the two adaptation types, but the number of individuals per component remains stable.

Table 18. Distribution of individuals and components by burial context and adaptation type

Burial Context	Arkansas Type C %	Arkansas Type D %	Arkansas Unassigned %	Missouri Type B %	Missouri Type C %	Missouri Type D %	Missouri Unassigned %	Oklahoma Type B %	Oklahoma Type C %	Oklahoma Type D %	Oklahoma Unassigned %
Cave											
Individual	1.8	0.0	0.4	0.0	1.0	0.0	2.0	0.0	0.1	0.0	0.0
Component	1.4	0.0	0.7	0.0	2.1	0.0	8.3	0.0	1.1	0.0	0.0
Shelter											
Individual	30.2	0.0	10.6	34.2	10.1	0.0	3.8	0.4	0.8	0.2	1.6
Component	25.4	0.0	21.7	1.0	10.4	0.0	8.3	1.1	6.4	1.1	1.1
Habitation											
Individual	0.0	3.4	2.7	0.0	7.6	0.0	0.0	0.0	0.1	0.0	0.0
Component	0.0	0.7	3.6	0.0	2.1	0.0	0.0	0.0	1.1	0.0	0.0
Hidden											
Individual	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.7	0.0
Component	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.2	4.3	0.0
Open											
Individual	5.6	5.2	2.0	0.0	1.0	0.0	4.3	0.0	0.0	0.0	0.0
Component	5.8	6.5	4.3	0.0	2.1	0.0	7.3	0.0	0.0	0.0	0.0
Mound											
Individual	6.1	1.4	0.0	0.0	27.8	0.2	1.8	0.0	2.3	13.9	7.4
Component	2.2	1.4	0.0	0.0	13.5	1.0	2.1	0.0	3.2	3.2	1.1
Cemetery											
Individual	0.4	20.5	0.0	0.0	0.0	0.0	2.0	0.0	8.0	9.9	0.0
Component	0.7	2.9	0.0	0.0	0.0	0.0	2.1	0.0	3.2	8.6	0.0
Grave											
Individual	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Component	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1
Cairn											
Individual	0.0	0.0	0.0	0.0	4.3	0.0	1.0	0.0	0.0	0.0	0.0
Component	0.0	0.0	0.0	0.0	5.2	0.0	5.2	0.0	0.0	0.0	0.0
No Content											
Individual	0.5	1.1	8.2	5.0	1.8	0.0	24.2	0.0	36.0	14.9	1.5
Component	4.3	2.2	15.9	1.0	3.1	0.0	25.0	0.0	26.9	28.0	5.4
Total											
Individual	44.5	31.6	23.9	13.9	46.7	0.2	39.1	0.4	47.2	41.7	10.7
Component	39.8	13.8	46.4	2.1	38.5	1.0	58.3	1.1	45.2	45.2	8.6

Total States: Arkansas 557 Individuals; 138 Components
Missouri 396 Individuals; 96 Components
Oklahoma 3020 Individuals; 93 Components

In addition to the sample biases noted above, the greatest deficiency in the data base is in the extent and distribution of bioarcheological data. Only 26.8% of the skeletons have been analyzed further than age and sex determinations, 12.7% analyzed for only age and sex determinations, and 60.4% have received no scientific attention (Table 19). The percentage of analyzed individuals varies between the states with Missouri the highest (34.3%), then Oklahoma (28.6%) and finally Arkansas (12.0%). The percentage of more comprehensive analyses is somewhat misleading because 78% of the analyzed individuals in Missouri are reported in a single journal article, while 67% of the analyzed Oklahoma burials are from Alice Brues' study of Spiro. If these two studies are removed, the three states are relatively similar in the proportion of analyzed individuals: Arkansas 12.0%, Missouri 7.5%, and Oklahoma 9.4%. There appear to be a number of historic factors which resulted in the selection of skeletal series to be analyzed. The individual per component ratio indicates that sites with ten or more individuals are more likely to have been studied. This reflects the bias of osteologists who tend to think that larger skeletal series are more profitably studied. In Arkansas, there is a bias toward sites along the Arkansas River, which reflects recent cultural resource management projects. In Missouri, the analyzed skeletons derive primarily from two reservoir salvage projects, with the remainder in both Arkansas and Missouri being student projects. In Oklahoma, analyses are associated primarily with large organized projects, whether cultural resource management related or not. In summary, the available bioarcheological data are extremely flawed because only a small percentage of the available skeletal series have ever been analyzed. Thus, the bioarcheological synthesis provided in this overview must be considered as preliminary and subject to radical revision as new data become available.

Table 19. Distribution of individuals and components by extent of bioarcheological analysis

		Arkansas	Missouri	Oklahoma	Total
Complete					
Individual	(N)	67	136	864	1067
	(%)	12.0	34.3	28.6	26.8
Component	(N)	9	14	15	38
	(%)	6.5	14.6	16.1	11.6
Individual/Component		7.4	9.7	57.6	28.1
Partial					
Individual	(N)	159	117	229	505
	(%)	28.5	29.5	7.6	12.7
Component	(N)	19	10	8	37
	(%)	13.8	10.4	8.6	11.3
Individual/Component		8.4	11.7	28.6	13.6
None					
Individual	(N)	331	143	1927	2401
	(%)	59.4	36.1	63.8	60.4
Component	(N)	110	72	70	252
	(%)	79.7	75.0	75.3	77.1
Individual/Component		3.0	2.0	27.5	9.5
Total					
Individual		557	396	3020	3973
Component		138	96	93	327

THE BIOARCHEOLOGICAL SYNTHESIS

Barbara A. Burnett

Bioarcheology is concerned with reconstructing prehistoric lifeways by evaluating human skeletal data and contributes to our understanding of prehistory by assessing the "adaptive efficiency" of prehistoric culture. Adaptive efficiency is a measure of how successfully a cultural system protects its members against disease and malnutrition, and enables people to survive and reproduce. The most direct way to measure adaptive efficiency is to evaluate population growth. High adaptive efficiency is characterized by a growing population, where births exceed deaths. Conversely, a declining population, where deaths exceeded births, indicates a low level of adaptive efficiency. Obviously, birth rates cannot be calculated from prehistoric skeletal remains. Therefore, bioarcheologists must employ indirect measures such as demographic profiles, nutritional adequacy, and the magnitude of disease loads to evaluate adaptive efficiency.

The bioarcheological synthesis of the OAO study area employs a population approach in which a wide array of prehistoric human skeletal evidence is interpreted within an archeological framework. The skeletal data for each cultural component per site are organized by study units into three basic geographic areas; the Ouachita Mountains, the Arkansas River Valley, the Ozark Mountains, and subdivisions therein. The skeletal data are also ordered by chronological division and cultural complex. Two principal benefits are derived from this approach. First, the biological data per site or cultural component are lumped into regional archeological schemes, thus establishing both synchronic and diachronic means for studying biocultural process. Second, the geographic/chronological consolidation of the osteological data maximizes the interpretive potential of those skeletal series with incomplete data collection, and/or very small skeletal series, by collapsing the site by site information into an aggregate data base.

The contribution bioarcheology makes to the prehistoric reconstruction of the Ozark Mountains, Arkansas River Valley, Ouachita Mountains (OAO) study area is multifaceted. First, the skeletal data provide information (e.g., diet) which otherwise can only be inferred through traditional forms of archeological data collection and analysis. Second, the osteological information provides an independent test of hypotheses derived from only archeological evidence. Finally, the bioarcheological interpretations not only contribute to ongoing archeological investigations, but also yield new avenues of research.

In this synthesis we compile and interpret previously reported and unreported osteological data, test previously established research hypotheses and propose new avenues of research. The synthesis seeks to identify biocultural variation between ecological zones, to evaluate the biological impact of environmental-cultural interaction and changes in the settlement pattern, and to test the long standing assumption of maize-dependent subsistence among the prehistoric Caddoan groups. In particular, changes in disease load and diet are contrasted between the prehistoric inhabitants of the Ozark and Ouachita highlands and the Arkansas River Valley populations.

This chapter is organized into four sections. The next section describes data collection methodology and how each particular class of data is used for reconstructing biocultural adaptation. The methodology section is included to assist individuals unfamiliar with bioarcheological investigation. The third section presents and interprets the osteological data and the fourth section encompasses the conclusions.

BIOARCHEOLOGICAL METHODS, DATA COLLECTION AND THE BIOLOGICAL CORRELATES OF CULTURAL ADAPTATION

This section briefly reviews data collection methodology and the application of skeletal and dental data to the study of biocultural process. All osteological data presented here are drawn from the regional osteological literature which represents thirty years of investigation. Because research orientations have changed and osteological techniques have been refined, the raw data presented by the original investigators were extracted and reanalyzed. In order to make the data comparable from one investigator's analysis to another's, it was necessary to recollect the frequency data by standardizing the observables (i.e., the denominator in the rate calculations) for each data set. For example, only the individuals with teeth present were counted as the denominator when we calculated the frequency of dental cavities in a skeletal collection. Standardization of the data sets proved for the most part successful, but there were some problems. Certain data classes could not be successfully compiled because: one, the inventory of all skeletal elements was not consistently reported (i.e., vertebrae and teeth), and two, it is suspected that some pathological lesions (e.g., porotic hyperostosis) were overlooked by the original investigators.

Examining the nature and severity of environmental and cultural stressors, and determining which age group or gender is most likely to exhibit evidence of stress, are inherent in evaluating adaptive efficiency. Certain sets of osteological data are considered good indicators of adaptive efficiency and good measures of cultural process (for a comprehensive discussion see Huss-Ashmore et al. 1982; Buikstra and Cook 1980; and Goodman et al. 1984a). Because of the previously mentioned data constraints within the OAO, adaptive efficiency is measured by comparison of mean age of death, childhood mortality, disease loads, and frequency of childhood stress episodes (enamel hypoplasias).

Mean Age of Death. The ultimate physiological response to stress is death. Ideally, mortality should be interpreted by construction of a life table, and the comparison of age specific probability of dying. While this analytical procedure is highly recommended for future bioarcheological analyses in the OAO region, it is not possible in this synthesis. The mean age of death per component is the only demographic measure which can be utilized here.

Mean age at death is considered an important stress indicator (Goodman et al. 1984a) and has additional importance if other stress indicators (i.e., frequency of enamel hypoplasias) can be related to it. However, mean age of death is only a sensitive indicator if the sample is large enough and the age ranges are small enough (5 to 10 years). The mean age of death is calculated for all individuals per mortuary component and for adults alone, because the subadult (under 17 years at death) segment of each skeletal sample is often underrepresented, and thus it is appropriate to compare only adult mean ages of death. In a few cases, the age ranges employed by the original osteological investigators in the study area are too large (30-year spans) to yield meaningful mean age at death statistics.

The demographic data utilized in the OAO bioarcheological synthesis will be examined for changes in mean age at death that correspond to changes in subsistence strategy. Previous research indicates that the mean age of death declined with the adoption of agriculture (Cohen and Armelagos 1984). Cook (1984), in her bioarcheological synthesis of the prehistoric Lower Illinois Valley, finds some increase in life expectancy as cultigens were initially incorporated into a hunting and gathering economy. However, this was followed by a decrease in the mean age at death when full dependency upon maize agriculture was reached. In the Lower Mississippi Valley the lowest mortality (highest adaptive efficiency) is associated with a dispersed hunter-gathering settlement/subsistence strategy (Rose et al. 1984).

Infectious Disease. The type and frequency of the biological responses to pathogen contact, resulting from environmental/cultural interaction (i.e., disease), is another good measure of a population's adaptive efficiency. Interpreting the pattern of these biological responses, such as the frequency of infectious lesions within a skeletal series, can reveal much about cultural behavior. For example, agriculturalists interacted differently with the environment than did hunter/gatherers. These behavioral dissimilarities are often reflected in the skeletal biology at both the individual and population level.

The frequency of infectious disease within a skeletal sample is influenced by population densities of both pathogen and human host, spatially determined human activity patterns, the creation of and contact with pathogen niches (e.g., the accumulation of human waste and garbage), and ecological constraints of the environment. At the individual level, the susceptibility of the human host to disease is determined by genetic endowment, nutritional adequacy, social pressures resulting in psychological stress, and preceding health experience. While infectious diseases which impact the skeleton are usually chronic, and are not usually the primary cause of death, they do impair the immune system and further reduce disease resistance. In many cases, the cause of an infection exhibited by a particular prehistoric skeleton remains unknown because a variety of micro-organisms can produce identical skeletal lesions (Ortner and Putschar 1981). Therefore, most skeletal infectious lesions are classified as nonspecific infections. Despite these limitations, the patterns of infectious lesions within and between skeletal groups are excellent indicators of adaptive efficiency.

There are several expressions of skeletal infection. Periostitis is inflammation of the periosteum (i.e., the cartilaginous tissue covering the bone) which is observed as the deposition of woven bone (i.e., exhibiting irregular structure) on the original bone surface (Ortner and Putschar 1981). Osteitis is inflammation of the bone cortex and osteomyelitis involves the bone marrow. These last two are the most severe expressions of skeletal infection.

As stated, the susceptibility of an individual to stress is influenced by previous disease experience, age, sex, genetic background and differential access to resources, which is often determined by social status. If host susceptibility, and environmental and social constraints are held constant, the variations in stress levels can be attributed to differences in cultural practices when examined at the population level (Goodman et al. 1984a). Twelve regional studies from across the world measured the impact of agriculture and concluded that infection was a more common and serious problem for prehistoric farmers than for their hunting and gathering predecessors (Cohen and Armelagos 1984). The investigators suggest that increased infection is the result of sedentism (permanent rather than seasonal residence), larger population groups, and the well established synergism between infection and malnutrition. A large aggregated population allows for heightened interpersonal contact and thus for easy transmission of the infectious disease. The nature of interpersonal contact and the demographic structure of the population determines the spread of the disease (Sattenspiel 1987). Large communities have increased accumulations of garbage and human waste which creates an ideal pathogen niche and source of transmission. The frequency of skeletal infectious lesions are interpreted in the OAO study area keeping these variables in mind.

The infection data reported by various investigators for the OAO area skeletal series are standardized by the number of observable individuals. Since skeletal infectious lesions are primarily found on leg bones, only individuals with at least 50% of the leg bones available for examination by the original investigator are counted as observations (i.e., denominator for rates). While this method often raises the infection rates over those originally reported, it is believed that this practice yields computed frequencies that more closely approximate reality. The original investigators often calculated frequency of infections while including individuals with grossly incomplete skeletal remains. It cannot be assumed that an individual did not have a pathological lesion if the skeletal element most likely to be involved is not available for examination. This method of standardization runs into problems when skeletal inventories are not reported. A variety of information sources were examined to compensate for this lack of reporting (i.e., photographs, illustrations of the burials, metric data, and burial descriptions) in order to accurately tally the observables. It can be safely assumed that all infectious lesions observed were reported in the original analyses.

Enamel Defects. Recent research has demonstrated the utility of enamel defect analysis for the reconstruction of childhood stress (Goodman et al. 1980; Huss-Ashmore et al. 1982; Rose et al. 1978). Dental enamel is a nonrenewable tissue that once formed is never altered except by wear and decay. Therefore, like the rings of a tree, enamel contains a memory of its metabolic experience. Enamel hypoplasias or defects are deficiencies in enamel thickness caused by a metabolic disturbance and are considered excellent indicators of childhood stress (Rose et al. 1978; Goodman and Armelagos 1985). Since each tooth is formed during a specific chronological period (i.e., mandibular canines between 0.3 and 5.0 years), an enamel defect can be assigned to a specific age. This enables the researcher to analyze childhood stress in a twofold manner. The examination of adult dentitions will reveal the childhood stress encountered by those individuals who successfully survived the rigors of childhood, while the examination of teeth belonging to subadults (who died prior to 17 years) will reconstruct the stress experienced by those who succumbed to the stress of childhood. Ten regional syntheses report that the frequency of childhood stress increased with the adoption of agriculture (Cohen and Armelagos 1984). It is expected that childhood stress similarly increased in the OAO area.

Porotic Hyperostosis. Porotic hyperostosis is a cranial lesion indicative of chronic anemia (iron poor blood). Numerous investigators have demonstrated that porotic hyperostosis among New World archeological populations is associated with nutritional stress (El-Najjar et al. 1976; Lallo et al. 1977; Mensforth et al. 1978) which can be attributed to inadequate dietary iron intake, the chronic loss of iron by inhibition of iron availability through a disease process, or by parasitic infestations such as hookworm. An unbalanced diet can lead to chronic anemia. For example, a diet deficient in animal products can produce anemia since the iron available from vegetable sources is more difficult to absorb than the iron ingested from animal products. Bioarcheologists often attribute the presence of porotic hyperostosis (anemia) among Native American prehistoric groups to a diet rich in maize. The phytic acid present in maize inhibits the absorption of iron. However, if maize is processed with an alkali, such as wood ashes or lime, the effect of the phytates is reduced.

The relationship between infectious lesions and porotic hyperostosis has also been established. Infective bacteria require large amounts of iron. In its efforts to combat the invasive pathogen, the body will restrict the availability of serum iron. Mensforth et al. (1978) have demonstrated that infectious disease at the prehistoric Libben site was the initial pathological response which made individuals more prone to exhibit porotic hyperostosis.

The interpretation of porotic hyperostosis data is hindered by the incomplete description of cranial lesions. Cranial pitting is consistently reported in the OAO skeletal series, but the thickening of the diploe, which is diagnostic of porotic hyperostosis, is not. Both cranial features are required for the diagnosis of porotic hyperostosis. The regional lack of porotic hyperostosis may be due either to poor reporting or to a lack of skeletal evidence for the disease. Because neither can be determined, reporting of porotic hyperostosis is considered incomplete.

Degenerative Disease. The degenerative conditions reported here include osteophytosis and osteoarthritis. Vertebral osteophytosis is characterized by marginal lipping (or bony outgrowths) of the vertebral body and is attributed to the cumulative effects of biomechanical stress (physical labor) (Steinbock 1976). The frequency of osteophytosis could not always be accurately determined here because the presence or absence of vertebrae was not consistently reported. If 30% of the vertebrae for an adult was originally reported as present for examination, then the individual is considered an observation for osteophytosis. Only adult observables are included in the computation of frequency, as degenerative changes are primarily associated with adults. Unfortunately, the presence of vertebrae are frequently not mentioned unless there is something noteworthy about them, such as a pathology.

Osteoarthritis is degeneration of major joint surfaces and is associated with chronic biomechanical stress and advancing age (Steinbock 1976). Patterning of osteoarthritic lesions can be associated with specific physical behaviors (Merbs 1983). If an individual habitually engages in an activity (such as chopping wood) those joint surfaces bearing the physical stress are most likely to exhibit the degenerative changes. Interestingly, there appears to be a consistent reduction in the frequency of degenerative lesions associated with the adoption of agriculture in most areas of the world (Cohen and Armelagos 1984), that is thought to be associated with a reduction of physical labor. An adult skeleton reported with at least 50% of the upper and lower body present is considered an observation for osteoarthritis.

Trauma. Specific kinds of trauma can provide direct evidence for certain behaviors. Clear evidence for the presence of interpersonal violence includes: scalping, projectile points embedded in the bone, and depressed cranial fractures. Fractures are the most commonly reported injuries in the OAO, but it is often not possible to determine the cause of the fracture (i.e., violence or accident). Suspected violence related trauma is specifically reported in the OAO synthesis. If a skeleton had the majority of skeletal elements present, then it is considered an observation for trauma. It is likely that all evidence of trauma was reported by the original osteological investigators.

Dental Caries. The analysis of dental caries (cavities) is a reliable tool for the reconstruction of prehistoric diets (Moore and Corbett 1971; Turner 1979). As every parent knows, a diet rich in sugars will result in cavities. Turner (1979), using a large sample of prehistoric and historic dentitions, has shown that the proportion of the diet derived from carbohydrates can be reliably estimated by the frequency of dental caries. Processed carbohydrates used by prehistoric peoples, such as maize or starchy seeds, provide an ideal oral environment for cariogenic bacteria. Any increase in the amount consumed will result in a corresponding increase in caries. Rose and Marks (1985) have used 2.0 caries per individual to differentiate between high and low carbohydrate diets.

Complicating the comparison of dental caries frequencies between groups are the variables of age, dental morphology (tooth type), and attrition as these all contribute to the presence or absence of cavities. Each of these should be held constant leaving the proportion of carbohydrates consumed as the independent variable. The comparison of caries across and between skeletal samples is the OAO area must of necessity be crude. Only adult caries data are compared in an attempt to control for age. Fortunately, dental wear was almost consistently described as heavy for almost every skeletal sample, therefore the comparison between groups is felt to be fairly accurate. Screening for tooth morphology proved impossible, as the tooth type data (i.e., premolar, molar, etc.) were infrequently reported. In most cases, the number of teeth available for examination was also not reported. Only adults with at least half the expected teeth are considered as observations. While the caries comparisons are crude, they can distinguish between hunter/gatherer and horticulture based economies.

Dental Attrition. The amount of macroscopic dental attrition, or gradual removal of enamel, is an excellent indicator of the abrasive quality of the diet (Powell 1985). Macroscopic attrition rates characterize a lifetime of mastication and are useful for isolating particular food processing techniques. For example, hunter/gatherers usually have a higher rate of dental attrition than agriculturalists due to food contamination by grit derived from the use of stone milling utensils and the coarse nature of the foods themselves (high proportions of vegetable fiber). In contrast, agricultural diets often contain fewer abrasive particles and are composed of more highly processed foods. Few studies in the OAO study area report quantifiable dental attrition data. Dental attrition is usually described in the literature as heavy. Unfortunately, it is not possible to determine if one observer’s description of “heavy” is the same as another’s. Therefore comparison of dental attrition in this synthesis is somewhat hindered.

Scanning Electron Microscopy. Observation of the occlusal surfaces of molars with a scanning electron microscope (i.e., dental microwear) has made significant contributions to the reconstruction of prehistoric diets (Rose et al. 1981, 1983). In particular, these observations can document the presence of hickory nuts and unprocessed vegetable fiber in the diet (Blaeuer and Rose 1982). The proportion of abrasive particles in the diet can also be estimated. Excellent results can be achieved when macroscopic attrition rates and microwear are interpreted together (Moore-Jansen 1982). Both data categories are occasionally available for the same skeletal sample in the study area and are employed toward dietary reconstruction in the OAO bioarcheological synthesis.

BIOARCHEOLOGICAL SYNTHESIS OF THE STUDY AREA

ARCHAIC PERIOD

The bioarcheological synthesis for the study area begins with the Archaic period. No bioarcheological evidence is available for the earlier periods. Forty sites contain both burials and Archaic cultural components. Only 11 of the sites, containing a total of 181 burials, have mortuary components specifically assigned to the Archaic period. The inability to associate burials with specific cultural periods within the Archaic and Woodland sequence is the result of several factors. Variable mortuary programs, the absence of grave goods, the lack of interpretable stratigraphy, poor bone preservation, and even poor excavation techniques have all contributed to the problem. The lack of cultural affiliation has hindered efforts to evaluate the biological impact of environmental and cultural changes seen during the Archaic period.

The Archaic (8000–2000 B.P.) was a time of increasing cultural regionalization. A gradual climatic change (i.e., general warming trend) is thought to have been the major impetus for the profound cultural changes seen during this time. The climatic shift altered the resource base and the cultural system responded accordingly. In general terms, Archaic people were settling down into regional bands, with circumscribed territories and distinctive cultural attributes. There was a tendency toward increased sedentism and technological innovations.

These observed changes in settlement and subsistence pattern were likely to have impacted the biology of Archaic people in a variety of ways. Increased sedentism should be reflected in a corresponding change in infection rates. Changes in activities, such as hunting and gathering, as well as the decrease in mobility most likely affected both birth rates and the frequencies of osteoarthritis and osteophytosis. Utilization of grinding stones and inclusion of plant fiber in the diet probably affected dental wear patterns. If starchy seeds were part of the menu, this increase in carbohydrate consumption should be reflected in elevated caries rates. Most of these hypotheses cannot be investigated because of the paucity of analyzed skeletal data from the Early or Middle Archaic periods.

There are two sites with analyzed burials assigned to the Late Archaic. These are Bug Hill (34PU116) in the Ouachita

Mountains of Oklahoma and Smullins Shelter (34CK44) located in the southwest fringe of the Ozark Mountains. The cultural affiliation of the Smullins Shelter is unknown (Robert Brooks, personal communication). The burials recovered here are variously considered either Late Archaic to Early Woodland period (Hall 1954), or Late Mississippi period, Fort Coffee phase (Wyckoff 1980).

Wister Phase

The only bioarcheological data affiliated with a Late Archaic, Wister phase component are drawn from 15 burials recovered from the Bug Hill site, 34PU116, (Rose et al. 1983; Vehik 1981). Bug Hill is located in the Jackfork valley, an interior river valley of the Ouachita Mountains in Oklahoma. During the Late Archaic, eastern Oklahoma, southern Missouri, and northwestern Arkansas were populated by several regionally distinct groups. The Late Archaic component of the Bug Hill site is related to the Wister phase of the northern Ouachita Mountains (Vehik 1981; Wyckoff 1984).

Dietary Reconstruction

The archeological evidence from the Bug Hill site indicates that the Wister phase occupation was an intensive seasonal or permanent base camp. The subsistence data suggest an emphasis on hunting with only a minor utilization of collected plant material (Vehik 1981; Altschul 1983). Analysis of the Wister phase dentition and stable carbon isotope values supports this subsistence reconstruction (Rose et al. 1983). The absence of dental caries (Table 20) points to a diet low in processed carbohydrates. The stable carbon isotope ratios are all within the range of nonmaize eating peoples (Rose et al. 1983).

Table 20. Paleopathology by percent (N) of the Ouachita Mountains of Oklahoma (Late Archaic period Wister phase)

Site Name	Infection Subadults	Infection Adults	Osteo-arthritis	Osteo-phytosis	Trauma	Caries/ Person
Bug Hill[1]	50 (4)	40 (5)	50 (4)	57 (3)	25 (8)	0.00 (4)

[1]Rose et al. 1983

Unfortunately, the values for the macroscopic dental attrition are combined for the entire temporal sequence representing Bug Hill (Late Archaic to Early Mississippi) and cannot be used here. However, Rose et al. (1983) examined two Wister phase mandibular molars for microwear patterns. The first of these belonged to a 46 to 50-year-old male. The enamel exhibits frequent large striations and a rough surface texture, which indicate the use of stone grinding implements. The absence of polishing indicates little or no unprocessed vegetable fiber. The second molar belonged to an over 55-year-old female. The enamel exhibits frequent large striations (stone grinding) and a somewhat smoother surface texture suggesting some vegetable fiber. The absence of compression fractures for both these individuals indicates little or no hickory nut utiliization. It should be noted that the majority of the nut shell fragments come primarily from the Woodland and early Caddo contexts of Bug Hill (Altschul 1983). The slight difference of vegetable fiber intake exhibited by these individuals may be due to dietary seasonality or a male-female dietary differential. This can only be better understood with a larger data base.

Bug Hill subsistence reconstruction does not fit the general model for the Late Archaic Wister phase. Wyckoff (1984), among others, interprets the Late Archaic peoples as highly adept hunter/foragers. Their main prey were deer, a variety of small mammals, and waterfowl. They also fished, collected mussel shells and intensely foraged for plants. Thousands of hickory nut shells as well as grinding basins have been recovered at other Wister phase sites. At Bug Hill, only a few grinding stones and few nut hulls have been found in the Late Archaic component. Collectively, the dental analysis and archeological remains at Bug Hill indicate that these particular folks placed a much greater emphasis on animal products than on vegetable matter.

Adaptive Efficiency

Before interpreting the pathological and demographic data, it is necessary to evaluate the representative nature of this skeletal series (Buikstra 1981). The demographic dimensions and skeletal attributes of the burial series can be influenced by both the mortuary practices and archeological sampling strategies. The population's demographic profile is examined both in terms of its biological and mortuary attributes. Buikstra (1981) interprets the skeletal series from Koster and Modoc Shelter as representing a specialized Middle Archaic burial program consisting exclusively of individuals debilitated through age or pathology. Therefore, these populations are not accurate representations of Middle Archaic adaptive efficiency. Buikstra cautions that, without the recognition of the biases introduced into a mortuary series through cultural practices, osteologists will be misled in their interpretations.

There were 15 burials containing 17 individuals excavated at Bug Hill. Six (35%) of these are adults and 11 (65%) are children (Rose et al. 1983). The age ranges represented are highly unusual. Juveniles and young to middle aged adults are missing. Ten of the 11 children are under the age of 3 years, with the majority being infants. A normal biological profile of a hunter-gatherer group should contain fewer than 50% sub-adults. The overrepresentation of the Bug Hill children could indicate a high mortality rate for the subadults and imply a low adaptive efficiency. Of the six adults, two have been sexed females and two males. One of the males is aged 46-50 and has severe arthritis of the elbows, feet, knees, and right shoulder, as well as extensive spinal osteophytosis. The other male is aged older than 35 and exhibits both healed osteitis of the right tibia and osteomyelitis of the clavicle. One of the females is aged 55+ and again exhibits extensive arthritis, which is especially severe in the sacroiliac joints. Her left femur and corresponding surface of the tibia show severe destructive arthritis. The other female exhibits a number of lesions, including osteitis on the left parietal (Vehik 1981). The remaining adults are poorly preserved and unobservable for pathology. The children exhibit numerous infectious lesions. A neonate displays extensive periostitis of the left humerus, all rib fragments, and 28 skull fragments (Rose et al. 1983). Another baby aged between 9 and 12 months has evidence of osteomyelitis of the scapula and humerus. It is apparent that this cemetery population was severely handicapped by age (either extremely young and old), extreme arthritis, and debilitating expressions of infectious disease.

Collectively, the Late Archaic Wister phase burials from Bug Hill are characterized by high infection rates (Table 20). The lesions are primarily osteitis and osteomyelitis. These two severe expressions of infection are usually chronic and debilitating. Fifty percent (N = 4) of the subadults (under 17 years) and 40.0% (N = 5) of the adults exhibit infectious lesions.

It is proposed here that this skeletal series is not a realistic representation of a Late Archaic living population, but rather the result of differential burial practices. Like the Middle Archaic of Illinois (Buikstra 1981), the Bug Hill mortuary series represents only a segment of the population, those who were handicapped and could not fully participate in the cultural system. This interpretation suggests that the Wister phase midden mound burials are only one part of an elaborate mortuary program that distinguishes by status.

The unusual paleopathological data are to a certain extent the result of cultural practices, in addition to differential mortuary selection. The severe expression of infection, while not representative of the population as a whole, does suggest inadequate cultural buffering. Rose et al. (1984) postulate that aggregated populations gave rise to increased infection rates due to heightened availability and exposure to pyogenic bacteria resulting from poor sanitation and increased interpersonal contact. Galm (1984) proposes that the major occupations at the Wister phase midden mounds were year round or, at least, several seasons in duration. There are two areas of intense occupation defined at Bug Hill (Vehik 1981). One area is associated with some of the Late Archaic burials and is seen as having evidence of repeated occupations. This suggests that, at least during part of the Late Archaic period, Bug Hill functioned as a base camp (Altshul 1983). The repeated use of the Bug Hill site over 1,300 years of occupation, and the extended duration of at least some of the occupations are reflected in high rates and severe expressions of both subadult and adult infection.

The Bug Hill adults exhibit moderately high rates and extreme expressions of osteoarthritis and osteophytosis (Table 21). The two individuals that exhibit these degenerative processes are a female aged 55+ years and a male of 46-50 years. Rose et al. (1983) interpret these data to indicate an arduous lifestyle. These cases are more appropriately interpreted as the expression of both old age and a rigorous lifestyle.

Grove Focus

There are several other Late Archaic manifestations in the Ozarks which are considered culturally distinct from the Wister phase. The Grove focus of the eastern Oklahoma Ozark Mountains, to which the Smullins Shelter could possibly belong, is quite different from the Wister phase. Galm (1984) suggests that distinct cultural adaptations developed north and south of the Arkansas River during or prior to the Late Archaic. While the Smullins Shelter burials are thought to be included within the Grove focus (Hall 1954), their cultural affiliation is unclear. Wyckoff (1980) places these same burials within the Fort Coffee phase, Late Mississippi period. The biological manifestations of the Late Archaic complexes and their cultural dissimilarities should be reflected in the associated skeletal remains.

The biological data from the Smullins Shelter burials will be compared here to Bug Hill and later in the discussion to the Fort Coffee data. The skeletal remains of nine individuals and one dog were recovered from this rockshelter. Aaron Elkins (1959) reported on the remains of five of these individuals. The skeletal collection consists of four infants, one child, one adolescent, two young to middle aged males and one old female. Elkins states that the life expectancy of this group appears to be very low. I calculated the total mean age at death at 16.5 years (N = 9), and the adult mean age at death at 39.7 years (N = 3). The inclusion of five individuals below the age of 6 years, or 55.5% of the sample in the calculation of total mean age at death indicates low adaptive efficiency. While the adult mean age of death is high, it is hazardous to interpret the data based on three individuals. The structure of this demographic profile is not reminiscent of the Bug Hill collection because it includes one adolescent and two young adult males (24 years and 25-35 years). It is apparent that this group did not practice the specialized burial program thought to be present at Bug Hill.

The pathology frequencies, based on Elkins' descriptions (1959), are presented in Table 21. Elkins states that most of the nine skeletons were in very poor condition and any generalization about the living conditions of these people is hazardous. In general, the reconstructed pathology data indicate no adult infection present, high frequency of osteoarthritis and osteophytosis, high frequency of trauma, and a low caries rate. All these frequencies are based on extremely small samples and, like Elkins, any interpretation should be considered with caution.

The lack of infection and high rates of degenerative changes and low caries rate are reminiscent of other hunter/gather groups (e.g., east Texas). However, a comparison to the Late Archaic component from Bug Hill reveals differences in infection rates (Table 20) which probably relates more to differential burial practice at Bug Hill. Both samples have low caries rates indicating low carbohydrate consumption. Elkins (1959) describes the dental attrition as severe, some of the adult teeth are worn completely through the crowns which likely contributed to the numerous abscesses (at least five per adult).

WOODLAND PERIOD

The Woodland occupations of eastern Oklahoma, northern Arkansas, and southern Missouri are not well known. Only a few sites have clear stratigraphy and therefore archeologists have found it difficult to assign burials to particular cultural components. The first geographic unit considered is the Ouachita Mountain region of eastern Oklahoma. In Oklahoma, there are 25 sites which have Woodland components containing a total of 92 individuals. The majority of these sites also have Archaic and/or Caddoan components and assigning the burials to the proper provenance has proven difficult.

Table 21. Paleopathology by percent (N) of the southwestern Ozark fringe (Late Archaic Grove Focus)

Site Name	Infection Subadults	Infection Adults	Osteo-arthritis	Osteo-phytosis	Trauma	Caries/ Person
34CK44[1]	(0)	0 (2)	100 (1)	100 (3)	100 (1)	1.0 (3)

[1]Wallis 1977; Hall 1954

The Fourche Maline is seen as an extension of the previous Wister phase and is characterized by the intensive utilization of collected plant resources (Schambach 1982a). The fewer and thinner midden deposits of the Fourche Maline occupations in the northern Ouachitas suggest a possible change in settlement pattern (Galm 1984).

Fourche Maline

The bioarcheological data base is far more complete for the Fourche Maline phase in the Ouachita Mountains of eastern Oklahoma than for the preceding Wister phase. Five sites with Fourche Maline components have bioarcheological analyses. These are: the Bug Hill site (34PU116: Rose et al. 1983), the Scott site (34LF11: Hammett 1978, Brighton 1953), the Sam site (34LF28: McWilliams 1970, Powell and Rogers 1980), the McCutchan-McLaughlin site (34LT11: Powell and Rogers 1980) and the Wann site (34LF27: Hammett 1978, McWilliams 1970). While not all the burials from these sites can be firmly assigned, the majority are thought to be Fourche Maline. Only the Bug Hill burials have been definitely assigned to the Fourche Maline phase (Altschul 1983).

Adaptive Efficiency

The reconstruction of demographic profiles, genetic background and mortuary attributes of the burial population are critical to the interpretation of the paleopathology data. McWilliams (1970) concludes that the genetic analysis of the Sam and Wann series suggests a common genetic heritage for these sites. Powell and Rogers (1980) conclude that the McCutchan-McLaughlin series cannot be differentiated from the Sam-Wann series. Rose et al. (1983) synthesize the genetic data for the Fourche Maline and found the comparison of the Bug Hill genetic markers also indicates a common heritage.

The genetic reconstruction indicating the Fourche Maline peoples of this area shared a common gene pool and presumably common predilection to disease allows the comparison of paleodemography and paleopathology across these samples. Additionally, all these sites are within the Ouachita Mountains and share the same ecological constraints in addition to similar cultural attributes.

The representative nature of the skeletal series is considered next. As demonstrated with the Late Archaic skeletal series from Bug Hill, the distribution of the ages and proportion of males/females will influence the extent of bioarcheological interpretation that can be derived from the skeletal samples. Thirty-one percent of the 42 ageable McCutchan-McLaughlin (34LT11) individuals are under 15 years of age (Powell and Rogers 1980). Additionally, 29 (69%) adults between 17 and 55+ years are present, with 57% between the ages of 25 and 44 years. The male/female ratio is approximately equal with 14 females and 13 males identified. At the Sam site (34LF28), 17% of the sample (N = 60) died before 15 years (McWilliams 1970). Forty ageable adults are present between the ages of 17 and 60+ years with 43% between 17 and 30. The male/female ratio is approximately equal with 18 females and 22 males. Five Bug Hill individuals (34PU116) are thought to be Fourche Maline; three are under 17 years (Rose et al. 1983). The Fourche Maline phase at the Scott site (34LF11) is represented by 25 aged individuals of which 10 (40%) are below the age of 15 (Hammett 1978, Brighton 1953). The adult remains represent 14 individuals between 20 and 40+ years with the majority between 20 and 30 years. The male/female ratio is approximately equal with eight females and seven males. The Wann (34LF27) burials included two skeletal samples excavated during two field seasons and, as a result, there are two osteological analyses. The first Wann analysis (McWilliams 1970) includes 32 individuals composed of 24 adults, seven children and one unknown. Seventeen of the burials are females and seven are males. Adult age ranges extend from 18 to over 60 years. The second skeletal collection reported upon (Hammett 1978) contains two children between the ages of 4 to 6 years and a male 30 years or older. Collectively, the subadult portion of the entire Wann collection represents 26% of the entire sample. The male/female ratio is 0.5, or eight males and 17 females.

Clearly, the subadults for the entire Fourche Maline sample are proportionately underrepresented with 45 (30%) of a total of 152 aged individuals. The underrepresentation of the subadults may be due to excavation strategies employed by the archeologists or by the burial program utilized by the prehistoric inhabitants. The underrepresentation hinders our interpretation of the subadult indicators of adaptive efficiency. Additionally, the seemingly low subadult mortality should not be interpreted necessarily as an indicator of high adaptive efficiency. The males/female ratio is 0.9, or 50 males to 58 females indicating that comparisons between male and female indicators will be fairly reliable.

Paleodemography. The mean ages are presented in Table 22. As previously stated, the underrepresentation of subadults has inflated the mean age for the sample. Only the Scott

(34FF11) sample with approximately 40% subadults approaches what is considered a normal demographic structure. Therefore, it is more prudent to consider only the adult mean age. Collectively the adult mean age is 34.4 (107) which indicates an adequate adaptive efficiency in that the adults were reaching ages that are well beyond the reproductive years and survived long enough to raise their offspring. It is interesting to note that adult mean ages of death derived from the Sam, Wann, and McCutchan-McLaughlin skeletal series are almost identical. These three sites also yielded the larger samples. It is hard to tell, however, if the larger samples are representative of the actual number that resided at these sites or are the product of better excavation. It is interesting that the Scott site yielded the lowest adult mean age of death and also had proportionately more subadults. If we could hold all the extraneous factors, such as excavation strategy, equal, then the values at Scott could indicate that these people operated under a less efficient adaptive strategy than their neighbors.

Table 22. Paleodemography by percent (N) for the Fourche Maline

Site	Total Mean Age at Death		Adult Mean Age at Death		Analyses
34LF11	20.1	(24)	28.0	(14)	1, 2
34LF27	26.9	(32)	35.5	(23)	1, 3
34LF28	29.6	(50)	35.3	(40)	3
34LT11	25.6	(42)	35.2	(29)	4
34PU116	19.5	(4)	42.5	(1)	5
Total	26.2	(152)	34.4	(107)	

1 Hammett 1970; 2 Brighton 1953; 3 McWilllams 1970; 4 Powell and Rogers 1980; 5 Rose and Marks 1983

For the McCutchan-McLaughlin and Sam-Wann series the mean ages of death are computed by sex (Powell and Rogers 1980). The McCutchan-McLaughlin female average is 32.3 years, while the male average is 38.5 years, which is a 6.2 year differential. The difference is more apparent with the Sam-Wann series. Females average 34.2 years, while the males have a mean age at death of 43.5 years. Powell attributes the sexual differential to the hazards females encountered during child birth.

Paleopathology. Examination of Table 23 indicates that the high rate of subadult infection seen in the Wister phase children of Bug Hill continued into the Fourche Maline. While the rate appears high (100%), the severity of infection has decreased. The subadult sample includes only three individuals and interpretation is hazardous. Two teenagers and one 4-year-old child exhibited periostitis, a much less debilitating disease than previously seen among the Late Archaic subadult residents of Bug Hill. Another site with available childhood infection data is McCutchan-McLaughlin Here one subadult (12%) is diagnosed with periostitis. The subadult infection frequency at McCutchan-McLaughlin indicates that this subadult population had either little contact with infectious disease or the subadults died before infectious disease could impact their skeletons. The sample of eight subadults with enough skeletal material for examination includes; four individuals between 0 and 5 years, three individuals between 5 and 10 years, and one individual between 11 and 12 years. The individual reported with periostitis (on both tibiae, or lower leg bones) is aged 3 to 4 years.

Table 23. Paleopathology by percent (N) in the Ouachita Mountains of Oklahoma (Woodland period Fourche Maline phase)

Site Name	Infection Subadults/	Adults	Osteo-arthritis	Osteo-phytosis	Trauma	Caries/ Person
Bug Hill[1]	100 (3)	0 (1)	0 (1)	0 (l)	0 (3)	0.25 (4)
Scot	0 (1)	75 (4)	0 (4)	80 (5)	40 (5)	------
Sam	---	15 (27)	4 (22)	22 (23)	18 (22)	0.84 (45)
Wann[2,3]	---	24 (17)	6 (17)	35 (17)	10 (19)	*
McCutchan-McLaughlin[4]	12 (8)	59 (27)	29 (14)	63 (19)	30 (20)	1.60 (24)
TOTAL	33 (12)	37 (76)	10 (58)	42 (65)	20 (69)	1.10 (73)

[1]Rose at al. 1983
[2]Hammett 1978
[3]McWilliams 1970
[4]Powell and Rogers 1980
*included with Sam

Adult infection data are more reliable because the samples are much larger. The collective frequency is moderate to high. Approximately 40% of the adult population was impacted by infectious skeletal lesions. The McCutchan-McLaughlin adult frequency is high. Approximately one-half of the infected McCutchan-McLaughlin adult sample (Powell and Rogers 1980) exhibit either osteitis or osteomyelitis. The high frequency and chronic nature of the infectious lesions indicate that adult residents of McCutchan-McLaughlin were severely impacted with a heavy disease load. These data indicate that the adult residents of McCutchan-McLaughlin were less well adapted than their neighbors. The Scott adult infection frequency is also high at 75% and two of the three individuals are diagnosed with osteomyelitis. Unfortunately the Scott sample is too small to be considered reliable.

The adult residents of the Sam site have a low infection rate of 15%. Here the sample is relatively large with 27 observations. The nature of the infection is unclear. McWilliams (1970:111) states that the four Sam burials with infection displayed a greater degree of involvement than the individuals from the Wann site. All four of the Sam adults diagnosed with infectious lesions exhibit thickening of the distal one-third of the femora and the entire tibiae as well as roughening of the outer bony surface. In addition, tibiae from two individuals are bowed. McWilliams' (1970) description is reminiscent of the treponemal disease syndrome described by Powell (1985) for the skeletal series recovered from the Moundville site, Alabama, a large paramount community dated between A.D. 1050 and 1550. The treponematosis at Moundville is thought to be a form of nonvenereal syphilis. In order to more accurately identify treponematosis within the Sam series, the morphology, location, frequency and anatomical and demographic distribution of the lesions should be compared.

The adult infection frequency for the Wann site is also low at 24%. McWilliams (1970) reports that two females and one male display light bilateral thickening of the tibial cortex. The marrow cavities are not involved and there is little porosity of the outer cortex. The mean age of death for these individuals, as reported by McWilliams (1970), is 33 years. In addition, one female aged 25-30 years displays pronounced bowing of the femora and tibiae. However, McWilliams concludes that the pathological manifestations are neither severe nor widespread enough to indicate a treponemal disease. Powell (Powell and Rogers 1980) makes the same conclusion for the McCutchan-McLaughlin sample. Powell postulates the absence of cranial lesions, dental stigmata, and interpopulational distribution argue against a treponemal disease.

A comparison of mean age of death and infection rates between the McCutchan-McLaughlin series and those of the Sam-Wann series indicates an interesting relationship. The presence of the more severe expression of the infectious lesion (i.e., osteomyelitis) did not adversely affect the mean age at death of the McCutchan-McLaughlin series as a whole, but the presence of osteomyelitis is associated with a decline in individual adult ages of death. The mean age of death for those individuals exhibiting osteomyelitis is 6.8 years lower than the mean age at death of those individuals without osteomyelitis (Powell and Rogers 1980). Thus, the data indicate individuals afflicted with osteomyelitis succumb to death more readily than those individuals without the disease. In contrast, the mean age of death for those individuals with periostitis (most mild expression of skeletal infection) calculated for the McCutchan-McLaughlin and Sam-Wann series is higher than that of the individuals without any infectious lesions (Powell and Rogers 1980). It is possible that those skeletons exhibiting periostitis represent the most robust individuals who lived longer and did not easily succumb to infection.

Childhood Stress. Two bioarcheological studies include enamel hypoplasia data from the Fourche Maline components at Bug Hill (Rose et al. 1983) and McCutchan-McLaughlin (Powell and Rogers 1980). Fifteen sets of teeth drawn from the McCutchan-McLaughlin series were examined (seven subadults, eight adults). Powell reports that the severe dental attrition of the older adults prohibited their examination. Therefore, the stress encountered during childhood for the older individuals, the most successful biologically, could not be examined. Of the 15 dentitions examined, Powell reports that 73.3% displayed at least one hypoplasia. The incidence of stress rose from 27.0% between 2.0 and 2.5 years to higher levels of 64% between 2.5 and 3.0 years, 77.0% between 3 and 35 years, and 62.0% between 3.5 and 4.0 years and then fell to 36.0% between 4.0 and 4.5 years. The period of highest childhood stress, as indicated by the data, is between 2.5 and 4.0 years. Powell (Powell and Rogers 1980) attributes the clustering of enamel hypoplasia frequency between 2.5 and 4.0 years to a populationwide source of systematic metabolic stress which affected successive generations at approximately the same age. Powell suggests a likely source of the stress is weaning. Weaning is a period of both perceived rejection on the child's part leading to psychological stress and, in many cases, to dietary inadequacy (Scrimshaw et al. 1968). The timing of weaning is usually culturally determined. For example, to nurse a child beyond 2 years of age in our society is discouraged.

The frequency of enamel hypoplasias for the Bug Hill series is reported for five individuals, all but one under 18 years. All individuals exhibit at least one hypoplasia. It must be remembered that the Bug Hill stress episodes are observed on a less successful segment of the population than those obtained from McCutchan-McLaughlin and it is expected that the Bug Hill subadults would exhibit a higher frequency of stress. Therefore a comparison of the Bug Hill data to McCutchan-McLaughlin would be hazardous.

Trauma. The frequency of trauma for the entire Fourche Maline collection is low (Table 23). Except for the McCutchan-McLaughlin series, the trauma exhibited are all fractures. Powell and Rogers (1980) report that of nine individuals buried together, at least five present unequivocal evidence of violent death. These individuals have been pierced by large dart points in their thoracic and abdominal regions, spines, and limbs. This group includes two males and two females. Powell and Rogers (1980) suspect that traumatic death among the Fourche Maline was more frequent than had been previously thought. This conclusion is based on a preliminary check of burial records from all excavated Fourche Maline sites in eastern Oklahoma by Galm (1978a).

Dietary Reconstruction

Rose et al. (1983) have summarized the dietary data of the Fourche Maline burials from Bug Hill and other Fourche Maline sites. An examination of caries data (Table 23) indicates that these particular Fourche Maline populations were not consuming a diet rich in carbohydrates. The combined rate of 1.1 carie per individual is far below the 2.0 caries per individual division point for high carbohydrate consumption proposed by Rose et al. (1983). Stable carbon isotope values from one Fourche Maline Bug Hill burial supports the caries data and indicates a nonmaize diet (Rose et al. 1983).

Although botanical data are lacking, it has been suggested that horticulture was practiced at some of the large Late Fourche Maline sites close to the Red River south of the OAO study area (Schambach 1982a). This contention is supported by caries data from Old Martin Place (2.1 caries/person) and Ferguson (4.3 caries/person) (Rose et al. 1984). While the Red River is not far from these sites in the OAO study area, Galm (1984) suggests that the Ouachita Mountains, which lie between the Wister valley and the Red River, served as a cultural barrier and prevented the spread of maize horticulture.

The archeological evidence from the Fourche Maline sites indicates an increased use of stone grinding basins to prepare vegetable foods. In particular, the Woodland component at Bug Hill, when compared to the Late Archaic, is characterized by a decrease in the proportion of tools associated with hunting or working animal products and an increase in grinding stones (Altschul 1983).

A comparison of mean Murphy (1959) dental attrition scores is possible, but complex, for three of the Fourche Maline mortuary series. The Murphy scoring system measures the amount of dentin (the layer of dental tissue beneath the enamel) exposed on occlusal surfaces of the molars. Murphy defines eight progressive stages of wear; the eighth is complete exposure of dentin save for an outer margin of enamel. Powell (Powell and Rogers 1980) found the wear exhibited by the McCutchan-McLaughlin and the Sam-Wann series to be so severe that the use of a ninth stage was required, which slightly inflates these scores when compared to those from Bug Hill. Powell reports slightly higher mean wear values for the McCutchan-McLaughlin molars when compared to the Sam-Wann dentitions, and attributes this to the slightly higher mean age at McCutchan-McLaughlin The McCutchan-McLaughlin, and Sam and Wann scores are reported for individuals between 18 and 35 years of age (Powell and Rogers 1980), while a comparable age range is not available for the Bug Hill series (Rose et al. 1983). However, the Bug Hill wear scores are comparable to the other Fourche Maline values from older individuals (Rose et al 1983). The above sites all exhibit high dental attrition which is attributed to a highly abrasive diet.

While no numerical attrition data are available for the Scott site (Hammett 1978), the dentition are characterized by severe wear on the occlusal and mesial surfaces. Hammett (1978) suggests that the extensive wear contributed to the many abscessed teeth and extensive antemortem tooth loss, and is attributable to a highly abrasive diet. The rate of dental abscessing in the Bug Hill series is high at 3.5 per individual (Rose et al. 1983). The high rate of dental abscessing is attributed, as in the Scott series, to rapid attrition, which exposes the pulp chamber within the tooth to bacterial invasion. Rose et al. (1983) relate the high antemortem (before death) tooth loss to the prevalence of abscessing. Powell (Powell and Rogers 1980) reports that 22.2% (N = 45) of the Sam-Wann population and 31.8% (N = 22) of the McCutchan-McLaughlin series exhibited resorbed sockets. Rose et al. (1983) and Powell (Powell and Rogers 1980) attribute the abrasive diet to the use of grinding stones, which apparently introduced a fair amount of grit into the food.

Two mandibular second molars (two 16-year-old males) and one deciduous second molar (4-year-old child) of the Bug Hill sample were examined with a scanning electron microscope (Rose et al. 1983). One of the teenage males exhibits extensive marginal chipping, numerous large and small striations, and evidence of polishing on the occlusal surfaces and crown margins. The other teenage male also displays numerous striations, but only a low frequency of compression fractures and polishing. The young child exhibits numerous striations and compression fractures, but little evidence of polishing. The numerous microscopic striations and the rapid wear observed macroscopically indicate an increased use of stone grinding utensils from the preceding Late Archaic burials. The marginal chipping indicates large quantities of debris in the food and the compression fractures suggest the presence of hickory nuts. The presence of polishing indicates a large quantity of consumed vegetable fiber. These data support the paleobotanical and archeological evidence from Bug Hill (Altschul 1983). Nut shell fragments were recovered primarily from the Fourche Maline and Caddoan contexts. Therefore, it is highly probable that the use of nuts increased over time. The presence of grinding stones also increased within the Fourche Maline components. This, coupled with the increased polishing of the enamel, indicates an increased usage of plant foods in the Woodland period at Bug Hill.

The microwear observed on the McCutchan-McLaughlin Fourche Maline dental sample closely resembles the contemporaneous Bug Hill molars (Rose et al. 1983). Enamel surfaces are rough, exhibit large striations with rounded margins, numerous small striations, and moderately frequent compression fractures. The striations are attributed to food processing with stone grinding implements, the rounded striation margins to the consumption of plant fiber, and the compression fractures to the inclusion of pulverized nut hulls in the diet. The dietary analyses of these two sites are much the same.

McWilliams (1970) specifically states that porotic hyperostosis is not present in the Sam-Wann skeletal series. Porotic hyperostosis is a skeletal indicator of anemia and is attributed in some cases to the presence of maize in the diet (refer to Methodology section). The absence of porotic hyperostosis is not surprising in a population where the practice of maize agriculture is not indicated by either the archeological evidence or the dental data.

The patterning of degenerative disease across a population can be related to subsistence activities (Merbs 1983). The frequencies of osteoarthritis and osteophytosis are presented in Table 23. Collectively the frequency of osteoarthritis is low except at McCutchan-McLaughlin where the frequency is 29% (N = 14). The onset of osteoarthritis is related to age. The older an individual is, the more likely he or she will exhibit osteoarthritis. However, this does not appear to be the case at McCutchan-McLaughlin. A comparison of adult mean age of death for the Sam, Wann, and McCutchan-McLaughlin samples are approximately identical. A closer examination of the demographic structure of each of these samples indicates there are proportionately more older adults within the Sam-Wann series than there are within the McCutchan-McLaughlin series. These data suggest that the McCutchan-McLaughlin peoples experienced more biomechanical stress than their neighbors residing at the Sam and Wann sites.

This pattern is also repeated with the osteophytosis data. While the collective osteophytosis frequency is high at 42%, the frequency exhibited by the McCutchan-McLaughlin is again much higher at 63%. It is suspected that the frequencies of osteophytosis and osteoarthritis exhibited by the McCutchan-McLaughlin series is related to increased biomechanical stress.

Of the 12 cases of osteophytosis exhibited by the McCutchan-McLaughlin sample, eight were primarily degenerative changes involving the lumbar vertebrae and males were twice as likely to display osteophytosis as females (Powell and Rogers 1980). The pattern by gender is reversed and intensified within the Sam-Wann series. Within the Wann series five females and one male exhibit osteophytosis of the lumbar vertebrae. The age ranges for the females are between 18 and 55 years. Within the Sam series four females (ages between 20 and 60) and one male exhibit osteophytosis of the lumbar vertebrae. The female predilection for degenerative changes of the lumbar vertebrae within the Sam- Wann series indicates three things. One, females of all ages were affected; two, the females were subject to chronic back stress probably resulting from a habitual activity such as carrying heavy loads or grinding food with heavy stone manos and metates (McWilliams 1970); and three, the females were more likely to suffer from chronic back stress than were the males.

Summary

The macroscopic and microscopic dental data and stable carbon isotope ratios for the Fourche Maline skeletal collections of the northern Ouachita Mountains are in accordance. It is postulated that these populations were not eating maize; however, they were consuming more plant foods, which were prepared with stone grinding utensils, and fewer animal products (Altschul 1983) than the Late Archaic people. The greater use of stone grinding utensils, suggested by both the archeological record and the bioarcheological evidence, had a detrimental effect on their teeth, both in terms of abscesses and tooth loss. The compression fractures observed in the Bug Hill and McCutchan-Mchaughlin series (Rose et al. 1983) along with the paleobotanical data from Bug Hill (Altschul 1983) indicate an increasing reliance on nuts.

The sexual patterning of the frequency and nature of degenerative disease exhibited by the Sam-Wann series indicate that the females were impacted more severely than the males by subsistence activities. Conversely, male residents of McCutchan-McLaughlin were more severely impacted by labor-related activities. Additionally, the residents of McCutchan-McLaughlin suffered considerably more degenerative disease than their neighbors.

The demographic and infectious disease data indicate that the Fourche Maline residents of the northern Ouachita Mountains experienced a moderate level of adaptive efficiency. In general, the females appear to have been more disadvantaged. While Powell concludes (Powell and Rogers 1980) that the health status of the Fourche Maline of McCutchan-McLaughlin may be characterized as generally good, comparison to the Fourche Maline residents elsewhere indicates the McCutchan-McLaughlin adults appear to have suffered from a greater disease load than their neighbors.

Ouachita Mountains

Galm (1984) states that further refinement of the Mid-Ouachita sequence, as defined by Schambach (1970), is important for regional Fourche Maline interpretations. The Jones Mill site (3HS28) is the only Fourche Malinc site in the Arkansas Mid-Ouachita Mountains with bioarcheological analysis (Burnett and Marks 1982). Preliminary archeological investigation at Jones Mill indicates that the burials are Late Fourche Maline.

Rose and coworkers (1984) and Schambach (1982a) propose that maize dependency developed in some of the larger Late Fourche Maline sites in the Great Bend region. In light of very cursory findings at Jones Mill, Burnett and Marks (1982) suggest a similar transition took place in the Mid-Ouachita region, which suggests the absence of the diffusion barrier observed in Oklahoma. An intriguing mix of observations commonly associated with both hunter-gatherers and agriculturalists are observed. Ten caries per individual in conjunction with porotic hyperostosis suggests a maize-rich diet characteristic of agriculturalists. The compression fractures on this set of dentition observed with a scanning electron microscope are characteristic of the Fourche Maline and resulted from the mastication of pulverized nut hulls. The macroscopic attrition is low suggesting stone grinding basins were not used. However, the striation margins are rounded, due to polishing of vegetable fiber, which is typical of Fourche Maline dentitions (Moore-Jansen 1982). Burnett and Marks interpret these data to indicate both seasonality and a transitional diet with both hunting/gathering and agricultural characteristics.

Adaptive efficiency could not be assessed due to the small sample size. The paleopathology data is presented in Table 24 for future reference.

Table 24. Paleopathology by percent (N) of the Ouachita Mountains of Arkansas (late Woodland period)

Site Name	Infection Subadults	Infection Adults	Osteo-arthritis	Osteo-phytosis	Trauma	Caries/ Person
Jones Mill[1]	(0)	100 (1)	100(1)	(0)	(0)	10.0 (1)

[1] Burnett and Marks 1982

Arkansas River Valley

There are five Woodland sites in the Arkansas River Valley with bioarcheological analysis: 34LF40 (Spiro: Brues 1988), 3PP17 (Howells Farm, University of Arkansas Osteological Laboratory (OL) site files n.d.), 3PP105 (Rose 1985), 3LN42 (Toltec: OL site files), and 3CN117 (Alexander site: Rose and Marks 1985). The sites are organized geographically and culturally. Spiro is in the western portion of the valley, Howells Farm and 3PP105, while located within the central portion of the valley (Russellville to Little Rock, Arkansas), are considered culturally distinct from the Toltec and Alexander sites, also within the central portion of the river valley (George Sabo, personal communication). The cultural assignment of the Spiro burials was done by reviewing tables and maps in the Spiro Studies volumes 1, 2, 3 (Brown 1966a, b, 1971a). The Spiro burials listed as Fourche Maline or Evans phase are considered Woodland (Ann Early, personal communication).

While the inclusion of the Spiro data with the rest of the Arkansas River skeletal series crosscuts cultural distinctions, it is our contention that Spiro shares similar ecological constraints with the Arkansas River Valley sites. The addition of the Spiro skeletal data to the Oklahoma Ouachita Fourche Maline would mask this.

Galm (1984) describes the Arkansas River Valley as a major commercial and communication link to southeastern cultures and proposes that extensive cultural interaction occurred between the Ouachita and Arkansas drainages in western Arkansas and the Poteau basin throughout the Woodland period. In other words, the Fourche Maline adaptation in the northern Ouachita Mountains of Oklahoma appears to be culturally linked to sites along the Arkansas and Ouachita rivers. Hoffman (1977a) identifies a Woodland adaptation in the central Arkansas River Valley, which he calls the Gober complex, that shares many cultural attributes with the Fourche Maline Woodland adaptation in LeFlore County, Oklahoma. The Spiro Woodland occupation is thought to represent a Fourche Maline adaptation interacting with both the northern Ouachita populations and the Gober complex. The Woodland manifestation at the Toltec Mounds site represents the cultural center of a local variation (i.e., Plum Bayou culture) of the Coles Creek ceramic complex of the Lower Mississippi Valley (Rolingson 1982c). The three individuals removed from Toltec are not sufficient to represent the cemetery population believed to exist there. The Alexander site is also associated with the Plum Bayou culture. The 3PP105 site and Howells Farm yielded Baytown ceramics, but the cultural affiliations of these burials have not been specifically identified.

Adaptive Efficiency

The demographic profiles of the Arkansas River Valley Woodland series are examined prior to interpreting the pathology data, so that the representative nature of the samples can be assessed. Spiro is unique because only four subadults (6.0%) are included in the sample of 67. The exact age ranges of the adults is unknown because of the paucity of skeletal age indicators. Whether overrepresentation of adults is the result of differential burial practices or an accident of excavation strategy is unknown. The paleopathology data from Spiro represents only adults.

Site 3PP105 represents a small Arkansas River Valley habitation site (Heartfield et al. 1985). Of the seven individuals, five are aged as definite adults (15+ to 40 years) and two are classed unknown, but not children. The absence of children is attributed to poor preservation (Rose 1985). Site 3PP17 is represented by nine individuals. Eight are adults (16+ to 38 years) and the subadult is aged between 6 and 18 months. Again the preservation is poor (OL site files).

Two of the three Toltec individuals are classed as adults, one male and one female. Only the male has an estimated age of 40-45 years. The third is a child aged between 5 and 6 years (OL site files). The Alexander sample includes eight individuals: five adults and three subadults. The underrepresentation of the subadults is consistent with the Arkansas River Valley mortuary series and may be the result of poor preservation or differential burial practices. The mortuary attributes can only be clarified as future skeletal samples in the Arkansas River Valley become available.

The male-female ratio is fairly equal. At 3PP105, only two could be sexed and both were males (Rose 1985). Four adults from 3PP17 were sexed: one male and three females (OL site files). The paucity of morphological criteria at Spiro greatly hindered sex determination. Of the 63 adults represented, eight were sexed: four female and four males (Brues 1988). Differentiating between the sexes does not appear to have been part of the burial program, at least for three of these sites. With only three individuals, the Toltec burial program remains undefined. The poor preservation of the Alexander skeletal remains hindered sexual designation.

Paleodemography. The paucity of demographic data based on nine adults from three sites, as illustrated in Table 25, renders intersite comparison of these data meaningless. A comparison of the collective adult mean age of death for the two Baytown skeletal series suggests that these individuals were less well adapted than the Fourche Maline adults living in the Ouachita Mountains of eastern Oklahoma. Mean age of death is not available for the Alexander skeletons, as the adults could not be assigned specific ages (Rose and Marks 1985). It is apparent that the adaptive efficiency of the Woodland period in the Arkansas River valley is poorly defined.

Table 25. Paleodemography by percent (N) for the Woodland period in the Arkansas River Valley

	Total Mean Age at Death	Adult Mean Age at Death	Analysis
Spiro	---	---	1
Howell Farm	23.6 (8)	26.9 (8)	2
3PP105	---	28.5 (2)	1
Toltec	23.5 (2)	42.0 (1)	2
Alexander	---	--	4

1 Brues 1985; 2 Osteology Laboratory site files;
3 Rose 1985; 4 Rose and Marks 1983

Paleopathology. An intersite comparison of the paleopathology exhibited by adults reveals a general similarity between the sites. However, the sample only includes 24 individuals and half of them represent the Spiro occupation (Table 26). The collective adult infection rates are low (16%, N = 24) with the Spiro skeletons exhibiting all the infections. The infection rate at Alexander is zero with two observable.

Table 26. Paleopathology by percent (N) of the Woodland period in the Arkansas River Valley

Site Name	Infection Subadults	Infection Adults	Osteo-arthritis	Osteo-phytosis	Trauma	Caries/ Person
Spiro[1]	--	25 (12)	---	---	0 (7)	0.16 (43)
Howell Farm	--	0 (5)	0 (3)	67 (3)	0 (2)	0.6 (5)
3PP105[3]	--	0 (4)	---	---	0 (2)	0.0 (2)
Toltec[2]	--	0 (2)	0 (1)	---	50 (2)	0.0 (1)
Alexander[4]	--	0 (1)	---	---	0 (1)	0.0 (1)

[1] Brues 1988
[2] Osteology Laboratory Site Files
[3] Rose 1985
[4] Rose and Marks 1965

Comparison with Howell Farm, 3PP105 and Toltec reveal the same pattern, no infection. The poor preservation and fragmentary condition of the skeletal material from all these sites could explain the lack of infection. Alternatively, the small size of the resident populations at Alexander, Howell Farm, and 3PP105 could well account for the low rate of infection because populations were too small to maintain the presence of infective pathogens and the accumulation of waste was minimal. Comparison with the Coles Creek populations of the Lower Mississippi Valley with a combined infection rate of 8.6% (134) prompted Rose and Marks (1985) to postulate that the absence of infectious lesions at Alexander might reflect a similar level of high adaptive efficiency.

The severity of disease expression at Spiro is not known. It is not clear whether the presence of infection within the Spiro peoples, and total absence of lesions within the other samples are indicative of differing cultural practices or other factors. The frequency at Spiro (25%) falls in between the collective frequency observed among the Fourche Maline population of the Ouachita Mountains (38%) and the total absence exhibited by the Woodland samples downstream.

A comparison of the pathology and demographic data to the Fourche Maline sites of the Ouachita Mountains of Oklahoma is instructive (Table 23). Adult infection rates show that the Fourche Maline inhabitants (37%, N = 76) experienced a much higher infection rate than that seen in the Arkansas River Valley (16%, N = 24). Even if Spiro is examined alone, the infection rate (25% N = 12) is still considerably lower. These data indicate that the Woodland inhabitants of the river valley had less frequent contact with infectious pathogens. It is possible that the settlement pattern in the Arkansas River Valley, during the Woodland period, was less aggregated than in the upland communities of the northern Ouachitas, and thus provided reduced interpersonal contact.

The comparison of adult mean ages at death indicates that the value for the Arkansas River Valley inhabitants (28.7 years, N = 10) is lower than that of the Ouachita Mountains residents (34.4 years, N = 107). Obviously the discrepancy in sample size may account for the mortality differential. Older adults are consistently not seen in the Arkansas River Valley. This may be due to the poor preservation, mortuary practices, or poor excavation technique. With these reservations in mind, it would be premature to assess the adaptive efficiency of the Arkansas River Valley Woodland residents. The recovery of burials and the examination of those skeletal series which already exist should be a priority in future archeological investigation in the Arkansas River Valley.

Childhood Stress. Childhood stress data are virtually nonexistent due to lack of reporting. Only one individual from 3PP105 (OL site files) is reported as having severe multiple hypoplasias between 2.5 and 4.5 years. The data from one individual is not meaningful.

Trauma. There is no evidence of trauma except at the Toltec site. One individual here exhibits a fracture. The collective frequency for all samples is 7% (14). In comparison to the Fourche Maline samples of the Ouachita Mountains at 20%, this frequency of trauma is very low.

Degenerative Disease. The osteoarthritis and osteophytosis data are equally negligible and noninterpretive.

Dietary Reconstruction

The skeletal samples of the Arkansas River Valley consistently display a high rate of dental attrition. Rose (1985) and Brues (1988) separately describe the wear exhibited by the 3PP105 and Spiro collections as rapid. The heavy and rapid wear is indicative of contamination of the food by highly abrasive particles introduced by grinding with stone implemeats. This cannot be affirmed without a scanning electron microscope survey of the enamel topography. The heavy wear is consistent with the heavy wear exhibited by the Fourche Maline populations of the Wister valley.

There are two sets of dentition within the Alexander sample that are thought to represent the Coles Creek dietary strategy (Rose and Marks 1985). One is thought to be an 8-year-old child which exhibits three caries. The other is an adult represented by two molars without caries. Rose and Marks (1985) calculate the caries rate at 3.0 caries per individual based upon the juvenile dentition. In the OAO synthesis, caries rates for children have not been included as there is a paucity of these data.

The botanical remains from the Coles Creek occupation at Alexander include numerous starchy seeds which may have been cultivated or encouraged: maygrass, knotweed, and chenopodium (King 1985). The small size of these seeds and their hard seed coats are thought to require extensive grinding which would explain the extensive dental wear and distinctive cupped shaped occlusal surfaces of two molars from one adult (Rose and Marks 1985). A scanning electron microscopic survey was done on the right maxillary first molar of this adult dentition. The surface of the molar is rough with numerous rough, sharp margined striations, compression fractures, and numerous small striations. This pattern suggests to Rose and Marks (1985) a coarse diet with low to moderate vegetable fiber prepared with stone utensils, but dominated by a heavy reliance upon nuts. Later in their discussion, Rose and Marks (1985) suggest that starchy seeds were processed into flour and consumed in significant quantities and that incipient horticulture, emphasizing native North American plant species and perhaps Cucurbita, is indicated. Rose and Marks (1985) suggest the microwear of the adult and caries data of the child indicate a heavy reliance on starchy seeds possibly implying an intensification of certain aspects of the horticultural complex. The paucity of these dental data make comparisons to the other Woodland samples in the valley impossible.

The consistent wear pattern seen throughout Woodland skeletal samples allows for comparison of caries data, which appears very interesting. The combined caries rate for the Arkansas River Valley Woodland is 0.19 per individual (52) and is exceptionally low. The 3PP105 and 3LN42 skeletal series both exhibit no caries (N = 3). The Spiro mortuary population has a very low rate of 0.16 caries per individual (N = 43). The 3PP17 collection has the highest rate with 0.6 caries per individual (N = 5). One individual exhibited all the caries here. Overall the virtual absence of caries indicates low carbohydrate consumption. The low rates are unique and beg further investigation. The combined caries rate observed among the Woodland inhabitants of the Oklahoma Ouachita Mountains is much higher at 1.1 (73). The carbohydrate content of the Arkansas River Valley Woodland peoples was markedly lower, as indicated by the caries data and indicates a divergent subsistence strategy from that employed by the northern Ouachita residents. Perhaps this dichotomy implies that different adaptive strategies existed between the uplands and lowlands. The dichotomy between upland and alluvial data sets is almost consistently repeated throughout the OAO study area and suggests that the upland populations, irrespective of cultural period (prior to the Fort Coffee phase, Late Mississippian) or locality, placed a heavier emphasis on carbohydrate consumption than the inhabitants of the Arkansas River Valley.

Summary

The caries and infection rates suggest the existence of distinct adaptations between the Arkansas River Valley and the northern Ouachita Mountains. Spiro, located in the river valley, appears to have a greater biocultural similarity to other river valley sites than to the Fourche Maline of the northern Ouachitas.

WOODLAND–MISSISSIPPI PERIODS

The Southwestern Ozark Fringe

The bioarcheological synthesis of the Ozark Mountains is divided into three study units: the southwestern fringe, the interior, and northern Ozark fringe. They correspond to differing cultural and ecological constraints (George Sabo, personal communication).

The Woodland–Mississippi period adaptation of the southwestern fringe of the Ozarks is represented by three sites with skeletal analyses; Edens Bluff (3BE6, OL site files), Montgomery Farm (Fritz 1979), 3BE187 (OL site files). The specific cultural affiliation for these burials is unknown, but it is thought, based on associated artifacts, that the burials are either Woodland or Mississippi (George Sabo, personal communication). The lack of diagnostic artifacts in direct association with the burials and the incomplete excavation record precludes the identification of cultural affiliation.

Edens Bluff and 3BE187 are rockshelters and Montgomery Farm is a complex of four rockshelters. Montgomery Farm and 3BE187 are located in the same vicinity. The 3BE187 skeletal series includes eight adults of indeterminate age and two subadults. Montgomery Farm is represented by 10 adults and four subadults. The burials excavated at Montgomery Farm were retrieved from four shelters dug by Dellinger's crew in the 1930s. The burials are believed to represent both Woodland and Mississippian occupations (Fritz 1979).

However, Sabo suggests these burials may represent the Mississippi period, since the excavated artifacts are primarily Mississippian (George Sabo, personal communication). Seventeen burials were excavated from Edens Bluff, however only eight have received analysis and only five had enough data to include here. These individuals are all adults; two are thought to be females and two are possible males. The total Woodland–Mississippian sample includes 23 adults and six (21%) subadults. It is not clear if the skeletal series resulted from complete excavation of the sites. If the sites were completely excavated, then it must be concluded that the underrepresentation of subadults is a product of the burial program. Nevertheless, the underrepresentation of the subadults hinders realistic assessment of Woodland–Mississippian adaptive success in the southwestern fringe of the Ozarks. The lack of clear cultural affiliation hinders comparison both within and between the skeletal samples. Genetic affinities of these samples have also not been assessed. Therefore it is not clear if these people represent a single biological population. The interpretations gained from the osteological data presented here must be viewed with caution.

The Woodland period for both the Missouri and Arkansas Ozarks is poorly understood and what follows is a brief archeological overview to set the stage for the bioarcheological interpretations. Sabo (Chapter 6) suggests that the Middle and Late Woodland rockshelter occupants were indigenous and part of a settlement system incorporating habitation sites in the upland river valleys. Hoes found in sites along Lee Creek and elsewhere have suggested to archeologists the possibility of horticulture (Trubowitz 1980). During the Late Woodland period there is archeological evidence to suggest that populations residing along the upland river drainages, flowing south to the Arkansas River, were developing relationships with the Fourche Maline/Gober complex along the Arkansas River. Sabo (Chapter 6) postulates that the Late Woodland populations residing in the southern fringes of the Ozarks were possibly adopting horticulture to counter environmental fluctuations.

The Mississippi period in the Ozarks extends from A.D. 900 to 1600. The advent of shell-tempered pottery heralds the beginning. Briefly, the Mississippi adaptation in this region is seen as a continuation of the Woodland adaptive strategy. As with the Middle and Late Woodland, the settlement pattern included the use of open sites, located on terraces adjacent to fertile bottomlands, and rockshelters, which are thought to have served a variety of special functions and were usually temporarily occupied. There is little evidence for a shift toward fully sedentary residence. These populations are thought to have been partly dependent on horticulture and it is assumed that the dietary importance of domesticated plants increased through the Mississippi period. The paleobotanical and faunal evidence indicates these groups supplemented their diet with wild plant and animal resources.

Dietary Reconstruction

Fritz and Yarnell (1985) report the frequency and distribution of plant remains obtained in the 1930s from 38 sites in northwest Arkansas. The sites are located in eight counties that are geographically grouped into five areas. Edens Bluff (3BE6), included with 17 other sites, is in the southern Beaver Reservoir vicinity of Benton, Carroll, and Washington counties. Sites in this area are in proximity to alluvial terraces where farming would have been optimal (Fritz and Yarnell 1985). The plant remains in the Edens Bluff sample include, in descending order by quantity: gourd, squash, maize, sunflower, maygrass, grape, hickory nut, hazelnut, sumpweed, paw paw, beans, chenopodium, acorn, walnut, chinquapin, sumac, giant ragweed, wild bean, cherry, plum, peach, ground nut, hawthorn, persimmon and knotweed. Unfortunately, the majority of archeobotanical samples from the 38 sites could not be associated with temporally diagnostic artifacts, and therefore interpretations of subsistence through time for the Ozarks could not be made. Both Woodland and Mississippian artifacts were abundant in the dry deposits of the rockshelters where these samples were recovered. A recent C-13 date obtained from a sample of domesticated chenopodium from Edens Bluff yielded an approximate date of 1860 B.P. (Fritz 1986b) which falls within the transition between the Early and Middle Woodland periods and suggests the potential importance of domesticates in the Middle Woodland Ozarks. Whether the rest of the botanical remains at Edens Bluff relate to this recent date has yet to be determined. The general subsistence data from the Ozarks, as revealed by this study, indicates that horticulture or at least the encouragement of starchy seeds was important, as were nuts, nondomesticated starchy seeds, fruits and roots (Fritz and Yarnell 1985).

The combined caries data is 1.0 caries per individual (8), and the caries rate specifically at Edens Bluff is 1.0 caries per individual (N = 2). The wide range of wild foods and the presence of possible domesticated chenopodium at Edens Bluff documents a mixed economy of hunting/gathering and possible horticulture. Unfortunately, the dental sample size at Edens Bluff is too small to generate conclusions about the the quantity of carbohydrates consumed. A larger sample size is required for complete interpretation of the dietary data. Clearly the adult caries rates from these upland sites are higher than the Woodland adults of the Arkansas River Valley, and quite similar to those observed among the Fourche Maline samples from the Ouachita Mountains. It is unfortunate that the cultural affiliation of these Ozark burials is not better known. The porotic pitting data are negligible. If these are nonmaize consumers as is suspected, the absence of porotic hyperostosis is not surprising.

No caries data from Montgomery Farm are available. However, a coprolite analysis has been done for a partially mummified 30-year-old female (Wakefield et al. 1937a). Fritz (1979) determined that this female is one of the Montgomery Farm burials. The main food items found included the sumac fruit, ground acorns, small amount of unidentified vegetable matter, charcoal, and several species of insects and larvae. Additionally, another Montgomery Farm burial (number 16) is associated with several caches of maize, squash, bean hulls, and large sunflower heads.

Dental wear is heavy for all three samples and consistent with dental attrition seen throughout the OAO study area. There are five abscesses with subsequent antemortem tooth loss among the Edens Bluff individuals (OL site files). This is comparable to the abscesses and tooth loss rates seen among Fourche Maline populations of the northern Ouachita Mountains. These data, not surprisingly, indicate the extensive use of stone grinding implements. A scanning electron microscopic survey of an adequate dental sample would be beneficial.

Adaptive Efficiency

Paleodemography. The mean age of death for all individuals in the Montgomery Farm sample (Table 27) is 14.7 years (14), and 24.8 years (6) for adults alone (Fritz 1979). The mean age of death for 3BE187 could not be calculated as only one adult was aged (OL site files). The mean adult age of death for Edens Bluff is 29 years (2). Total adult mean age of death is 25.9 (8). Admittedly the sample is small and can only suggest a diminished adult adaptive efficiency. Nothing can be concluded from such an incomplete sample with partial analysis.

Table 27. Paleodemography by percent (N) for Woodland/Mississippi periods in the southwestern Ozark fringe

Site	Total Mean Age at Death	Adult Mean Age at Death	Analyses
Edens Bluff	25.9 (8)	29.0 (2)	1
Montgomery Farm	14.7 (14)	24.8 (6)	2
3BE187	---	---	1
Total	18.8 (22)	25.9 (8)	

1 Osteology Laboratory site files
2 Fritz 1979

Paleopathology. The combined infection rate for adults is 33% (18) (Table 28). This is considered moderate to high and is similar to the rates observed among Fourche Marine populations further south in the Ouachita Mountains and considerably higher than the combined frequency observed within the Arkansas River Valley. The frequencies of adult infection at both Edens Bluff and 3BE187 are high, but the samples are small and preclude meaningful interpretation. Two of the Edens Bluff individuals with infections were examined by x-ray and diagnosed with osteomyelitis by Wakefield et al. (1937a).

Table 28. Paleopathology by percent (N) in the southwestern Ozark fringe.

Site Name	Infection Subadults	Infection Adults	Osteo-arthritis	Osteo-phytosis	Trauma	Caries/ Person
Edens Bluff[1]	---	50 (4)	33 (3)	0 (3)	50 (2)	1.0 (2)
Montgomery Farm[2]	---	25 (12)	28 (7)	28 (7)	30 (10)	---
3BE187	---	50 (2)	100 (1)	(0)	0 (2)	1.0 (6)
Total	--	33 (18)	36 (11)	20 (10)	28 (14)	1.0 (8)

[1] Osteoloqy Laboratory site files
[2] Fritz 1979

The osteoarthritis and osteophytosis rates are 36% (11) and 20% (10) respectively. These rates suggest moderate biomechanical stress. Degenerative disease is common among hunting and gathering groups, and usually declines with the initial adoption of agriculture (Rose et al. 1984). The trauma rate of 28% (14) represents fractures alone.

Summary

The Woodland–Mississippian biological adaptation of the southwestern Ozark fringe is poorly understood. The available bioarcheological data sets are comparable to the upland Fourche Maline adaptation of the northern Ouachita Mountains and less comparable to the data sets drawn from Woodland Arkansas River Valley series. The infection and mortality data only hint at a low adaptive efficiency for bluff shelter occupations. Considerable work must be done before more definite statements can be made.

Interior Ozark Mountains

Woodland and Mississippian occupations are represented by three analyzed skeletal samples; 3BA20 (OL site files), 3MR13 (OL site files), 3MR56 (OL site files). All three represent occupations of open sites (not bluff shelters) within the White River drainage. The skeletal samples from 3MR13 and 3MR56 include three and four adults respectively and no subadults. The skeletal series from 3BA20 contains eight adults and two children. Again, incomplete burial records and the lack of diagnostic artifacts in direct association with the burials precludes further refinement of the temporal affiliations. It is thought that the burials from 3BA20 are possibly Mississippian (George Sabo, personal communication). The underrepresentation of the subadults greatly hinders the assessment of adaptive efficiency.

Adaptive Efficiency

Paleodemography. The adult mean age of death for the 3MR56 individuals is 28.0 years (N = 3). There are no comparable data for the other two sites. The mean age is similar to the adult mean age calculated for the southwestern Ozark fringe at 25.9 years. Adaptive efficiency could not be interpreted due to the small sample size.

Paleopathology. The combined adult infection rate is 28% (7). The results from the individual sites are mixed due to sample size. The infection rate is comparable to the Woodland–Mississippian samples from the southwestern fringe. The small sample size precludes assessment of adult adaptive efficiency.

Osteoarthritis, osteophytosis and trauma frequencies are reported in Table 29. The frequencies are similar to those reported for the southwestern Ozark fringe. Again, the small sample sizes precludes bioarcheological interpretation.

Table 29. Paleopathology by percent (N) in the interior Ozark Mountains

Site Name	Infection Subadults	Infection Adults	Osteo-arthritis	Osteo-phytosis	Trauma	Caries/ Person
3BA20	--	0 (3)	50 (2)	33 (3)	0 (1)	0.0 (1)
3MR13	--	33 (3)	50 (2)	(0)	33 (3)	0.0 (2)
3MR56	--	100 (1)	50 (2)	0 (1)	--	--
Total	--	28 (7)	50 (6)	25 (4)	25 (4)	0.0 (3)

All data from Osteology Laboratory Site Files

Dietary Reconstruction

The adult caries rate is zero for three observations. The small sample size (N = 3) precludes interpretation but hints at low carbohydrate consumption.

Summary

The biological adaptation of the Woodland–Mississippian occupation of the interior Ozarks cannot presently be assessed because of small sample size.

Northern Ozark Mountains

The northern tier of the Ozarks Mountains is represented by the Bolivar burial complex (Wood and Brock 1984) which is a Late Woodland manifestation in western Missouri north of the OAO region. Nine sites with 48 mounds containing 308 individuals were included in this abbreviated discussion (Wood and Brock 1984) of a more detailed analysis (Brock 1980). The individuals are represented by both scattered bone and discrete burials, some of which were articulated while others were cremations and bundle burials. Brock concludes that the higher incidence of infectious disease and higher mortality rates found among individuals under 5 years of age indicates low adaptive efficiency. These individuals were interred in an archeological context that did not include maize. The evidence for Woodland horticulture is the presence of maize at some of the mounds, although its consumption was not confirmed by stable carbon isotope analysis. The caries rates were not reported. The life expectancy data indicate that the agriculturalists were participating in a more favorable adaptive strategy than were their hunting and gathering predecessors.

MISSISSIPPI PERIOD

The Caddoan culture of the Mississippi period spans approximately 900 years. The Caddoan cultural area includes northeast Texas, northwestern Louisiana, southwest Arkansas and eastern Oklahoma. The OAO bioarcheological synthesis of Caddoan adaptation will treat the Caddoan manifestation in the Arkansas basin as defined by Wyckoff (1980). The bioarcheological data will be ordered by cultural phase and geographic divisions that corresponded to Sabo and Early (this volume). Wyckoff aptly summarizes the Caddoan adaptation of the Arkansas basin as follows:

> From A.D. 650 to 1550, sedentary farmers occupied the Arkansas basin of eastern Oklahoma. Physically and culturally they resemble Caddoan horticulturalists who lived to the south in the Red River Basin. Between A.D. 650 and 1400, the Arkansas Basin people established many settlements while they adopted Southeast forms of social classes, mound building, and ceremonies. But after A.D. 1400 Southeastern customs were forsaken for Plains cultural

traits. Emigration, immigration, acculturation, failures of political systems, and reaction to a drier climate are current explanations for this marked cultural change (Wyckoff 1980:vi).

Rose et al. (1984) in their synthesis of the Caddoan bioarcheology hypothesize that cultural change, population nucleation and the adoption of agriculture in the Caddoan cultural area were the prime stimuli for altering stress and morbidity. This hypothesis and the long standing assumption of maize dependency will be examined.

Harlan Phase (Northern Ouachita Mountains of Eastern Oklahoma)

The bioarcheological synthesis of Mississippi period, early Caddoan manifestation in the Arkansas basin includes two sites with analysis: Bug Hill (34PU116: Rose et al. 1983) and the Sam site (34LF28: McWilliams 1970). The Bug Hill and Sam sites are both upland sites in the Ouachita biotic community. Obviously these two sites are not a fair representation of all eastern Oklahoma early Caddoan occupations. The bioarcheological synthesis can only represent early Caddoan Harlan phase inhabitants of the northern Ouachita Mountains.

The early Caddoan residents of Bug Hill constructed a house and a burial ground, with three individuals placed in two graves. Two individuals were probably associated with the house structure; the other individual, an adult male, was placed under a large metate. The residents of Bug Hill were in proximity to both the prairie and uplands. Carbonized seeds and pollen recovered from the house debris indicate a utilization of diverse plant resources. The early Caddoan subsistence pattern at Bug Hill seems to be a late fall to early winter gathering of fruits, seeds and nuts with a strong emphasis on deer hunting and turtle collecting. Sunflower horticulture may have been practiced during the summer. Whether the site was permanently occupied or served as a base camp for hunting and gathering forays into the uplands is not known (Altschul 1983).

The Harlan phase is represented by 11 individuals from the Sam site (Wyckoff 1980). The Caddoan occupation at the Sam site consists of a midden, two houses, trash pits and the burials. The site is located on a terrace in the Poteau drainage within the Ouachita biotic community. Because only 11% of Harlan phase sites (Caddo II, Wyckoff 1980) are in the Ouachita biotic community, the Bug Hill and Sam burials cannot reflect the living conditions of all early Caddoan occupations, a large number of which are located in the Arkansas bottomlands (Wyckoff 1980).

Adaptive Efficiency

Before the interpretation of the pathology data, the mortuary attributes and genetic affiliations must be assessed. Three individuals represent the Caddoan occupation at Bug Hill: one 8-year-old child, adult hand bones mixed with the child, and a 40 to 44-year-old male. The sample is too small to be considered representative. The Sam analysis presented by McWilliams (1970) includes 11 individuals: four subadults and seven adults. The adult age range is 18 to 65 years indicating no mortuary selection by age. Four males and three females are present indicating no sexual preference existed in the burial program.

An important research question concerns the genetic origin of the Caddoan people. Many previous investigators have postulated an intrusion of Caddoan culture bearing peoples, while others suggest an indigenous development (Rose et al. 1983). The epigenetic and osteometric analyses of the Fourche Maline/Caddoan inhabitants at the Sam site, and the Fourche Maline residents of the Wann site indicate that these people were members of the same population (McWilliams 1970). Although McWilliams (1970) indicates that the Sam skeletal sample was genetically the same as the Wann series, it is suspected that McWilliams was unaware of the Caddoan component at the Sam site. He did not analyze these particular burials separately and thus the genetic composition of the Caddoan people of the Sam site is unknown. Both skeletal and dental nonmetric traits are reported for the Bug Hill skeletal series. Rose et al. (1983) compared nonmetric traits from two Caddoan sites and three midden mound sites (with both Fourche Maline and Caddoan components) within the Oklahoma Arkansas River and the Red River areas. Although the available data was insufficient for a comprehensive examination, Rose et al. (1983) suggest that there are no major differences between the Fourche Maline and Caddoan skeletons. Therefore, we will assume that any differences observed within the osteological data sets of the Fourche Maline and subsequent Caddoan populations represent culture change rather than a difference in biological inheritance.

Paleodemography. The combined adult mean age of death for the Caddoan samples from the Bug Hill and Sam sites is comparable to the total adult mean age of death for the Fourche Maline samples from this same area at 34 years. These data indicate that the adaptive efficiency for at least the Caddoan sample from the Sam site remained constant or became slightly elevated. Unfortunately the Bug Hill sample is to small to merit interpretation (Table 30).

Table 30. Mean age at death by years (N) for Harlan phase sites

Site	Total Mean Age at Death	Adult Mean Age at Death	Analyses
Sam	26.9 (11)	38.4 (7)	1
Bug Hill	25.0 (2)	42.0 (1)	2
Total	26.6 (13)	38.8 (8)	

1 McWilliams 1970
2 Rose et al. 1961

Paleopathology. The pathology data affiliated with the Harlan phase is negligible and uninterpretable. At Bug Hill only one Caddoan adult was represented by leg bones and he did not exhibit any form of infectious lesion (Table 31). Additionally, the eight year old child from Bug Hill also did not

Table 31. Paleopathology by percent (N) in the Ouachita Mountains of Oklahoma

Site Name	Infection Subadults	Infection Adults	Osteo- arthritis	Osteo- phytosis	Trauma	Caries/ Person
Woodland Period Fourche Maline						
Bug Hill[1]	100 (3)	0 (1)	0 (1)	0 (1)	0 (3)	0.25 (4)
Scott[2]	0 (1)	75 (4)	0 (4)	80 (5)	40 (5)	--
Sam[3]	--	18 (27)	4 (22)	22 (23)	18 (22)	0.84 (45)
Wann[2,3]	--	24 (17)	6 (17)	35 (17)	10 (19)	*
McCutchan-McLaughlin[4]	12 (8)	59 (27)	29 (14)	63 (19)	30 (20)	1.60 (24)
Total	33 (12)	38 (76)	10 (58)	42 (65)	20 (69)	1.10 (73)
Mississippian Period Harlan Phase						
Sam[3]	0 (1)	0 (1)	0 (1)	0 (1)	0 (l)	--
Bug Hill[1]	0 (1)	0 (1)	0 (1)	0 (1)	0 (2)	0 (1)
Total	0 (2)	0 (2)	0 (2)	0 (2)	0 (1)	0 (1)

[1] Rose et al. 1983
[2] Hammett 1978
[3] McWilliams 1970
[4] Powell and Rogers 1980

display any infection. Conversely, while no Fourche Maline adults at Bug Hill were observable for infection, all the observable children displayed periostitis. The Sam Caddoan skeletal remains are fragmentary and/or cremations and therefore there are few osteological observations reported (McWilliams 1970). The paucity of data precludes any attempt at interpretation.

Dietary Reconstruction

For the 900 years of Caddoan prehistory Wyckoff (1980) describes two stages of cultural change which may be regionally distinctive. Territorial expansion and increasing social-political complexity occurred between A.D. 650–1200 (including the Harlan phase). Wyckoff postulates increasing population pressure and depletion of arable lands through farming in the Poteau River drainage as the explanation for the territorial expansion into the uninhabited, fertile bottomlands along the Arkansas, Canadian, Illinois, and Grand Rivers. Plant remains, which include maize, hickory, and walnuts, have been recovered from Caddo II (Harlan phase) contexts, primarily community centers, settlements and base camps in the Arkansas bottomlands (Wyckoff 1980). The bioarcheological data do not support the interpretation of maize dependent subsistence.

Only one Bug Hill adult had an observable dentition which did not exhibit any caries (Table 31). The molars of the Caddoan individual at Bug Hill are heavily worn, indicating continued use of stone grinding implements. The molar surface of Burial 10 (8-year-old) was examined by scanning election microscope and numerous striations, compression fractures, marginal chipping and no evidence of polishing were observed (Rose et al. 1983). These observations corroborate the use of stone grinding implements and the presence of hickory nuts in the Caddoan component at Bug Hill. The stable carbon isotope value for Burial 11, a Caddoan individual recovered from Bug Hill, indicates no maize consumption. Although the dental data from Bug Hill are meager, they suggest a continuity of subsistence practices from the Fourche Maline through the early Caddoan periods (Rose et al. 1983). Robert E. Bell states that farming is assumed to have been important, although actual plant remains are rare (Bell 1984b). The assumption that horticulture was a primary characteristic of the early Caddoan tradition is premature and must be examined with bioarcheological data not presently available.

Summary

The indicators of adaptive efficiency for the early Caddoan peoples are meager. In general, a comparison of the mean ages of death and infection rates for the Fourche Maline and the early Caddoan inhabitants of the northern Ouachita Mountains suggests that the level of adaptive efficiency did not change. The dental data and stable carbon isotopc values derived from the Bug Hill collection also indicate a continuation of Woodland subsistence strategy. Rose et al. (1983) conclude that the archeological and skeletal evidence from Bug Hill indicate cultural stability over time.

Spiro Phase

The Spiro phase Caddoan adaptation is well represented by mortuary components from the following sites: Lundy (34CG15), a base camp in the Cherokee Prairie biotic community, and Morris (34CK39), a settlement in the Ozark biotic community. Both of these sites are considered within the southwestern fringe of the Ozarks (George Sabo, personal communication). The Spiro phase adaptation in the Arkansas River Valley is represented by Horton (34SQ11), a settlement on the border of the Ozark uplift and the Arkansas River Valley, and Spiro (34LF40), a community center in the Arkansas bottomland biotic community (Wyckoff 1980). In this discussion the upland sites (34CG15 and 34CK39) are treated separately from the alluvial sites (34LF40 and 34SQ11).

During the Spiro phase, the Caddoan people are thought to have abandoned the fertile valleys in the Cherokee Prairie, the northern Ozarks, and the northern and western reaches of the Arkansas bottomlands and resettled in hamlets and villages in the Arkansas bottomland and Osage savannah along the lower Grand and Arkansas rivers (Wyckoff 1980). Regional chiefdoms flourished briefly at centers such as Spiro, Norman, and Brackett. These civic ceremonial centers produced burials with elaborate grave goods (Brown 1984b). Between A.D. 1250 and 1450 the Caddoan populations of the Arkansas River Valley were at the peak of social complexity and cultural elaboration. The Spiro site was at the pinnacle of the settlement hierarchy and the numerous villages within the Spiro vicinity were supported by the highly productive Arkansas bottomlands. Between A.D. 1200 and 1550 there was an increasing use of temporary camps in the northern and western peripheries. Base camps, such as the Lundy site (34CG15), were located in bluff shelters and open areas within the Osage savannah, Cherokee Prairie, and Ozarks. These were temporary autumn camps where the people gathered nuts, and hunted deer and bison. After A.D. 1400 (Fort Coffee phase), the chiefdoms disappear, community centers were abandoned and the settlements became smaller than ever (Wyckoff 1980). Brown (1984b) states that a broad spectrum of plants and animals were utilized by the Caddoan peoples, in addition to a cultivated plant complex of maize and other domesticated plants which probably included squash, beans, sunflowers and gourd, all of which testify to a well established agricultural system. The archeological evidence for farming is the presence of hoes, availability of arable land and plant remains. A total of 305 hoes have been found in Caddoan contexts (Wyckoff 1980: Table 53), the majority of which are associated with Wyckoff's Caddo III components (Spiro phase). Both maize and beans are found in Spiro phase assemblages from settlements in the Arkansas bottomland (i.e., Horton site) and the Osage savannah, as well as base camps in the Ozarks. Charred seeds or nut hulls are recovered from one Ozark base camp and the Horton site, which is located in the western periphery of the Arkansas bottomlands. Black haw, bitternut, butternut, and walnuts were also found at the Horton site (Wyckoff 1980).

Spiro Phase in the Southwestern Ozark Fringe

The bioarcheology synthesis of the upland Spiro phase includes the Lundy site (34CG15), represented by 18 individuals (Buikstra et al. 1971) and the Morris site (34CK39) with 75 individuals (Brues 1959). The Morris site has traces of houses, middens, and a cemetery located nearby. Chipped stone, and shell and bison scapula hoes are present. The Lundy site is an open site with midden, burials, and refuse pits. Perino (1971) does not mention hoes in his description of the Lundy artifact assemblage and interprets Lundy as a special purpose site, for procuring and processing venison.

Dietary Reconstruction

The dental evidence from the Spiro phase upland skeletons does not indicate high levels of carbohydrate consumption as would be expected for people who are supposed maize consumers. The caries rate per individual is 0.8 (N = 27) and is similar to the caries rate (1.1 N = 73) observed among the upland Fourche Maline populations of the northern Ouachita Mountains. Dental attrition is moderate to severe in the Morris skeletal series (Brues 1959). The wear is sufficient to obliterate the molar cusps and in some cases the teeth are worn down to the roots. Brues (1959) suggests that the degree of wear did not correlate well with the other dental lesions. With seven individuals exhibiting moderate to heavy wear, no caries, abscesses or tooth loss were observed. In 12 cases with moderately to severely worn teeth, caries, abscesses, and tooth loss did occur. No caries were observed in the children. It is likely that the wear exhibited by the Morris skeletons is much the same as the wear observed in the cultural periods previously discussed.

The present dietary evidence, without the beneficial aid of scanning electron microscopy or stable carbon isotope analysis, indicates that the subsistence pattern initiated during the Fourche Maline phase and thought to have continued into the Harlan phase in the Ouachita Mountains is also evident among the Spiro phase peoples residing within the southwestern fringe of the Ozarks. The presence of maize in the upland base camps apparently does not necessarily imply that these people were using maize as a dietary staple. A more accurate interpretation of the subsistence practices of the upland Caddo can only be obtained from a larger sample of analyzed burials. Caries and dental attrition rates are almost identical to those seen in the Woodland dietary tradition in the Ozarks and northern Ouachita Mountains. While archeological evidence indicates that the Caddoan people and possibly the Woodland people (presence of domesticated chenopodium at Edens Bluff) were cultivating plants, the dental data suggest that starchy cultigens (including maize) did not make up the major portion of the diet. More likely, the upland Caddoans (at least through Spiro phase) supplemented their diet by cultivating a variety of plants including starchy seeds (e.g., domesticated chenopodium). Starchy seeds have hard outer coats that require extensive grinding before consumption (Rose and Marks 1985). The use of stone grinding implements is indicated by the presence of stone metates and manos and heavy dental attrition. The dental data suggest a hunting/gathering subsistence strategy, a practice established in the upland area during the Woodland. Hunting/gathering subsistence also is indicated by the wide variety of the plants recovered within Spiro phase contexts. There appears to be continuity of wild plant utilization by the upland peoples from the Fourche Maline through the Spiro phases.

Adaptive Efficiency

The demographic and genetic attributes of Spiro phase populations must be assessed prior to paleopathological and paleodemographic analyses. The Morris sample of 75 includes: 51 identified adults (23 males and 21 females), and 24 (31%) identified subadults (Brues 1959). The adult age ranges are 20-50+ years. The Lundy population is represented by 12 adults (seven males and four females and one unknown) and six (33%) subadults (Buikstra et al. 1971). The age ranges for the adults are between 18 and 50+ years. The demographic parameters represented by Morris and Lundy skeletal series do not seem unusual for a prehistoric cemetery population and imply that no particular age or sex is being systematically excluded. The subadults are consistently underrepresented, as seen throughout our discussion, and therefore the adaptive efficiency for this age segment of the population is not well defined.

Unfortunately, the genetic affinities of these skeletal samples cannot be compared as the data are not available. Buikstra et al. (1971) analyzed both cranial and postcranial nonmetric traits and dental morphological variation in the Lundy sample. They conclude that the high frequency of two particular morphological characteristics: (i.e., supernumerary teeth lingual to the mandibular premolars on the left side, and spondylolysis) indicate that the burial group at Lundy may be a biological kin group. Racial type and affinities were investigated by Brues for both the Morris and Horton skeletal collections, however, nothing conclusive can be said (Brues 1958, 1959). For the time being, it will have to be assumed that Lundy and Morris skeletal remains represent the same biological population. Both groups share geographic proximity and cultural attributes.

Paleodemography. The mortality data for both upland Spiro phase sites are presented in Table 32. The adult mean ages of death are essentially identical and indicate a high level of adaptive efficiency. It is interesting to note that while the Lundy skeletal collection has proportionately more subadults, the Morris sample exhibits a lower total mean age of death which indicates that the subadult residents of the Morris settlement died at an earlier age than those buried at the Lundy base camp. Two (33%) of the six subadults buried at Lundy died before 5 years of age. Fifteen (63%) of the 24 subadults recovered at the Morris settlement died prior to 5 years of age. The higher mortality of the younger children at the Morris site is indicative of a lower adaptive efficiency in general and also suggests that the younger children at the Morris site were biologically selected against. In other words, the cultural system in place at the Morris site failed to adequately buffer harmful stimuli and protect the youngest inhabitants. The equivocal adult mean ages at death imply that if an individual survived to adulthood, the cultural system in operation at both communities was adequate and enabled the adults to survive to a reproductive age and prosper long enough to raise their offspring.

Table 32. Mean age at death in years (N) for Spiro phase upland sites

Site	Total Mean Age at Death	Adult Mean Age at Death	Analyses
Lundy	25.3 (16)	36.3 (10)	1
Morris	20.9 (51)	36.4 (24)	2
Total	22.0 (67)	36.4 (34)	

1 Buikstra et al. 1971
2 Brues 1959

Paleopathology. If, as hypothesized by Rose et al. (1984), the degree of population aggregation is associated with both increased infection rates and increased severity of infection, then Spiro phase people should show these increases. The Spiro phase settlements and civic ceremonial centers are clustered along the lower reaches of the Grand, Illinois, and Arkansas rivers and the size of the communities is thought to have increased from the previous Harlan phase.

At the Morris site, a multicomponent village with two houses and nine refuse pits, the infection rates are very high for both children and adults (67%, N = 6 and 54%, N = 26 respectively). The expression of the infection is severe. Seven (39%) of the 18 affected individuals have either osteitis or osteomyelitis (Table 33). Six of the seven individuals severely impacted by skeletal infection are adults. There is a higher prevalence of low level skeletal infection among males (61.0%, N =13) than females (37.5%, N = 8) or, in other words, one female and five males are reported with periostitis. However, the distribution by sex of individuals with the more severe infectious lesions is equal, three males, and three females. The age of adults exhibiting osteomyelitis could not be compared with the ages of adults with periostitis, as only six of the 14 adults with infectious lesions are aged (Brues 1959).

Table 33. Paleopathology by percent (N) in the southwestern Ozark fringe (Middle Mississippi period Spiro phase

Site Name	Infection Subadults/Adults		Osteo-arthritis	Osteo-phytosis	Trauma	Caries/ Person
Lundy[1]	--	12 (8)	60 (5)	80 (5)	67 (3)	1.3 (6)
Morris[2]	67 (6)	54 (26)	33 (9)	37 (19)	8 (12)	0.7 (21)
Total	67 (6)	44 (34)	43 (14)	46 (24)	20 (15)	0.8 (27)

[1]Buikstra al. 1971
[2]Brues 1959

At Lundy, a small base camp, the infection rate is moderate (25% N = 8) for the adults and no children were observable. The infectious lesions are described as localized areas of periosteal elevation and are considered minor periostitis (Buikstra et al. 1971). In comparing the two samples, the smaller residential group at Lundy exhibited a lower frequency of adult infection than the larger residential group of adults buried at the Morris site. The higher frequency and severe expression of infectious lesions among adults, in conjunction with the high frequency of subadult infection and high mortality of children under 5 years within the Morris collection, indicate that a less adaptive strategy was in place at the Morris settlement than at the Lundy base camp.

Unfortunately, it is not possible to compare the Spiro phase data to the comparable data for the Harlan phase since that sample is too small to see if infection frequency corresponds to increased site size. A comparison per site of the Spiro phase to the previously discussed Woodland–Mississippi period skeletal remains recovered from this same area, the southwestern fringe of the Ozarks, is instructive. The frequency of adult infection is lower, at 33% (18), for the three Woodland–Mississippian bluff shelter sites (Edens Bluff, Montgomery Farm, and 3BE187) than for the Morris site at 54% (26). Perhaps the lower infection frequency for the adult inhabitants of the bluff shelters is related to smaller residential size. Additionally, the adult infection frequency at Lundy, the small Spiro phase base camp, is 25% (8). These comparisons support Rose and coworkers' (19841 hypothesis that larger population aggregates experienced higher frequencies and more severe expressions of skeletal infection.

Trauma. The upland sites exhibit a comparatively high frequency of trauma at 29% (N = 24), and all seven of the trauma victims exhibit fractures. There is no direct evidence of violence. Four of the five Morris adults with fractures are males. The high rate of trauma at Lundy is likely the result of small sample size. It is interesting to note that the trauma frequency for the Woodland–Mississippian samples from this same area, the southwestern fringe of the Ozarks, is also high at 28% (14).

Degenerative Disease. The combined frequencies for osteoarthritis and osteophytosis are 29% (N = 19) and 42% (N = 24) respectively, for the upland Caddo sites. The sexual dichotomy of skeletal osteophytosis is consistent within both skeletal samples and indicates a preference for males. The pattern is less clear with the osteoarthritis data. Within the Lundy sample three males and one female experienced osteophytosis, and two males and one female experienced osteoarthritis. Five males and one female within the Morris collection exhibit osteophytosis, while two males and two females exhibit osteoarthritis. These comparisons suggest that the Spiro phase males inhabiting the uplands experienced more back stress than the females. The age range of the males exhibiting osteophytosis within the Morris group is 20-50 years and the age range of the Lundy male residents exhibiting osteophytosis is 50+ years. The Spiro phase Caddoan frequency of osteophytosis at 42% (24) is similar to comparative data collected for the upland Fourche Maline residents of the northern Ouachitas at 42% (65). This comparison indicates that a constant level of strenuous physical labor, relating to subsistence activities, was maintained through time.

Summary

In conclusion, the high frequencies of osteophytosis and the dietary reconstruction (based on dental data) for both the Fourche Maline and Spiro phase upland adults indicate that the subsistence strategy remained unchanged through time for the upland inhabitants of the northern Ouachitas of eastern Oklahoma and the southwestern Ozark fringe. The analysis of prehistoric lifeways indicates that the level of adaptive efficiency remained unchanged between the Fourche Maline and Spiro phase upland groups. Adult mean ages at death, the frequency of adult infection, and degenerative changes in caries rates are similar.

Spiro Phase in the Arkansas River Valley

The Spiro phase adaptation within the Arkansas River Valley is represented by two skeletal collections recovered from the Spiro and Horton sites and both were analyzed by Brues (1988, 1959). The Spiro site (34LF40) is classified as a community center within the Osage savannah. The Horton site (34SQ11), located close to the Morris site and the southwestern fringe of the Ozarks, is designated a settlement at the edge of Osage savannah and Ozark uplift biotic districts (Wyckoff 1980; Rogers 1983). The Spiro site is most likely the most important Spiro phase site and its associated population is thought to have been dispersed in small sites within a 3 km radius (Bell 1984b). Rogers (1983) uses certain artifacts in association with burials to determine the social rank of the individual burials and found that Horton consistently had only the lowest ranked interments. The artifacts in association with the Spiro burials indicate that six (4%) interments are ranked highest, 41 (24%) are ranked second, 49 (29%) are ranked third, and 71 (43%) interments are ranked lowest. The interments at Spiro represents individuals of all social classes with the majority from the third and fourth lowest ranked social strata. Rogers (1983) concluded that the trappings of authority are more elaborate at Spiro than elsewhere indicating Spiro's political and economic domination during that time.

The Horton Spiro phase occupation is represented here by 45 adults and 10 (18%) subadults. The adult portion of the sample is composed of 11 males and 10 females (Brues 1958) with ages between 20 and 50+ years. The Spiro site Spiro phase residents are represented here by 280 adults and 20 (7%) subadults. Brues (1988) was able to sex 25 of the Spiro adults as males and 29 as females. With only 8% (355) of both mortuary samples aged as subadults, it can be assumed that children, for the most part, were systematically excluded by the mortuary program at Horton, a site where only the lowest ranked individuals were buried and at Spiro, where individuals of all social strata were buried. There is no evidence for adult sexual preference within each burial program at these two sites. Clearly, these skeletal samples do not reflect a normal biological population and the estimate of adaptive efficiency can only measure the adults or most biologically fit segment of the Arkansas River Valley Spiro phase residents.

Adaptive Efficiency

Paleodemography. The demographic data are illustrated in Table 34. Due to the fragmentary nature of the Spiro skeletal remains, Brues (1988) was unable to assign specific age ranges to the adults. The adult mean age at death for the Horton sample is extremely high and indicates a high level of adaptive efficiency. It should be cautioned that only nine (22%) of the 45 adults within this collection could be assigned specific age ranges, and it is likely that the mean age of adult death is inflated because only middle age and old adults are assigned ages (Brues 1958). Therefore, the adult mean age of death for the Horton cemetery sample is not considered a reliable indicator of adaptive fitness for that community.

Table34. Mean age at death by years (N) for Spiro phase lowland sites

Site	Total Mean Age at Death	Adult Mean Age at Death	Analyses
Horton	24.8 (19)	44.2 (9)	1
Spiro	----	----	2

1 Brues 1958
2 Brues 1986

Paleopathology. Rose et al. (1984) have hypothesized that the degree of population aggregation can be positively associated with the frequency and severity of skeletal infection. A comparison of the Spiro phase upland samples previously discussed tends to support this contention. The more aggregated (crowded) upland sites have higher infection rates. While Spiro is a large community center, Brown (1984b) describes the population associated with the Spiro site as dispersed in small, isolated sites within a 3 km radius around Spiro. Horton is considered the largest Spiro phase habitation site (Brown 1984) and Wyckoff (1980) includes as Spiro phase features: two houses, three refuse pits, and a midden.

Table 35. Paleopathology by percent (N) in the western Arkansas River Valley (Webber's Falls to Russellville)

Site Name	Infection Subadults	Infection Adults	Osteo-arthritis	Osteo-phytosis	Trauma	Caries/ Person
Woodland Period Evans Phase						
Spiro[1]	--	25 (12)	--	--	0 (7)	0.16 (43)
Mississippian Period Spiro Phase						
Spiro[1]	--	20 (112)	--	--	9 (90)	0.24 (127)
Horton 2	--	85 (13)	0 (14)	0 (13)	0 (13)	0.70 (20)
Total	--	26 (125)	0 (14)	0 (13)	8 (103)	0.29 (147)

[1] Brues 1958
[2] Brues 1988

The adult infection rate among the Horton skeletal sample is 84.6% (N = 13); no subadults are observable (Table 35). Eight of the 11 individuals afflicted (72.7%) exhibit either osteitis or osteomyelitis. As with the Morris skeletal collection, the Horton males have a higher frequency of infectious lesions than the females. Five out of the six observed males (83.3%) are affected, compared to one female out of the five female observations. This sexual dichotomy is possibly due to a division of activity that might have resulted in an increased pathogen contact by the males. Brues (1958) concludes that the infectious disease exhibited by the Horton sample is of epidemic proportion and is remarkable not only for its high prevalence, but also for its severity. The dramatic infection frequency witnessed among the skeletal remains at Horton and Morris supports Rose and coworkers' (1984) hypothesized positive relationship between increased population density and increased disease frequency.

Among the Spiro adults the frequency of infection is dramatically lower. The adult infection rate is 20.5% (N = 112). Putting aside the social status distinctions for the present, two explanations are entertained. The lower infection rate may be due to a better diet (i.e., high protein) and/or derivation of the Spiro burials from dispersed settlements. The diet of the Spiro population is interpreted here as a continuation of the Woodland subsistence strategy, a mixed economy of hunting and gathering which is considered nutritionally balanced. During the Spiro phase, few people were actually living at Spiro. Wyckoff (1980) states that the nearby villagers participated in ceremonies, mound construction and buried their leaders at Spiro. Brown (1984b) suggests that the participating population at Spiro came from small isolated sites within a three kilometer radius. It is postulated that the differences in residential distribution between Spiro and the large crowded settlements is reflected in the frequency and severity of the adult skeletal infection.

A third explanation for the low infectious disease rate exhibited by the Spiro burials is associated with their elite status. The people buried at Craig Mound are thought to represent the highest ranking members in a regional hierarchy. The low infection rates may reflect living conditions enjoyed by the elite. It is possible that in the day to day activities, the elite individuals were not exposed to the same frequency of pathogen contact as the lower ranked members (e.g., Morris and Horton). However, it should be recalled that the majority (72%) of the Spiro site burials are ranked within the lowest two social classes (Rogers 1983). It is more likely that the differing pattern of infectious disease is positively associated with increasing degree of population aggregation. Whether the infection rates are reflective of class distinction or the result of the degree of aggregation can only be resolved with the bioarcheological analysis of habitation sites within the Spiro vicinity.

Trauma. The Spiro burials display an 8.8% (N = 90) trauma rate, which is entirely composed of fractures with undetermined causality (i.e., violence or accident). Brues (1958) does not describe any trauma for the Horton collection. There is no evidence of violence.

Degenerative Disease. The osteoarthritis frequencies suggest the same trends as seen with the trauma data (Table 35). Brues (1988) reports that osteoarthritis at Spiro is very infrequent, approximately one out of one hundred individuals exhibit arthritic changes. Brues attributes the lack of arthritis to the small amount of bone representing some individuals. Osteophytosis could not be observed at Spiro because the vertebrae had been lost during burial preparation (Brues 1988). There is neither osteoarthritis (N = 14) nor osteophytosis (N = 13) reported for the Horton sample (Brues 1958). This is markedly different from the high frequencies observed among the Morris and Lundy samples. While these data indicate differing intensification of subsistence related activities, the dietary reconstruction, as will be demonstrated, indicates similarity in carbohydrate consumption with the Lundy, Morris and Horton samples.

Dietary Reconstruction

While the combined caries data (0.29, N = 147) from the lowland sites of Spiro and Horton suggest even less carbohydrate consumption than observed among the upland populations, the caries rate is deflated by the large proportion of the sample (N = 127) representing the Spiro interments (Table 35). The caries rate for the Horton site alone is 0.7 per individual (N = 20) and is more comparable to the upland Caddoan populations of Morris and Lundy. Dental wear described by Brues (1959) for the Horton skeletons is identical to dental wear she observed among the Morris individuals. These data suggest the Horton population, located just 24 km from the Morris site at the edge of the Osage savannah and the Ozark uplift, practiced much the same dietary strategy. The plant remains recovered from Horton imply a mixed economy of both wild foods and cultigens.

The Spiro caries rate is exceedingly low (0.24 caries per individual, N = 127) indicating very little carbohydrate consumption which is not indicative of maize agriculturalists. The data also suggest that a slight dietary dichotomy existed between the Spiro interments and individuals residing at the Lundy, Morris, and Horton sites. Brues (1988) describes dental wear exhibited by the Spiro sample as "severe and early wear of the teeth is normal in the Spiro people, as among other Indians of the period." This description suggests that the high rate of attrition is consistently observed throughout the Spiro phase populations and indicates a commonalty of food preparation with stone grinding implements. The consistency of wear exhibited by the Spiro phase samples, in conjunction with the low frequency of caries observed among the Spiro population, suggests a slightly lower consumption of carbohydrates (e.g., maize and/or starchy seeds) at Spiro. None of the caries rates reported for the Lundy, Morris, Horton or Spiro adults are indicative of large carbohydrate consumption and do not support the hypothesis that the Spiro phase Caddoan economy of the Arkansas basin was based on maize agriculture.

Comparison to the caries rate of the Fourche Maline population residing at Spiro (0.16, N = 43; Table 35), suggests that the Woodland dietary tradition was continued by the Spiro phase inhabitants. The bioarcheological interpretation corroborates Fritz's (1983) paleobotanical analysis of the plant remains retrieved from Copple Mound at Spiro.

> The two most striking characteristics of the Copple Mound archeobotanical assemblage are the considerable diversity of plant food types represented and the abundance of small seeds.... The existence of a highly diversified husbandry pattern with a distinctly Woodland flavor as late as A.D. 1200 deserves some discussion given the assumption that the Caddoan sociopolitical system was based on fully developed maize agriculture. (Fritz 1983: 12–13)

If indeed the similarities of caries rates and dental attrition represent a continuation of the Woodland period subsistence strategy as suggested by Fritz's (1983) paleobotanical analysis then there is no evidence for dietary differences between social strata during the Spiro phase. The subtle but consistent differences observed in the levels of carbohydrate consumption between the sites within or adjacent to the Ozark fringe and the alluvial residents of Spiro are likely more a reflection of resource availability than a manifestation of class distinction. The biotic characteristics of the bottomlands change from east to west (Brown 1984b). In the vicinity of Spiro, the bottomland was dominated by a southeastern bayou vegetation which changed to a floodplain gallery forest in the western drainage above Webber's Fall (Brown 1984b after Thwaites 1905). Horton is in the vicinity of Webber's Falls and the Morris site is approximately 9 km upstream on the Illinois River (Brown 1984b). It is possible that while the Horton site has been listed as being within the Arkansas bottomland biotic community (Wyckoff 1980), the environmental constraints and opportunities that existed for Horton residents were not the same as those that existed for the Spiro population. A comparison of two maps, in Rogers' (1983) chapter on social ranking, places the Horton site at the border of the Osage savannah (riverine environment) and the Ozark uplift (Ozark biotic community). It is speculated here that the dietary resources available to the Morris residents were also available and utilized by the Horton population. In contrast, the Spiro residents had access to a different array of plant resources and thereby utilized a slightly different dietary regimen with lower emphasis on carbohydrate consumption.

Summary of Upland and Alluvial Spiro Phase

The reconstruction of the paleodemography of Morris, Horton and Lundy indicates moderate to high adaptive efficiency. However, the high frequency and severity of infection indicates that, while the upland adults were surviving long past the onset of reproduction, they were exposed to a high level of pathogen contact at habitation sites located in or adjacent to the uplands. It is interesting to note that the site with the highest frequency of skeletal infection, Horton, also had the highest adult mean age of death. The higher disease load exhibited by the Morris and Horton samples is thought to relate to increased population aggregation. Conversely, the Spiro interments exhibited a much lower frequency of skeletal infection which is thought to relate to a dispersed settlement pattern. The high male prevalence of infection, trauma, and degenerative diseases, indicate that the Caddoan males buried at the habitation sites experienced the lowest level of adaptive efficiency. The prevailing cultural system consistently exposed these adult males to hazards, either emanating from the biophysical environment at large or specifically from within the cultural landscape.

Low caries rates are characteristic for all Spiro phase skeletal samples and are not indicative of maize dependency. The subtle but consistent difference in caries rates between the upland and lowland populations of the Woodland period is observed between the comparable Spiro phase samples and is thought to relate to differing biophysical constraints and accessibility to food resources. Dietary reconstruction indicates that the Woodland period subsistence strategy of hunting and gathering continued through to the Spiro phase. Dietary dependency upon maize (or other carbohydrate sources) is not indicated and the hypothesis of an agricultural based economy is not supported.

Fort Coffee Phase

The Fort Coffee phase adaptation is primarily represented by dental data from four sites: Smullins Shelter (34CK44: Elkins 1959), a base camp in the Ozark biotic community (Wyckoff 1980) which is also possibly Late Archaic (see previous discussion); Barren Fork (34CK94: Wallis 1973) also a base camp in the Ozark biotic community (Wyckoff 1980); Wybark (34MS76: Keith 1973b), a base camp in the western Arkansas River Valley (Wyckoff 1980); and Lymon Moore (34LF31: Keith 1973a), a settlement in the uplands adjacent to the Arkansas River Valley, but considered within the western end of the valley proper (Wyckoff 1980).

The caries rates representing the occupants of two of the sites, Lymon Moore and Barren Fork, are 4.1(7) and 3.0 (1) respectively (Table 36) and indicate high carbohydrate consumption. The dramatic increase in caries frequencies suggest that a drastic change in subsistence occurred during the Fort

Table 36. Paleopatholoqy by percent (N) of the Fort Coffee phase

Southwestern Ozark Fringe Site Name	Infection Subadults	Infection Adults	Osteo- arthritis	Osteo- phytosis	Trauma	Caries/ Person
Barren Fork[1]	--	--	--	--	--	3.0 (1)
Smullins[2]	0 (2)	100 (1)	100 (3)	100 (1)	--	1.0 (3)
Western Arkansas R. Valley Site Name	**Infection Subadults**	**Infection Adults**	**Osteo- arthritis**	**Osteo- phytosis**	**Trauma**	**Caries/ Person**
Lymon Moore[3]	--	--	--	--	--	4.10 (7)
Wybark[4]	--	0 (1)	0 (1)	0 (1)	--	1.00 (1)

[1]Wallis 1973
[2]Elkins 1959
[3]Keith 1973a
[4]Keith 1973b

Coffee phase. Conversely, the caries rate reported for Smullins Shelter (possibly Late Archaic) and Wybark at 1.0 each (4) indicates low carbohydrate consumption, as previously seen. It should be cautioned that only 12 individuals represent the Fort Coffee dietary practices and all interpretations must await future confirmation. The higher caries rates indicates that a major increase in carbohydrate consumption occurred during the Fort Coffee phase with at least some people.

Prior to the Fort Coffee phase, the dental data indicate that a subtle difference in subsistence strategy existed between upland and lowland groups which is consistently seen within the Arkansas basin of eastern Oklahoma. Lowland groups had lower caries rates than upland groups and the data from both groups indicate that neither group was ingesting carbohydrates as a major component of their diets. It is postulated that during Fort Coffee phase, at least with some groups, subsistence tended toward an increased reliance on carbohydrates, perhaps maize or starchy seeds. However, the food processing technology (e.g., stone grinding implements) did not change because the dentitions are reported as heavily to severely worn.

The negligible paleopathology data precludes assessment of the adaptive efficiency for the Fort Coffee phase of the southwestern Ozark fringe and the western portion of the Arkansas River Valley. These data are presented in Table 36 for future reference.

Late Caddoan in the Ouachita Mountains of Arkansas

The Ouachita Caddoan adaptation of Arkansas, within the Ouachita drainage but outside the OAO study area, are represented by three late Caddoan individuals from the Standridge site (3MN53), and one unspecified Caddoan individual from the Adair site (3GA1).

Dietary Reconstruction

Without comparable material or a larger sample, dietary reconstruction of the Caddoan residents of the Adair site is hazardous. It should be noted that the caries frequency reported 1.0 (1) is similar to the upland Caddoan groups in eastern Oklahoma prior to the Fort Coffee phase. The difference in caries rates between the Adair and Standridge samples is considerable (Table 37). A more precise cultural affiliation for the Adair burial would be helpful for osteological comparison and bioarcheological interpretation.

Table 37. Paleopathology by percent (N) of the Ouachita Mountains of Arkansas (Mississippi period Caddoan)

Site Name	Infection Subadults	Infection Adults	Osteo- arthritis	Osteo- phytosis	Trauma	Caries/ Person
Adair[1]	--	0 (1)	--	--	0 (1)	1.0 (1)
Standridge[2]	--	100 (2)	50 (2)	100 (2)	0 (2)	4.5 (2)

[1]Osteology Laboratory Site Files
[2]Burnett 1988

Burnett (1988) compares the small late Caddoan collection of Standridge to eight late Caddoan sites in the Middle Ouachita region, south of the OAO area. The conclusions are summarized here. The caries rate is high at 4.5 (N = 2) for the Standridge series, as is the combined rate of 8.1 caries per individual for the late Caddoan adults from the Middle Ouachita region. Both caries rates indicate a high carbohydrate intake, which is supported by the floral evidence collected at many of these sites (Ann Early, personal communication). Burnett (1988) postulates that these individuals were full blown agriculturalists. Stable carbon isotope analysis and scanning electron microscopic survey of the dentition would be helpful in confirming this dietary reconstruction. The caries frequencies are much higher than the Caddoan populations (prior to the Fort Coffee phase) residing in the Arkansas basin of eastern Oklahoma and are comparable to the Middle and Late Mississippi period populations of northeast Arkansas, where stable carbon isotope ratios indicate the use of maize as a dietary staple (Lynott et al. 1986). Dental wear is light for all late Caddoan populations in the Arkansas Ouachitas suggesting the presence of a different food processing technology than was found among the Caddoan populations in the Arkansas basin.

Adaptive Efficiency

The paucity of the data representing the Caddoan occupation of the Adair site precludes interpretation of the osteological data. Two individuals from the Standridge skeletal sample exhibit minor localized periostitis. Collectively, the late Caddoan infection rate from the Middle Ouachita region is very high, but the lesions observed are minor expressions of periostitis. Burnett (1988) postulates that the high frequency of periostitis was maintained among the dispersed Ouachita populations by regular interpersonal, intersite contact. The mean age of death for these sites is unavailable. Burnett (1988) concludes that the burials at Standridge, thought to represent high status individuals (Ann Early, personal communication), enjoyed a fair measure of good health and a well adapted culture.

Summary

The Standridge sample and the one individual from the Adair site are insufficient to generate a complete bioarcheological interpretation of the Caddoan adaptation in the Ouachita Mountain region of Arkansas. These preliminary interpretations indicate similar dietary practices (with the inclusion of large proportions of carbohydrates) for the Late Caddoan, Arkansas Ouachita inhabitants and some of the upland and alluvial valley late Caddoan residents Fort Coffee phase of eastern Oklahoma. However, differing reports of dental wear between these regions indicate differing food processing techniques were in place.

Eastern Ozark Fringe

The Mississippian adaptation in the eastern fringe of the Ozark Mountains is represented by skeletal samples from two sites. Owls Bend (23SH10) is an open site in Missouri thought to represent an Early Mississippi period occupation. One adult and two subadults were analyzed from the Owls Bend site (23SH10: Rose and Burnett 1985). The Owls Bend collection contained only three highly fragmented individuals, one was an adult female between 45 and 49 years. The small size of this skeletal sample and the lack of comparable Early Mississippi period skeletal data recovered from the rest of the Ozark area hinders biocultural interpretation.

The other analyzed skeletal collection recovered within the eastern Ozark fringe is the Middle Mississippi period series excavated at the Johnny Wilson site (3LW106: OL site files) in Arkansas. The Middle Mississippian residents of the Johnny Wilson site are represented by 19 individuals including 16 adults (three males and eight females) and three children. The subadults are poorly represented and the biological patterning of the stress they encountered cannot be realistically interpreted.

Where appropriate, the skeletal data for these two Mississippi period collection will be compared. Because genetic affinities of these two samples have not been determined, it must be assumed that these individuals represent a continuous breeding population. Therefore, by assuming that the environmental constraints and genetic histories are similar, the intersite biological variation among the adults can be examined.

Adaptive Efficiency

Paleodemography. The combined mean age of death for the Johnny Wilson series is 24.3 years (N = 17) and the mean age for adults alone is 30.5 years (N = 13). The excavations at the Owls Bend site yielded only one identifiable adult female aged between 40 and 45, thereby precluding intersite comparison. The mean age of death for the adult residents of the Johnny Wilson site is indicative of a moderate adaptive efficiency.

Paleopathology. The high subadult (66.6%, N = 3) and moderately high adult (33.5%, N = 15) infection rates reported within the Johnny Wilson sample are exclusively represented by periostitis (Table 38). The adult frequency is reminiscent of those observed with other upland sites of both the Ozarks and the Ouachita Mountain ranges within the OAO. The moderately high adult infection rate is thought to be a function of population aggregation.

Table 38. Paleopathology by percent (N) in the eastern Ozark fringe

Site Name	Infection Subadults	Infection Adults	Osteo-arthritis	Osteo-phytosis	Trauma	Caries/ Person
Owls Bend[1]	(0)	100 (1)	0 (1)	(0)	0 (1)	0.5 (2)
Johnny Wilson[2]	67 (13)	33 (15)	8 (12)	25 (12)	7 (15)	2.7 (7)

[1] Osteology Laboratory site files
[2] Rose and Burnett 1985

Dietary Reconstruction

The Mississippi period in the Ozarks extends from A.D. 900 to 1600. The advent of shell-tempered pottery marks its arrival. It is thought these populations were horticulturalists and it is assumed that the dietary importance of domesticated plants increased through the Mississippi period. Paleobotanical evidence indicates that these groups supplemented their diet with wild plant and animal resources.

Lynott et al. (1986) report stable carbon isotope ratios for the eastern fringe of the Ozarks adjacent to the Mississippi River Valley. These ratios indicate that the Middle Mississippi period residents of the eastern Ozark fringe were participating in a horticultural economy and were consuming maize. The Owls Bend site (23SH10), considered an emergent Mississippian occupation (Lynott et al. 1984), has a low caries rate of 0.5 (2) that suggests a low consumption of carbohydrates in the Early Mississippian diet. This interpretation is supported by the stable carbon isotope ratios (Lynott et. al. 1986), which indicate that the inclusion of maize as a dietary stable is a phenomenon that did not begin until Middle Mississippi times. The Middle Mississippi period adult caries frequencies reported for the Johnny Wilson sample at 2.7 (7) support this interpretation. It is interesting to note that the bioarcheological evidence drawn from some Fort Coffee phase skeletal samples from eastern Oklahoma indicates that a dramatic increase in the consumption of simple carbohydrates occur there at this time (A.D. 1400 to 1550) which is also Middle to Late Mississippi period.

Central Arkansas River Valley

The Mississippi period sample of analyzed material in the Arkansas River Valley, from west to east, includes: 3LN119, 3WH4, and 3PU2 (OL site files) and the Alexander site, on the southern fringes of the Ozarks (Rose and Marks 1985). The Alexander data is compared to both the Lower Mississippi Valley and Lower Arkansas data.

Dietary Reconstruction

The low caries rate exhibited by adult teeth from 3LN119 and 3WH4 (Table 39) are similar to the low caries frequencies reported for the Spiro phase residents at Spiro. Heavy dental attrition and a caries rate of 0.2 per individual (N = 5) can only suggest that these people, like the Spiro adults, were not consuming large quantities of carbohydrates. The scarcity of data on infection, trauma, degenerative disease, and mean ages at death, for the two sites prevents further interpretation. The adaptive efficiency of Mississippian peoples in this locale cannot be estimated until a larger data base is obtained.

Table 39. Paleopathology by percent (N) in the Central Arkansas River Valley (Mississippi Period)

Site Name	Infection Subadults	Infection Adults	Osteo-arthritis	Osteo-phytosis	Trauma	Caries/ Person
3LN19[1]	--	--	0 (1)	--	0 (1)	0.0 (1)
3WH4[1]	--	--	--	--	--	0.3 (4)
Alexander[2]	0 (1)	50 (2)	0 (2)	0 (2)	33 (3)	6.0 (2)
Total	0 (1)	50 (2)	0 (3)	0 (2)	25 (4)	1.0 (7)
Kinkead-Mainard[1]						3.5 (4)

[1]Osteology Laboratory Site Files
[2]Rose and Marks 1985

The high caries rates for the Alexander and Kinkead-Mainard sites, as well as the caries rate for the Johnny Wilson site in the eastern fringe of the Ozarks (Table 30), are consistent with caries rates from the Middle to Late Mississippi period sites in the Lower Mississippi Valley. The high caries rates at sites in the northern portion of the Lower Mississippi Valley are tied to maize consumption by both stable carbon isotope assays and paleobotanical remains (Rose and Marks 1985; Lynott et al. 1986). A large survey of stable carbon isotope ratios drawn from sites in the Mississippi Valley (Arkansas and Missouri) and the eastern fringes of the Ozarks establishes that maize became a dietary staple after A.D. 1200 (Lynott et al. 1986). No stable carbon isotope assays have been performed on the Kinkead-Mainard skeletal material, but these very Late Mississippi period peoples, with a high caries rate, are assumed to have been maize dependent.

Macroscopic molar attrition scores are available for only one 30 to 34-year-old Mississippian male from the Alexander site. Wear is moderate relative to the Caddoan populations from the Arkansas basin, much higher than the wear observed among Caddoan groups of the Mid-Ouachita and Red River areas, and comparable to the Lower Mississippi Valley specimens (Rose et al. 1984; Rose and Marks 1985).

Scanning electron microscope observations are available for the right molar from the same Alexander individual cited above. The surface is characterized by low to moderate frequency of large sharp margined striations (Rose and Marks 1985). The microwear pattern is similar to that observed on the McCutchan-McLaughlin sample (Fourche Maline). Striation frequency indicates the use of stone grinding implements, and the absence of polishing indicates little unprocessed plant fiber in the diet. The Alexander Mississippian diet is characterized by soft foods which were extensively processed with stone grinding implements (Rose and Marks 1985).

Three cases of porotic hyperostosis (N = 4) from the Mississippi period occupation at Alexander are consistent with the porotic hyperostosis rates observed among the northern portion of the Lower Mississippi Valley skeletal series (Rose et al. 1984). Evidence of maize agriculture from both paleobotanical remains and stable carbon isotope ratios are consistent with the interpretation that porotic hyperostosis is a sequela of maize induced iron deficiency anemia.

Adaptive Efficiency

The demographic dimensions and genetic affiliations of these mortuary samples cannot be examined prior to the interpretation of the paleopathology data. The demographic profile of the Kinkead-Mainard site cannot be reconstructed because the ages of the individuals are unknown. Two children and two adults represent the Mississippian occupation at the Alexander site. In general, sites along the central Arkansas River have been infrequently studied because of poor preservation, and/or biased collecting procedures (i.e., only crania were retained).

The small sample size and poor preservation of the Alexander material prohibited Rose and Marks from assessing biological distance (Rose and Marks 1985). The genetic traits of the Kinkead-Mainard sample have not been examined.

The frequencies of trauma and osteoarthritis are very low, possibly indicating low chronic biomechanical stress, but again the small size of the sample begs further investigation. One Alexander adult male displays a severe infection (N = 2). An analysis of the northern portion of the Lower Mississippi Valley Mississippi infection rates suggest that the frequency and severity of infection increases over time, exceeding 50.0% by the Late Mississippi times (Rose et al. 1984). This trend is attributed to increased population densities, residential site nucleation, and a decline in nutritional adequacy resulting from maize dependency (Rose et al. 1984). Rose and Marks (1985) hypothesize that the cultural-ecological patterns of adaptive efficiency along the lower stretches of the Arkansas River Valley are more closely associated with the Mississippi Valley than with the Caddoan region. Their contention is supported by the lower infection rates observed further up the Arkansas River among the Spiro phase burials at the Spiro site. The increasing caries rates going down the Arkansas River and the low infection rates of the Spiro burials, up river, jointly lend support to the hypothesis of Rose and Marks (1985). Similar environmental constraints and ease of cultural communication up the Arkansas River from the Mississippi Valley probably facilitated the spread of similar subsistence and settlement patterns along the lower Arkansas River and the Mississippi Valley. Perhaps the sphere of influence exerted over the Arkansas River Valley within the vicinity of the Spiro civic-ceremonial center shaped the dietary practices of the nearby inhabitants. They were not relying upon maize as a staple, as their neighbors further downstream were.

The combined mean age of death for the Alexander skeletal series is 16.4 years (N = 4) and the mean age at death for the adults is 32.0 (N = 2). Mortality data indicate that the adults enjoyed a fair measure of adaptive efficiency, but again small sample size begs further investigation. The assessment of the adaptive efficiency of the Mississippi period occupation of the central Arkansas River Valley must await future analyses.

Table 40. Summary paleopathology by percent per study unit

Ouachita Mountains of Oklahoma			Late Woodland Period Emergent Mississippi		
Late Archaic Period Wistar Phase			Infection	Subadults	---
Infection	Subadults	50 (4)		Adults	0 (3)
	Adults	40 (5)	Osteoarthritis		0 (1)
Osteoarthritis		50 (4)	Osteophytosis		---
Osteophytosis		67 (3)	Trauma		33 (3)
Trauma		25 (8)	Caries/person		0.0 (2)
Caries/Person		0.0 (4)	Mississippi Period		
Woodland Period Fourche Maline Phase			Infection	Subadults	0 (1)
Infection	Subadults	33 (12)		Adults	50 (2)
	Adults	38 (76)	Osteoarthritis		0 (3)
Osteoarthritis		10 (58)	Osteophytosis		0 (2)
Osteophytosis		42 (65)	Trauma		25 (4)
Trauma		20 (69)	Caries/Person		1.1 (4)
Caries/Parson		1.1 (73)	Late Mississippi Period Quapaw Phase		
Mississippi Period Harlan Phase			Infection	Subadults	---
Infection	Subadults	0 (2)		Adults	---
	Adults	0 (2)	Osteoarthritis		---
Osteoarthritis		0 (2)	Osteophytosis		---
Osteophytosis		0 (2)	Trauma		---
Trauma		0 (3)	Caries/Person		3.5 (4)
Caries/Person		0 (1)	Southwestern Ozark Fringe		
Late Woodland Period Fourche Maline Phase			Woodland/Mississippi Period Mixed		
Infection	Subadults	---	Infection	Subadults	---
	Adults	100 (1)		Adults	33 (18)
Osteoarthritis		100 (1)	Osteoarthritis		36 (11)
Osteophytosis		---	Osteophytosis		20 (10)
Trauma		---	Trauma		28 (14)
Caries/Person		10.00 (1)	Caries/Person		1.0 (8)
Mississippi Period Unspecified Caddoan Phase			Middle Mississippi Period Spiro Phase	.	
Infection	Subadults	---	Infection	Subadults	67(6)
	Adults	0(1)		Adults	7(34)
Osteoarthritis		---	Osteoarthritis		37(19)
Osteophytosis		---	Osteophytosis		42(24)
Trauma		0(1)	Trauma		29(24)
Caries/Person		1.00 (1)	Caries/Person		0.8 (27)
Late Mississippi Period Late, Caddoan			Late Mississippi Period Fort Coffee Phase		
Osteophytosis		(0)	Osteophytosis		25 (4)
Trauma		0 (7)	Trauma		25 (4)
Caries/Person		0.16 (43)	Caries/Person		0.0 (3)
Middle Mississippi Period Spiro Phase			Eastern Ozark Fringe		
Infection	Subadults	---	Emergent Mississippi Period		
	Adults	2 (125)	Infection	Subadults	---
Osteoarthritis		0 (14)		Adults	100 (1)
Osteophytosis		0 (13)	Osteoarthritis		0 (1)
Trauma		8 (103)	Osteophytosis		---
Caries/Person		0.29 (147)	Trauma		0 (1)
Late Mississippi Period Fort Coffee Phase			Caries/Person		0.5 (2)
Infection	Subadults	---	Middle Mississippi Period		
	Adults	0 (1)	Infection	Subadults	67 (3)
Osteoarthritis		0 (1)		Adults	33 (15)
Osteophytosis		0 (1)	Osteoarthritis		8 (12)
Trauma		---	Osteophytosis		25 (12)
Caries/Person		3.75 (8)	Trauma		7 (15)
Central Arkansas Valley			Caries/Person		2.7 (7)
Woodland/Late Woodland Phase					
Infection	Subadults	---			
	Adults	0 (9)			
Osteoarthritis		0 (3)			
Osteophytosis		67 (3)			
Trauma		---			
Caries/Person		0.0 (7)			

CONCLUSIONS

The primary conclusion which can be drawn from the OAO bioarcheological synthesis is that very little is actually known about the biology of the prehistoric inhabitants in this region. Few bioarcheological analyses have been conducted (26.0% of the extant skeletal resources) and consequently these cannot adequately represent their respective prehistoric populations. The biocultural adaptations of the prehistoric inhabitants of OAO are presented in a three level hierarchy which includes seven geographic units which in the osteological data are presented by chronological division and cultural complex (Table 40). A total of 19 study units are included in the synthesis and only three included enough data to begin a thorough examination. These are: the Ouachita Mountains of Eastern Oklahoma, Woodland period, Fourche Maline phase; the western Arkansas River Valley, Mississippi period, Spiro phase; and the Southwestern Ozark Fringe, Mississippi period, Spiro phase. The data presented in Table 40 summarizes each study unit. These data illustrate the paucity of information representing most of the prehistoric adaptations.

Despite the limitations of the OAO data base, a number of interesting trends are observed. The dental data from Woodland and Caddoan populations in the Arkansas basin are evidence for continuity of subsistence practices in both the uplands and Arkansas River Valley. It appears that the mixed economy established in the Woodland period, characterized by consumption of animal products, unprocessed vegetable fiber, and low amounts of carbohydrate foods, was continued until Fort Coffee times. Low caries rates are characteristic for all Spiro phase skeletal samples and are not indicative of maize dependency. The subtle, but consistent, difference in caries rates between the upland and lowland populations of the Woodland period is observed between the comparable Spiro phase samples and is thought to relate to differing biophysical constraints and accessibility to food resources. Dietary reconstruction indicates that the Woodland period subsistence strategy of hunting and gathering continued through the Spiro phase. Dietary dependence upon maize (or other carbohydrate sources) is not indicated and the hypothesis of an agricultural based economy is not supported. The consistent upland and bottomland dietary differential suggested by the respective caries rates indicates that environmental constraints, rather than cultural practices, dictated subsistence strategies. During the Fort Coffee phase there is limited evidence for high carbohydrate consumption, suggesting a change in subsistence, possibly indicating reliance on horticultural products such as maize. The bioarcheological reconstruction of the Arkansas basin Caddoan subsistence practices is intriguing, as the osteological data do not support the traditional archeological interpretation of the prehistoric Caddoan people in this region as farmers. It has been assumed that the affluence observed during the Spiro phase was fueled by an agriculturally based economy. It is recommended that future bioarcheological analysis include stable carbon assays, which will more accurately determine if maize dietary dependency is indicated.

While the levels of adaptive efficiency remain fairly stable throughout the OAO, the highest rates and severity of infection are exhibited by the Fourche Maline sample and by the upland Caddoan populations of eastern Oklahoma. It is postulated that during these times the prevailing cultural systems were not adequately buffering against the harmful aspects of population aggregation and proximity to onsite midden deposits. An upland/lowland disease load differential is also consistently observed. The frequency of infectious skeletal lesions is positively associated with increasing degrees of population nucleation. In other words, the frequency of pathogen contact is dictated by both human and pathogen population densities and/or disposal of waste products.

The bioarcheological observations and hypotheses within the OAO synthesis provide bioarcheologists with a framework for conducting problem oriented research in the OAO study area. Similarly, resource managers are provided with a reference for establishing the significance of both extant skeletal resources and those encountered in future archeological investigations, as well as a framework for judging scopes of work and establishing criteria for mitigation compliance.

OZARK-ARKANSAS-OUACHITA ADAPTATION TYPES

George Sabo III, Ann M. Early, Jerome C. Rose, Barbara A. Burnett

This chapter summarizes the cultural history and bioarcheological data discussed in preceding chapters in terms of a series of adaptation types for the OAO study area. The adaptation types identified for the OAO area reflect, more than anything else, the kinds of data sets currently available to us. The existence of various classes of paleoenvironmental evidence from the study area and closely adjacent regions, in addition to the chronometric data we have for many of the cultural manifestations discussed in this overview, enabled us to build our adaptation types around a framework of temporally controlled, paleoenvironmental contexts. Data on site types and settlement patterns are also available for many of these cultural manifestations (even though these data vary widely in quantity and quality), so this represents another important dimension of our adaptation type definitions. Archeological and bioarcheological data on subsistence are poorly represented in comparison to paleoenvironmental and settlement pattern data, and so this evidence ranked third in importance in the identification of adaptation types. Even so, the subsistence data we were able to incorporate into our formulations suggest significant new interpretations of the prehistoric record of the OAO area.

It is often the case in attempts to develop regionwide archeological syntheses that many gaps in current knowledge are covered over in the broad strokes used to paint the "big picture," and this instance is no exception. We therefore warn the reader of the highly provisional nature of the summaries provided below. This fact acknowledged, we nonetheless believe that our reconstructions can provide a useful basis for assessing the current state of our knowledge, and for highlighting critical issues and areas that should be considered in any future archeological research in the OAO region.

The large territory encompassed within the boundaries of the Southwestern Division contains several distinctive ecological regions supporting markedly different prehistoric and historic human adaptations. In order to facilitate comparative assessment of adaptation types which may crosscut some of these ecological boundaries, the specific adaptation types identified below may be subsumed within a Temperate Interior, Forest and River adaptation type "superclass." This designation may serve to distinguish OAO adaptation types from adaptation types defined for other zones within the Temperate Interior region (e.g., southern prairie/plains, southwestern desert, western basin and plateau), as well as adaptation types defined for other major ecological zones (e.g., Gulf Coast).

PREHISTORIC ADAPTATION TYPES

Pleistocene–Holocene Transition Adaptation Type

Date Range

The Pleistocene–Holocene Transition adaptation type characterizes the lifeway and ecology of the earliest known prehistoric inhabitants of the region 12,000 to 9,500 years ago. Subsumed within this adaptation type are the Paleo-Indian and Dalton periods, and the Packard complex. The distribution of known sites representing this adaptation type is shown in Figure 47.

Environmental Context

The environmental context of this adaptation type is a late Pleistocene ecosystem undergoing change toward a Holocene system. In the Ozarks, some upland areas were mantled with windblown loess deposits. These produced many landforms that no longer exist, and buried some bedrock formations that are exposed today. During the latter part of this era a variety of erosional forces had begun to strip away these deposits. Major rivers, including the Arkansas, carried great amounts of glacial meltwater draining from the upper midwest. Cold and turbid, the high volume and rapid flow of these streams extensively scoured riverine sediments, producing wide, gravel-bedded channels in which few biological species existed. Toward the end of this period, river systems began to change toward more modern regimes. The biotic content of early Holocene riverine habitats increased, and species such as turtles, mussels, and fish became available to early Native American populations. These systems produced a topography in major alluvial valleys (such as the Arkansas Valley) much different from the landforms we can observe in these areas today. It is likely that larger upland stream valleys also differed from their more recent characteristics. The Pleistocene Boreal forest, which during earlier times extended throughout the study area, was also beginning to shift towards a more modern composition of habitats and species. For example, deciduous tree species were increasing in frequency, and forest composition was becoming a patchy mosaic of varying habitats. During the later part of this era prairie habitats were beginning to encroach along the western fringes of the Ouachitas and Ozarks, and probably into the Arkansas River Valley as well.

The transition from Pleistocene to Holocene environments should not be viewed as a gradual, even displacement of biological communities from south to north or from west to east. Plant and animal species that occur today in widely separated

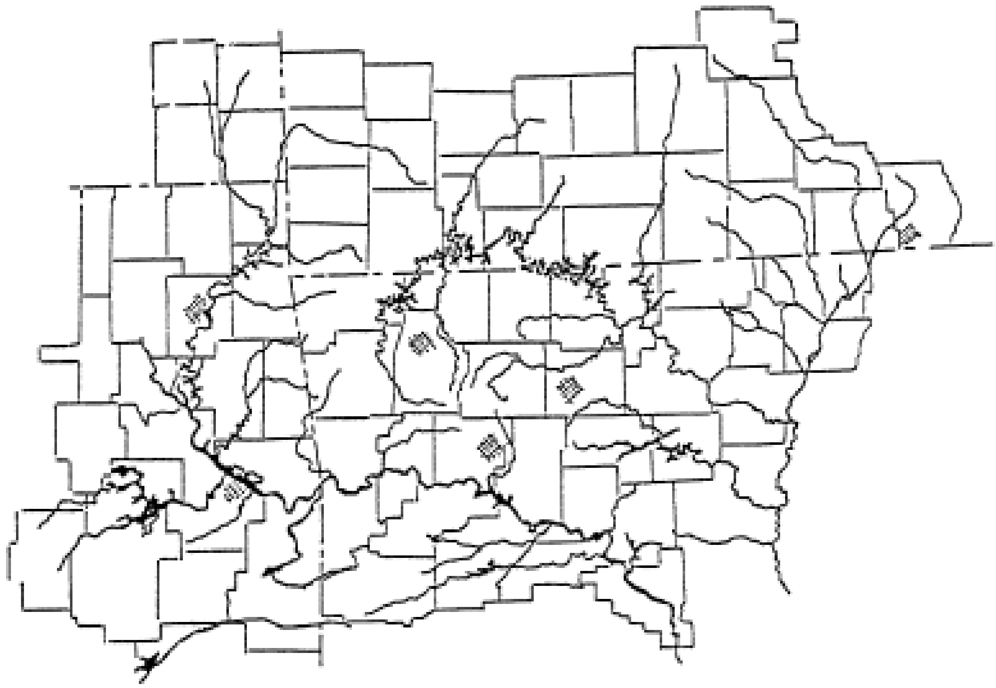

Figure 47. Distribution of archeological sites representing the Late Pleistocene–Early Holocene Transition Adaptation Type

habitats were combined in biotic communities that have no modern counterpart. Some species comprising these communities no longer exist. When the first Paleo-Indians arrived they were able to hunt mammoth and mastodon. These animals were gone by the Dalton period. In summary, late Pleistocene and early Holocene environments were very different from modern environments, but they were no less complex. In fact, they were possibly more diversified than present ones, and the amount of natural resources available to early Native Americans may have been very high. Most importantly, these were ecosystems in transition, and for humans, adaptation to change was their most salient quality.

In evaluating this adaptation, it is necessary to consider the rate of environmental change as it might have been perceived by early human groups. Although short term, large scale environmental fluctuations may have occurred more frequently than in recent times, most changes probably developed more gradually during the roughly three and one half millennia we are considering here. In other words, extensive changes probably did not occur within the lifespans of individuals. On the other hand, there may have been some environmental shifts that were perceptible from generation to generation. These would include changes in the composition of local forest or stream habitats, or changes in the distribution, abundance, or predictability of some of the species within these habitats. It is in relation to changes such as these that we may consider the Pleistocene–Holocene Transition adaptation type.

Cultural Context

The early Native American groups inhabiting these changing environments undoubtedly represent small scale societies, supporting themselves by means of hunting and foraging for the food and other material supplies they required. An advanced chipped stone technology is abundantly evident in the archeological record. Less well represented, but probably just as important, were boneworking and woodworking technologies. Using these technologies, early societies were able to fashion the tools and facilities they required for effective collection and utilization of natural resources. Archeological evidence from areas adjacent to the OAO study area indicates that these groups sought a wide variety of animal species for food, and they also foraged for at least a few major plant resources (such as nuts), especially by early Holocene times. This suggests that the organization of hunting and foraging activities within this adaptation type was a generalized and flexible one, capable of rapid response to opportunities that might arise unexpectedly (such as the sudden availability of huge amounts of meat and hides when a mammoth or mastodon was killed), as well as to problems or shortages that had to be overcome. In the latter category, we might identify changes in the seasonal availability of some animal or plant species that occurred as the habitats of these species underwent compositional changes.

Distribution of Subsistence Activities

Since the prey of early hunters included large, wandering species such as mastodon, mammoth, caribou, and elk (notwithstanding smaller species with more restricted habitat distributions), we can be reasonably certain that subsistence activities were likewise distributed widely across the landscape. Upland as well as bottomland forest settings were undoubtedly utilized at least on a seasonal basis. Although streams initially may not have contained significant food resources, gravel bars may have been important sources of other materials such as chert for stone tool making. Watercourses would also have attracted animals seeking drinking water, and some places may have served as fords along migration routes. Springs were also locations attracting concentrations of animals, including the large Pleistocene species (e.g., Haynes 1985).

Settlement Pattern/Site Distribution/Site Types

The settlement pattern characterizing adaptation to these conditions was probably determined primarily in relation to the seasonally changing distribution of important resources within these different habitats. A second, and perhaps nearly equal determinant would have been the distribution of separate social groups across this landscape, and the degree and kind of human interaction between neighboring groups. In other words, people were distributed across the landscape in response to both the pattern of natural resources and the proximity of other human groups with whom they were in contact. Since resource distributions were also undergoing change in relation to habitat modifications, we should expect to find few instances of multiple, repeated human occupations spanning several generations in any one area. We would expect instead that from generation to generation different localities would be occupied within a larger region or territory. Settlement strategies therefore would be generalized and flexible, perhaps representing what anthropologists refer to as a restricted wandering settlement or community pattern (e.g., Beardsley et al. 1956). That is, groups moved from season to season within some large but delimited territory they were familiar with, changing the locations of their camps as resources were depleted in one area or as resources became available in new areas. The propensity for a wandering population to move from one location to another for reasons other than resource availability (wanderlust springs readily to mind) should also not be discounted in our speculations concerning the settlement patterns of this adaptation type.

This adaptation type should be represented archeologically by small sites representing temporary occupations and limited ranges of activities. The Packard complex and Dalton components discussed previously are typical examples. It is important to note that some of these sites are found in early Holocene sediments buried deeply within extant stream terraces. Others are found in similar buried contexts, but at the base of midden deposits built up by later, more intensive occupations. We have also observed that some sites have very abundant remains; for example, the kill sites of mammoths or mastodons often contain rather extensive amounts of bone, even if associated artifacts are few. Other types of sites we should expect to find include chert quarries at outcrops and chert gathering spots (for example, in places where abundant river gravels were accessible), as well as nearby workshop sites. Armament/hunting station/lookout sites and other sites in diverse locations representing special purpose or limited activities should also be anticipated. It is likely that many sites in these latter categories will produce few or perhaps no artifacts which are stylistically diagnostic of this early time period. On the other hand, the distribution of small, nondiagnostic artifact scatters across extant Pleistocene age landforms may at least hint at the distribution of this adaptation type. Many of the Clovis and Dalton points found in isolated contexts on Pleistocene landforms probably represent places where certain activities like hunting were carried out.

Bioarcheology

No skeletal samples representative of this period have been found in the study area. Consequently, there are data neither from this area nor adjacent areas that could be used to extrapolate the bioarcheological parameters of this adaptation type.

The type of settlement pattern envisioned for this adaptation type will make it very difficult to assemble a sample of human skeletons for bioarcheological research. Mortuary sites will be widely dispersed and many often contain only one or two individuals. However, the Sloan site in eastern Arkansas contains evidence of a Dalton cemetery, suggesting the existence of focalized mortuary activity by the later part of this period. A similar focal mortuary program exists for this adaptation type in the desert area of west Texas (Turpin 1985).

Social Organization

Very little can be said about the social organization of groups representing this adaptation type. In the overview portion of this report it was suggested that local groups might have been connected to one another via kinship or other kinds of ties that would have produced widely extending social networks. These could have provided several kinds of adaptive advantages to early hunting and foraging groups. Such networks can facilitate rapid and widespread distribution of superabundant amounts of meat and other materials such as would result from a mammoth or mastodon kill, thereby spreading the benefits of this resource among the largest number of people. In Africa, modern !Kung hunters are able to make effective distributions of giraffe kills in this way, and Mbuti elephant hunters are also able to share widely the bounty of their successes by distributing meat along similar social lines. At the same time, these social networks can provide effective means to cope with local shortages of critical resources. If these networks can be maintained on a fairly constant basis (by maintaining a constant, if low level, traffic in some commodity such as exotic chert, for example), people can use these networks as needed to widely and rapidly disseminate information about the changing distribution and abundance of resources. This information can then be used by local groups to adjust their distributions accordingly.

Trade and Exchange

As the previous discussion indicates, human group mobility and continual interaction among neighboring populations are believed to be important features of this adaptation type. Using modern hunting populations as models, we may infer that trade in both raw materials and finished goods could have played an integral role in these societies. The most obvious manifes-tation of this trade would be durable materials such as stone, represented in the distribution of exotic raw materials and/or finished tools.

Ideology

Less can be said of the ideologies or belief systems of groups representing this adaptation type, but still there are some hints that cosmological notions were important. Belief in supernatural beings and/or powers, and integration of human activities within a larger matrix of cosmological perceptions, are considered by anthropologists not only to be general characteristics of all human cultural systems, but significant determinants as well of adaptation and cultural development (e.g., Rappaport 1971). The Dalton burials at Graham Cave in Missouri and the interpretation of the Sloan site in eastern Arkansas as a Dalton cemetery may be regarded as indications that beliefs in the afterlife motivated at least some of the activities of the living. The "ceremonial hearth" at Graham Cave also indicates activity directed toward or influenced by some supernatural belief, although we cannot be sure of specifically what this may have been. Given the hunting and gathering focus of this adaptation type, we are probably safe in attributing to these populations beliefs in communities of soul-bearing animals, as well as guardian sprits or other sorts of powerful beings responsible for the welfare and propagation of plant and animal communities. In the context of such beliefs, hunting and gathering activities often assume the character of a social transaction between the human population and these other beings. In short, although archeologists are usually able to take only the most faltering steps into the dark recesses of prehistoric religious mysteries, we can be sure that these notions were very real to the people involved and they did occasionally leave their mark, however faint, in the archeological record.

Sensitive Areas of High Probability

Based on the foregoing considerations we may identify all extant late Pleistocene and early Holocene landforms as sensitive areas of high probability for the occurrence of sites belonging to this adaptation type. Some of these surfaces are exposed today but many are deeply buried beneath more recent sediments. Remnants of late Pleistocene and early Holocene landforms are exposed in some upland regions of the Ozarks and the Ouachitas, and other surfaces are buried in upland stream valleys. In the Ozarks, some upper terrace formations along streams are of late Pleistocene age (e.g., Kay and Sabo 1983) and others may be located in the Ouachitas. Major alluvial valleys such as the Arkansas Valley and the lower valleys of its major tributaries have been subjected to pronounced geomorphological transformation during Holocene times (Nials 1980; Leonhardy 1980). As a result few earlier landforms remain, but occasionally remnants occur, and these deposits often contain extremely valuable indicators of late Pleistocene/early Holocene environments. Archeological sites representing this adaptation type may also exist in these deposits.

Data Gaps and Critical Research Questions

The fact that many late Pleistocene and early Holocene landforms have been destroyed is undeniable, and as a result the gaps in our knowledge of cultural activities and environments during this period are substantial. Perhaps the first priority for research on the Pleistocene–Holocene Transition adaptation type should be on reconstructing landscapes and habitats. This will require extensive work involving Pleistocene geomorphology, biogeography, and ecology. Archeologists also need to identify as many sites as possible and define as well as they can the geomorphological contexts of these sites, and their internal structure, content, and integrity or condition. From these observations valid interpretations can then be made of the types of occupations and ranges of activities these sites represent. This latter task will necessitate state-of-the-art analytic techniques, such as microscopic use-wear studies of stone tools (e.g., Keeley 1980; Vaughan 1985). Given the likely significance of trade in exotic raw materials as an indicator of social organization, source analysis of certain materials (such as chert) found on early sites should also have a high priority. Establishing the age of early sites through radiocarbon dating or other available techniques will also be crucial to any advances we may hope to make in our understanding of this adaptation type. Any plant or animal remains preserved at sites which could provide indications of subsistence or environment would be of exceptional significance, particularly because many sites of this time period are found in contexts which are not conducive to the preservation of these kinds of remains. Human remains from this period are so rarely preserved that any occurrence of these should be considered tremendously significant. As indicated above, there is currently no information whatsoever about the bioarcheology of this adaptation type, and there are no extant resources (i.e., no skeletal collections) from which this information could be derived.

Early to Middle Holocene Adaptation Type

Date Range

This represents Native American adaptations to Hypsithermal environments approximately 9,500 to 5,000 years ago. The Early and Middle Archaic periods are subsumed here, including the Grove focus, Caudill complex, Tom's Brook complex, and Rice complex mentioned in the overview portion of this report. The distribution of sites representing this adaptation type is shown in Figure 48.

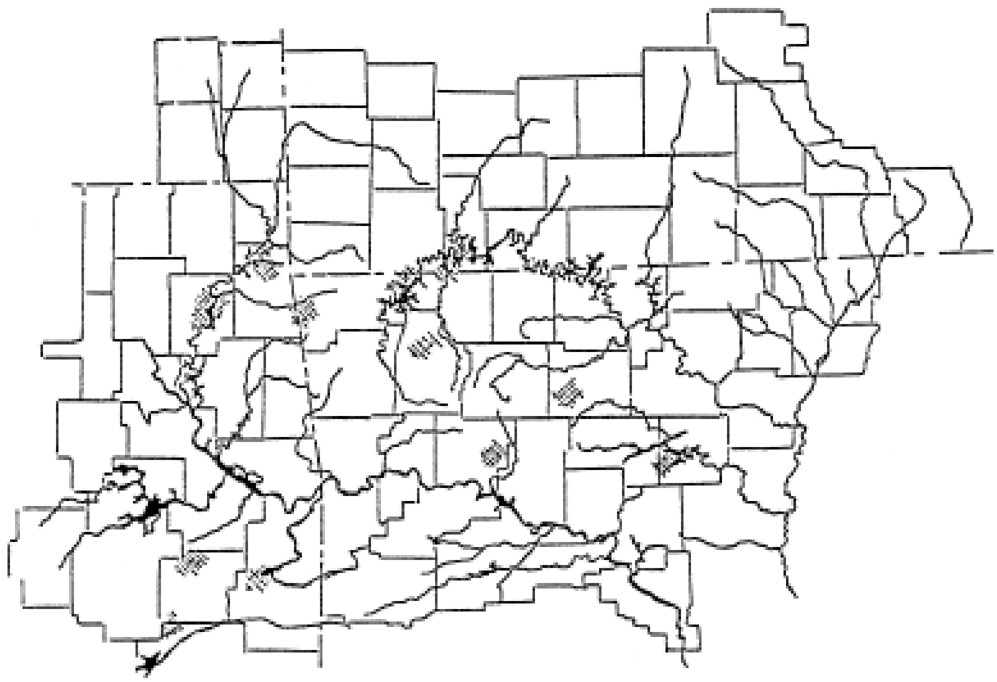

Figure 48. Distribution of archeological sites representing the Early-Middle Holocene Adaptation Type

Environmental Context

Hypsithermal climatic conditions were generally warmer and drier than at present. The effects of the Hypsithermal were not uniform in all areas, however, and a variety of local environmental factors influenced the ecological impact of the Hypsithermal in any particular area. Prairie vegetation and associated animal species spread eastward during this period, reaching their maximum extent about 5,000 years ago (Delcourt and Delcourt 1981). This desiccation was less pronounced, however, in the interior Ozark and Ouachita regions. Even so, vegetation communities were altered to include increasing numbers of species more tolerant to dry conditions, and accompanying this spread of prairie vegetation were associated animals, such as pronghorn antelope and prairie gophers. Hypsithermal vegetation was probably more thinly distributed in many areas and therefore less able to hold soil, so that erosion — especially of slopes — was pronounced during this period. The stripping of upland loess deposits in the Ozarks, already underway by late Pleistocene times, was accelerated. These eroded sediments were carried in rivers and streams, and deposited over banks and across terraces during punctuated flooding episodes. Consequently, the hydrology and configuration of rivers and streams changed markedly during early and middle Holocene times, and new river valley landforms were created from alluvial sediments. These newly formed bottomlands supported the most diversified and richest habitats for humans, and Hypsithermal conditions were probably buffered in these areas by their relatively great topographic variation.

Cultural Context

We believe that generalized hunting and foraging by small scale societies continued in this adaptation type, but some important changes in adaptive organization developed in response to changing environmental conditions. In many areas rich and productive biotic communities were diminished in size and were probably more confined than previously to bottomland habitats. Local groups adapted to these changes by intensifying and diversifying their subsistence activities within these shrinking habitats, rather than by expanding their territorial ranges. One of the primary ways they did this was to increase the number of species they sought for food. Turtles, mussels, and fish were now more abundant in rivers and streams, and nuts and other usable plant resources were becoming increasingly available in forest habitats. Prehistoric Native Americans were now making increased use of these resources, and accompanying these subsistence changes was a series of technological developments. For example, we see the emergence of a ground stone technology that produced heavier woodworking implements, along with items such as grinding stones and grinding basins used to process plant foods such as seeds and nuts. As a result of these shifts in subsistence

subsistence and technology, local groups were now beginning to be less mobile, and opportunities for contact and interaction with other groups may have been attenuated, or at least pursued on a less frequent basis. The effects of former high levels of long distance interaction in maintaining stylistic homogeneity in artifact types over large areas appears to have decreased, while perceptions of social distance between groups may have begun to increase. One expected consequence of these changes would be the emergence of locally distinctive artifact assemblages, such as we see, for example, in the development of the Caudill, Tom's Brook and Rice complexes. On the other hand, broad similarities in numerous projectile point styles seen on Early and Middle Archaic sites throughout the eastern United States indicates that some mechanisms promoting interaction between far-flung groups were maintained in early Native American cultural systems.

Distribution of Subsistence Activities

The distribution of subsistence activities within the context of these changing environmental and social circumstances is modified from that of the previously described adaptation type only to the extent that we now observe in some regions the beginnings of a more pronounced focus on selected areas, such as rich bottomland habitats and upland forest edge areas. Utilization of some other upland areas may well have decreased, such as portions of the Ozarks and Ouachitas where south and west facing slopes predominate. On the other hand, newly exposed upland bedrock outcrops containing chert and other mineral resources (such as galena and hematite) provided additional raw materials for industrial activity.

Settlement Pattern/Site Distribution/Site Type

Settlement patterns should reflect an increased emphasis on bottomland habitats and adjacent landforms. Localized erosion and flood hazards, however, would have necessitated occasional movement from some areas within these zones. If smaller territories were being utilized more intensively, even despite these hazards, the instances of repeated occupation of specific locations would have been more frequent than in earlier times. This does seem to have been the case, for now we begin to see the formation of larger archeological sites featuring evidence of more intensive and permanent occupation. These sites sometimes contain extensive middens, and prolific quantities of artifacts reflecting a wide range of activities. Usually referred to as "base camps," these sites are found on terraces (now often buried under more recent sediments), as well as in caves and rockshelters. Some open air sites were evidently occupied by smaller groups who were engaged in more limited sets of activities. These special purpose sites are often represented by small scatters of artifacts (most or all of which may not be temporally diagnostic), but they occur in a wide range of alluvial and upland settings. Some sites occur in surface or near-surface contexts, especially in areas where older landforms exist, and where soil development or deposition has been limited. However, many areas exhibiting these characteristics have also been subject to extensive soil erosion, so the geomorphological context of sites presumed to reflect limited activity needs to be carefully evaluated in all cases. Kill/butchering sites would not normally be expected for the Early to Middle Holocene adaptation type since the largest animals hunted (deer, pronghorn antelope) would in most cases be solitary kills and these could be transported whole back to the camps (although evidence has been mentioned above which suggests that this was not always the case). Where field butchering did occur, the "archeological signature" — that is, the resultant scatter of artifacts and bone would probably not be subject to intact preservation and would more likely be represented at the base camps by animal bone assemblages representing only certain preferred parts of animal carcasses.

Bioarcheology

No human skeletal material representing this adaptation type has been studied, so a bioarcheological synthesis cannot be provided. Some skeletal material has been derived from a few sites, however. Two burials were found in early occupation levels at the Rice site in Missouri, and 12 burials were excavated at the Smith I site in Oklahoma. The Jakie Shelter also produced 53 burials, but available information does not indicate which cultural components individual burials correspond to. These skeletal remains, in any event, offer a potential source of information for independently evaluating some of the adaptive shifts indicated by the archeological data.

The changes in dietary regimen postulated above for this adaptation type can be evaluated by toothwear, dental attrition and microwear, trace element, and stable isotope analyses where skeletal samples are available. Some of the technological changes, such as increasing use of stone implements for grinding foods, should leave detectable traces on tooth microwear. The suggested changes in social organization could also be detected using genetic markers such as nonmetric aspects of skeletal and dental morphology. Were sample sizes sufficient, we should see a stochastic pattern to these traits rather than homogeneity over large regions, which would be hypothesized for the earlier Pleistocene–Holocene Transition adaptation type.

Social Organization

Little can be added to the statements made above concerning forms of social organization associated with this adaptation type. Small group patterns of social organization continued, and relationships among adjacent groups probably existed for many of the same reasons we suspect they did among Pleistocene/Holocene Transition groups. During the early and middle Holocene, however, these relationships evidently were not as strongly sustained by means of long distance trade in exotic raw materials as they previously were. It rather seems as if these groups were concentrating their efforts upon more extensive and intensive use of the resources available within their own territories. As yet, however, we find little evidence of prolonged sedentariness at any particular site, nor is there any evidence to suggest the practice of long term storage of collected food resources. The kinds of adaptive organization we may infer from these observations seem to represent “immediate return” systems as discussed by Woodburn (1980), who has suggested that long term social commitments between individuals and groups comprising such localized communities may have been of limited importance. To broaden their resource base, these groups paid greater attention to the seasonal scheduling of multiple food-getting activities, along with the incorporation into their subsistence organization of a variety of alternatives upon which they could sustain themselves should the primary resources fail. Social organization found among these kinds of groups usually incorporate mechanisms for seasonally reorganizing local task groups, rather than adjusting regional population distributions. It may well be that patterns of social organization postulated for the Pleistocene–Holocene Transition adaptation type would also have been effective in meeting these new requirements, although the emphasis on flexibility would have centered within localized communities rather than between adjacent groups.

As mentioned above, one possible archeological indicator of these changing social strategies would be an increase in stylistic variation in local artifact assemblages. On the other hand, an additional level of security would be afforded through the maintenance of alliances between groups through which food and other resources could be exchanged. It is therefore likely that such social ties were maintained, through means we would much like to discover. In any case, the centrally based wandering settlement/community pattern (Beardsley et al. 1956) probably best approximates the organization described here.

Trade and Exchange

The increasingly localized focus of community settlement patterns proposed for this adaptation type suggests that long distance trade or exchange was less important as a mechanism for countering resource fluctuations that it previously had been. On the other hand, deforestation and hillslope erosion in some upland areas exposed new chert and mineral deposits. As a result, some varieties of chert and novaculite from the OAO area were becoming widely distributed, thus perhaps conferring new purpose upon previously established trade networks.

Ideology

Very little can be said about the ideology of these groups beyond what has already been mentioned in relation to the preceding adaptation type. However, value systems reflecting an increased emphasis on within group as opposed to between group solidarity may have begun to develop. These values conceivably could be reflected in burial patterns, but little data of this kind presently exists.

Sensitive Areas of High Probability

Sensitive areas of high probability for archeological sites representing this adaptation type include landforms and surfaces which existed during early and middle Holocene times. The areas of highest probability will be found in alluvial bottomlands as well as in the valleys of larger upland streams. Early to middle Holocene landforms should be considerably more extensive than remnant Pleistocene landforms, but in many cases these landforms will be deeply buried beneath overlying late Holocene sediments. Buried sites will occur most frequently in places where extensive river aggradation and terrace formation has occurred. Multiple occupation sites should be anticipated in these areas, so at sites where later materials are found, components dating to the early to middle Holocene may exist at deeper levels. Caves and rock-shelters, especially those located at the margins or closely adjacent to major stream valleys, will also represent high probability areas for this adaptation type. Certain upland areas where chert or other mineral resources are available, or where forest edge habitats occurred, should also be considered high probability zones. Other upland situations including south and west facing slopes (especially in areas underlain by limestone bedrock), may be regarded as having a lower probability for this adaptation type.

There is a high probability that many multiple component rock shelters will contain skeletons from this time period. Previous experience has shown that these individuals may be difficult to identify with a specific component (e.g., Jakie Shelter), therefore special care must be taken in these situations. Since the archeological reconstruction of the settlement pattern representing this adaptation type indicates primarily seasonal use of rock shelters (as opposed to year-round inhabitation), these burials may represent only one component of the mortuary sample. It will thus be crucial to identify the counterpart mortuary sites, presumably located in the larger stream valleys. Since preservation (particularly in Arkansas and Missouri) is likely to be poor in these alluvial settings, great care must be taken in locating potentially fragmentary and poorly preserved human remains.

Data Gaps and Critical Research Questions

Several data gaps or problems in need of additional research may be identified for this adaptation type, beginning with the major topics identified for the Pleistocene/Holocene adaptation type. These include reconstruction of landscapes and habitats; better definition of archeological sites in terms of their structure, content, integrity or condition, geomorphological context, and function; establishing better temporal control of sites and artifact assemblages; recovery and analysis of human skeletal remains, including establishing tighter control on the temporal assignment of human skeletal remains; identification of raw material sources; and collection and analysis of floral and faunal data pertinent to environment and subsistence reconstructions. Since more sites representing this adaptation type will occur in buried contexts, the chances that faunal, floral, and human skeletal remains will be found will be greater, so attempts to recover these classes of data should always be made where appropriate. Some major interpretive problems we need to address for this adaptation type also include the seasonality of different prehistoric resource collecting strategies, the relationship between settlement location, environmental parameters and subsistence activities, the development of new technologies and industries, and the mechanisms by which local groups maintained social relations with one another. As mentioned earlier, these research topics will require application of many new and sophisticated kinds of laboratory analyses, in addition to appropriate field recovery techniques.

Several problems areas may also be addressed specifically through the analysis of human skeletal remains. Postulated changes in diet and food preparation techniques may be investigated using a variety of bioarcheological analyses. Dental attrition, for example, should show a remarkable increase with the introduction of stone grinding implements. Analysis of tooth microwear using scanning electron microscopy should also detect this change. Increasing reliance on vegetal foods such as nuts and fibrous plants can also be verified on the basis of tooth microwear. Drastic differences should be exhibited between this and the Pleistocene–Holocene Transition adaptation type. Trace element analysis of bones (especially strontium analysis) would also permit comparison of proportions of meat and plant foods in the diet. Reduced contact between groups and localization of subsistence-settlement systems indicated by the archeological data may also be reflected by changes in genetic markers. The previous adaptation type should exhibit a very homogeneous genetic profile extending over large areas. In this adaptation type we should see the appearance of stochastic (random) variation and increasing heterogeneity or regional variation. If a large enough sample of human skeletons were available, nonmetric skeletal traits and possibly dental morphology could be used to test this hypothesis.

Late Holocene Semi-Sedentary Adaptation Type

Date Range

After 5000 B.P. several important developments took place among prehistoric Native American groups throughout the eastern United States. Cultivated plants domesticated in Mexico were widely adopted, and small scale gardening was added to the repertoire of food-getting activities practiced by many local communities. Perhaps as a consequence of this, local groups also began to exhibit semi-sedentary patterns of settlement. A series of cultural changes led to the development of increasingly complex forms of social organization. The Late Holocene Semi-Sedentary adaptation type represents these developments during the Late Archaic and Woodland periods throughout the OAO study area, and in most areas of the Ozarks it best approximates the adaptive organization of Mississippian groups. This adaptation type subsumes the Late Archaic Wister and Lawrence phases as well as the James River complex and the Grove C focus. The Woodland Fourche Maline phase and its related western Arkansas Gober complex are included, as are the Delaware A, Delaware B, and Cooper foci. The Plum Bayou culture is tentatively included here although, like the Fort Coffee phase discussed below, further work is needed to determine how sedentary the population may have been. The late Mississippian Neosho focus and Jakie aggregate also represent this adaptation type. Mississippi period settlement patterns in the upper White River drainage include sites with structures suggesting permanent residence (e.g., Loftin, Cantwell), but these are accompanied by numerous rock shelter base camps, indicating that the Semi-Sedentary adaptation type continues to be represented despite interaction with other Sedentary groups. The same is also true for the central interior and eastern fringes of the Ozarks. Finally, this adaptation type is also portrayed by the early historic Osage who seasonally ranged into the OAO study area on hunting and gathering forays from villages located further to the northwest. The distribution of sites representing this adaptation type is shown in Figure 49.

Environmental Context

Post-Hypsithermal environmental trends portray forest development toward recent composition prior to extensive alteration consequent to modern land use practices. Corresponding range shifts in animal species also occurred as essentially modern habitat configurations emerged. At various times climatic shifts altered the character of some habitats, and produced changes in the distribution and abundance of many animal and plant species. With the advent of gardening, arable soil became an increasingly important environmental variable, and late Holocene climatic changes interacting with bedrock geology occasionally altered the effective moisture levels of these soils. Although the adoption of tropical cultigens further broadened the human ecological niche, it posed additional environmental constraints which Native Americans were only partially able to control.

Cultural Context

Late Holocene populations represent larger and more complex Native American societies than their predecessors. Several technological developments are associated with this adaptation type, although the relationships between technological change and increasing cultural complexity are poorly understood. The development of a fired clay ceramic technology produced jars, bowls, bottles and a variety of other containers, and led to new processes of food preparation and storage. The invention of the bow and arrow permitted significant changes in hunting techniques and strategies. The development of a simple hoe technology may have facilitated the production of domesticated plants, although hoes can also be used to disturb the soil and promote the growth of wild seed-bearing plants. Gardening, which began with the introduction of squash and gourds, seems to have been adopted by some of these groups at a time when

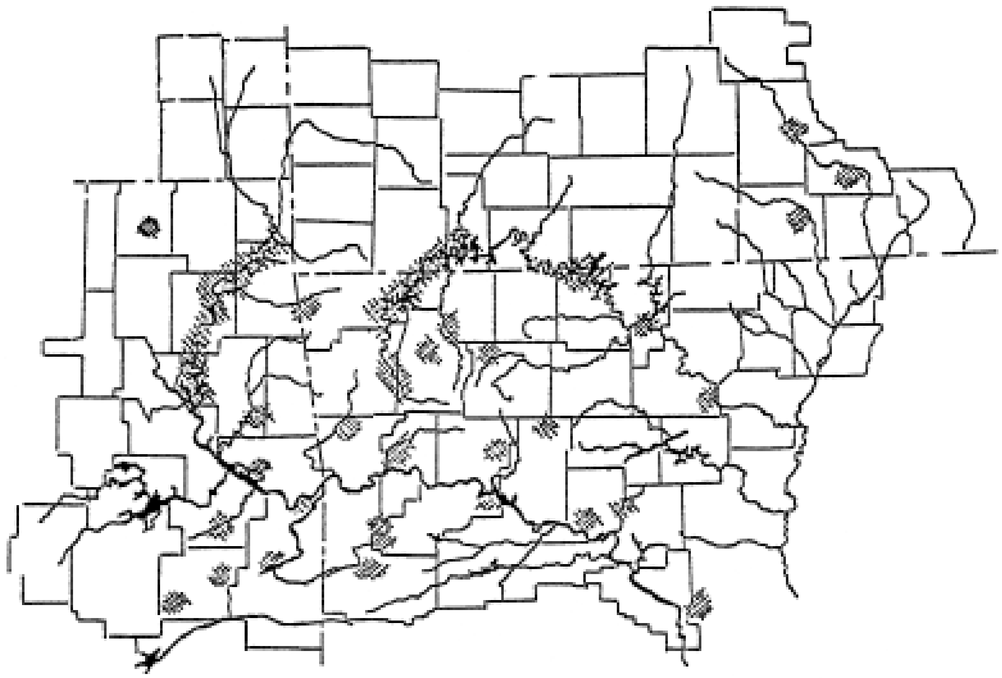

Figure 49. Distribution of archeological sites representing the late Holocene Semi-Sedentary Adaptation Type

they were concentrating intensively upon harvestable native plant resources. These collectible resources included nuts and a number of seedbearing plants including sunflower, sumpweed, goosefoot, knotweed, and maygrass. At first, cultivated plant foods probably did not contribute very much to the food base. Domesticated and nondomesticated plant foods are readily storable, however, and this may have been a significant factor leading to the increasing importance of these resources.

At the same time we find archeological evidence for the adoption of domesticated plants, we also witness increasing levels of occupational permanence, represented by sites that were probably occupied throughout much, if not all, of the year. These sites evidently served as bases from which some members of the group ranged out on seasonal forays, to hunt or gather natural resources in other areas. These seasonal forays continue to be a major feature of the Semi-Sedentary adaptation type. Those who stayed behind at the base camps probably tended gardens or engaged in other maintenance tasks.

It does not appear that Semi-Sedentary communities were uniformly distributed throughout the OAO study area. Along portions of the upper White River in southwest Missouri and northwest Arkansas, for example, no evidence of occupation by Semi-Sedentary groups has been found. This area seems to have been utilized only intermittently, perhaps as a resource area, by groups concentrated further to the north in the Ozark Highlands region. What this evidence of discontinuous occupation indicates in terms of changing social patterns is presently unknown. Semipermanent sedentary, or in some cases simple nuclear centered, patterns of settlement/community organization (Beardsley et al. 1956) would seem to apply to these groups.

It is important to note that archeological and bioarcheological evidence strongly suggest that some Late Holocene Semi-Sedentary communities may have practiced gardening to only a limited extent, and some groups may not have used domesticated plants for food at all. At many sites the only evidence of gardening is the presence of hoes. Hoes may have been used in some cases merely to cultivate plots of land to encourage the growth of certain wild plants, especially seedbearing weeds like lambsquarter, knotweed, and goosefoot. This is a form of cultivation significantly different from that involving tropical cultigens. Cultigens are in fact preserved at only a few sites, and in many areas and even for some entire archeological complexes there is no indication at all that domesticated plants were raised or used as a food resource. Given the vagaries of archeological preservation, coupled with the fact that appropriate techniques for the recovery of preserved plant remains have not been regularly employed in site excavations until very recently, it may well be that our present understanding of the archeological record is deficient with respect to the dietary significance of gardening among Late Holocene Semi-Sedentary populations. A more direct source

source of information is the bioarcheological record of human skeletal materials. Although the sampling problems inherent in these data are no less troubling, the bioarcheological evidence for this adaptation type, which is discussed below, portrays a picture somewhat different than the one often painted by archeologists.

Distribution of Subsistence Activities

The distribution of subsistence activities appears to be much more localized than in previously described adaptation types. Plant foods were presumably raised or gathered in the immedi-ate areas of semipermanent base camps, located primarily in bottomland settings of major alluvial valleys and larger upland streams. Much of the hunting, as well as gathering of other natural resources, probably took place in these bottomland zones. Upland areas were possibly visited less frequently for hunting and gathering purposes and for collecting other ma-terial resources. It is likely that the most intensively utilized upland zones were adjacent to occupied bottomlands. How-ever, some groups apparently ranged widely in search of certain resources, or perhaps to visit other groups.

Settlement Pattern/Site Distribution/Site Types

The settlement patterns described for the preceding adaptation types were attributed primarily to the distribution of important natural resources, despite the significance of social patterns to some aspects of settlement. Settlement patterns of the Late Holocene Semi-Sedentary adaptation type continue to be organized partly in relation to resource distributions, but the distribution of other human groups, and social relations among these groups, now appear to be of even greater significance. This change in the primary determinants of settlement was probably related to two factors. The first is population growth, which cannot be quantified but which is indicated by the relative increase in numbers of sites, and the density of their distribution. The second factor involves increasing dependence upon localized resources. One consequence of these factors would have been an increased need for social mechanisms to keep individual groups adequately spaced with respect to the perceived carrying capacity of the land. Local communities probably were organized with respect to cultural perceptions of social distance defining the limits to which local group membership was recognized. Support for this assertion exists in the first appearance during Woodland period times of bioarcheological evidence for violence between groups (i.e., skeletons with embedded projectile points), as discussed in Chapter 8 of this overview. At the same time, mechanisms promoting solidarity and cooperation within groups would have been required to make effective use of the "delayed-return" products of gardening, as well as stored wild plant foods. Occasional cooperation among separate groups may still have been necessary, if only occasionally, to cope with periodic local shortages of resources. Cooperation between local communities, therefore, may have involved forms of reciprocal relations based on notions of debt (that is, delayed reciprocity) that did not exist or were only incipient in the previous adaptation types. Under these circumstances we might expect to see increased evidence for the emergence of forms of social grading and status. The nature of these relations is otherwise very poorly understood, but they may have involved values, such as ethnicity, status, and debt, which were not present in earlier Native American cultural systems. It is furthermore likely that these values, whatever they were, may have been expressed symbolically in public ritual. Unfortunately, little evidence of ritual symbolism from this period has been recognized by archeologists working in the OAO study area.

Site types recognized for this adaptation type include semipermanent base camps located within or directly adjacent to bottomlands. These sites typically contain evidence of multiseasonal occupation and many were also repeatedly occupied. Sometimes evidence of dwelling structures is found on these sites. A wide range of artifacts representing many different functional types further suggests that numerous subsistence, maintenance, and other activities were carried out. Many Late Archaic and Woodland sites buried in terraces of major Ozark streams represent this adaptation type. Wister and Fourche Maline phase midden sites are also examples of base camps where intense and diverse activities took place, ranging from food preparation to human burial. The emergent Mississippian sites located along the Current and Eleven Point Rivers in the eastern Ozarks also represent this settlement type. Base camps reflecting seasonal occupation by fewer numbers of people are the other major settlement type. These are found in open air settings within stream valleys, as well as in rockshelters. The latter seem to be particularly frequent in the Ozarks, and this may also be the case for the Ouachitas. Burials sometimes occur in larger as well as in the smaller base camps. However, the skeletal data we currently have from the Ozarks are disproportionately representative of rock shelter components. Underrepresented in this sample are burials from open sites in river valley situations. In the Wister Valley an opposite situation exists, where we have approximately 1,400 burials from open air sites. Special purpose sites occur pretty much as in the preceding two adaptation types, although they appear to be less frequent.

Site types identified for Mississippian Semi-Sedentary groups include open air settlements along rivers featuring permanent structures and other evidence of intensive occupation. Seasonal base camps occur in open areas and in rockshelters. Special purpose sites are found in a variety of topographic situations but again these appear less frequently than in preceding adaptation types. Mound sites, which served as local ceremonial centers, also occur in the upper White River drainage in settlement pattern contexts we currently believe are best placed within the Semi-Sedentary adaptation type. Although the presence of these sites indicates a higher level of social complexity than is evident among any other groups lumped within this adaptation type, we are presently uncertain as to whether this complexity matches that exhibited by Sedentary societies. For example, no high status burials have yet been found at the upper White River mound centers (although only Loftin has been extensively investigated). In any case, the status of mound construction as a potential element of the Semi-Sedentary adaptation type is certainly an issue warranting further special attention.

The presence of numerous storage pits on Neosho focus sites is regarded by some (e.g., Wyckoff 1964a) to indicate seasonal abandonment while their inhabitants paid extended visits to other areas to pursue different subsistence activities. Many have interpreted this pattern as a late prehistoric precursor of the Osage pattern of seasonally shifting settlement. But this raises another question: since Fort Coffee settlements (generally interpreted as reflecting a more sedentary lifeway) also feature large numbers of storage pits, could not these sites also be interpreted as representing the Semi-Sedentary adaptation type? This is another important question requiring further consideration.

A similar question may be asked regarding the Plum Bayou culture. Residential mounds at the Toltec site may have been permanent dwellings for a small caretaker population. Yet, this localized phenomenon may not represent the adaptation type of the larger support population dispersed in small settlements in the river valley. Further research on Plum Bayou domestic settlement types is necessary to clarify the relationships between the sociopolitical center and the larger society.

Bioarcheology

A bioarcheological interpretation of this adaptation type is derived from human skeletal samples of individuals representing 25 mortuary components. Both the subadult (37.5%) and adult (33.1%) infection rates are moderate in this sample and are comparable to summary figures for the entire Trans-Mississippi South (Rose et al. 1984). The vast majority of bone lesions are periostitis, a mild abnormality produced by infectious diseases. When moderate infection rates and mild level of lesion severity are viewed in light of a mean adult age at death of 34.7 years, a good to high level of adaptive efficiency must be assumed. A low caries (dental cavities) rate of 0.67 per individual and heavy tooth wear indicates a diverse diet low in carbohydrates. An osteophytosis rate of 39.0% reflects chronic back stress, while an osteoarthritis rate of 23.3% suggests the same for stress upon the major joints (e.g., knees, elbows, etc.). Although chronic physical stress is characteristic of this adaptation type, the frequency of trauma (i.e., skeletal evidence of violent injury) (16.0%) is relatively low. Overall, the Semi-Sedentary adaptation type appears to reflect a successful relationship between human populations and the environmental resources and constraints of the OAO study area.

Adaptive efficiency is a measure of how well a cultural system is responding to a particular environment. Since there are important physiographic divisions within the study area, ecological variation must be examined. Because the bioarcheological synthesis (Chapter 8) identified important differences between the upland and alluvial valley inhabitants, the Semi-Sedentary adaptation type is also examined by this ecological dichotomy. Unfortunately, we have a disproportionately large sample of human remains representing the upland component, which comprises 75% of the total sample. Because there are no alluvial valley subadults, only the adult infection rates can be compared between areas. Not only is the upland adult rate higher (35.2%) than the alluvial rate (19.0%), the more severe forms of infectious lesions (i.e., osteitis and osteomyelitis) are also more common. The adult mean age of death in the uplands (35.1 years; N =123) cannot be considered significantly different from that in the valleys (28.9 years; N = 21), because of the small alluvial valley sample size. This comparison suggests that rates of pathogen transmission and/or disease susceptibility were higher in the upland populations. There are a number of upland characteristics which might explain this phenomenon: compact habitation sites which promote interpersonal contact (e.g., shelters and occupation sites located in narrow valleys), long term occupation of the same locations which promote contact with human waste and garbage (e.g., extensive midden mounds), and dietary differences due to lower biomass and/or reliance upon different foods. The higher caries rate in the uplands (0.93 per individual) may reflect greater carbohydrate consumption and possibly other dietary differences. Dietary reconstruction using biochemical techniques is required for testing this hypothesis.

Potential differences in chronic physical stress cannot be compared between areas because of the virtual absence of observable joint surfaces among the alluvial valley samples. However, the differences in trauma rates (16.5% upland; 9.0% alluvial) could indicate a more rigorous life style in the uplands. This possibility should be tested with better preserved skeletal samples in future research projects.

These ecological differences can be interpreted within the framework of evolutionary theory. Similar to the biological adaptation of a species to a particular ecological niche, a culture is designed for a particular array of ecological variables. When the culture extends beyond the particular conditions for which it is best suited, its ability to buffer its members is reduced (i.e., lowered adaptive efficiency). The bioarcheological data suggest that cultures of the Semi-Sedentary adaptation type were better suited to the alluvial valleys than to the uplands. Since the magnitude of these differences is small, it must be assumed that, overall, this adaptation type was relatively flexible and adaptive. This hypothesis requires further testing with both extant and future skeletal samples.

Social Organization

Two aspects of the social organization of Late Archaic and Woodland groups have long interested archeologists working in the eastern United States. First, increasing numbers of sites, along with the greater size and complexity of these sites and their more abundant artifact contents, have been interpreted as indicating not only larger and more stable populations, but also the emergence of more complex societies. The idea that some of these societies may have been organized as chiefdoms has been suggested by several archeologists (e.g., Buikstra 1976; Gibson 1974; Seeman 1979a; Struever and Houart 1972). Others have argued that chiefdom levels were not attained among Native American societies during these periods (Braun 1979; Ford 1979; Seeman 1979b), suggesting instead that some form of organization developed intermediate to small bands and large, complex chiefdoms. In these intermediate forms of social organization some social grading is postulated in which certain individuals (perhaps shamans or "big man" leaders) attain positions invested with limited amounts socioeconomic or religious authority. It is our view that attempts to characterize prehistoric societies in terms of a handful of generalized ethnographic "types" is less important than attempting to determine — using ethnographic examples where necessary — how these prehistoric societies may have operated, and why certain forms of organization arose rather than others.

The second aspect of these societies which has attracted much attention from archeologists is the widespread regional interaction networks which are indicated by the appearance of specific artifact styles throughout very large areas, and by the widespread distribution of a variety of exotic materials. These goods include obsidian from the Rocky Mountains, copper from the upper Great Lakes, and marine shells from the Gulf Coast area. This interaction reached its apogee during Middle Woodland times in the context of the Hopewell culture, which is generally considered to have been a powerful ideological system with very widespread influences. The relationships between this ideological system and emerging horticultural adaptations are being investigated by a number of scholars. Such relationships may or may not have existed. The concomitant spread of diseases resulting from this widespread interaction is an additional topic which could be investigated by bioarcheologists.

The above topics are pertinent to our understanding of Late Holocene Semi-Sedentary adaptations in the OAO study area. The evidence we have indicates that larger, more complex societies did emerge by late Holocene times. The social mechanisms promoting internal group solidarity remain poorly understood, however, as do the mechanisms regulating interaction between groups. The relationships between increasing population size, changing subsistence and settlement systems, and the emergence of new forms of social grading or ranking also require much further investigation. In summary, the specific form or forms of social organization associated with this adaptation type need to be much better identified, and, as mentioned above, the nature of relations between separate groups also needs to be clarified.

Trade and Exchange

There is, interestingly, relatively little indication that groups in our study area were participants in the widespread interaction networks which elsewhere in the eastern United States were so prevalent. The Middle Woodland child burial at the Alexander site does contain Gulf Coast marine shells, and it exhibits mortuary ceremonialism similar to practices carried out among contemporary complex societies outside of our study area. At present, however, this is a unique feature. The manifestation identified as the Cooper complex also suggests stylistic affinities with the Kansas City Hopewell, but these are expressed primarily in ceramic designs; we do not have much evidence for the acquisition of exotic materials by these groups. Similarly, Plum Bayou ceramics show stylistic affinities with Baytown and Coles Creek cultures in the Lower Mississippi Valley. Perhaps the manner in which populations in this region were interacting with others is reflected only in terms of more subtle aspects of the archeological record. In any case, the nature of relationships between populations living here and groups in other areas needs much additional attention. In addition, the relationships between these developments and disease and stress levels is poorly understood and also needs to be a focus of increased research attention.

A somewhat different set of relationships with outside groups is portrayed among Mississippian Semi-Sedentary societies in the OAO study area. Groups living in the upper White River drainage were interacting with Caddoan populations in the Arkansas River Valley who we believe represent a Sedentary adaptation type. Semi-Sedentary groups in the eastern Ozark fringe were interacting with other Sedentary groups in the central Mississippi Valley. At least some of those in the interior of the Ozarks were involved in the Southeastern Ceremonial Complex, as were their neighbors to the east and west. These interactions will be discussed in greater detail in the section on the Sedentary adaptation type.

The distribution of raw materials and finished goods among groups within this area is another aspect of trade that merits attention within the context of this adaptation type. Although little research has been devoted to this subject, it is evident that intra-areal distribution systems were operating, which undoubtedly influenced subsistence activities and settlement patterns in the region. For example, Plum Bayou populations in the eastern portion of the Arkansas River Valley were engaged in the extensive collection and distribution of rock and mineral resources from the Ouachita Mountains. Food and other perishable materials were also probably moving within this distribution network. As was the case with previous adaptation types, considerable research needs to be done in identifying the source and distribution of these materials in order to better understand late prehistoric systems of trade and exchange.

Ideology

As was the case with preceding adaptation types, we can say very little about ideological beliefs held by Semi-Sedentary cultures in the OAO study area. Ceremonialism among Woodland groups is apparent primarily in burial activities. It reflects little more than a sense of concern for the orderly disposition of the deceased, perhaps with accompanying rituals marking the passage of individuals to a noncorporeal existence. Of course, this is not to say that these cultures may not have had complex and vibrant belief systems. The material remains and symbols of prehistoric belief systems are often difficult to recognize and even harder to understand in the absence of a living culture.

It is reasonable to assume that with increased dependence upon gardening as an economic activity, a new set of concerns regarding the reliability of climatological factors affecting plant propagation, such as rainfall and seasonal fluctuations, were incorporated into existing belief systems and associated rituals. The pattern of mound distribution at the Toltec site, for example, reflects a cognizance of and concern for cyclical movements of the sun that may have been the subject of ritual activity at the site. Alignment of mounds in relation to seasonal solar positions at the Huntsville and Collins sites in the upper White River drainage reflects a similar set of concerns. Other aspects of Mississippian ideology appear to be considerably more complex, but these will be addressed in the following section.

Sensitive Areas of High Probability

Sensitive areas of high probability for Late Holocene Semi-Sedentary archeological sites occur primarily in bottomland settings of major alluvial valleys as well as in most larger upland streams. Even though many sites occur at or near the present ground surface, a large number are buried beneath more recently deposited sediments. For example, Late Archaic house remains have been found along lower Lee Creek in northeastern Oklahoma buried under 5 m of more recent deposits. These alluvial deposits also indicate the pronounced flood hazards that exist in many bottomland settings. Therefore, settlements also occur frequently along upper terraces or along blufftops adjacent to bottomlands. These areas should also be considered high probability zones for sites representing this adaptation type. Moreover, the mortuary component of this aspect of the settlement pattern is grossly underrepresented in extant samples, particularly in Missouri and Arkansas. Since one possible feature of this adaptation type is a differentiation of burial practices implying the emergence of status stratification, the acquisition of burial data representing the entire mortuary program is crucial.

Rockshelter sites, as indicated above, form a major component of the Late Holocene Semi-Sedentary settlement pattern, so that bluff lines also represent high probability zones. Upland areas where nut bearing trees occur, and where prairie or oak openings exist, will also be sensitive areas for sites at which evidence may be found for temporary occupation and hunting or collecting activities. Many quarry and workshop sites also occur in upland settings (as well as in lowland areas) where chert and other mineral resources can be mined or collected.

Based on the available data for this adaptation type, we should expect larger mortuary components in the alluvial valleys as compared to the uplands in Missouri and Arkansas. In Oklahoma mortuary components have been excavated which are larger than anywhere else in the study area. There do not seem to be significant differences in cemetery sizes in Oklahoma when uplands and lowlands are compared (both average 36 per site). However, it is interesting that in the uplands the number of human skeletons per cave, shelter, habitation, and open site are the same in all three states (4-10 individuals per site). Mounds and cemetery sites average 10-24 individuals each in Missouri and Arkansas, and more than 50 in Oklahoma. It must be emphasized that these figures are from excavated components only, and these may not accurately reflect the actual distribution of burials throughout the study area.

Data Gaps and Critical Research Questions

The major issues previously identified concerning landscape and habitat reconstruction, chronology, site characteristics, subsistence reconstruction, and bioarcheology all represent topics in need of much further research for this adaptation type. Additional data gaps or research problems we may identify specifically for this adaptation type include, first of all, a thorough reexamination of the evidence concerning the importance of domesticated cultigens among these populations. This issue also needs to be addressed in relation to potential differences in the adaptations of Semi-Sedentary groups occupying major alluvial valleys versus those residing in upland habitats. Related to questions about subsistence organization are suppositions concerning population growth during late Holocene times. Can we hope to measure even relative differences in population sizes for each of our adaptation types? We also need to explore the relationships between postulated increases in population sizes, development of new technologies and subsistence and settlement strategies, and the emergence of new forms of social organization. The nature of emerging social complexity also warrants much further research: how may we best characterize these semi-sedentary societies, what new social strategies entered into the adaptive organization, and in what ways were these groups related to others in adjacent regions? Since the Semi-Sedentary adaptation type continues in some localities within our study area while other groups were developing sedentary settlement patterns, we further need to determine what kinds of relationships existed between groups exhibiting these two different adaptation types.

One important data gap affecting bioarcheological interpretation is a lack of trace element or stable carbon isotope studies. Otherwise, this adaptation type is the only one for which a good sample of skeletal material by site type and location exists in all of the states. If anything, shelter components of the mortuary program are overly represented in comparison to other site types. This prevents analysis of population density and growth.

Several additional bioarcheology research problems may be identified. First, increased data from mortuary sites would permit investigation of population growth and density trends. If a complete sample of mortuary programs were available the presence or absence of social stratification could be tested. There is an indication that societies were less stratified in this adaptation type because more people were buried in some types of mounds than are found in the Sedentary adaptation type below. This might instead indicate differential access to high status positions rather than rigid social stratification along hereditary lines. There is evidence at the Bug Hill site in Oklahoma, for example, that suggests a different burial treatment of individuals of different ages, who may have occupied different statuses. This would explain the underrepresentation of children at most Woodland period mound sites.

The interpretation of increasing localization and the emergence of culturally distinct groups would imply differential genetic transmission. In other words, there should be greater genetic variation between local groups. This could be tested using nonmetric skeletal traits and dental morphology. If the archeological variations truly represent social discontinuities this should be clearly indicated by these genetic markers.

Interpretations regarding dietary shifts can also be evaluated with bioarcheological evidence. Tooth enamel microwear could indicate seasonal utilization of certain resources such as nuts. Stable carbon isotope analysis could also be used to identify when and where reliance on tropical cultigens developed. Available data on rates of dental cavities for the study area suggest that in some areas such reliance did not occur. Trace element analysis can also be used to identify shifts in the proportion of animal and vegetable foods consumed.

A final research problem concerns differential adaptive efficiency exhibited between upland and lowland populations in the study area. Why were the upland people experiencing increased stress and greater resource deficiencies in comparison with populations living in alluvial valleys?

Late Holocene Sedentary (Dispersed) Adaptation Type

Date Range

This adaptation type overlaps the Semi-Sedentary adaptation type, becoming evident in some areas as early as 1,100 years ago. It continues into the early contact period and is exhibited by some historic Native American groups such as the Quapaw. This adaptation type subsumes most of the Mississippi period and includes the Harlan, Spiro, and Fort Coffee phases in northeast Oklahoma and northwest Arkansas, and the Carden Bottoms and Quapaw phases in the Arkansas River valley. The War Eagle and Huntsville phases tentatively identified for the upper White River basin are known only in terms of the stratigraphic sequence in Mound A at the Huntsville site, so while we believe these phases may represent this adaptation type this cannot presently be demonstrated. It is important to reiterate that many Mississippi period groups (or cultural complexes) do not represent the Sedentary (dispersed) adaptation type. As mentioned previously, the Loftin phase, Neosho focus, and Jakie aggregate, as well as the Mississippian groups occupying the central interior and eastern fringe regions of the OAO study area, appear to represent a continuation of the Semi-Sedentary adaptation type. Recent research in the central interior area (Limp 1986), however, may eventually force us to modify this interpretation. Research on Mississippian adaptation in the upper White River region may similarly necessitate modification of this scheme. There are currently no analyzed skeletal data for this adaptation type in the Missouri or Arkansas Ozarks, so this is also a source of information which could alter greatly the nature of our interpretations. The distribution of sites representing this adaptation type is shown in Figure 50.

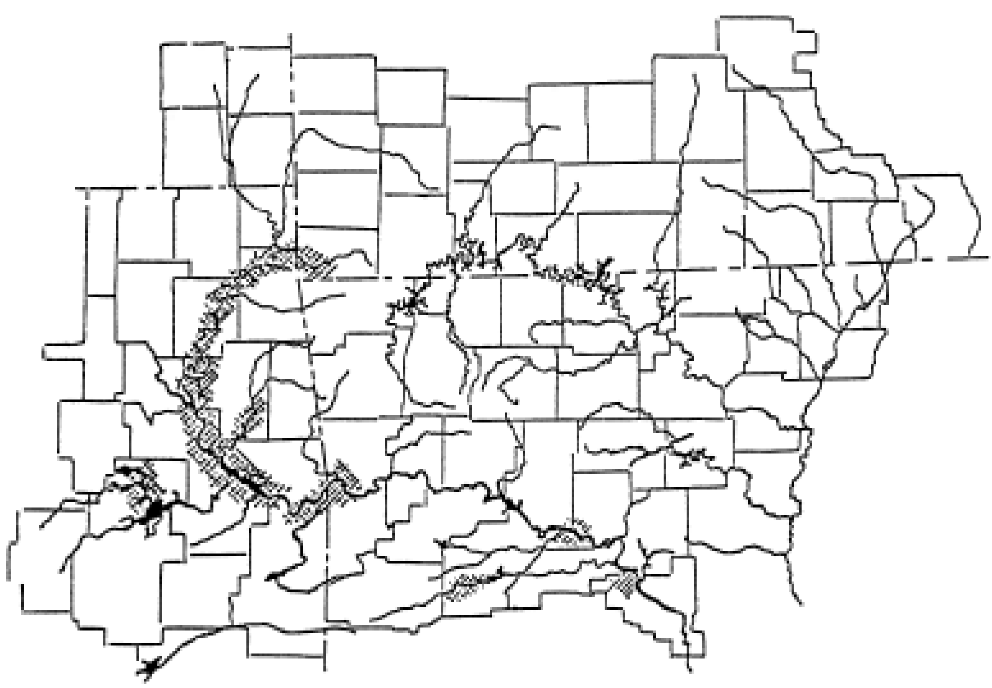

Figure 50. Distribution of archeological sites representing the Late Holocene Sedentary (Dispersed) Adaptation Type

Environmental Context

There are no major environmental parameters which differentiate this late Holocene adaptation type from the one previously described. In very general terms, late Holocene environments varied within the range of historically recorded environments. However, this does not mean that the biophysical environment may now be regarded as a passive background variable in this adaptation type. It is evident that environmental shifts did take place during the late Holocene, and some of these effected important changes in the subsistence and settlement patterns of many groups.

Cultural Context

There are several cultural aspects of this adaptation type which differentiate it from the Late Holocene Semi-Sedentary adaptation type. There is, first of all, clear indication of sedentary settlement at sites featuring the remains of permanent dwelling structures. Extensive midden deposits and cemeteries consisting of multiple burials also characterize these sites. These sedentary populations also constructed mound centers, usually consisting of multiple mounds arranged according to a predetermined pattern, which served as places for special social and ceremonial activities including the ritualized treatment of the remains of certain, evidently high status, members of local groups. The implication of high status positions within these societies also suggests that some forms of social organization — such as ranked lineage societies where some individuals are born into positions of high status — may be limited to this adaptation type only. Moreover, emergence of OAO area mound centers at about the same time, and the fact that these plus other mound centers throughout the Trans-Mississippi South incorporate characteristic and elaborate features of construction that may have had important symbolic meaning, indicates that groups in the OAO area were engaged in far-flung interaction networks very different from any that may have existed earlier. Despite the increased permanence of settlement indicated for this adaptation type, however, local communities remained dispersed among farmsteads and small hamlets. At the Reed site in northeastern Oklahoma, 19 house structures were identified, and even though we have no idea whether these houses were simultaneously occupied or not, this is the largest number of houses so far identified at one site for this adaptation type. Thus the large nucleated towns established in some areas of the central Mississippi Valley by Late Holocene agriculturalists are definitely not found in this area. A final characteristic of this adaptation type is a relatively greater dependence than previously upon horticulture as a component of the subsistence system. Most archeologists believe that sedentary, dispersed Mississippian populations in the OAO area based a large part of their subsistence on mixed crop horticulture (e.g., Wyckoff 1980; Brown 1984). This interpretation rests on the preservation of cultigens at several sites (primarily dry rockshelter sites), on the presence of a horticultural technology at an even larger number of sites, and on the general assumption that sedentary settlement necessarily implies a horticultural subsistence base. Preliminary assessment of caries rates (amounts of human dental cavities) for this adaptation type, however, suggests that in many areas people were not consuming large amounts of carbohydrates. Further implications of the bioarcheological data will be discussed below.

Distribution of Subsistence Activities

The distribution of subsistence activities for this adaptation type is generally regarded as being comparable to that described for the Semi-Sedentary adaptation type. Hunting, and gathering a variety of natural resources for use as food and raw materials continue to be important subsistence activities, even among groups who are demonstrably engaged in horticulture. Therefore, the utilization of a variety of upland and lowland habitats is similar to land use patterns exhibited by Semi-Sedentary groups. To the extent that differences are observable, a somewhat more intensive focus on bottomland habitats containing the most extensive distributions of arable soils is seen.

The hypothesis of a more complex, stratified social organization characterizing this adaptation type suggests the possibility of one important difference in the distribution of subsistence activities that may not have existed previously. Within such a society there could have been differential access to food, with diet varying according to social status. For example, the individuals buried at the Spiro site — at least some of whom presumably occupied positions of very high status — have unusually low caries rates for a Mississippian population. Perhaps these individuals consumed greater quantities of meat in addition to a wider variety of other vegetal foods than other members of their community. Populations in outlying areas may have been hunter-horticulturists, who supplied much of the meat they obtained as tribute to the Spiroan elites. This hypothesis could be tested using a combination of trace element and stable carbon isotope analyses. High status populations would also be expected to show better health and less evidence of stress.

Settlement Pattern/Site Distribution/Site Types

Settlement patterns of Sedentary (dispersed) populations differ from those of Semi-Sedentary groups in terms of the following characteristics. Residential sites (farmsteads and hamlets) are characterized by substantial houses (ranging from one to several per site) and other evidence of year round habitation. These sites are typically located in the larger stream valleys. Also situated in major stream valleys are mound centers whose distribution seems to be the result of intentional design incorporating specific distance parameters which are maintained despite local topographic variation. It is likely, although this has not been demonstrated, that locations of permanent settlements as well as temporary base camps were influenced at least partly by the distribution of these mound centers. Base camp sites were occupied only on a seasonal basis. These sites occur less frequently as components of Sedentary (dispersed) settlement patterns than in the Semi-Sedentary adaptation type, but they continue to occur in open contexts as well as in caves and rock shelters. Sites representing limited, specialized activities occur both in bottomland and upland settings. If current interpretations of their cultural affiliation are correct, rock art features on overhangs and shelter walls are also special site types belonging to this adaptation type.

The same expectations for the distribution of mortuary sites are found here as in the Semi-Sedentary adaptation type. Burial components in shelters, caves, and open habitation sites should be relatively small in Missouri and Arkansas, with a difference in absolute numbers corresponding to upland versus lowland context. In Oklahoma numbers of burials found in shelters should be about the same, but in other contexts these will be much larger. Excavated mounds and cemeteries in Oklahoma typically produce about 50 individuals, whereas those in Missouri and Arkansas have produced only between 10 to 24 per site. Again, it is necessary to point out that these averages are derived from excavated sites which may not adequately reflect the distribution of human skeletal materials throughout the entire study area.

Bioarcheology

A bioarcheological synthesis for this adaptation type is based on 468 individuals representing 14 mortuary components. Sampling biases are reversed in this adaptation type and favor the alluvial valleys with Spiro contributing 71.0% of the total sample. An additional social status bias is introduced because 28% of the Spiro burials are thought to represent an elite group. Because the indirect indicators of adaptive efficiency do not provide an absolute measure of adaptive success, the most appropriate method for evaluating this adaptation type is to employ a comparative method. The Sedentary adaptation samples are compared here with the preceding Semi-Sedentary type.

The subadult infection rate (60.0%, N =10) is almost twice as high as the Semi-Sedentary rate (37.5%, N =16), but great significance cannot be attached to this difference because of the small sample sizes. In contrast, the more reliable adult rates are virtually identical. (33.1%, Semi-Sedentary; 32.7%, Sedentary). This similarity is somewhat misleading because lesions on skeletons in this adaptation type are predominantly the more severe forms of infection (i.e., osteitis and osteomyelitis), while those found in the Semi-Sedentary adaptation type are predominantly the milder periostitis. The adult mean ages of death are also similar (Semi-Sedentary, 34.7 years; Sedentary, 36.1 years). The greater lesion severity implies that resistance of Sedentary populations was reduced to the extent that the infections were able to impact large areas of tissue before the individual's defense mechanisms could respond. Lowered resistance can result from increased social-psychological stress, inadequate nutrition, and higher overall parasite-pathogen loads. There are a large number of possible cultural and ecological factors identified in the archeological record which could be associated with decreased resistance. Increased interpersonal contact associated with higher population densities would provide increased pathogen contact and higher individual pathogen-parasite loads. Permanent residence within restricted areas would create an environment heavily contaminated with pathogens and parasites associated with human waste and garbage. Dietary changes which reduced the intake of protein and other essential nutrients would also lower host resistance. Such a dietary change is suggested by the increase in caries (dental cavity) rates from 0.67 (Semi-Sedentary) to 0.82 caries per person (Sedentary).

In contrast to the infection rates, the degenerative disease rates (osteophytosis 17.8%; osteoarthritis 11.7%) and trauma rate (8.2%) are almost one-half the rates exhibited by the Semi-Sedentary samples. These differences indicate a major reduction in physical stress upon the back and limbs, in addition to a reduction in accidents with the adoption of a sedentary lifestyle. Similar reductions in physical stress among Sedentary populations have been discovered world-wide (Cohen and Armelagos 1984). A more realistic understanding of the differences between the two adaptation types is possible when the upland and alluvial valley samples are compared.

Comparison between upland and alluvial valley areas is somewhat biased in the distribution of samples by social status because Spiro makes up 93% of the alluvial valley sample. However, the few differences which do exist between Spiro and the other alluvial valley samples are considered in the interpretation represented below. The upland adult infection rate (483%) is almost 60% higher than the alluvial valley rate (28.2%). As before, the upland mean adult age at death (36.2 years) is identical to the alluvial valley age (36.1 years). Social status appears to play no role in these two phenomena, as there is no difference between Spiro and the other alluvial valley samples. Once again, we see the upland samples with both a higher infection rate and more severe lesion expression. This comparison by ecological units also makes it apparent that the similarity in overall infection rates between adaptation types is only a function of sample bias. In the Semi-Sedentary adaptation type, the upland samples with higher infection rates make up 75% of the total, while in the Sedentary adaptation type the alluvial valley samples with lower infection rates make up 76% of the total sample. Infection rate increases are proportionally identical between adaptation types when compared separately by upland and alluvial valley samples. This implies that the adoption of a sedentary lifeway decreased adaptive efficiency and that the impact of this culture change was approximately equal for both ecological zones. In other words, the upland peoples, who were already at a disadvantage, retained the same disadvantage in the sedentary adaptation type.

Dietary differences are also evident with a 2.25 caries per person rate in the uplands and a 0.49 rate in the alluvial valleys. Partitioning the samples temporally demonstrates that the upland caries rates do not significantly increase until after 550 B.P. The implication is that conditions did not encourage a change to a high carbohydrate diet prior to this late date in the uplands and lowlands. This interpretation must be extensively tested using the entire battery of biochemical techniques. Since infection rates increased prior to the caries increase, causal factors in addition to dietary change must be sought. Increased disease susceptibility could be associated with increased pathogen contact and individual pathogen loads resulting from sedentary residence and increased population densities. Again, this conforms to events observed elsewhere in the world (Cohen and Armelagos 1984).

Upland rates of osteophytosis (20.0%), osteoarthritis (21.7%), and trauma (11.5%) are higher than those in the alluvial valleys (16.0%, 3.5%, 7.6% respectively). These differences indicate that life in the uplands continued to be more rugged than in the alluvial valleys.

The adoption of a sedentary lifestyle resulted in a decrease in adaptive efficiency, which is masked when the data are not separated by ecological units. Disease susceptibility increased proportionally in both the upland and alluvial valley environments. Overall physical stress (degenerative diseases) decreased primarily in the valleys. The adoption of a high carbohydrate diet did not occur until late in the upland and lowland sequence. These results lead to the conclusion that this lifeway change resulted in reduced, but still acceptable, adaptation (see Cohen and Armelagos 1984), which continued to favor the alluvial valley residents over the upland residents. These results must be considered tentative reconstructions which will require extensive testing by future research projects.

Social Organization

Evidence of complex social organization characterizing this adaptation type is best represented at the mound centers. Burials accompanied by quantities of exotic or specialized, nonutilitarian goods are interpreted as evidence of societies incorporating overtly symbolized distinctions of social class ranking. The fact that some highly ranked individuals were very young when they died further suggests that social distinctions were based on hereditary ascription rather than achievement. Special, ritualized treatment of these individuals in death also portrays strong ideological underpinnings supporting or legitimizing these social institutions. The ties archeologists have demonstrated between widely spaced mound centers also points to the existence of political, social, and ideological relations between separate communities within the OAO study area, and these ties also extended to Mississippian communities in other regions of the Southeast. These relationships among groups representing different adaptation types and between separate regions may have been motivated by economic factors but this is not necessarily so, and much further research needs to be done before final conclusions can be reached.

Trade and Exchange

It is evident that at least some societies belonging to this adaptation type were engaged in complex and multilevel trade or exchange systems linking them with distant cultures as well as with other communities within the study area. These ties are expressed most vividly in the presence of rare and exotic raw materials and finished artifacts accompanying deceased representatives of the social elite. Participation in these systems may have had much to do with the development of the complex social organization that characterizes this adaptation type. Trade relations undoubtedly served as an important mechanism for maintaining social and economic ties, for example, between individuals and their respective communities.

Along with these material symbols of status and authority, ritual objects and the ideological beliefs they encoded were also probably transported into and out of the study area, along with an array of utilitarian objects and economic resources. Some of these more mundane items, such as foodstuffs, animal pelts and fibers, and local stone, may be proposed, but a considerable amount of research remains to be done in identifying the kinds and quantities of goods passing though this exchange network, and the locations from and to which they traveled.

Ideology

Because societies belonging to this adaptation type are envisioned as depending at least in part on the cultivation of domestic foodstuffs, concern with environmental factors that affect gardening success are likely to have been prominently expressed in cosmology and ritual activities. Solar movements, rainfall, and other climate conditions may have been addressed through the organization of sacred spaces such as buildings and earthworks in mound centers, and through rituals conducted at these sites and elsewhere. Similar concerns are important themes in the religious beliefs of historic period Southeastern Native American groups.

It is clear from looking at the rich corpus of ritual objects found in the burial features of major mound centers belonging to this adaptation type that a number of other concerns, probably all interrelated, were part of the complex belief systems shared by at least some populations during this time. These include the importance of deceased members of the social elite to living populations, expressed in part in the careful curation of mementos of the honored dead, and the role of warfare in validating the social position of some members of society.

Although we can identify some themes that must have contributed to the ideologies associated with this adaptation type (e.g., strongly ritualized belief in supernatural powers, legitimatization of social hierarchies and the offices of the elites, warfare), we are not likely ever to fully comprehend the richness and complexity of the total system. There are some areas that can and should be addressed in future research, however. For instance, although we know a substantial amount about the material expression, at least, of belief systems in the Arkansas River Valley of Oklahoma, we are unable to say how diversified belief systems were among other societies representing this adaptation type elsewhere in the study region. At the eastern end of the Arkansas River Valley, for instance, differences in burial practices and material culture suggest to us that this portion of the study area, with its proximity to cultural systems in the Mississippi Alluvial Valley, may have held some significantly different concepts than populations residing elsewhere. The same statement may be reiterated for groups occupying the interior and eastern portions of the Ozarks, as well as the northern Ouachitas. We would also point out that a great deal of information about this aspect of these societies can still be gleaned by examining evidence already available, such as the iconographic data present on exotic ritual objects like the engraved shell cups from Spiro. Although some studies along these lines have been pursued, many additional possibilities for innovative research remain.

Sensitive Areas of High Probability

Sensitive areas of high probability for this adaptation type are basically the same as those designated for the Semi-Sedentary adaptation type. Bottomland habitats containing arable soils can be expected to exhibit evidence of somewhat more intensive utilization where horticultural adaptations were important. But even in those areas upland utilization was no less critical.

Data Gaps and Critical Research Questions

In addition to the basic data needs which are shared among all four adaptation types, we may identify several which pertain specifically to this one. A reevaluation of the significance of horticulture among sedentary groups in the OAO study area is badly needed in light of the bioarcheological evidence summarized above. This problem needs to be carefully considered in relation to the apparent dichotomy between alluvial valley and upland areas. A key element of this reevaluation will be assessment of the representativeness of extant bioarcheological samples across various discernible social strata. Major sampling gaps will need to be corrected. Much better control of the archeological data on subsistence organization is also needed for this adaptation type. Further investigation into the nature of social organization and accompanying social, political, and ideological institutions is badly needed in order to better understand the significance of the various levels of interregional interaction which have been documented for the late prehistoric period. The expression of Late Holocene adaptation types (of both kinds) is known only in fragments for some portions of the OAO study area such as the upper White River valley, the Arkoma basin between Toltec and Spiro, the northern Ouachita Mountains, and the central interior and eastern fringe. Further investigation will be especially important, not only for understanding what went on in those areas but also for more fully evaluating the relationships between these groups and others inhabiting better documented regions of the Southeast.

Turning specifically to bioarcheological research needs, several additional gaps may be identified. No trace element or stable carbon isotope data are currently available. Little is known about the mortuary samples from all but a very few sites. The data available are not representative of all mortuary site types and social strata. This lack of adequate data compromises almost all of the interpretations which have been made of the skeletal data to date. In fact, less than 10% of the available sample of human skeletal remains has produced any useful data.

Furthermore, from the bioarcheological perspective this adaptation type is not well represented throughout the study area. There are no data from Missouri, and for Arkansas all of the data are from the Ozark fringes. Data from Oklahoma are not evenly distributed; most come from LaFlore County with some additional data from McIntosh, Wagoner, and Cherokee counties. If this adaptation type is represented in the Ozarks we currently have no burial components representing it there. Children are also underrepresented in the available samples, suggesting that their social strata have not been adequately sampled.

The primary bioarcheological research problems we may identify for this adaptation type include, first, establishing the degree of dependence on domesticated carbohydrates where they are assumed to be a major factor in subsistence. Again, stable carbon isotope and trace element analyses would be useful. The extent of differential distribution of food resources among different social statuses also needs to be investigated. Finally, the upland-lowland differences in disease and stress loads needs to be clarified and the adaptive efficiencies of groups in these areas better defined.

HISTORIC ADAPTATION TYPES

The adaptation types summarized below reflect cultural patterns anticipated in the OAO study area during the period of Euramerican penetration and settlement, beginning with the De Soto entrada of 1541–1542. Since very little archeological evidence exists for these suggested cultural patterns, the adaptation types identified here are based on inferences derived primarily from documentary information sources. We emphasize the provisional nature of these formulations, and we expect that many changes will be necessitated by future archeological and historical research.

Given the complexity of the historic cultural landscapes discussed in this overview, it has been necessary to designate “varieties” and “subvarieties” for some historic adaptation types. These varieties and subvarieties are identified under the appropriate adaptation type heading. Information provided for each is variable, depending primarily upon how important each is both as an aspect of its larger adaptation type and as a component of the archeological record anticipated for that adaptation type.

Euramerican Exploration Adaptation Type

Date Range

The physical impacts on the landscape of transient European and American explorers were slight. However, these early explorers paved the way for later settlement by their countrymen, and in some cases their presence and activities wrought significant changes in indigenous Native American populations and cultures. For these reasons it is necessary to identify a Euramerican Exploration adaptation type. In the OAO study area the relevant time period extends from 1541 to about 1820.

Environmental Context

The environmental context for this adaptation type is within the range of modern climatic and biophysical variation (a more detailed summary of this environmental context is presented below under the section treating Pioneer Settlement adaptation types). Specific environmental parameters can often be reconstructed from information contained in the written accounts of early Euramerican explorers.

Cultural Context

Euramerican exploration of the Ozarks, Ouachitas, and Arkansas River Valley represents primarily the exploits of individuals and relatively small groups of men, and only infrequently larger armies of explorers such as the collection of early Spanish conquistadors led by De Soto. In each of these instances, however, the presence of explorers in this region was only a temporary one. As a consequence, the cultural landscape of Euramerican exploration consists only minimally of sites of their own creation (i.e., camping sites along their routes of travel, etc.). Of far greater significance is the impact these explorers had on the cultural landscapes of contemporaneous Native American groups.

Distribution of Subsistence Activities

Documentary accounts indicate that early Euramerican explorers sometimes hunted or foraged for foodstuffs, but more frequently they obtained necessary supplies from indigenous Native American settlements, either by trade or through plunder.

Settlement Pattern/Site Distribution/Site Types

The chances of identifying the temporary encampments or other special purpose sites created by individuals or groups representing this adaptation type are slim. The presence of explorers is seen archeologically mainly in terms of items of equipment lost along travel routes, or as trade goods dispersed among contemporary Native American sites (e.g., Brain et al. 1974). Since the travel routes of these explorers were often keyed to the distribution of contemporary Native American settlements, some of the impacts on indigenous populations of contact and interaction with Euramerican explorers may be archeologically recognizable. For example, population declines resulting from diseases contracted either directly or indirectly were widespread during this period (Dobyns 1983). Population reduction often had additional, widely ramifying effects on other aspects of Native American cultural systems (Milner 1980; Ramenofsky 1983). Changes in economic and social organization and political alignment, for instance, may have developed as trade opportunities expanded with the increasing frequency of explorers in the region. We should be able to detect at least some of these changes in terms of alteration in contact era Native American settlement patterns.

Bioarcheology

Since there are no skeletal data for this adaptation type, no bioarcheological evaluations or interpretations can be made. The impact of newly introduced diseases upon indigenous populations, as well as the biocultural consequences of other cultural changes hypothesized for this period, are likely to represent major avenues of bioarcheological research should skeletal collections representing this adaptation type become available.

Social Organization

The distinctive social forms brought into the OAO area by explorers who represented the early modern Spanish and French cultural systems are implied here. Most of the archeological evidence we currently recognize concerning early Euramerican exploration in the southeast, however, pertains to contact and interaction between these individuals and contemporaneous Native American groups. Investigation of the consequences for Native American societies of contact and interaction with Euramerican explorers is likely to be the most significant social aspect of this adaptation type. However, at present very little data pertaining to this subject exists for the OAO study area.

Trade and Exchange

This is an important aspect of contact and interaction between Euramerican explorers and Native Americans that may be directly addressed through archeological studies. The occurrence of trade goods on contemporary Native American sites can reveal much about patterns of trade and exchange, and about the changes in indigenous material culture that resulted (e.g., Brain 1979; McEwan and Mitchem 1984). But again, very few data concerning this subject exists for the OAO study area.

Ideology

Investigation of contacts between Native Americans and Euramerican explorers may provide useful insights concerning the manner in which early explorers were perceived by Native Americans and, conversely, how Native Americans were perceived by the explorers (e.g., Sabo 1987). At present, however, no studies concerning the ideological dimensions of contact in the OAO area have been completed, and therefore we have no basis for anticipating the archeological implications of this aspect of the contact situation.

Sensitive Areas of High Probability

A variety of documentary resources exist indicating routes of travel followed by early Euramerican explorers. In the OAO area most early exploration routes followed the course of the Arkansas River (e.g., La Harpe, La Bruyere, the Mallet brothers, etc.), so this area should have the highest potential for discovery of sites representing this adaptation type. The relevant documentary accounts often contain problematic geographical information, but it is sometimes possible to identify localities where modern investigators should be alert to the possibility of encountering material evidence of this adaptation type. Contemporaneous Native American sites should always be viewed as areas of high probability for this evidence.

Data Gaps and Critical Research Questions

As recent research by Charles Hudson and his colleagues has shown, attempting to establish the actual route of travel and places visited by many early explorers is a very difficult task, necessitating intensive scholarly investigation. Identification of Euramerican artifacts on Native American sites can provide important data concerning the routes traveled and the areas visited by early explorers (e.g., Brain 1975; Brain et al. 1974; Hudson et al. 1985), but the existence prior to contact of widely extending trade/exchange networks necessitates a very cautious approach to such interpretation. We presently known very little about the nature of contact in the OAO study area. Any discovery of contact period archeological remains should therefore be considered highly significant. Archeologists working in the OAO area should be especially alert for any evidence relative to the suggestion recently made by Hudson (1985) that the "River of the Cayas" mentioned in the De Soto accounts may be a reference to the Arkansas River. Bioarcheological investigations will be necessary, in addition to archeological studies, to provide the basic data from which the subjects identified for this adaptation type can be addressed. Archeological and bioarcheological studies, however, will need to be coordinated with detailed examination of pertinent documentary records.

Historic Native American, Pioneer Reservation Adaptation Type

Date Range

This adaptation type refers to Native American groups in the OAO study area after the period of initial contact, until the disruption of the Civil War. At this time Native Americans were occupying lands formally designated by the government (whether or not these were aboriginal territories). After the Civil War many of these groups were resettled on different reservations or in enclaves in nonreservation areas, and many others became assimilated within the larger framework of American society. These situations are addressed in the discussion below of the Developed Settlement adaptation type. No distinction is made here between Native American groups indigenous to the region, and those who were resettled here from other areas. Native Americans in both groups were subjected to similar acculturative processes during this period, and consequently basic aspects of their postcontact lifeways and cultural landscapes are very similar. This is not to suggest that cultural variation is absent in this adaptation type. The evidence we have on historic Native American cultural landscapes (derived primarily from documentary sources), however, does not suggest significant differences between these groups. The distribution of sites representing this adaptation type is shown in Figure 51.

Environmental Context

The environmental context of this adaptation type is essentially that recorded by early nineteenth century observers (see below). Since historic Native Americans were involved in domestic livestock raising, however, some environmental variables (such as forest vegetation and the distribution of mast), were significant for reasons that did not exist during prehistoric times.

Cultural Context

Most Native American groups had become sedentary agriculturalists by this time, settled on lands assigned to them by the United States government. Hunting was pursued to a greater or lesser extent by many, however, and other natural resources were often sought. Some individuals were engaged in other occupations, including trading, scouting, local commerce and industry, politics, and education. The tie through government agents to the economic, political, and military institutions of Pioneer American society is a highly important aspect of the cultural context of historic Native American populations, and this should have high archeological visibility. Despite United States sovereignty over these groups, many aspects of traditional social, political, economic, and ceremonial organization endured. Among some groups new Pan-Indian cultural institutions arose, which promoted further distinctions between these groups and contemporary Euramericans.

Distribution of Subsistence Activities

Basic subsistence activities including agriculture and livestock raising were concentrated in the valley bottomlands and adjacent uplands wherever these groups were settled. Hunting activities presumably took individuals or small groups of hunters to more widely dispersed locales. Subsistence was not based on land use alone, however, since these groups were also involved in a market economy. Trading posts and stores were consequently very important elements of the cultural landscape.

Settlement Pattern/Site Distribution/Site Types

Settlement patterns characteristic of most historic Native American groups were dominated by dispersed family farmsteads. These farmsteads typically contained a primary log cabin or house, and sometimes a few other outbuildings. Archeological assemblages from these sites may or may not contain aboriginal artifacts, but there may be patterns of animal utilization, or patterns of material distribution that distinguish these sites from contemporary Euramerican sites. In many instances, such distinctions will be difficult to recognize unless intensive examination of sites is undertaken. Since many of these groups traditionally exhibited communal settlement patterns, during the historic period perceived community ties often cut across otherwise isolated settlements (as they did among the Cherokee in Arkansas, for example), although such ties may be very difficult to detect archeologically. Other, more readily identifiable aspects of the cultural landscape might in-

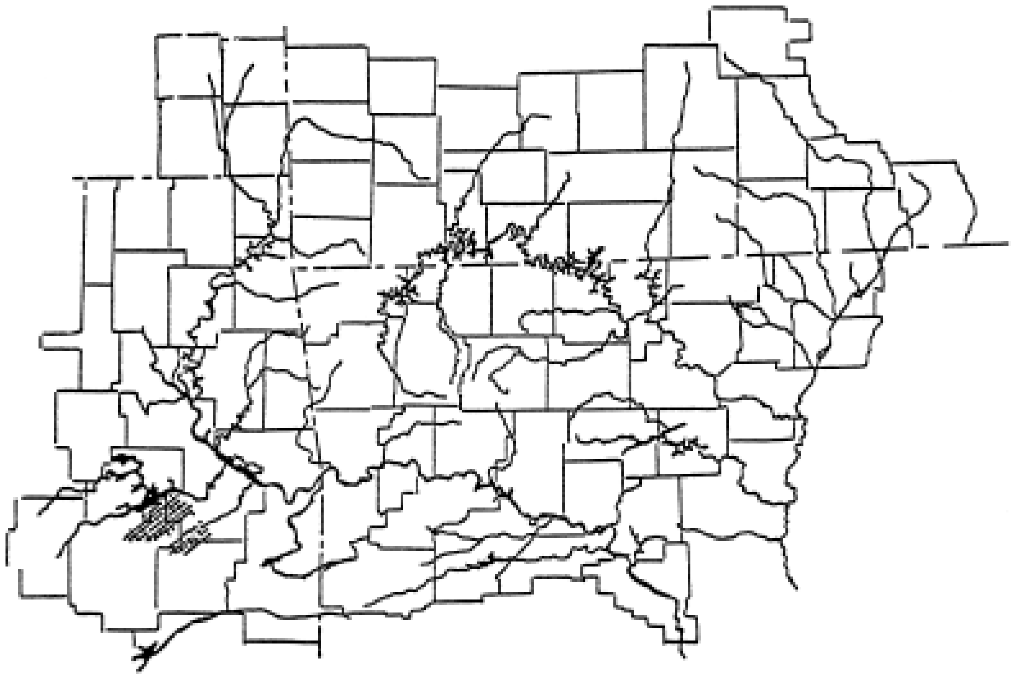

Figure 51. Distribution of archeological sites representing the Historic Native American, Pioneer Reservation Adaptation Type

clude communal recreation areas, centers for civic or ceremonial activities, or communal agricultural fields such as those of the Creek, throughout which family grain cribs were dispersed. But here again, the archeological recognition of historic Native American patterns of ethnicity will almost certainly require intensive, areal research in most instances.

Bioarcheology

Since no skeletal data exist for this adaptation type, bioarcheological evaluations or interpretation cannot presently be made. The archeological excavation of skeletal materials representing this adaptation type will be a very sensitive issue, given prevailing views on the part of modern Native Americans concerning the remains of their ancestors.

Social Organization and Ideology

An extensive literature exists on historic Native American social organization and ideology which does not need to be reiterated here. What does need to be emphasized, though, is that very little attention has been paid to the significance this information may have for identifying and interpreting cultural landscapes. Settlement patterns often reflect the social strategies people use in adapting to the natural and cultural environments in which they live. Even after they had suffered the assaults of decades of discrimination and eventual resettlement, and despite the concerted efforts of the government to transform the vestiges of their societies, historic Native Americans still exhibited social patterns that were significantly different from those of their Euramerican contemporaries. These patterns and the adaptive strategies they sustained may be recorded in the archeological record, but identification and interpretation of these relationships will require detailed interdisciplinary investigation.

Trade and Exchange

Archeological evidence for trade and exchange within this adaptation type will most prominently reflect economic ties between resettled Native American communities and the trading posts and other service centers established to serve the needs of these communities. As noted in the overview, archeological excavations have been undertaken at a small number of trading post sites in the OAO study area. Analysis of the artifact assemblages from these sites in conjunction with the examination of relevant documentary sources has produced valuable information on the kinds of goods made available to Native American communities representing this adaptation type. The counterpart examination of the actual utilization and/or consumption of these goods from the perspective of Native American habitation sites of this period has been undertaken in only a single instance (Gettys 1980).

Sensitive Areas of High Probability

Treaties and historic maps tell us approximately where historic Native Americans lived in the OAO study area. This information, coupled with data on land use summarized above, can be used to identify sensitive areas for sites of this adaptation type (see Figure 52). Because these groups were so frequently relocated, their impacts on the land are generally acknowledged, probably correctly, as being slight. This does not mean that sites are nonexistent, however. It does mean they will be hard to find, and often it will be difficult to discriminate these from contemporary Euramerican sites. But as some studies have suggested (e.g., Davis 1987), there is a very real potential for identifying sites of even the most acculturated Native Americans in the region. Perhaps the reason that so few historic Native American sites are presently known is that archeologists have paid insufficient attention to determining the special characteristics these sites are likely to exhibit.

Data Gaps and Critical Research Questions

There are several critical research needs we may identify for this adaptation type. Extensive research in documentary sources is needed to translate available information on historic Native American cultural systems into propositions concerning the archeological record (Wyckoff and Baugh 1980). The resultant indicators of Native American settlement will be most useful to archeologists, who need to attempt more assiduously to identify these sites, and classify the primary types which occur. It cannot be stressed too strongly that identification and evaluation of these sites will often not be possible at the single site level. Patterns that have ethnic significance may be expressed only at the level of the community. The primary need, in any event, is to identify these ethnically significant patterns in the archeological record.

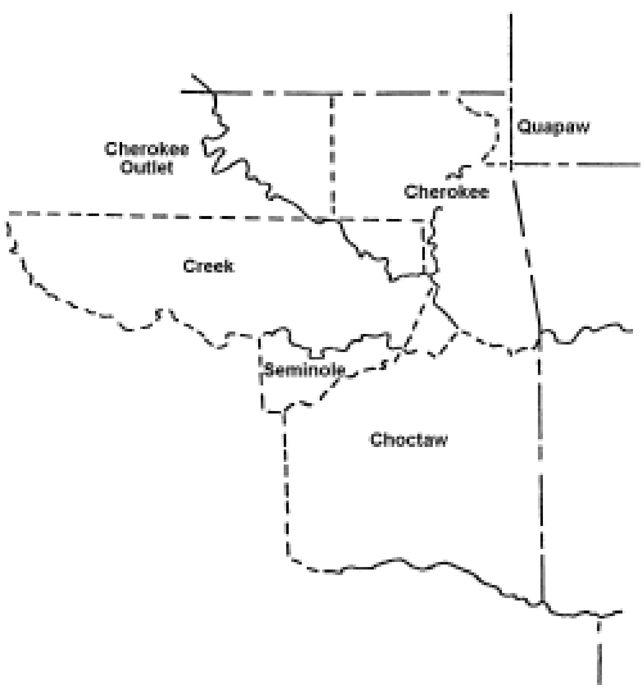

Figure 52. Locations of Pioneer Settlement Era (pre-Civil War) Reservations in Oklahoma within or adjacent to OAO study area

If this primary goal can be accomplished, archeologists will be in a much better position to contribute significant information concerning the cultural heritage of Native Americans. The archeological record does not contain the same kinds of biases inherent in historical accounts written by whites. Therefore, archeological sites should provide a valuable independent source of information for interpreting the experiences of Native Americans representing this adaptation type. Important questions concerning the resettlement period include (but are certainly not limited to) the following: To what extent did Native Americans become integrated within Pioneer American economic and social institutions? What aspects of traditional culture were maintained, and what other aspects were modified to meet new circumstances? To what extent are cultural differences between individual Native American groups (e.g., Cherokee, Choctaw, Shawnee, etc.) indicated in the archeological record? These and many additional questions can be addressed in archeological research. This research would not only facilitate our ability to better manage cultural resources, but more importantly, it could produce information of significance to modern Native Americans.

Pioneer Settlement Adaptation Types

Date Range

The Pioneer Settlement adaptation types represent the first major influx of American settlers into the OAO study area, and extend from ca 1803 to 1860. The distribution of sites representing these adaptation types are shown in Figure 53.

Environmental Context

During the Pioneer Settlement era neoboreal climatic conditions exhibiting somewhat cooler temperature extremes than at present were drawing to a close. Historic descriptions of the region identify five primary vegetation communities consisting of oak barrens, lowland forests, lowland prairies, upland forests, and upland prairies. Animals associated with these habitats include species present today, in addition to bison and other species now extinct such as the passenger pigeon. In addition to natural processes effecting environmental change, human impacts were by now becoming increasingly pronounced. Pioneer settlement resulted in the clearing of land on a scale vastly exceeding that of any aboriginal populations. Large numbers of domestic livestock were turned loose in the forests to compete with native animal species for food

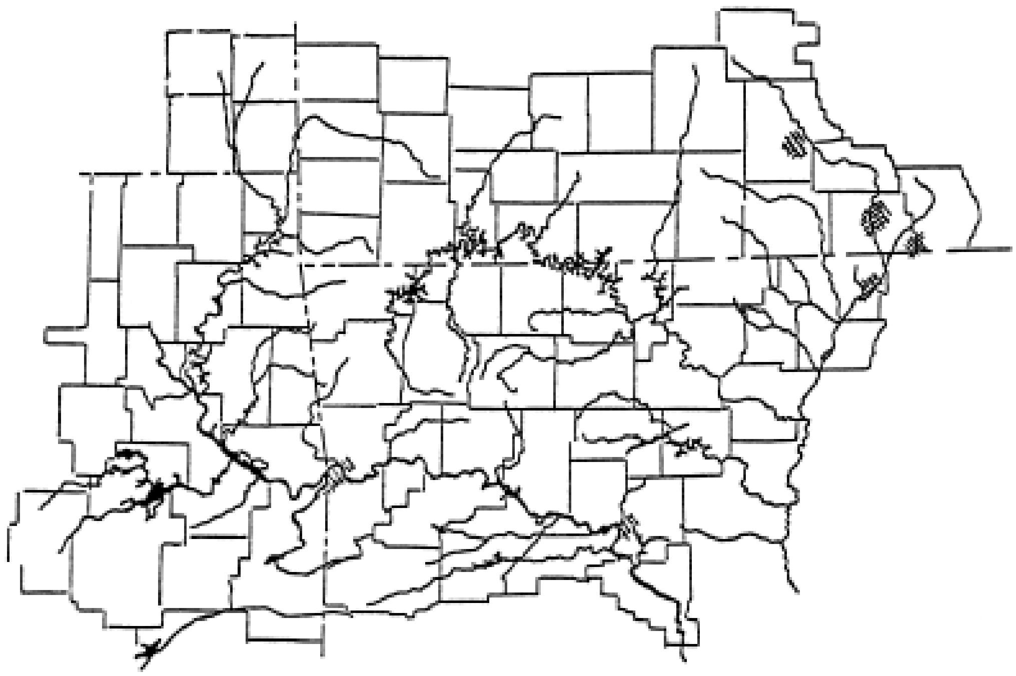

Figure 53. Distribution of archeological sites representing the Pioneer Settlement Adaptation Types

resources. Pioneer agricultural techniques resulted in the depletion of soil resources on a local scale, promoting an ever expanding frontier zone. To one extent or another, all Pioneer groups were affected by changes their own activities brought about in local environments. These interactions must be considered in archeological research addressing Pioneer Settlement sites.

Cultural Context

Three adaptation type varieties may be recognized for the Pioneer Settlement era. These are the Pioneer Hunter/Trader/Trappers, the Pioneer Hunter/Herders, and the Pioneer Agriculturalists. Each of these represents a separate population exhibiting a lifeway that produced a distinctive cultural landscape. Characteristics specific to each of these adaptation type varieties are identified below.

Pioneer Hunter/Trapper/Trader

Distribution of Subsistence Activities

This adaptation type represents a highly mobile class of individuals whose livelihood was based on the exploitation of native forest resources. In many instances the goods they sought (furs, salt, etc.) were obtained by trade with indigenous Native Americans or early Euramerican settlers. Some itinerant traders who visited the area at regular intervals would set up their operations at a designated place, where local inhabitants (Native American and Euramerican) would congregate to do business. Others established more permanent residences and trading posts.

Settlement Pattern/Site Distribution/Site Types

The cultural landscape of this adaptation type should consist of only a few types of sites. These would include temporary encampments, locations where periodic trade rendezvous took place, and permanent trading posts and residences. These sites will be few in number, dispersed in their locations, and generally hard to identify archeologically.

Bioarcheology

Since there are no skeletal data for this adaptation type, bioarcheological evaluations and interpretations cannot presently be made.

Social Organization, Trade and Exchange, and Ideology

We presently know very little about the social and ideological characteristics of this adaptation type. However, given the presumed importance of interaction between Hunter/Trapper/

Traders and Native Americans, their impacts on indigenous populations and the perceptions each group held regarding the other, should be fertile areas for ethnohistoric research. The position of Hunter/Trapper/Traders within the wider economic networks of the early historic frontier in this region is also a significant issue that could be addressed archeologically. In particular, the relationships between Hunter/Trapper/Traders and groups representing the other Pioneer adaptation type varieties need to be investigated.

Sensitive Areas of High Probability

Sites representing this adaptation type should be located along or near riverine or major overland transportation routes. The encampments of Hunter/Trapper/Traders should also be situated with respect to the distribution of fur-bearing animals, which narrows down potential locations to virtually any place in the region except for the few major population centers which had developed by this time (e.g., Davidsonville). The distribution of indigenous populations (again, whether Native American or Euramerican) should be the main determinants of locations of rendezvous and trading posts.

Pioneer Hunter/Herders

Adaptation to the region by Pioneer Hunter/Herders began at the turn of the nineteenth century and persisted approximately until the 1860s. At this time the lifeways of these settlers, and their agriculturalist neighbors, were radically transformed by the events of the Civil War.

Distribution of Subsistence Activities

The Hunter/Herders represent a dispersed population engaged in a subsistence economy based on hunting, open range livestock herding, and gardening. Hunting supplied not only meat for consumption, but hides and other materials (such as bear oil and grease) for the fur trade. Some gathering of native resources (honey, beeswax, salt) provided additional consumables and trade goods. The primary economic resource of the Hunter/Herders, however, was their livestock, which they annually drove to market. Trading was necessary to obtain a variety of critical items (such as gunpowder and lead, tools and utensils, books, and some other personal and recreational items), so rendezvous centers, trading posts, and Pioneer towns were also significant elements of Hunter/Herder cultural landscapes.

Settlement Pattern/Site Distribution/Site Types

A form of nonkin social organization (discussed below) was an important characteristic distinguishing Hunter/Herders from other Pioneer societies. The cultural landscape of the Hunter/Herders reflects, in part, the social strategies around which their adaptations to the region were organized. This cultural landscape consisted of dispersed family settlements typically containing a single log cabin, and perhaps one or two additional outbuildings (privy, barn, grain crib, etc.).

These settlements were often located at the mouths of tributaries descending from upland valleys providing natural enclosures for free ranging livestock. In addition to their homesteads, Hunter/Herders maintained other special purpose sites including hunting camps, quarries and mines, stills, saltmaking sites, and transit camps. Streams and overland trails connected these dispersed settlements to other frontier centers. Their settlements were only semipermanent, however, as Hunter/Herders periodically moved further into the frontier as local soil, game, and forage resources were depleted. The distribution and abundance of these resources imposed some environmental constraint upon the locations of Hunter/Herder settlements. Additionally, Hunter/Herders were sometimes forced to move on as their formerly isolated territories were increasingly encroached upon by agricultural settlers. Perceived levels of isolation and social distance, therefore, comprised another set of cultural variables influencing Hunter/Herder settlement patterns.

Bioarcheology

Since no skeletal data exist for this adaptation type, bioarcheological evaluations and interpretations cannot presently be made.

Social Organization

A distinctive form of pioneer social organization developed among these groups. Hunter/Herder families were fairly isolated on the frontier, and most of these families did not have nearby kinfolk. This situation was by choice: self-sufficiency, "rugged individualism," and the maintenance of social distance were important cultural values within this society. There arose many occasions, however, when reliance on a larger network of settlers was imperative. For example, should an individual family meet with severe adversity (prolonged illness or death, accidental destruction of a dwelling, loss of animals, crops, or essential equipment, etc.), the aid of neighbors could be critical to the ability of the family to survive and endure. A mechanism promoting such cooperation arose in the form of "neighborhood alliances," in which pacts were made by the residents of a locality to come to the aid of whomever should require help due to unusual misfortune. This nonkin form of community organization did not violate the cultural values promoting individualism, self-sufficiency, and social distance, yet it provided a social strategy for meeting unpredictable adversity exceeding the capabilities of isolated nuclear families. Despite the hazards of isolated living, neighborhood alliances enabled many families to endure successfully the rigors of frontier life.

Trade and Exchange

The primary tie Hunter/Herders maintained with the larger Pioneer American society was through itinerant traders and ephemeral trading centers, or more permanently situated trading posts and frontier towns. Through these ties Hunter/Herders were able to dispose of their livestock and occasionally other surplus goods in exchange for the industrially produced items necessary to their isolated existence. Although we poorly understand the nature and extent of Pioneer economic networks in the OAO area, future archeological studies could provide crucial information unavailable in other sources.

Ideology

As noted above, the isolated, dispersed cultural landscape of Hunter/Herders, in which interaction between settlements was limited to neighborhood localities, itinerants, and regional trade or market centers, was both a product and a reflection of a unique combination of social and environmental strategies. These strategies not only enabled successful adaptation to an isolated frontier, but they also maintained a particular value system — involving notions of individualism, self-sufficiency, and social distance — which defined the very essence of Hunter/Herder society. A unique opportunity exists in this adaptation type for archeologists to investigate relationships between value systems, material culture, and elements of the settlement landscape.

Sensitive Areas of High Probability

The domestic sites of Hunter/Herders should be most conspicuous at the junctures of upland tributary valleys and larger stream channels, although other localities may have been occupied, especially as prime alluvial valleys were increasingly settled by agriculturalists. Special purpose sites may be widely distributed in a variety of habitats.

Pioneer Agriculturalists

Adaptation to the region by Pioneer Agriculturalists followed the Hunter/Herders by only a few years, so for some decades prior to the Civil War the two societies were contemporaneous, producing separate but partially overlapping cultural landscapes.

Distribution of Subsistence Activities

Pioneer Agriculturalists engaged in the same subsistence pursuits as the Hunter/Herders — agriculture, hunting, and livestock herding — but hunting was deemphasized in favor of more intensive agricultural activity in order to produce a surplus of crops to be sold at market. However, many Pioneer Agriculturalists were essentially subsistence farmers, selling to the market and purchasing in exchange little more than their Hunter/Herder counterparts. But like other pioneer settlers, a variety of industrially produced goods was necessary for their frontier existence, and in one way or another these items had to be obtained through trade.

Settlement Pattern/Site Distribution/ Site Types

The cultural landscape of Pioneer Agriculturalists was far more complex and diversified than that of the Hunter/Herders. Permanent family farmsteads consisted of more elaborately constructed and furnished log houses (typically double-pen houses later converted to “I” houses). There were more kinds of outbuildings (now including sheds, springhouses, smokehouses, and other structures in addition to barns, cribs, and privies), and in some instances fields were enclosed by rail or stone fences. Often these farmsteads were loosely clustered into rural neighborhood communities, and among these, isolated service centers exhibiting specialized architecture including mills, tanneries, distilleries, schools, churches, and post offices were found. The neighborhood communities and service centers were most often located along major streams or at confluences, and almost always along roads. Nucleated hamlets and towns consisting of a cluster of structures, including residences and service centers (mills, blacksmith shops, tanneries, stores, post offices, schools, churches), were often located in valley bottoms or at crossroads leading to county courthouse towns. Also accompanying these nucleated settlements were cemeteries and nearby farmsteads. County courthouse towns represent larger nucleated settlements exhibiting a planned layout of streets and buildings. These were located centrally with respect to surrounding rural farmsteads and hamlets, and along major transportation routes. Dispersed, special purpose sites completing this landscape include religious camp meeting sites, saltmaking sites, local industrial sites (mines, quarries, pottery kilns, etc.), distilleries, hunting camps, and taverns and lodges.

Bioarcheology

Since there are no skeletal data for this adaptation type, bioarcheological evaluations and interpretations cannot presently be made.

Social Organization

Another similarity between Hunter/Herders and Agriculturalists existed, and this was a value system promoting ideals of self-sufficiency and autonomy. Among the latter group, however, these values were maintained not at the level of the nuclear family, as they were among Hunter/Herders, but at the level of the local kin-based community. This kinship organization was a hallmark of the “Upland South” community pattern, although it was supplemented by other, nonkin alliances including church affiliation, nationality, and state affiliation of founding groups. Through these kin and nonkin associations, socioeconomic cooperation and political solidarity were maintained at the community level.

Greater agricultural dependence imposed a set of important environmental constraints upon this pioneer society, and the continuing influx of immigrants into the region increased the weight of these constraints on patterns of settlement. Tillable bottomlands with good soil, water, timber and forage resources were not unlimited, and preferred tracts were quickly taken up in some areas. Even so, environmental parameters were not the exclusive determinants of Pioneer Agriculturalist settlement. Federal land disposal policies and other acts of Congress had strong impacts on pioneer settlement patterns. In this society kin ties extended widely throughout local groups, tracing through both parental lineages. This bilateral kinship organization played an important part in choosing where to settle, for proximity to kin was every bit as important as the quality of the land. Among Pioneer Agriculturalists the local kin group, rather than the nuclear family, was the primary social unit upon which adaptive organization was based. Like the Hunter/Herders before them, the Agriculturalists relied heavily on social strategies as part of their adaptation to the region, and these strategies too were imprinted on the cultural landscape.

Trade and Exchange

In Pioneer Agriculturalist cultural landscapes we expect that interaction between settlements was greatest within neighborhood communities (including nearby service centers), and secondarily between these rural communities and county courthouse towns. Rural populations were able to dispose of their surplus agricultural goods in the courthouse towns, where they could also acquire the necessary or desired products made available by the industrialized world. The maintenance of ties with the outside world primarily through the courthouse towns, however, would effectively distance these rural populations from the larger world, thereby enabling them to maintain traditional values of autonomy and self-sufficiency at the local community level. These hypotheses have obvious archeological implications.

Ideology

Reflected in this landscape, then, are important elements of the social and economic strategies around which Pioneer Agriculturalists organized their adaptations. These strategies were motivated by social and ideological factors as well as by environmental constraints. Like that of the Hunter/Herders, the Pioneer Agriculturalist landscape should reflect a value system promoting social distance and autonomy; but unlike the Hunter/Herders, these values should be observable at the level of the local, kin-based, community. Again, archeologists are here provided with an unparalleled opportunity to investigate the manner in which these relationships are reflected in the archeological record.

Sensitive Areas of High Probability

The cultural landscape of Pioneer Agriculturalists is keyed primarily to riverine valley bottomlands where environmental resources supportive of agricultural land uses are most abundant. After the best areas were occupied, many secondary areas on the hilly flanks of stream valleys and on upland plateaus were also settled. It is important to recognize, furthermore, that the cultural landscapes described here were then subjected to the ravages of the Civil War. Subsequently they were replaced by cultural landscapes of the Developed Settlement and modern eras. In many areas only a few remnants of Pioneer cultural landscapes are visible today as deteriorated vestiges of earlier times and experiences, while other elements remain only as traces in the archeological record. These traces are, indeed, often quite ephemeral. Yet they represent the real, tangible stuff that renders meaningful the cultural heritage of this region, otherwise preserved in word, song, and image. Considerable value is attached to this heritage by contemporary populations (witness the numerous local celebrations of Arkansas' sesquicentennial), and so these traces must be recognized as important cultural resources, not junk and debris to be swept aside and discarded as they come in the way of modern uses of the land.

Data Gaps and Critical Research Questions

Several data gaps and some additional research problems may be identified for the three Pioneer Settlement adaptation type varieties identified above. Since until recently very little attention has been paid to historic archeological sites, only a few sites dating to this period have been identified, and of these an even smaller number have been thoroughly examined. Much work needs to be focused on the identification of these sites in the field and evaluation of their differentiating characteristics. These archeological studies must be accompanied by in-depth documentary research, utilizing pertinent primary and secondary source materials where they exist. To facilitate this research, an extensive list of relevant sources is included in the Annotated Bibliography section of this teport. Individual sites must be evaluated within the context of the larger settlement patterns and cultural landscapes of which they were a part. Evaluations made without consideration of this broader historical context will yield few meaningful results. Establishing age and contemporaneity among historic sites will therefore be of crucial importance to their evaluation and interpretation. This can only be done by archeologists who are familiar with historic sites and artifacts.

Research problems which may be addressed through the study of Pioneer American sites are virtually endless and limited only by the imaginations of researchers, but a few issues of central relevance to cultural resource management needs may be identified. First, the locational tendencies of these sites and correlations with modern landforms need to be further examined. Although too few archeological sites are currently on record in most areas to permit meaningful distributional analyses to be made, data from other sources (such as Government Land Office maps) could be analyzed to provide useful insights concerning locational patterning. We also need to assess the overlaps between Pioneer settlement patterns and subsequent patterns of settlement and land use, in order to further specify areas in which Pioneer era sites may be expected to occur. To further understand why identifiable patterns exist, studies will be needed to examine in greater detail the various environmental and social strategies that influenced Pioneer settlement patterns (e.g., C. Price 1987).

Civil War Adaptation Type

Date Range

The central concerns of this adaptation type are, first, the impacts of wartime events and conditions on the Pioneer adaptations summarized above (including the responses of Pioneer settlers to the stresses of war), and second, the cultural landscape produced specifically as a result of Civil War activities in the region. The period covered extends from 1860 to about 1875, after which time the Developed Settlement of the "New South Ozarks" created a new cultural landscape. The distribution of sites representing this adaptation type is shown in Figure 54.

Environmental Context

The environmental context for this adaptation type is generally the same as that described above for the Pioneer Settlement adaptation types.

Cultural Context

In cultural terms this adaptation type reflects the breakdown of normal social, political, legal, and ideological institutions which so often accompanies war. The result is widespread violence, lawlessness, and strife. Often the impact of these tendencies on a local level exceeds by far the direct impacts of war, and such was the case in our study area. Therefore, the salient quality of the Civil War adaptation type in this region is represented not so much in the military battles that were fought, as in the battles individual families waged with terrorists, with other families suddenly perceived as enemies, and with general conditions of privation, stress, and disorder.

Distribution of Subsistence Activities

Generally the same as those described for the Pioneer Settlement adaptation types.

Settlement Pattern/Site Distribution/Site Types

This adaptation type consists of two overlaying settlement patterns. The first is the settlement pattern previously described for the Pioneer Agriculturalists. On top of this landscape there developed a separate, Civil War landscape of military encampments, earthworks, fortifications, battlefields, supply depots, arsenals, and processing and manufacturing centers including salt peter mines. The determinants of this second landscape include topography, resource locations, population distributions, and the strategic aims and movements of Union and Confederate forces. And finally there are the hideouts of desperadoes and bushwhackers.

Bioarcheology

Since no skeletal data exist for this adaptation type, no bioarcheological evaluations or interpretations can be made.

Social Organization, Trade and Exchange, and Ideology

Our knowledge of these aspects of Civil War impacts on societies in the OAO study area derives solely from the work of historians, and their interpretations generally have not been translated into terms relating to archeological study. This is an area of great research potential for historical archeologists.

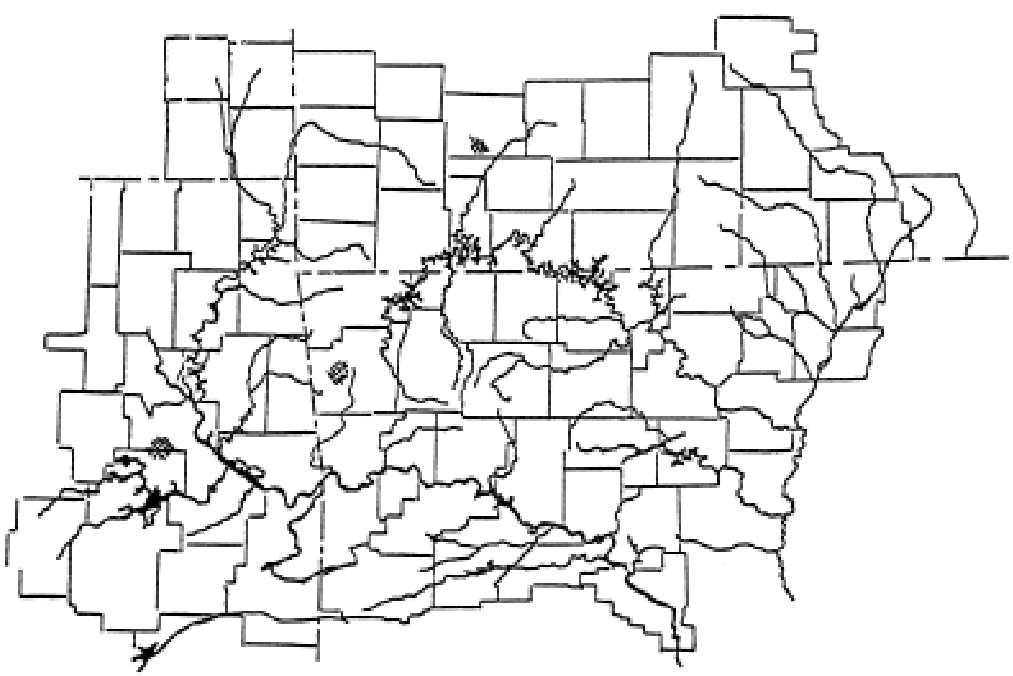

Figure 54. Distribution of archeological sites representing the Civil War Adaptation Type

Sensitive Areas of High Probability

Sensitive areas discussed above for Pioneer Agriculturalists would also apply to this adaptation type. In addition, other specific areas determined by the requirements of Civil War military operations and other activities would be important. These areas need to be defined through additional research of documentary and archeological data, however.

Data Gaps and Critical Research Needs

Most archeological work on Civil War sites has focused on battlefields, although in some cases (e.g., the Wilson's Creek battlefield investigations) data have been collected from nearby domestic sites and service centers. Much additional work needs to be focused on the other types of archeological sites mentioned above. Identification of additional military and military-related sites will provide information which can be evaluated along with pertinent documentary evidence, to better define the content and distribution of the Civil War cultural landscape. Increased attention to domestic and other nonmilitary sites is also needed to assess the impacts of the war on the civilian population of the region.

Developed Settlement Adaptation Types

Date Range

Reestablishment of populations in Ozarkia and the Arkansas River Valley following the Civil War era led to the establishment of what Robert Flanders has referred to as the "New South Ozarks." A composite cultural landscape emerged, consisting of several overlapping and interconnected patterns of settlement and land use. For present purposes, the date range for this adaptation type extends from ca 1875 to 1945. The distribution of sites representing this adaptation type is shown in Figure 55.

Environmental Context

The environmental context of Developed Settlement adaptation types consists of topography and habitats extensively modified wherever settlement occurred, or wherever other activities (including building transportation routes or extracting primary resources such as timber or minerals) were distributed. Still, this left large tracts in their pristine state. As populations increased, and as greater amounts of natural resources were extracted, however, many areas formerly untouched were now extensively transformed.

Cultural Context

Five adaptation type varieties, one with two subvarieties, are identified for the Developed Settlement adaptation type. One variety represents the Rural Agriculturalists, and subsumed within this formulation are the Plantation and Tenant Farm subvarieties. Rural Nonagriculturalists, Rural Foragers, Reservation Agriculturalists, and Cities and Towns are the other Developed Settlement adaptation type varieties. Each represents a discrete population interacting with the environment and natural resources in distinctive ways, thereby establishing a specific context for identifying and evaluating diagnostic features of their respective cultural landscapes. Specific characteristics of each adaptation type variety are discussed below.

Rural Agriculturalists

The dominant and most widespread landscape reflecting Developed Settlement was that of Rural Agriculturalists. Most of the population in the region prior to World War II was engaged either in general or specialty farming. Farming families resided in dispersed "yeoman" farmsteads, usually associated with dispersed service centers and nearby hamlets. The degree of involvement with external market economies varied from farm to farm, depending in part on the extent of agricultural specialization. As a rule, though, interaction with external markets was considerably greater during the Developed Settlement era than it was during the preceding Pioneer era. Rural farmsteads were also tied to county courthouse towns. Rural settlement density was increased, however, and centrally placed urban centers arose in some areas (i.e., Springfield, Fayetteville, Conway, etc.). In general, this landscape represents continuity with, but elaboration upon, the "Upland South" community and settlement patterns brought to the region by earlier Pioneer Agriculturalists.

Many Native Americans settled after the Civil War on non-reservation lands in all four states represented in the OAO area, sometimes in enclaves or on individual farmsteads or other residential sites. Archeological investigation of these Native American sites, as well as those of blacks and other ethnic minorities, could provide much useful information on the archeological correlates of ethnicity within the framework of the larger rural agriculturalist lifeway.

Distribution of Subsistence Activities

The distribution of basic agricultural and subsistence activities was little changed from that of Pioneer Agriculturalists, although now with increased population lands formerly considered of secondary or even marginal quality were increasingly settled and put into production. Settlement of marginal lands was further encouraged by federal land disposal policies and legislation such as the Swamp Act. Numerous abandoned farmsteads which now dot the countryside are testimony to the risks involved in this lifeway.

Settlement Pattern/Site Distribution/Site Types

Developed Settlement Rural Agriculturalists created a cultural landscape denser but in most other respects similar to that created by their pioneer era agricultural predecessors. The primary additions to this landscape were the result of more elaborate, high technology modes of transportation that became available enabling farmers to more effectively move their goods to market. Overland roads, railroads and associated facilities, and steamboat routes all expanded during this period. The most dramatic impact these transportation improvements

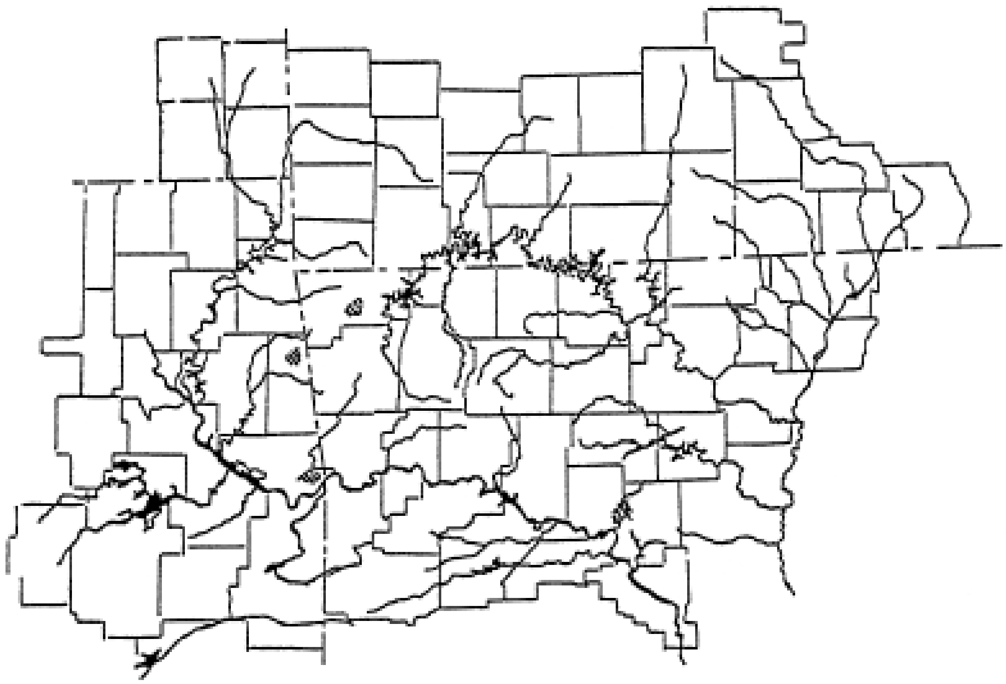

Figure 55. Distribution of archeological sites representing the Developed Settlement Adaptation Types

had upon the cultural landscape was a pronounced increase in the connectedness of rural populations to local as well as external market centers. This increased connectedness interacted with traditional values of autonomy and social distance to produce many important changes in the character of local communities. Some of these changes are discussed below in greater detail.

Bioarcheology

Since no skeletal data exist for this adaptation type, bioarcheological evaluations and interpretations cannot presently be made.

Social Organization, Trade and Exchange, and Ideology

One major change was the emergence during this period of regional subcultures. Some groups adopted a more cosmopolitan attitude, while others maintained the traditional value system and often exaggerated it as a reaction against "progressivism." This led, on the one hand, to the emergence of hillbilly stereotypes as history and tradition interacted with new realities. But it also produced variation within rural agricultural landscapes. In some areas traditional settlement strategies and value systems remained largely intact and the resultant Developed Settlement landscape differed relatively little from earlier ones reflecting Pioneer settlement. In other areas, interaction with the larger world became an important adaptive strategy which evolved along with an entirely different value system, embodying the cultural ideals of the New South (Woodward 1951). As indicated above, rural agriculturalist landscapes of this period may also provide evidence in some areas of differences in adaptive strategies based on the ethnic character of the local community. Differential degrees of interaction with external markets would be one attribute of different adaptive strategies that can be measured archeologically (e.g., Stewart-Abernathy 1986). Resulting differences in cultural landscapes, the adaptive strategies upon which these differences were based, and the interactions between the associated subcultures are all issues which need to be examined in further detail. Historical archeology can play a very important role in this examination by providing many kinds of data which documentary sources typically do not contain.

Rural Agriculturalist Plantations

One variant of the Rural Agriculturalist adaptation type is the Plantation subtype. In some major alluvial valley areas (such as the Arkansas River and the lower White River), plantation systems arose in which commercial monocrop agriculture was supported by intensive labor investment and extensive technological support. Plantations can be viewed as self-contained socioeconomic systems, in which labor, technology, and capital resources are concentrated in a single place and run by a managerial class. Consequently this is a stratified social system, often consisting of slaves, overseers, and owner/managers (cf. Otto 1977). In the OAO study area cotton was the single crop most often raised on plantations. Plantations settlements were typically nucleated, consisting of a headquarters complex and a slavequarters or (in more recent times) laborer's complex, in addition to other buildings and field systems.

Rural Agriculturalist Tenant Farms

The second variant is the Tenant Farm system. Quite often tenant farms emerged as a later transformation of Plantation systems. This variation also represents intensive commercial production of a single crop (cotton in the OAO study area), but in this system individual renters or sharecroppers work the lands held by another owner. In practice the system operates much like a plantation, but as a settlement pattern it is characteristically more dispersed. A social class or caste system similar to that of the plantation is also maintained. However, in this system the laborer class would expectedly have increased decision-making powers — especially at the level of family economics — but the extent to which this was true in practice remains to be determined. Here is an area where the studies of historical archeologists can make significant contributions. As Stewart-Abernathy and Watkins (1982) point out, the importance of the Tenant Farm system stems in part from the fact that it represents the maximum occupation of many areas in the OAO region.

Rural Nonagriculturalists

During the Developed Settlement period, nonagricultural land uses increased substantially, resulting in a variety of specialized cultural landscapes. The four primary kinds of rural nonagricultural activity include localized industry, extractive industry, resort developments, and government-sponsored projects. In addition, some rural residents were occupied in nonagricultural service industries, or were employed in nearby rural or urban towns.

The distribution of localized industry centers was keyed to several factors including the availability of raw materials or other resources, location of market centers, and available transportation facilities connecting these centers to their markets. The kinds of sites that occur include processing centers such as grist and saw mills (powered by steam or water), tanyards, lime kilns, saltworks, and cotton gins. Manufacturing centers include ceramic potteries, brickyards, cloth mills, blacksmith shops, harness shops, wagonmaking shops, wheelwright shops, furniture/cabinetmaking shops, cobbler shops, and so on. Some manufacturing centers are also located close to raw material sources including clay pits, quarries, coal seams, and timber stands. In many rural areas miscellaneous cottage industries were located on family farmsteads or as part of individual nonagricultural residences.

The locations of extractive industry sites are also keyed to sources of raw materials, the location of processing or market centers, and transportation facilities, although quite often roads or railways were built to the industrial site if none already existed. Resource extraction sites in the OAO study area primarily include lead and zinc mines, coal mines and oil wells, stone quarries, clay pits, and timber stands. Support facilities include miners' and loggers' camps, separating and crushing stations, power plants, log storage/stacking yards, banking sites along rivers and streams, log raft retrieval sites, transit camps, and so forth. Transportation facilities include barges, railroads and tramways, overland roads, and bridges and ferries at water crossings. Residual sites include waste dumps, spoil piles, cull piles, and altered land surfaces.

Resorts were developed where mineral springs occurred, as well as in other areas where scenic or other esthetic qualities existed (such as scenic mountain tops). Resorts generally consisted of residential facilities (hotels, inns, cabins) plus recreational or other special purpose facilities including spas or baths, swimming pools, picnic areas, viewing platforms, trails, tennis courts, and bandstands. Support facilities may include offices, storehouses, staff quarters, kitchens, etc.

There were, finally, many kinds of government projects and activities which left their imprint on the rural landscape. The locations of these were usually determined in relation to general management plans directed toward the achievement of large scale conservation or development goals, or other national programs. The U.S. Forest Service, for example, built roads, bridges, fire towers, Civilian Conservation Corps camps, and other constructions, some of which could now qualify as historic sites. During the late nineteenth century the Corps of Engineers attempted to transform the lower Buffalo River into a navigable waterway. During World War II, prisoner of war camps were established in some Ozark areas. These should definitely be considered historic resources.

Rural Foragers

A minor class of individuals may be identified as Rural Foragers. These individuals are not lineal descendants of Pioneer Hunter/Herders, but they represent a holdover of that general way of life into the Developed Settlement period. It is this group in particular that has remained isolated and self-sufficient into the modern era. These individuals remain on the fringes of settled areas, subsisting by a variety of occupations usually involving small scale extraction of natural or residual resources. Loose ties are maintained with population centers where goods can be exchanged for money and supplies, or where temporary employment can be sought. The cultural landscape of rural foragers, if it can be called that, consists of isolated dwellings typically cluttered with trappings of this lifestyle.

Developed Settlement Reservation

Following the Civil War many reservations in Oklahoma were redesignated (Figure 56), and the modern cultural landscapes of these areas were established. Archeological investigations in these reservation areas could provide historical data not available in other sources, but any such work would have to be performed in close cooperation with modern Native American groups.

Developed Settlement Cities and Towns

Urban centers within the OAO study area represent a final major class of settlements within the larger Developed Settlement cultural landscape. Many cities and towns arose from earlier Pioneer settlements, while others trace their histories more recently. Although most urban centers of this period remain today, some did not endure and were abandoned. Why did these centers develop where they did, instead of elsewhere? How did these urban areas articulate with rural areas and centers? What role did urban centers play in the emergence of the New South Ozarks and the consequent development of discrete subcultures and ethnic associations in the region? Why were some urban centers eventually abandoned? There are many answers to these questions in history books and other documentary sources. But as we have suggested, documentary sources alone cannot provide us a complete understanding of the past or a sufficient assessment of extant cultural resources that remind us of that past.

For the OAO study area, two particular issues concerning Developed Settlement Cities and Towns need to be addressed, both of which should be especially amenable to archeological investigation. The first concerns the origin and subsequent development of presently existing urban centers, such as Fayetteville. What political, economic, and social factors led to the initial establishment of these centers? What specific patterns of growth and development occurred in these centers, and what continuing role did the aforementioned political, economic, and social factors play in shaping this growth? Recent research in Fayetteville by Hilliard (1983) has shown that these developmental processes may be traced in the archeological record preserved even within modern urban contexts. A second issue concerns the fate of late nineteenth- and early twentieth century cities and towns that did not endure. What factors account for the origin of these centers, and what factors then led to their decline and, in some instances, extinction? Recently Harington (1986) has written a landmark history of failed cities and towns in Arkansas, based on documentary and oral history data. Historical archeology could add an important additional dimension to our current understanding of this important part of local history.

In summary, archeological investigations are necessary along with documentary research to fully evaluate and interpret the historical significance of our cities and towns, regardless of where they might exist or what condition they might currently be in (see Dickens 1982 and Staski 1987 for examples of urban archeological research in other areas). Even standing structures often contain associated archeological components that may bear importantly on the historical value of the structure, as well as its place in the larger urban context. Much that is directly relevant to issues concerning processes of urban growth and decay is preserved in the ground, in abandoned towns as well as in the most developed, highly populated modern cities. These archeological resources have an important bearing on the past and our ability to preserve its heritage.

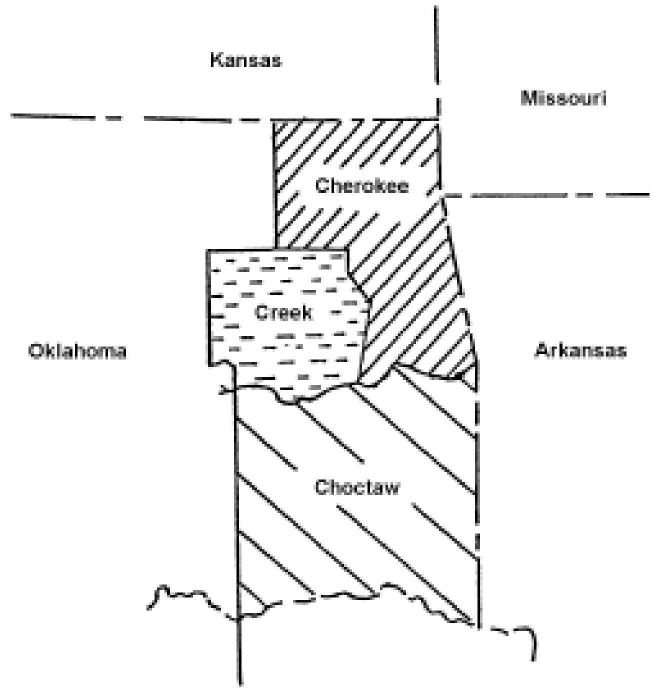

Figure 56. Locations of Developed Settlement era (post-Civil War) Reservations in Oklahoma within or adjacent to the OAO study area

Sensitive Areas of High Probability

Sensitive areas for cultural resources reflecting the Developed Settlement adaptation type and its numerous varieties are generally similar to areas previously identified for Pioneer adaptation types, although they are more extensively distributed across the landscape as a result of the much greater size of later historic populations. The above-ground visibility of these more recent sites is also much greater, owing in part to the greater variety of buildings and other facilities associated with Developed Settlement land uses. The fact that these cultural landscapes have greater visibility above the ground surface, however, does not imply that the below ground, archeological components should be considered any less significant than the remains of earlier historic settlements.

Data Gaps and Critical Research Needs

The archeology of the Developed Settlement period is only poorly known as yet. Although quite a large number of sites actually are on record as a result of increased efforts to identify historic sites in recent cultural resource management surveys and inventories, very few of these sites have been thoroughly studied. Most sites currently on record, moreover, represent either rural or urban residences. One very important need at present is to identify the wider range of site types suggested in the foregoing discussion of historic adaptation types.

Unlike prehistoric sites, historic archeological sites are more frequently encountered in near-surface rather than in deeply buried contexts. Thus, while it is true that, in some cases, much can be learned about these sites through relatively limited excavations, considerable attention needs to be focused on identifying the most appropriate techniques for investigating the many different kinds of historic sites that may be anticipated in the OAO area. Whether they represent the Pioneer, Civil War, or Developed Settlement periods, historic sites and their contents have far different characteristics than prehistoric sites, and the techniques routinely employed in prehistoric archeology may not always be appropriate for determining the structure of historic sites, evaluating their integrity and condition, and adequately sampling their artifact content. In other words, much additional attention needs to be directed toward investigation of variation in the specific properties of historic sites upon which determinations of significance must be based.

The distribution of historic sites in relation to pertinent environmental and cultural parameters is a third area in which much additional research is required, in order to increase our ability to specify more precisely where these resources can be expected to occur. Our ability to meaningfully address the many specific research topics identified above for the Developed Settlement period will be significantly enhanced as we increase our understanding of these three primary issues.

Finally, it must be reiterated that sites reflecting the Developed Settlement adaptation type reflect a heritage that is important and meaningful to contemporary populations. Yet the historical information contained in these sites has scarcely been examined. Archeological and documentary research centered on these sites, and on examination of their place in larger cultural landscapes, should be encouraged whenever and wherever possible. The result of this research will be a better appreciation of our cultural heritage, and thus, a better understanding of ourselves.

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