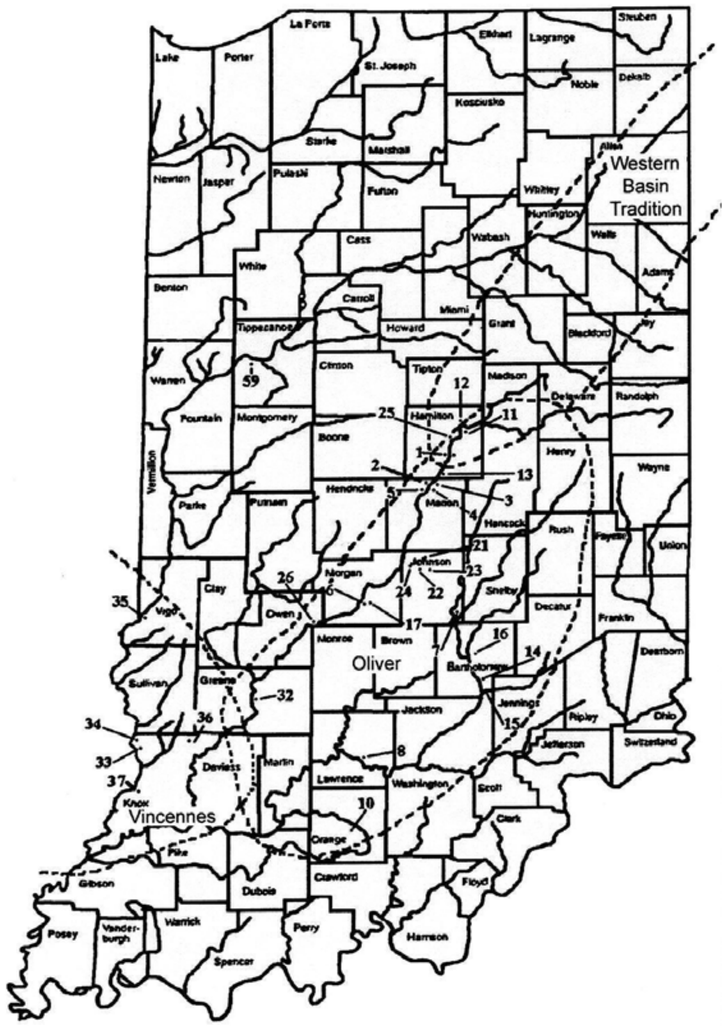
Facing the Final Millennium: Studies in the Late Prehistory of Indiana, A.D. 700 to 1700



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AND ARCHAEOLOGY

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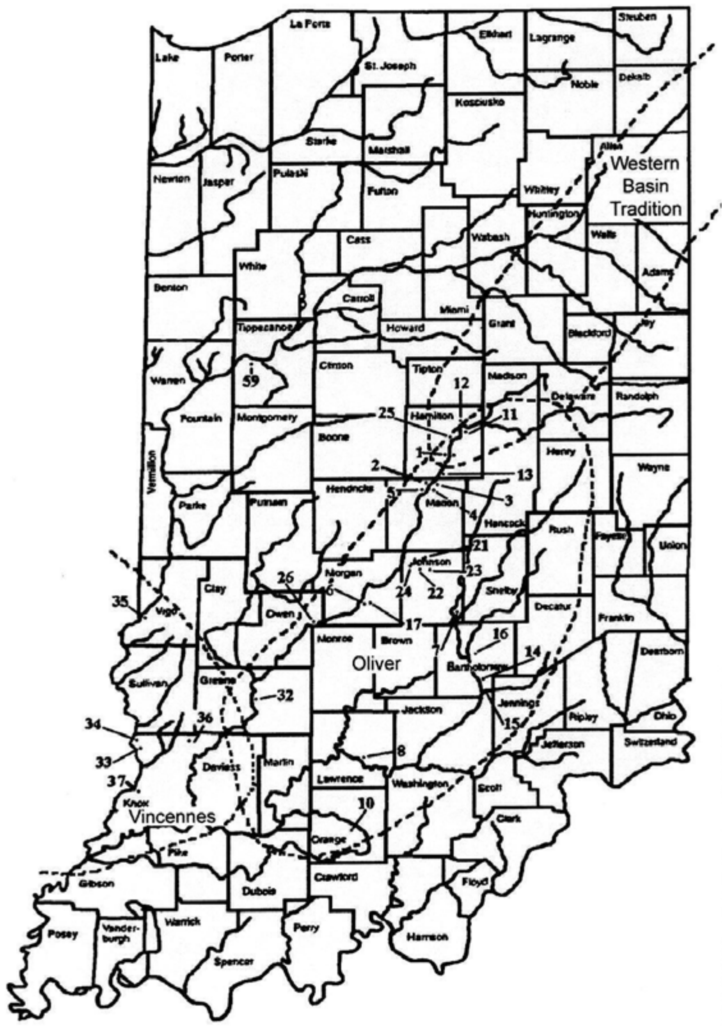

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HISTORIC PRESERVATION
AND ARCHAEOLOGY

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INTRODUCTION

This publication is the result of a 1998 symposium of the Midwest Archaeological Conference, titled Facing the Final Millennium. The symposium was organized by Brian G. Redmond of the Cleveland Museum of Natural History. The papers treat cultures from a range of time in Indiana's prehistory: A.D. 700 to 1700. The authors provide insights into the Late Prehistory of Indiana, as well as perspectives, and disagreement, on the cultures present in Indiana at that time.

In Chapter 1, Mark Schurr discusses and provides a synthesis of the Late Prehistory in northwestern Indiana and brings up the question or problem of connections between late prehistoric groups to protohistoric or historic groups. An overall question is what is Albee and how does it fit into the regional sequence? He also discusses seminal ideas and questions dealing with phase definitions, the questions of ethnic identifications of sites (and the relevance of this to the Native American Graves Protection and Repatriation Act), and the idea of multi-ethnic encampments as a long-standing tradition.

In the second chapter, McCord and Cochran refine the definition of the Albee phase, tracing it through over thirty years of research. Recent data from the single component Albee Morell-Sheets site and other sites is used to redefine the phase. Originally defined by the presence diagnostics such as cambered or wedge-shaped ceramic rims, the presence of Jack's Reef points, and mortuary patterns, the authors refine the chronology to A.D. 800-1200, suggest revisions to the original Albee ceramic type classifications, find that triangular points are associated with Albee (and not Jack's Reef), and a greater variety of mortuary patterns than previously thought. The subsistence/settlement pattern at Morell-Sheets consists of "temporary Late Woodland occupations based on horticulture," with little barley and corn the primary cultivated crops. The authors suggest further research avenues, including determining the relationships of Albee in the cultural sequence of the region and further work on settlement patterns and structure.

Schmidt and Greene examine the relationship of paleoethnobotany and human osteology in terms of the consumption of maize. They look at questions such as differential consumption of maize; incipient maize use, especially in the Albee Phase; and availability of maize to individuals or groups. An effort is made to distinguish maize reliance in a population from non-maize reliance. A hypothesis tested is that Albee dental characteristics would be less like Middle Woodland and more similar to traits in the Mississippian. Data from 224 adults from 14 sites are examined.

The research potential of contextual Albee data is examined in Chapter 4. In particular, the range of morphological variability of projectile points is analyzed. Tim Wright looks at technology, raw material, and the individual in prehistory. Wright notes that there are many variables reflected in one group of artifacts, and flintknapping is not one "rigid sequence," but comprises various sequences and objectives to meet certain circumstances or problems. Regarding the set of points he analyzed, he asks a relevant question: "Is it really a representative example of Albee culture, or, does it only represent the wishful thinking of a contemporary archaeologist?"

Havill, White, and Murphy contribute information on Albee human remains, a subject that has been little researched and analyzed. At least 163 burials from four sites were divided into early and late components and analyzed by burial position, diagnostic artifact associations, and superposition. The authors define two components: one (C1) based on the presence of loosely flexed burials, Jack's Reef points, and ceramic vessels with uncollared rims; and C2, including tightly flexed burials, less common artifact assemblages, one collared rim vessel, and triangular projectile points. They found differences in C1 and C2 in terms of dental wear, dental health, metabolic disturbance, and possibly anemia. Differences in cemetery use were found among the four sites, as well as differences from early to late Albee. The authors argue that Albee should be looked at "in a broader temporal and geographical context, and by further analyses integrating mortuary and non-mortuary data."

As Leslie Bush points out, in Chapter 6, from A.D. 700 to European Contact important changes in subsistence practices occurred. Bush examines botanical patterns in the Albee and Oliver phases, and includes data from seven Late Woodland sites including the later periods of Allison-Lamotte (A.D. 200-700) and the Newtown Phase (A.D. 300-800), and emergent Mississippian (Yankeetown). She notes decreasing use of starchy seeds, cucurbits, and nuts at Late Woodland sites, with a "trend toward decreasing nut use," a precursor to low frequencies of nutshells at Oliver and Fort Ancient sites. Albee differs from other Late Woodland subsistence strategies. Oliver Phase sites demonstrate substantial corn use, but little evidence of beans is found. Ultimately, Late Prehistoric sites in southern Indiana show a decline in nut use, less evidence of cucurbits, but noticeably greater corn cultivation.

Late Prehistoric occupations along the West Fork of the White River drainage are discussed by McCullough in Chapter 7. Oliver Phase and "Huber and Fisher-like" occupations are present, as are influences from the Western Basin and Fort Ancient. Difficulties in researching the area include a lack of C14 dates, comparatively little excavation, and paucity of research. Oliver Phase peoples were maize agriculturists, and sites yield evidence of swidden agriculture techniques, stockaded/fortified villages, and dispersed farmsteads. The phase is best known from ceramic assemblages.

Stothers and Schneider suggest that the "Oliver Phase" concept is not well defined and they question its usefulness. Using such data as ceramics and radiocarbon dates, they propose a migration and dispersal model of Western Basin Tradition populations into northeastern and central Indiana. They offer testable hypotheses to examine this model and argue for a movement of Western Basin peoples into Indiana, who cohabited with resident Oliver groups, and eventually might have been "subsumed" by these populations.

In Chapter 9, Redmond summarizes and characterizes the results of archaeological investigations of Oliver Phase sites in central Indiana, which earlier appeared to be influenced by Late Woodland and Fort Ancient groups. The Albee Phase is not recognized in this area. Survey information provided data on Oliver Phase material culture, areal distribution, chronology, settlement characteristics, and their "relationship with other Late Prehistoric cultures." Characteristics of Oliver Phase sites include fortified habitation sites on terrace landforms, burials, an "annular pattern of storage/refuse pits,' maize horticulture with fall and spring hunting and gathering, and smaller habitation sites in the floodplain and low terraces. Oliver Phase is dated to A.D. 1250-1450, and southwestern Ohio is postulated as the origin of the Oliver Phase in the White River Valley.

Lastly, Pollack and Munson discuss the Caborn-Welborn (C-W) Phase in Indiana and adjacent portions of nearby states, and the Angel Phase to Caborn-Welborn transition. Angel and C-W are compared according to such traits as material culture and settlement/subsistence patterns. Caborn-Welborn is present in the late 14th and 15th centuries, the earliest dates overlapping with Angel. Angel is characterized as a chiefdom, while C-W is termed a "small riverine confederacy." The similarities and differences of Angel and C-W are delineated. Both phases have a riverine orientation, with similar cultivated plants, similar lithics, and similar general geographical locations. Differing characteristics of Caborn-Welborn include: the presence of triangular endscrapers; bi-pointed drills; Nodena points; trailed, incised, and/or punctated designs on jar shoulders; utilization of beans and less maize; and no mound center. There is a shift from Angel to C-W in terms of interaction spheres and increased access to non-local goods in C-W. There are Oneota jars found a C-W sites, catlinite pipes and ornaments, native copper artifacts, and the introduction of the triangular endscrapers. C-W sociopolitical organization included "the presence of a settlement hierarchy," and the "importance of group ceremonialism and rituals within Caborn-Welborn society." Caborn-Welborn is characterized as a "Mississippian society at the mouth of the Wabash river" with less political centralization after A.D. 1400, but that does not indicate the dispersal of the local population. Thus, the collapse of a Mississippian chiefdom does not necessarily mean dispersal.

In the Afterword, there is a brief discussion of protohistoric cultures and the problem of Late Prehistoric-Early Historic connections in Indiana.

The editors would like to thank the authors for participation in this volume on the study of the Late Prehistory in Indiana, and for their insights, information, and thought-provoking ideas presented and generated in their papers. It is with this kind of data that scholarly and research endeavors progress.

CHAPTER ONE

THE LATE PREHISTORY OF NORTHWESTERN INDIANA: NEW PERSPECTIVES ON AN OLD MODEL

Mark R. Schurr

INTRODUCTION

The last millennium of the prehistory of northwestern Indiana can be divided into two portions. From about A.D. 700 to 1100, occupations of the area are Late Woodland, in the classic sense of a poorly known period characterized by undistinguished, grit-tempered, cord-marked pottery. The later portion of the last millennium is marked by the appearance of shell-tempered pottery related to Oneota occupations of the Upper Mississippi River Valley area. The Upper Mississippian period (from about A.D. 1100 to historic contact) is the best understood prehistoric cultural period of the region thanks to Faulkner's (1972) synthesis of Upper Mississippian occupations in the region. The Late Woodland occupations that preceded the better known Upper Mississippian ones are poorly known, as is most of the prehistory of the region. Past studies of the Kankakee Valley and the southern shore of Lake Michigan have concentrated on the Middle Woodland (200 B.C. to A.D. 350) (Mangold 1998; Quimby 1941; Schurr 1997) or the Upper Mississippian period (after A.D. 1300 until historic contact) (Faulkner 1972). The Late Woodland, sandwiched between these two better known eras, with its genesis presumably lying in the earlier, and its demise in the later, remains virtually unknown compared to its antecedents and descendants.

Much of the later prehistory of northwestern Indiana is known primarily from syntheses that are over 25 years old. Through accidents of history, northwestern Indiana has generally been neglected by archaeologists. The area is geographically remote from the universities of Indiana that have maintained archaeological research programs over long periods of time, and archaeologists in Illinois have apparently preferred to confine their operations to their home state. This article will review existing models of the last millennium of prehistory in northwestern Indiana. It will also present previously unreported data from the region gathered from several sources. Rather than being a comprehensive synthesis, it is a summary of the current state of our knowledge of the later prehistory of northwestern Indiana, along with some hints about how that knowledge might change in the future.

THE REGION AND ITS NATURAL ENVIRONMENT

Northwestern Indiana is dominated by the Kankakee River Valley and the southern end of Lake Michigan. Most archaeological research in the area has concentrated on the area between the Kankakee River and Lake Michigan, in the counties of Lake, Porter, LaPorte, and St. Joseph. The archaeology of counties south of the Kankakee is even more poorly known than those to the north of it, and will therefore not be discussed here.

In a frequently cited scheme for the physiographic zones of Indiana (Schneider 1966), the region lies within the Northern Moraine and Lake physiographic zone, and contains three of that physiographic zone's five sub-zones (Figure 1.1). The physiography of the region is relatively simple. Three physiographic sub-zones extend across the region. From north to south, these are the Calumet Lacustrine Plain (the past and present shores of Lake Michigan), the Valparaiso moraine (a terminal end moraine), and the Kankakee Outwash and Lacustrine Plain (glacial outwash plains and deposits extending south from the moraine to the Kankakee) (Schneider 1966). The "Lacustrine Plain" portion of this description is somewhat of a misnomer. The terminology was apparently selected to reflect the very flat topography of the Kankakee Valley floor, which resembles that of a classic lacustrine plain, but the vast majority of geological deposits in the zone are sand or gravel outwash deposits created by rivers and streams. The region contains two separate watersheds. The areas north of the moraine drain into Lake Michigan. Areas south of the moraine ultimately drain into the Mississippi via the Illinois and Kankakee rivers.

The Kankakee marsh was the dominant environmental feature of the region. Lake Michigan is obviously an important geologic feature, and marshes were a significant component of the Calumet Lacustrine Plain, but the region to the north of the Valparaiso Moraine appears to have been inhabited less intensively than was the Kankakee Valley. The Kankakee Valley is an intermorainal valley which lies between the Valparaiso and Maxincuckee moraines. The valley was formed by glacial meltwater at the start of the Holocene. The topography of the valley consists of a very flat valley floor with a very low stream gradient (the average gradient of the Kankakee River in Indiana is five inches per mile [Meyer 1936]). The low river gradient, the wide valley floor, and the easily reworked outwash deposits of the valley gave the Kankakee River the form of a lacustrine marsh which once stretched from just west of South Bend, Indiana to Momence, Illinois and covered over 1,000 square miles (Malott 1922). The Kankakee River flowed through the marsh within a very sinuous channel of meanders bordered by oxbows and cut-offs. The Kankakee was straightened by ditching in the early twentieth century, but the paths of former meanders are still visible today after heavy rains.

The original Kankakee marsh primarily consisted of seasonally inundated wetland. Local relief on the valley floor was provided by low sand islands which were formed by aeolian (wind deposited) dunes. These dunal islands rose from just a few tens of centimeters to as high as 10 m above the marsh floor and provided preferred site locations. Dunal islands are found throughout the valley but are especially common downstream from western LaPorte County. At some locations, permanent lakes formed in depressions in the valley floor. Most of these former lakes, such as Mud Lake in eastern LaPorte County and English Lake in western LaPorte County, have been drained and no longer exist.

The northern edge of the marsh is delimited by the southern edge of the broad outwash plain extending south of the Valparaiso moraine. The outwash plain is primarily composed of loosely consolidated deposits of outwash sand and gravel and rises gradually from the marsh in most areas. The border between the former marsh and the upland is clearly visible today where the dark, organic marsh soils meet the lighter upland soils. Drainage into the Kankakee from the upland is provided by small streams in deeply incised valleys so that the marsh and upland interdigitate along much of their interface. The uplands are dotted with depressions which once held wetlands or wet prairies. The original drainage of the county has been extensively altered by ditching and now bears little resemblance to its original state.

Excellent reconstructions of the vegetation that covered the study area around A.D. 1830 before human activities dramatically altered the natural environment are available. The reconstructions are based on the General Land Office (GLO) surveys (Lindsey 1961; Meyer 1936; Potzger et al. 1956; Qadir 1964). Three major plant communities have been recognized for the region. The plant communities were wetlands, oak-hickory forest, and prairie. Soil moisture content and seasonal flooding were important controls of major plant communities in northwestern Indiana (Lindsey 1961), so that the pre-settlement vegetation associations are strongly associated with major geological landforms.

Wetlands were the dominant ecological zone of the Kankakee Valley and the Kankakee Outwash and Lacustrine Plain. Marshes formed in seasonally-inundated areas of the Kankakee Valley and along the drainages extending into the uplands. The marsh was composed of extensive tracts of sedges, grasses, marsh hay, and wild rice (Meyer 1936). Lindsey (1961) did not differentiate marshes (covered with sedges, marsh hay, and wild rice) from wet prairies (covered with tall stands of bunchy-sodded bluestem grass) in his definition of wetlands. Meyer (1936) distinguished marshes from wet prairies. His reconstruction of the pre-settlement marsh vegetation indicates that wet prairies were located along the margins of the marsh and in its upper reaches.

Environmental diversity within the marsh was provided by swamps, ponds, and lakes which were permanently wet. A map by Meyer (1936) based on General Land Office records identifies the locations of "willow swamps," "tamarack swamps," and "bullrush sloughs" as major swamp vegetation associations. Today these basins are now small depressions that may contain seasonal ponds or wetlands

True swamp vegetation was primarily located along the meander zone of the Kankakee River. Typical swamp vegetation included plants such as lily pads, cattails, reeds, and flags growing along standing water and large, dense stands of swamp timber species including ash, elm, oaks, and maple, with a dense undergrowth of brushy species such as swamp alder and wild rose (Meyer 1936). In Porter and Lake counties, the swamp timber zone was up to 5 km (3.1 miles) wide, but this zone was narrower in the upper Kankakee and was rarely more than 1.6 km (1 mile) wide in LaPorte County.

Sand dunes formed small islands of upland vegetation within the marsh. The marsh islands supported thin covers of herbaceous weeds or moss and stands of oaks. Pin oaks were especially common along island margins.

The open oak groves (i.e., oak openings or "barrens") occupied the sandy soils of the upland to the north of the marsh. Upland forest cover along the marsh margin would have included oak barrens on very well drained soils along with stands of oak-hickory forest in moister areas (Lindsey 1961). These vegetation zones once occupied outwash plain deposits.

Dry prairies lay along the Valparaiso moraine to the north of the oak-hickory and oak barrens vegetation zone (on the border between the Kankakee Outwash Plain and the Valparaiso Morainal area). These prairies are part of the Prairie Peninsula (Finley and Potzger 1952), an eastern extension of the prairies of the west into northern Indiana and across southern Michigan. To the north of the prairies, the morainal region was covered primarily by stands of oak-hickory forest, with a small area of Beech-Maple forest in northern LaPorte and St. Joseph counties.

The Calumet Lacustrine Plain is composed of relict beach ridges and the present shore of Lake Michigan. This zone is composed of alternating dunal ridges and swales which largely parallel the present lake shore. The Calumet and Little Calumet rivers are the two most important rivers in this zone. They also run parallel to the lakeshore over most of their courses. This zone appears to have had the lowest biological productivity and was the least attractive for settlement by prehistoric peoples (Faulkner 1972). Recent archaeological investigations in the Indiana Dunes National Lakeshore have shown that this zone was used throughout the Late Woodland period (Lynott, et al. 1998).

The modern environment has been created via the extensive alteration of the original one. Little remains of the original plant communities of the region. The area along Lake Michigan contains some of the most intense urban and industrial development in the region. The Valparaiso moraine contains a major interstate highway, and this transportation corridor is seeing increased residential development. The territory south of the moraine is now managed primarily for agricultural productivity with corn and soy beans being the most common crops.

EXISTING MODELS OF THE REGION'S LATER PREHISTORY

Two major works provide the basic framework for discussions of the region's prehistory during the last millennium. These are the reports of the 1948 excavations at the Moccasin Bluff site along the St. Joseph River in Berrien County, Michigan (Bettarel and Smith 1973) and Charles Faulkner's (1972) synthesis of Upper Mississippian occupation of the Kankakee Valley, which also includes an overview of the prehistory of the region as it was known at that time. These two reports, written at about the same time, provide two very different perspectives on the archaeology of northwestern Indiana.

The View from Moccasin Bluff

One comprehensive summary of the prehistory of the last millennium of northwestern Indiana was derived from excavations at the Moccasin Bluff site in southwestern lower Michigan (Figure 1.2). The report on the excavations (Bettarel and Smith 1973) also included an analysis of a large surface collection and artifacts collected during amateur excavations by John Birdsell, a local artifact collector who was active at the time of the Moccasin Bluff excavations. The Moccasin Bluff site has produced the largest and best described sample of pottery from the general region that appears to span the entire final millennium of prehistory. Although the site is located in Michigan, it is in the lower St. Joseph Valley,[i] an area which appears to have been closely tied to the Kankakee via the historically known portage at what is now South Bend, Indiana. The distribution of Middle Woodland Havana tradition artifacts across northwestern

Indiana into lower Michigan suggests that the portage was in use during the Middle Woodland period (and probably much earlier).

Moccasin Bluff was a large multi-component site that was occupied over many millennia. In their overview of the site's occupations, Bettarel and Smith (1973) provide an outline for the cultural history of the region. At Moccasin Bluff, the first portion of the Late Woodland period is assigned to the Brems Phase, named for a large Late Woodland site in Starke County, Indiana (Figure 1.2), known primarily from surface collections and amateur excavations by Birdsell. The use of the poorly known Brems site as the type site for the Brems Phase reflects both the arbitrariness of modern political boundaries and the limited database for Late Woodland archaeology in the region.

The Brems Phase is characterized as the period immediately after Hopewell. The earliest portions of the Brems Phase may have begun around A.D. 500, based on a radiocarbon date of A.D. 555 (M48A 1300 ± 300) from Brems (Bettarel and Smith 1973:112). Ceramics of this period are probably the Moccasin Bluff Modified Lip types, smooth and cordmarked vessels with a great variety of lip edge impressions, often produced with a cord-wrapped stick. Small side-notched and corner-notched points are also characteristic of the phase. During the later portion of the phase, cordmarking is used almost exclusively as a surface treatment, collars appear, and constricted necks become common. Triangular points also appear, indicating the appearance of the bow and arrow.

By approximately A.D. 1050, Moccasin Bluff Impressed Exterior Lip vessels appear, signaling the start of the Moccasin Bluff Phase. As the type name suggests, most of these vessels were decorated with impressions placed on the exterior lip edge (Figure 1.3a-c). The Moccasin Bluff site appears to represent the southernmost extension of Moccasin Bluff Impressed Lip sherds, which are distributed primarily along the eastern shore of Lake Michigan north to the Muskegon and Grand Valleys. Vessels decorated with curvilinear designs closely related to Fisher series pottery were associated with the Moccasin Bluff Impressed Exterior Lip vessels. These appear to be grit-tempered versions of styles that are attributed to the earliest Upper Mississippian occupations of the region when found in shell-tempered form (Figure 1.3d-e). As these types from Moccasin Bluff are grit-tempered, and Fisher pottery is shell-tempered, Bettarel and Smith saw the Moccasin Bluff vessels as the product of a pottery tradition that was influenced by Oneota traditions to the west. Shell-tempered Fisher style sherds were also found at Moccasin Bluff, indicating that people with an Upper Mississippian culture probably resided at the site.

The Moccasin Bluff Phase represents the most intensive occupation of the site. Corn agriculture was apparently fully developed by this time, and abundant maize remains from the site are thought to date primarily to this period. The Moccasin Bluff Phase can be divided into two sub-phases. The shell-tempered Fisher-style vessels were produced during the earlier sub-phase, but become less common in the second sub-phase, when the site population may have increased.

This last phase at the site is the Berrien Phase. The latest pottery styles at the site include *Berrien ware*, shell-tempered pottery that appears to be identical to Huber pottery, thought to have been produced after A.D. 1300 and extending to the early historic period (Brown 1990; Faulkner 1972). Huber pottery consists of globular shell-tempered vessels with everted rims that are often decorated with edge notches or weak scallops (Figure 1.3f). The vessels usually have strap handles and are decorated with narrow trailed vertical lines (Figure 1.3g). Huber pottery is widely distributed across northwestern Indiana and northeastern Illinois. Contemporary with the Huber style are two grit-tempered pottery types: Moccasin Bluff Scalloped, with a characteristic scalloped rim edge (Figure 1.4a); and Moccasin Bluff Notched Applique Strip, shell-tempered pottery decorated as the name implies. This style is associated with sherds of Indian Hills Stamped pottery (Figure 1.4b). Both of these pottery types are well known from the late prehistoric Sandusky Tradition of northwestern Ohio (Stothers 1995).

The presence of three different and distinctive pottery styles at Moccasin Bluff during the latest portion of the occupation was attributed to the presence of three different ethnic groups at the site. Huber pottery was attributed to the prehistoric ancestors of the Miami (seen as intruders from the west). Moccasin Bluff Scalloped pottery was associated with the area's "indigenous Central Algonquian inhabitants," probably the Kickapoo, Sauk, Mascoutens, or the Potawatomi (Bettarel and Smith 1973:148). Styles such as Moccasin Bluff Notched Applique Strip and Parker Festooned (including sherds now recognized as Indian Hills Stamped) were attributed to displaced persons from northern Ohio.

This sequence and its interpretation is clearly open to refinement and the Moccasin Bluff collection is badly in need of re-analysis with modern perspectives and techniques. For example, the Brems Phase, dated between about A.D. 500 to 1050 as constituted by Bettarel and Smith, clearly contains significant variation within both the ceramic and lithic artifacts, and should be divided into two sequential sub-phases. The initial division of the collection into Moccasin Bluff Plain and Moccasin Bluff Cordmarked probably combines plain and cordmarked pottery made during the entire span of the sequence into just two types. For example, Moccasin Bluff Cordmarked includes collared vessels, presumably with "poor" collars, to distinguish them from Moccasin Bluff Collared vessels, which have "good" collars (Bettarel and Smith 1973:52-56). The descriptions of Modified Lip and Impressed Exterior Lip sherds shows that there is substantial variation within these two "types" that might be untangled by an attribute-based analysis. The descriptions of the various groups of Moccasin Bluff Modified Lip sherds reveal that many have lip edge impressions, suggesting that the type divisions between Modified Lip and Impressed Exterior Lip sherds are either not as distinct as the type names imply, or that they are based on other attributes. In a similar fashion, the Berrien ware sherds contain Fisher and Huber types that span the known range of Upper Mississippian occupations of the region, and this leads to confusion when Berrien ware is considered diagnostic of a late (Huber) Upper Mississippian occupation.

Faulkner's Model for Northwestern Indiana

At about the same time that the Moccasin Bluff materials were being studied, Charles Faulkner was analyzing data from field surveys, collector interviews, and excavations in Lake and Porter Counties, Indiana. His 1972 synthesis of the prehistory of the Kankakee remains the best available.

The transition between Middle Woodland and Late Woodland is a gradual one. The Late Woodland begins around A.D. 400, after which Havana and Hopewell ware ceramics are no longer made, and trade in exotic artifacts and their placement with burials virtually disappears. The period after A.D. 400 is marked by changes in artifact styles and a reduction in the intensity of mortuary activity, but pottery styles are clearly derived from the preceding Havana tradition and burial mounds are still constructed. Thus, the period between A.D. 400 to 700 can also be seen as the terminal end of the Middle Woodland period. Archaeologists working in the region have traditionally seen the Late Woodland period as beginning after Hopewell ware and Havana wares were no longer produced (and thus starting around A.D. 400). The Middle Woodland pottery styles were replaced by cordmarked, grit-tempered pottery similar to Weaver wares (Griffin 1952) during the early Late Woodland. Later, collared vessels appear that are similar to the types such as Starved Rock Collared (Hall 1962) and Aztalan Collared (Baerreis and Freeman 1958), as well as vessels similar to Albee series pottery (Winters 1963) from the Wabash Valley. The typology of Late Woodland vessels in the KankakeeValley was not clearly defined by Faulkner.

Although there was a general decline in the intensity of mound building during this period, burial mounds were still constructed, and pre-existing mounds were also used as burial places. Early Late Woodland mortuary sites show less evidence for status differentiation than Hopewellian ones, indicating that these societies were more egalitarian than their predecessors. Artifacts interred with burials include pottery, keeled platform pipes, elbow pipes, triangular projectile points, single-hole slate pendants, and bone tools such as harpoons. Both primary and secondary burials were also interred at camp sites within the Kankakee marsh. The appearance of thin, corner-notched points such as the Jack's Reef Corner Notched point (Ritchie 1971) indicate that the bow and arrow first appeared in the area during this period. Triangular projectile points also appeared and became the dominant or exclusive projectile point by the end of the Late Woodland period.

Although Faulkner (1972) knew of no large habitation sites or villages in the Kankakee Valley dating to this period, smaller camp sites are abundant, and most of the larger sand islands in the marsh have Late Woodland components. Late Woodland sites are also found in the Calumet Lacustrine zone, indicating an increase in the use of this zone compared to preceding period, as this zone appears to have been virtually abandoned during the Middle Woodland. The changes in settlement pattern during the Late Woodland period appear to mark a change in adaptive pattern, with a dispersed population exploiting a greater variety of secondary resources with no decline in population density (Faulkner 1972).

The Late Woodland tradition of northwestern Indiana was apparently truncated by the abrupt appearance of Upper Mississippian groups in the area around A.D. 1100. The start of the Upper Mississippian period is marked by the appearance of shell-tempered pottery. There is now no evidence for a developmental sequence from the Havana tradition to Upper Mississippian occupations in the Kankakee Valley, which lies near the maximum northeastern extension of known Upper Mississippian occupations in Indiana. Faulkner thought that Upper Mississippian occupations of the Kankakee Valley represent an intrusion into the region when people from the west with a distinct material culture displaced, eliminated, or amalgamated (or some combination of these possibilities) with the Late Woodland inhabitants of the region.

Upper Mississippian occupations in northwestern Indiana represent one or more regional variants of the Oneota tradition, a widespread cultural pattern defined by certain characteristic artifact styles and centered on the upper Mississippi Valley (Brown 1990; Mason 1981). The maximum extension of the Oneota tradition apparently had its northeastern limit just beyond the St. Joseph River Valley in southwestern lower Michigan. However, the archaeology of the St. Joseph Valley upstream from South Bend is poorly known, so Upper Mississippian may actually extend a bit further to the east. Upper Mississippian occupations have not been identified in LaGrange or Steuben counties in northeastern Indiana (Schurr 1991; Schurr and Justice 1989) so the northeastern limit of Upper Missippian in Indiana probably does not extend beyond Elkhart County. The Upper Mississippian Oneota peoples are considered to be the first fully adapted maize agriculturalists in the region. Their subsistence economy combined the cultivation of domesticated plants (especially maize) with the hunting and collecting of wild resources. The complex seasonal round that historic Native Americans used to exploit wild and domesticated resources in the region evolved during this period.

In northwestern Indiana, Upper Mississippian subsistence appears to have been oriented primarily to seasonal exploitation of the Kankakee marsh and marshy sections of the Calumet Lacustrine Plain (Faulkner 1972). Radiocarbon dates provide evidence for the first appearance of Upper Mississippian occupations in the region. The earliest reported dates are A.D. 1090 ± 110 from the Moccasin Bluff site in Berrien County, Michigan (thought to date Fisher Oneota influences on indigenous Late Woodland pottery [Crane and Griffin 1970:164]). Early Upper Mississippian radiocarbon dates have also been obtained from the Wymer-West Knoll site (also in Berrien County, Michigan) where Upper Mississippian pottery has been radiocarbon dated to around A.D. 1000 (Garland 1991).

Faulkner (1972) identified two Upper Mississippian Oneota complexes in northwestern Indiana which he believed were sequential in time. The first was the Fisher complex, represented by abundant sites throughout the Kankakee and lower St. Joseph River valleys. An early Fisher component, dated between A.D. 1100 - 1200, was identified at the Yahl site (12 La 21) in Lake County (Faulkner 1972:159). Ceramic diagnostics include relatively high proportions of cord-marked shell tempered pottery, riveted loop handles, fine-lined incising, and curvilinear trailed decorations on pottery types such as Fisher Trailed. The later Fisher components, dated between A.D. 1400 - 1500, were identified at the sites of Griesmer (12 La 3) and Fifield (12 Pr 55). The predominant pottery types found on late Fisher sites include Fifield Trailed and Fifield Bold (Faulkner 1972). Fifield Trailed vessels are globular shell-tempered vessels with cordmarked surfaces. Decoration consists of trailed lines and punctates confined to a band along the vessel shoulder. Lip notching may also be present. Fifield Bold vessels possess similar attributes to the companion type Fifield Trailed but are decorated with wide trailed lines in bold, evenly spaced patterns on the shoulder. Other late Fisher diagnostics include humpbacked scrapers, rectangular sandstone abraders, sherd disks (which may have been spindle whorls or gaming tokens), scapula hoes, sherd pendants incised with the "forked" or "weeping eye" motif, and copper serpent pendants. Faulkner (1972) provides excellent illustrations of these artifact types, all of which represent typical Oneota diagnostics (Mason 1981). The Fisher subsistence system consisted of seasonal hunting and gathering oriented toward exploitation of marsh environments combined with maize agriculture. Seasonal hunting of bison on dry prairies may have been added to the subsistence base near the end of the Fisher occupations. Bison were probably not available in large numbers until after A.D. 1600 (Griffin and Wray 1946), and the seasonal bison hunts that were annual events for the historic tribes of the region may not have been very important to the Fisher culture.

The latest Upper Mississippian occupation of northwestern Indiana is the Huber Phase (Faulkner 1972). Sites representing this late, "classic Oneota," occupation were known primarily in the Chicago area and along the lower Kankakee, but surface collections show that they extended eastward into the lower St. Joseph Valley of Michigan. Huber pottery is shell tempered, has smooth surfaces, and was often decorated with fine to wide trailed incised lines in rectilinear patterns on the vessel shoulder. Punctates were occasionally used in the decoration as well, and strap handles are common. Huber pottery is most similar to the type Allamakee Trailed of the Orr focus in Wisconsin (Hall 1962). Other diagnostic artifacts used to distinguish Huber occupations include bone or antler shaft straighteners, catlinite disk pipes, and double-pointed bifacial knives. Several diagnostics found on Fisher complex sites are also found at Huber sites. These include rectangular sandstone abraders and humpbacked endscrapers. Huber sites are not common in the Kankakee Valley, and Huber occupations may be confined primarily to the 16th and 17th centuries, based on a radiocarbon date of A.D. 1520±130 from the Griesmer site (12 La 3) and by comparison with similar occupations in other areas (Faulkner 1972). The Huber complex is a protohistoric occupation which extends into the historic period. During the later portion of the Huber occupation time span (after about A.D. 1620), the Native American inhabitants of the region probably first became aware of European explorers who began to enter the upper Great Lakes at that time. Europeans cannot be documented in northwestern Indiana before A.D. 1679 and sparse amounts of European trade goods found on Huber sites in northern Illinois dated to the late 1600's indicate that Native Americans of the region first had direct or indirect contacts with Europeans in the 17th century.

If settlement patterns changed during the Upper Mississippian period in northwestern Indiana, the changes have not been identified. In general, the settlement pattern consisted of both semi-permanent villages and seasonal camps located in the Calumet Lacustrine Plain and the Kankakee marsh, and in the open forests and prairies of the surrounding uplands. The villages were occupied seasonally, primarily in the spring and fall, and contained a number of multifamily mat-covered lodges and perhaps one larger ceremonial structure as well. Cemeteries containing primarily extended burials but with some secondary (bundle) burials as well were often located in or near the village. The seasonal hunting and gathering camps were smaller, consisting of one or two dome-shaped "wigwams," each of which would house a single family. These sites were occupied during seasons when the village was abandoned.

NEW PERSPECTIVES

Over the last two and half decades since the two landmark studies cited above were completed, much more information has become available about the later prehistory of northwestern Indiana. Unfortunately, most of this information has not been disseminated or placed into a form that is accessible. Unexploited sources of data about prehistoric occupations of northwestern Indiana during the last millennium of prehistory include collections made by Ernest W. Young, an artifact collector and amateur archaeologist who was very active during the first half of this century. His extensive collections, primarily from northwestern Indiana and southwestern lower Michigan, have largely been unexamined and unreported, except for a summary of Middle Woodland sherds from the Goodall tradition sites of Goodall and Mud Lake (Brown 1964). The Young collection is curated at the Illinois State Museum.

Many site locations were documented during 1978 and 1979 when field crews from the University of Notre Dame conducted a study of prehistoric occupations of the Kankakee Marsh (Bellis et al. 1979). This study included surface surveys of 548 hectares in the Sandy Hook drainage of Porter County, the documentation of private artifact collections, and test excavations at four sites. The data collected during this multi-part project have been given a very preliminary analysis. The artifacts and their associated documents merit a more thorough study extending beyond the preliminary points presented here. While the original researchers did not consider the data they collected to be suitable for locational analysis, this judgement seems to be partially derived from unrealistically harsh expectations about the reproducibility of archaeological data and the suggestion that an unspecified number of multiple site visits are essential for any type of locational analysis. Other aspects of the project, especially the documentation of artifact collections, have not proven to be reproducible. In any event, the data collected during this project do provide valuable information about the variety of cultural materials found in the study area, and provide one of the largest extant databases on the cultural sequence for the area.

An archaeological reconnaissance survey of eastern LaPorte County (Schurr 1993) provided information about site distributions in the upper Kankakee drainage. This survey covered 306 hectares and included record reviews and collector interviews. While it is unlikely that the results of this survey can be generalized to the entire Kankakee Valley in Indiana, the survey did produce a generalized model of the cultural history of the region and of site distributions during the Late Woodland and Upper Mississippian periods. Portions of that model are revised here.

Taken together, the materials and data from these projects provide previously unreported data about Late Woodland and Upper Mississippian occupations in northwestern Indiana. In combination with earlier studies, they provide samples from all portions of the region (except the long-neglected area south of the Kankakee) and information about the cultural sequence of the area. At the same time, improved knowledge of the cultural histories of regions surrounding northwestern Indiana have become available, providing a much better framework for the organization of northwestern Indiana data than was available 25 years ago. These data are useful for exploring two important problems in the later prehistory of northwestern Indiana, which are the nature of Late Woodland in the region, and the origin and ethnic connections of Upper Mississippian.

Late Woodland in Northwestern Indiana

The formulations of Late Woodland by Bettarel and Smith (1973) and Faulkner (1972) both suffer from the same defect in that their Late Woodland period spans too long a period of time when substantial changes in artifact inventories and adaptations were occurring. Mason's (1981) somewhat dated but still very useful synthesis of Great Lakes archaeology provides a solid, basic framework for consideration of northwestern Indiana Late Woodland in a regional perspective. His division of the Late Woodland into two sub-periods (LW I and II) is especially convenient.

The Late Woodland I period is that immediately after Hopewell. It is the time of transition between Hopewellian occupations and those which are definably Late Woodland. While some aspects of the Middle Woodland period, especially mound burial, may be retained into LW I, these societies were gradually discarding elements that are recognizably Middle Woodland and replacing them with innovations such as the bow and arrow and more egalitarian mortuary treatments that are seen as hallmarks of Late Woodland in the general sense. The LW I was also the period during which experimentation with maize began, a process that would later lead to its use as a dietary staple.

The appearance of populations relying on maize agriculture for a significant proportion of their dietary calories, and attendant changes in social organization and material culture associated with a subsistence system based on maize agriculture, marks the appearance of the fully developed LW II period. The bow and arrow completely replaces the atlatl and dart by this period. With maize agriculture comes larger, more intensively occupied, more sedentary villages, and a subsistence-settlement system that provides a precursor for historic ones. Mound burial of just a few individuals in each mound is no longer practiced, and burials are primarily placed in cemeteries.

Both the Brems Phase as defined by Bettarel and Smith and the Late Woodland period as defined by Faulkner clearly contain both LW I and II occupations. This has previously been recognized for the early Late Woodland burial mounds of the region, which represent a widespread post-Hopewellian mound burial pattern (Halsey 1976). In an attempt to deal with this problem, Schurr (1993) divided the Late Woodland period in LaPorte County into two phases, paralleling developments in the central Illinois Valley (reviewed by Munson [1986]). Given the close similarities between the Middle Woodland occupations of the two regions, Schurr implicitly assumed that developments might have continued in parallel during the Late Woodland (an assumption which may be unjustified).

The Weaver Phase (A.D. 400 - 700) is the first post-Hopewellian occupation in the central Illinois Valley. Weaver sites can be identified by Weaver ware pottery (Griffin 1952), thin walled, conoidal or sub-conoidal vessels with rounded bottoms and smooth or smoothed-over cordmarked surfaces. Vessels were decorated with impressions made by cordwrapped sticks or other tools along the outside of the rim. Diagnostic Hopewell lithic artifacts, including Snyders points and lamellar blades, were no longer produced and the Steuben Expanding Stem point (Justice 1987:208) was the dominant point type. Dickson Broad Bladed knives were rarely manufactured, and most lithic artifacts are made of local cherts. Elaborate mortuary rituals were no longer practiced and there was a decline in the trade of exotic materials.

In the central Illinois Valley, the later half of the Late Woodland period (A.D. 700 - 1100) has been attributed to the Sepo Phase (Harn 1975). Ceramics show clear continuities with earlier Weaver wares and corner-notched arrow points and maize agriculture appear during this phase. The end of the Sepo Phase marks the end of the Havana tradition.

Schurr (1993) suggested phases for the Kankakee Valley that were chronologically equivalent to the Weaver and Sepo phases of the central Illinois Valley. The name "Walkerton Phase" was suggested for the Kankakee Valley equivalent of the Weaver Phase based on

Faulkner's (1960) description of the Walkerton Focus, which originally included the sites of Walkerton Mound and Weise as its only excavated components. This phase name was also used in comparative analyses of mortuary treatments during this time period (Halsey 1976). The Brems Phase of Moccasin Bluff (Bettarel and Smith 1973) was defined as a Late Woodland II phase of the Kankakee Valley contemporary with the Sepo Phase of Illinois. The predominance of collared vessels in the Late Woodland occupations of the upper Kankakee Valley suggest that the Late Woodland of northwestern Indiana was not closely related to the Sepo Phase because collared wares are not included in the list of diagnostic artifacts for the phase (Harn 1975).

Given the importance of Moccasin Bluff Modified Lip types with the Brems Phase as originally defined by Bettarel and Smith (1973), and the problematic nature of the type description (discussed above), it is now clear that Schurr's (1993) use of the label "Brems Phase" for the LW II occupations of the Kankakee Valley was incorrect. The earlier portion of the Brems Phase, as originally defined by Bettarel and Smith, may refer to a habitation site of the same people that produced the burials of the contemporary Walkerton focus (Faulkner 1960; 1972). As the Walkerton Phase was defined first, it has historic precedence as a phase name. In addition, the Brems Phase, as defined by Bettarel and Smith, could also denote an occupation which has not been recognized from the Kankakee, as Moccasin Bluff Modified Lip types have not been identified in the Kankakee Valley (except perhaps from the Brems site, although this is difficult to confirm without published descriptions of the Brems site pottery). The Brems Phase is too broad and too problematic in its definition to be used as a taxonomic unit in its present form. Except for burial patterns, the LW I Walkerton Phase occupations of northwestern Indiana remain obscure.

Occupations dating to the LW II period have proven to be easier to identify. Analysis of collections from northwestern Indiana, especially those made by Ernest W. Young and by the Notre Dame field program of the late 1970's, have shown that there is a substantial LW II occupation in the area with pottery that is very similar or identical to Albee pottery reported from the Wabash Valley (Winters 1963). The recognition of these Albee occupations in northwestern Indiana requires a re-assessment of LW II archaeological constructs for the region.

Albee in the Kankakee Valley

The Albee Phase was defined by Winters (1963) based on surface collections and excavations of burial sites. In a practical sense, for Indiana archaeologists, Albee has meant a certain style of pottery with collars and distinctive wedge-shaped rim profiles (produced by a collar that is thicker along the bottom edge than it is along the rim). Originally defined for the Wabash Valley, where it was thought to be intrusive from elsewhere, Albee has also been recognized in the middle Wabash Valley as well (Figure 1.2), and is currently being reassessed as a taxonomic concept (Cochran 1988; McCord and Cochran 1994; Havill, et al. this volume).

There is a diverse variety of collared pottery sherds from the Kankakee Valley, and many of these appear very similar to examples of Albee pottery that have been described from the Wabash Valley. The Wilson site (12 La 46) was located in Lake County (Figure 1.2). The site has produced a very large surface collection and a small area of the site was tested by excavation in 1979 (Bellis et al. 1979). Most of the site remained unexplored as it was destroyed by sand mining before it could be professionally investigated. Excavations at Wilson failed to locate discrete features and found no evidence for stratified deposits. Pottery from the site spans the entire Woodland period, beginning with Early Woodland Marion Thick and continuing to Huber Upper Mississippian.

Late Woodland occupations at Wilson are represented by grit-tempered collared or cambered rims. Several examples of sherds that seem to fit into the Albee type were collected from the site. These include sherds with the characteristic wedge-shaped rim profile accompanied by cord-wrapped stick impressions on the rim interior and exterior (Figure 1.5a-c). Cordmarked rims with trailed crosshatching over the cordmarking (Figure 1.5d) may also date to the Albee-like component, but they appear similar to a Wayne ware vessel from the Ft. Wayne Mound (Fitting 1975), and these sherds may date to the LW I period instead. If so, they are the first evidence for a LW I habitation site in the area. A very similar sherd has recently been reported from a site in the Indiana Dunes National Lakeshore (Lynott et al. 1998:241, Fig. 14d).

Other examples of Albee-like sherds have been collected from sites in the Kankakee Valley, and most appear to represent late Albee types as defined by McCord and Cochran (1994). The Wunderink site (12 La 40) has produced Albee rims (Figure 1.5e & f) with a gradually curving rim profile, exterior punctations, and tool impressions on the lower edge of the collar. The impressions were made with a split reed or hollow twig. Interior lip edge impressions and interior cross-hatching can also be present (Figure 1.6).

These sherds clearly appear to be Albee, whatever that means. The Albee Phase, as previously defined, suffers from the same defect as the Brems Phase and other concepts of Late Woodland for northwestern Indiana. As originally defined, both span relatively long periods of time which should be broken up into at least two subphases, especially considering the significant variability in the artifact types. Much of the typological confusion of Albee would evaporate if the uncollared, straight-rimmed vessels with occasional interior lip decorations, associated with small notched points, and often found in burial mound contexts were seen as markers for an early subphase that preceded the later subphase characterized by collared Albee vessels, triangular points, maize agriculture, and an increasing tendency toward cemetery burials at sites such as the Hesher site (12 Hn 298) in Henry County, Indiana (Cochran 1988; McCord and Cochran 1994; Havill et al. this volume).

A diverse variety of collared or cambered rim sherds have been collected from sites in northwestern Indiana. Several examples of cambered rims were collected from Wilson (Figure 1.7). Some of these rims appear to have a collar, but the thickened rim band is actually produced by a pronounced camber (Figure 1.7a). The temporal-cultural associations of rims of this type are uncertain. The smoothed surface could be early or late. The camber could be derived from Middle Woodland forms, or could represent a very late development, as similar rim forms appear in Owasco-related collections from Michigan (Fitting 1975). Cambered rims with thin broad collars have also been collected (Figure 1.7b). A collared/cambered rim (Figure 1.7c) very similar to examples from the Spring Creek site in Michigan (Fitting 1965) has been collected from the Alt site (12 Le 22) in LaPorte County, Indiana. The Brown South site (12 La 35) has produced sherds from collared vessels with tool impressions on the interior lip and bottom of the collar, and interior and exterior cross-hatching (Figure 1.7d). This vessel carries several Albee attributes but not in their typical forms. Late Woodland sherds in the Kankakee Valley appear to be very diverse, an impression reinforced by the diverse Late Woodland ceramics from sites in the Indiana National Lakeshore (Lynott et al. 1998), where multi-component sites have produced a relatively large number of as-yet untyped sherds.

Types that appear to be related to styles from Moccasin Bluff are also present in the Kankakee Valley. A few rims from the Wilson site are very similar to Moccasin Bluff Impressed Exterior Lip, except that the sherds from Wilson have tool impressions on both the interior and exterior edges of the lip (Figure 1.7e). These rims appear to have been less numerous than were similar styles at Moccasin Bluff, where they were associated with the Moccasin Bluff Phase (the dominant occupation at Moccasin Bluff). While suggesting that Wilson was occupied at the same time as the Moccasin Bluff Phase (from about A.D. 1050 to 1300), the predominance of collared wares at Wilson indicates that the Moccasin Bluff Phase should not be expanded to Lake County, Indiana. A scalloped rim similar to Moccasin Bluff Scalloped has also been collected from Brown South (Figure 1.7f), once again reflecting contact with southwestern lower Michigan.

For northwestern Indiana, there may be at least two LW II phases that are probably contemporary. One, in the upper Kankakee Valley and along the lower St. Joseph, produced the materials associated with the later portions of the Brems Phase at Moccasin Bluff. The second, in the lower Kankakee, especially in Lake County, is some variety of Albee. Sites producing Albee pottery have been documented only in Lake and Jasper counties, but this may be a reflection of limited sampling. Albee occupations in Indiana have generally been seen as confined to the valleys of the Wabash and its major tributaries. The presence of Albee-like sherds in northwestern Indiana has not been clearly recognized before. The presence of an Albee variant in northwestern Indiana is somewhat surprising because it was previously thought that Albee was confined to the Wabash Valley and central Indiana.

The evolution of Albee is still poorly known. Winters (1963) felt it was intrusive into the Wabash from the Illinois Valley, via the Vermillion rivers, as he could identify no predecessors (a problem that may have been caused in part by his overly broad definition of Albee). An interesting feature of the distribution of Albee-like pottery in Indiana is its occurrence in two major drainages, the Wabash and the Kankakee. It is possible that Albee entered the Kankakee Valley in northeastern Illinois and spread upriver into Indiana, because Winters reported Albee sherds from the Utica mound group in Illinois (Winters 1963). However, given the vagueness surrounding the term "Albee" as originally formulated, the cultural association of collared sherds at Utica is uncertain. In any event, the distribution of Albee as presently known suggests one of two things. If Albee is indeed a valid phase concept, then there must have been overland travel between the Wabash and the Kankakee, probably either as a part of a seasonal round, or perhaps through population expansion. In contrast, the distribution of Upper Mississippian sites in northwestern Indiana and southwestern lower Michigan seems much more strongly tied to major drainage patterns, suggesting that river travel and access to aquatic habitats were much more important to the later cultures. Or, the concept of Albee as currently formulated is so broad that it represents a style horizon and not a "phase" in the strict sense. In any event, the diversity of collared pottery sherds from the Kankakee Valley suggests a relatively complex history of Late

Woodland ceramic development, some of which parallels developments at Albee sites to the south, and some of which seems more strongly tied to developments in western Michigan.

Excavations at the Morell-Sheets site (McCord and Cochran 1994) provide, in an exceptionally clear presentation, the best information available on a non-mortuary Albee site. The Morell-Sheets site was a semi-permanent Albee occupation site. Features at the site consisted of areas of midden and earth ovens filled with fire-cracked rock. No evidence for structures, storage pits, or mortuary activity were found. The excavations at Morell-Sheets are especially important in several regards. First, they provide an attribute-based analysis of Albee ceramics that will be extremely useful for future comparisons with other Albee sites. Second, they provide information on the sequence of changes in temporal diagnostics within Albee. McCord and Cochran (1994) were able to propose a ceramic sequence in which limestone-tempered, uncollared rims are the earliest, followed by collared vessels with sharply curved neck profiles, and finally by collared vessels with gradually curving neck profiles. Exterior decoration becomes more common over time, with cross-hatching appearing very late in the sequence. The Albee ceramics are exclusively associated with triangular points. Radiocarbon dates for Albee range from A.D. 840 to 1190 (uncalibrated). Finally, botanical remains from Morell-Sheets demonstrate that maize and little barley (*Hordeum pusillim*) were both cultivated at the site (Bush 1994). The presence of maize is consistent with the date of the site's occupation.

The Albee ceramics from northwestern Indiana show that there was substantial communication between the Kankakee and the Wabash valleys around A.D. 1000. Excavations at Morell-Sheets and other Albee sites on the Wabash indicate that the Albee or Albee-like occupations of northwestern Indiana represent what is probably the first appearance of maize agriculturalists in the region, and that these occupations were roughly contemporary with those of the Moccasin Bluff Phase in southwestern Michigan. The widely dispersed chronological and temporal distribution of Albee ceramics in Indiana suggests that a redefinition of the "Albee Phase" will ultimately be needed.

Upper Mississippian Origins and Terminations

Faulkner's (1972) synthesis of Upper Mississippian in the Kankakee Valley has held up very well over time (Brown 1990). Little new information is now available on chronology or other aspects of the Upper Mississippian period for the Kankakee. Schurr's survey of LaPorte County (Schurr 1993) has provided some information on site distributions in the area. Upper Mississippian sites producing shell-tempered pottery are known only from marsh island settings in LaPorte County. Upper Mississippian utilization of the uplands of the study area are revealed only by the presence of late prehistoric point types such as Nodena points (Justice 1987:230-232). As far as can be determined by this study, the Oneota settlement pattern differed little from that of the preceding Late Woodland II period. Upper Mississippian habitations within the study area do not produce large amounts of cultural debris and probably represent small encampments occupied for limited periods of time. Two Upper Mississippian sites beyond those described by Faulkner (1972) have been tested by excavation, the Alt site (12 Le 22) and the Sikora II site.

The test excavations at the Alt site (Bellis et al. 1979) found that the site contained several components. Most of the features at the site were garbage-filled pits, but few could be confidently assigned to specific time periods, with the exception of what appeared to be an ossuary or group burial. The excavators attributed the burials to the Late Woodland period, but they could be Upper Mississippian as well. Further investigations should be conducted in the vicinity of this site to determine why a mortuary site was associated with a relatively minor habitation site (Bellis et al. 1979) and to determine if more burials are present at the site so that they can be protected. It seems likely that a larger habitation must be located nearby, or that the ossuary represents an unusual catastrophic event for the inhabitants of a small site.

The Sikora II site (Mangold 1984) was also occupied during several different periods, but the primary occupation of the site occurred during the Upper Mississippian period. Animal bones from the site indicate that it was probably occupied during the late winter to early spring, and the site appears to represent the remains of a small winter hunting camp, the first such site to be positively identified in the region (Mangold 1984). Radiocarbon dates from the site range between about A.D. 850 and 1230, showing that the site may have been occupied during the early to middle portions of the Upper Mississippian period.

One very important problem of Upper Mississippian archaeology is the connection of late prehistoric and proto-historic occupations with historic tribes or ethnic groups. The Late Woodland period of northwestern Indiana is generally considered to end with the appearance of Upper Mississippian occupations which are identified by shell-tempered Fisher-Huber ceramics (Faulkner 1972). The date of the LW/UM interface is somewhat uncertain, but the best available estimate places it around A.D. 1100, based on the earliest dates for Fisher ceramics. This estimate correlates nicely with the latest dates of Albee as defined by McCord and Cochran (1994).

The appearance of Upper Mississippian pottery in northwestern Indiana has been seen as evidence of an intrusion from the west, as the styles of pottery and other artifact types are similar or identical to Oneota styles of the Upper Mississippian heartland (located in the Upper Mississippi Valley region of Minnesota, Wisconsin and Iowa). It is not clear if the "Upper Mississippian intrusion" represents the physical migration of Oneota people from the west or the spread of Oneota cultural styles which were adopted by the indigenous inhabitants of the region. There was a widespread convergence toward Oneota styles during the late prehistoric period across the Prairie Peninsula (Brown 1990).

There have been several attempts to link prehistoric occupations with historically known tribes. Bettarel and Smith (1973) attributed the Scalloped Edge sherds at Moccasin Bluff to the ancestors of the Potawatomi, and the shell-temperd Berrien Ware sherds to the prehistoric Miami. Faulkner (1972) suggested that the Huber occupations were produced by people who were probably the ancestors of the historic Illiniwek or Miami, with the prehistoric Miami being the most likely. More recently, Brown (1990) has revived earlier suggestions that Huber ceramics were produced by unspecified speakers of a Chiwere Sioux dialect, in order to maintain correspondence between ceramic types and linguistic groups. In addition, Cremin (1996) has attributed the Berrien Wares from Moccasin Bluff to the ancestors of the Potawatomi (the exact opposite direction of Brown's hypothesis from a linguistic perspective).

Each of these proposed connections of prehistoric pottery sherds with named historic tribes has its own problems. If, as Bettarel and Smith and Faulkner suggested, the ancestors of the Miami produced Huber pottery, how and when did Central Algonquian speakers come to adopt pottery styles (and styles of other artifacts as well) that are virtually identical to those thought to have been developed by Oneota peoples of the upper Mississippi Valley who were probably speakers of Chiwere Sioux? Faulkner favored an acculturation model, and suggested that Miami groups may have come into close contact with Oneota groups as the Miami adopted seasonal bison hunts in the last few centuries of the prehistoric period. One major problem with the scenario is that bison may not have been present or abundant east of the Mississippi River until very late (perhaps after A.D. 1600), several centuries after the first appearance of Oneota-style occupations in the region, requiring the Miami to have gone on bison hunts long before they could have been expected to have had much first hand knowledge of the animal (Brown 1990).

Attribution of Berrien Ware to the prehistoric Potawatomi presents the same problem in a more extreme form. This theory is not supported by historical records of tribal locations and fails to explain the very convincing linkage of at least one band of Potawatomi with non-Huber, grit-tempered pottery at the Rock Island II site (Mason 1986). If both the shell-tempered Berrien wares from Moccasin Bluff and the very different, grit-tempered Bell Site Type II pottery from Rock Island, Wisconsin can both be attributed to the Potawatomi, then attempts to associate ceramic styles with historic tribes are clearly meaningless.

Brown (1990), in an attempt to maintain the equivalence “Oneota pottery = Chiwere-Sioux linguistic group,” has suggested that the prehistoric ancestors of the Miami (or their close relatives) produced the Danner series pottery found at the Zimmerman site in Illinois, and that speakers of Chiwere-Sioux were present along the southern end of Lake Michigan during the protohistoric period. It would be much more convenient for this intrusion model if at least one tribe of Chiwere-Sioux speakers had been recorded in the region at the start of the historic period, but this does not appear to have been the case (Faulkner 1972). However, as Brown has pointed out, a terminal date of A.D. 1600 to 1625 for the Oak Forest Phase Huber occupations would allow enough time for Chiwere-Sioux speakers to have been in the Chicago region and then to have been replaced by the Miami and other groups before historic contact in the late 1600s. This argument is valid as long as the dating of Oak Forest is correct. These dates must be extremely precise in order for the model to work. This model also implicitly assumes that the Oak Forest site is the latest and last Huber site occupied by Chiwere-Sioux speakers before they abandoned the region.

Models which associate the Illinois (or Illini or Illiniwek) with Danner series pottery and give primacy to linguistic connections over historical records of tribal locations require that the Miami be associated with pottery that is similar to Danner series types because the Illinois and the Miami languages were very closely related. The presence of Danner series pottery at the Haas-Hagerman site in Missouri could be cited to support the association of some type of Danner series pottery with the Miami if this site was indeed the location of an Illini village visited by the French priests Marquette and Joliet in 1673 (Grantham 1993). However, the accounts of Marquette’s and Joliet’s journey do not clearly describe the location of the Illini village they visited, which could have been located on either the Des Moines or the Iowa River. An Iowa

River location for the village was ruled out because the only major site known near the mouth of the river produced Oneota pottery, and was therefore attributed to Siouan speakers (Grantham 1993:12). Using the presence of Danner series pottery at the Haas-Hagerman site to associate that pottery style with the Miami because of linguistic affiliations of the Miami with the Illinois is therefore a circular argument because the presumed pottery affiliations were used to develop the tribal attributions in the first place. In addition, Danner series pottery has not been reported from northwestern Indiana, where late Huber styles dating to the protohistoric or early historic period are both well-known and widespread, and where Miami occupations are well-documented at the very start of the historic period (Faulkner 1972). It is difficult to reconcile contradictions between historical records of tribal locations and models presuming correspondence between language and pottery styles because these are both indirect lines of evidence which are highly circumstantial. This is clearly an area where archaeological evidence must play an important and decisive role.

In areas where prehistoric cultural assemblages have been most convincingly associated with the prehistoric ancestors of historic tribes or ethnic groups, the "direct historic approach" has proven essential (Fitting 1975). In this approach, the archaeological "smoking gun" consists of finding a historic account that identifies a specific locality as having been occupied by a specific group, followed by excavations at the locality which produce a homogeneous cultural assemblage dated to the correct time period. The smoking gun site has never been identified for northwestern Indiana, partially because no one has attempted to do so, and perhaps because it may be a difficult proposition. For example, Glenn A. Black was investigating the archaeology of northwestern Indiana in 1937. In his correspondence with Eli Lilly, Black (1937) expresses some frustration with his inability to link historic records to archaeological sites (or even to find sites worth excavating!). While some may see this as an inherent part of Great Lakes archaeology (Fitting 1975), others have been successful in identifying sites and attributing them to specific tribes or ethnic groups (Mainfort 1985; Mason 1986).

Archaeologists often attempt to define an archaeological phase as the exclusive inhabitants of a region at a certain time. While this approach may work for some areas and some time periods, it may not be appropriate for the Kankakee and the lower St. Joseph River valleys during and after the Late Woodland period. For example, during the Middle Woodland period, occupations of the region belong to the Goodall tradition and represent a variety of Havana Hopewell. It has proven difficult to distinguish Goodall Hopewell from other varieties because the material culture shows a remarkable degree of uniformity over a large geographic area (Mangold 1981; Quimby 1941). The same trends seem to continue during the Late Woodland and Upper Mississippian periods, when broadly distributed style names (e.g., Albee, Huber) are used to describe local sherds. The apparent uniformity may be an illusion caused only by the limited samples available and a lack of detailed comparisons of pottery from northwestern Indiana with that from other areas.

The historic record suggests that many different ethnic groups used the region in the early historic period (Berthong 1974). Multi-ethnic encampments appear to have been the norm rather than the exception within the Kankakee Valley. These features of Native American settlement of the region have often been implicitly attributed to the effects of European contact and, therefore, have been implicitly seen as anomalies rather than as traditional patterns of geographic settlement. Given that every excavated site in the region seems to produce at least a few sherds of types from outside northwestern Indiana, perhaps use of the Kankakee and the lower St. Joseph valleys by many different ethnic groups is not an aberrant effect of European contact but a longstanding pattern. Attempting to define a single homogeneous cultural phase for each time period of the later prehistory of the Kankakee may not work if this is the case unless phase definitions can somehow be modified to include much more sophisticated models of ethnic contact.

CONCLUSION

As the outlines of the cultural history of northwestern Indiana during the final millennium of prehistory become clearer, it quickly becomes apparent that the prehistory of the region is complex. Occupations at the end of the Late Woodland period (between about A.D. 850 to 1100) in one portion of the Kankakee Valley are clearly related to Albee occupations known from the lower Wabash Valley. These occupations appear to have been terminated by the intrusion of Upper Mississippian groups from the west. If this was the case, the ultimate fate of the Albee-related peoples of northwestern Indiana remains unknown, and is a very interesting topic for speculation and future research.

The general cultural sequence of Upper Mississippian occupations after A.D. 1100 up to the end of the seventeenth century is the best known temporal-cultural period of northwestern Indiana. Paradoxically, the origins and ethnicity of the Upper Mississippian Fisher-Huber occupations are actually less clear today than they were 25 years ago, primarily because several mutually incompatible theories have been published over the ensuing years. Given the high stakes of correct ethnic identifications in the modern NAGPRA era, archaeologists must be willing to clearly distinguish between speculations and testable alternative theories, and to meet higher standards of evidence than those of earlier generations, whose speculations were mainly of academic interest and were unlikely to be tested in a court of law. For the most convincing evidence, archaeologists will have to do the difficult work of locating that archaeological smoking gun: a very early historic site occupied by a known ethnic group.

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ENDNOTES

[i] There are two St. Joseph Rivers in Indiana. The largest one, known at the "St. Joseph of the Lake", flows into Lake Michigan. The smaller one, the "St. Joseph of the Maumee", drains into the Maumee River.

LIST OF FIGURES

Figure 1.1. Major physiographic zones of the study area (from Schneider 1966).

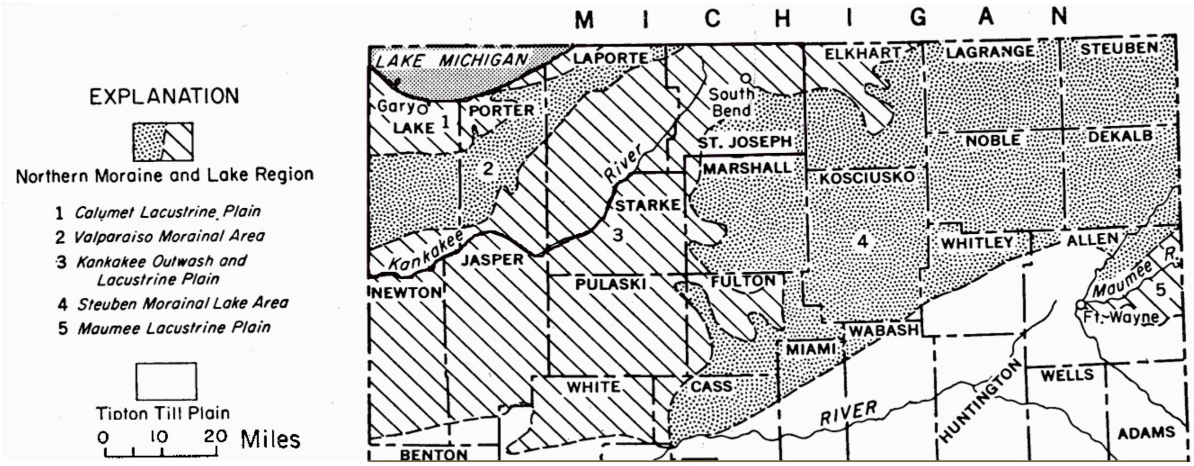


Figure 1.2. Locations of sites referred to in the text.

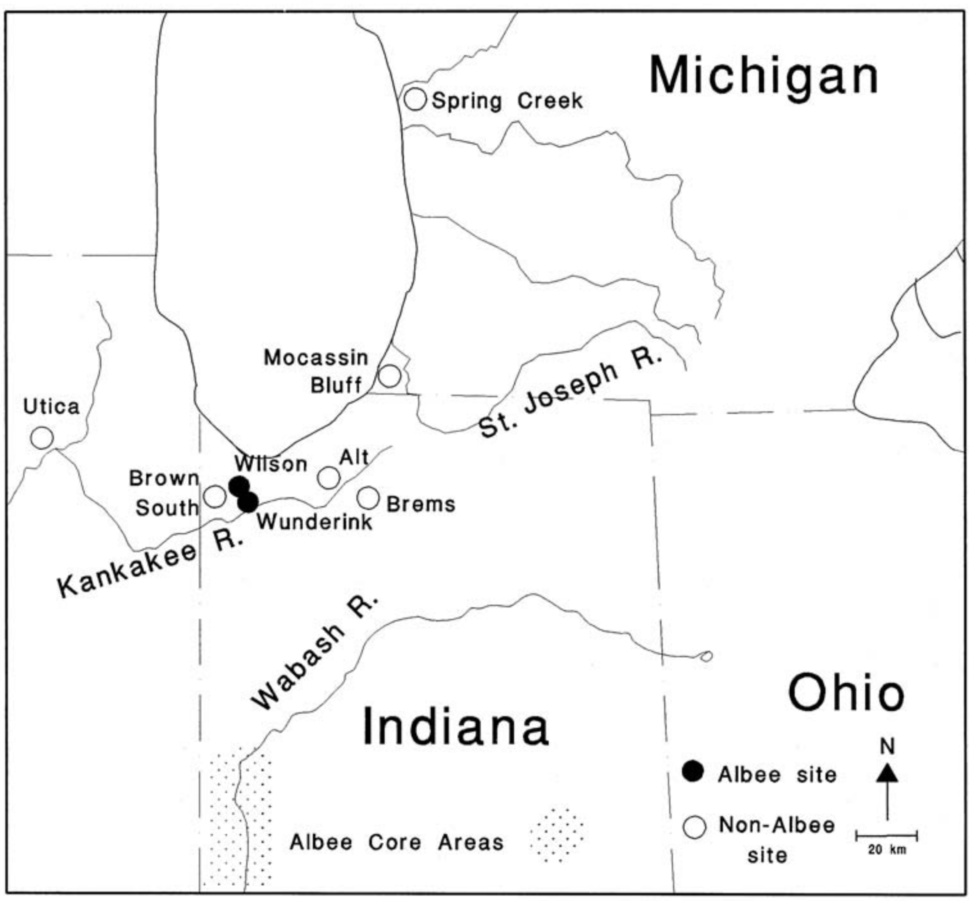


Figure 1.3. **a.., b. & c. Moccasin Bluff Impressed Exterior Lip rims. d. & e. Fisher rim and body sherds. f. & g. Huber sherds. All sherds from Moccasin Bluff (Young collection) except g. which is from the Harper site.**

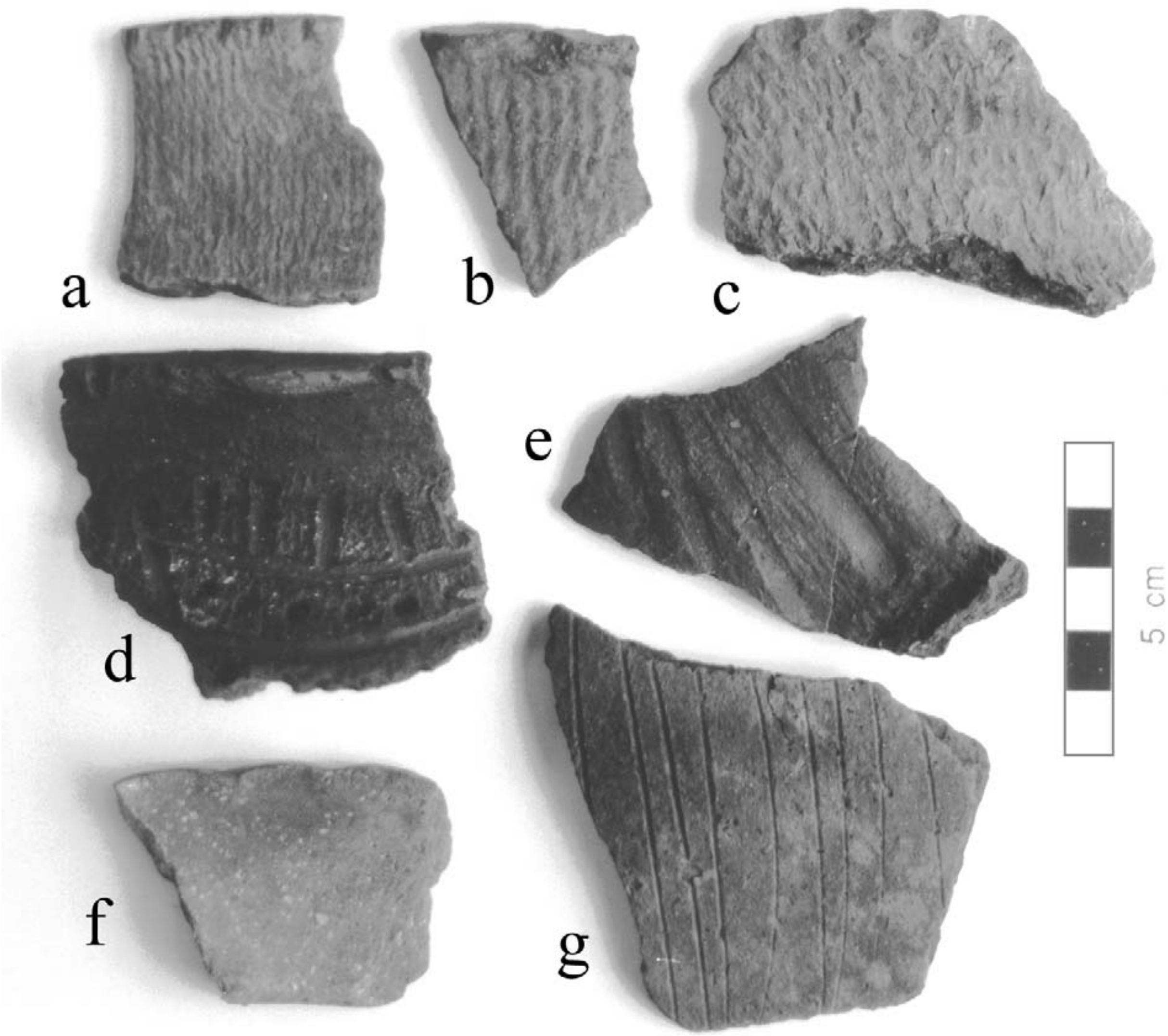


Figure 1.4. Sherds from Moccasin Bluff (Young collection). a. Moccasin Bluff Scalloped rim. b. Indian Hills Stamped rim.

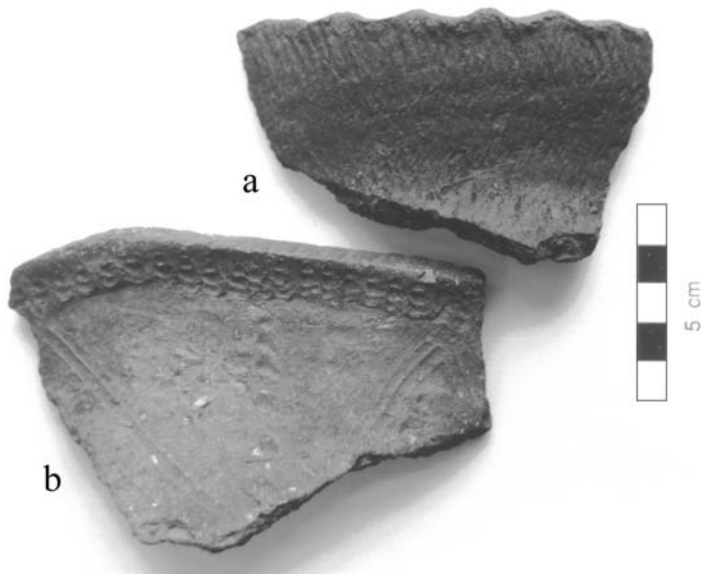


Figure 1.5. a., b. & c. Albee rim sherds from the Wilson site. d. Trailed cross-hatching over cordmarked rim sherd from the Wilson site. e. & f. Albee rim sherds from the Wunderink site.

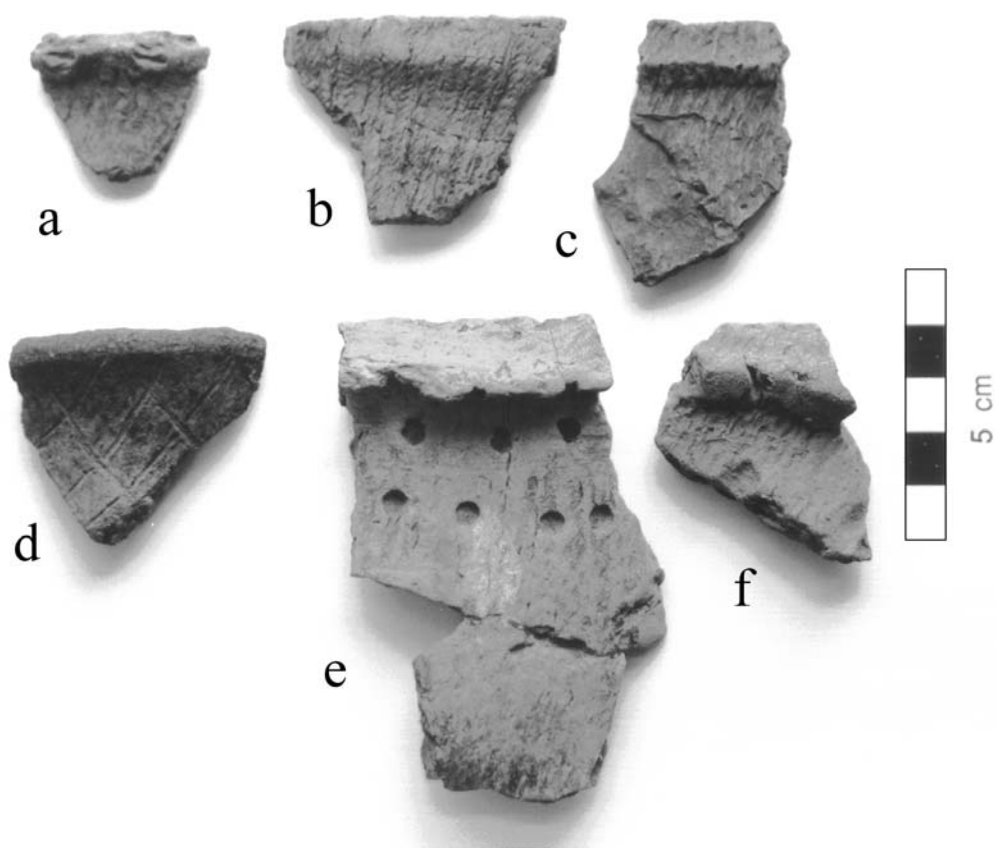


Figure 1.6. **Reversed views of Albee sherds in Figure 5 showing inner tool impressions.**

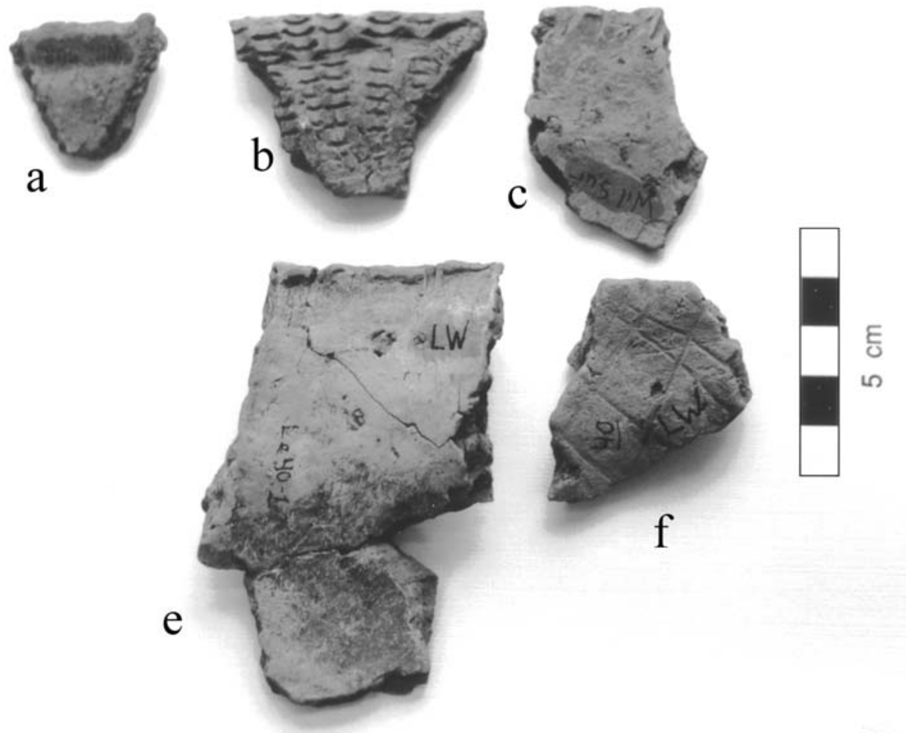
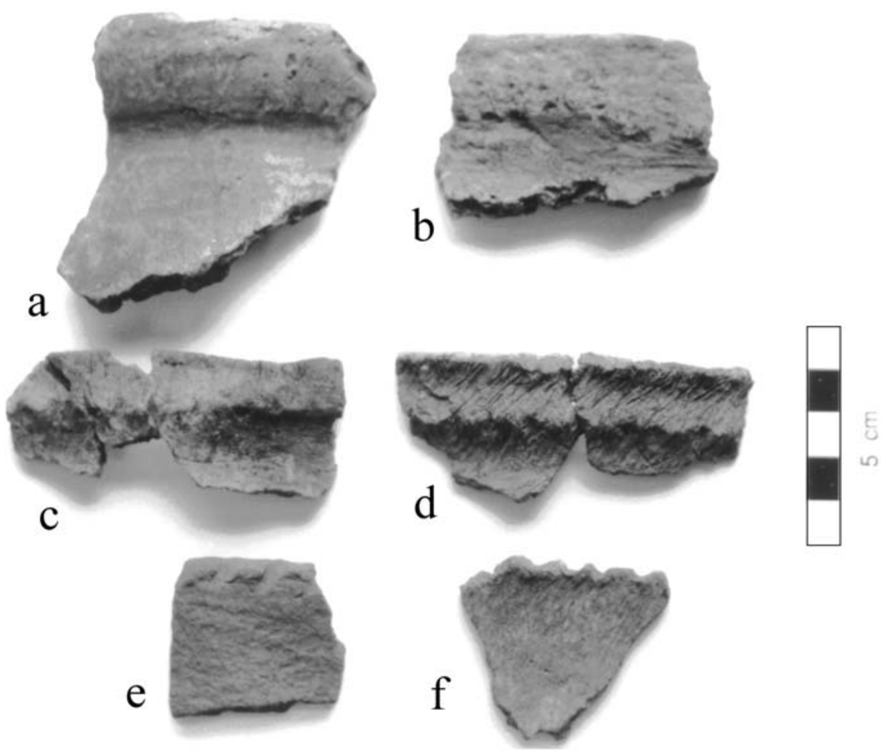


Figure 1.7. **a. & b. Collared or cambered rim sherds from the Wilson site. c. Collared rim sherd from the Alt site. d. Collared rim from Brown South. e. Rim sherd similar to Moccasin Bluff Impressed Exterior Lip from the Wilson site. f. Rim sherd similar to Moccasin Bluff Scalloped from Brown South.**



CHAPTER TWO

THE MORELL-SHEETS SITE: REFINING THE DEFINITION OF THE ALBEE PHASE

Beth K. McCord and Donald R. Cochran

INTRODUCTION

Over 30 years ago, Howard Winters (1967) defined the Albee Complex as an early Late Woodland artifact assemblage in the Wabash Valley of Indiana and Illinois. Since then, Albee became an accepted term for identifying certain Late Woodland artifacts and sites, particularly in the Wabash Valley. With the addition of new information, primarily from cemeteries, the Albee Complex was expanded into the Albee Phase (Halsey 1976) and the distribution of Albee sites was enlarged to include east central Indiana (Cochran et al. 1988) (Figure 2.1). In addition, the term Albee was loosely applied to a variety of ceramics with collared and wedge shaped rims (e.g., Lewis 1975). In 1992, a compliance project provided the first opportunity to excavate an Albee Phase habitation, the Morell-Sheets site. This site represents the most throughly documented excavation of an Albee Phase habitation to date (McCord and Cochran 1994). Information from the site allowed for a much-needed reevaluation of the definition of the Albee Phase.

In this chapter, the original definition of the Albee Complex as presented by Winters (1967) and interpreted by others (Anslinger 1990; Halsey 1976; Tomak 1970; Cochran et al. 1988; McCord and Cochran 1994; Redmond and McCullough 2000) is reviewed. The original definition is compared with the new data from Morell Sheets and other sites to construct a more refined definition of the Albee Phase. The research was conducted through an intensive literature review, particularly defining associations between Albee ceramics and other artifact types.

BACKGROUND

The Albee Complex was first recognized and defined by Howard Winters (1967) from survey data from the Wabash Valley in Illinois. Winters (1967:13) used the term "complex" since only a few recognized artifacts were consistently occurring together. He assumed that future data would allow for the recognition of the complex as a culture when large numbers of items within diverse functional categories were found to belong together (Winters 1967:13). Although Winters (1967:69) stated that a complex had only a few recognizable artifacts, he produced a trait list of over 30 artifacts associated with the Albee Complex (Table 2.1). The trait list and the type description for Albee Cordmarked ceramics was based on artifacts recovered from the surface of four multicomponent sites in Illinois: Chenoweth and Murphy 1, 2 and 3; an amateur excavation of a multicomponent site in Indiana: Catlin; and two multicomponent cemeteries in Indiana: Albee Mound and Shaffer (Winters 1967:60, 88). The sites in Illinois were considered outlying camps of a heavier occupation to the north and east in Indiana (Winters 1967:60).

The most distinctive artifact in the complex was a cordmarked, grit-tempered jar with a wedge-shape or cambered rim. The jars were predominantly cordmarked on the exterior, but fabric impressed sherds were also noted. The paste was well mixed and tempered with fine grit. The ceramics were rarely decorated, but occasionally the interior of the lip contained vertical or diagonal, plain or cord-wrapped stick impressions. Other decorations included cylindrical punctations and vertical incisions on the exterior of the neck. Other attributes of the ceramics included an occasional channel around the interior of the rim and peaks on some rims (Winters 1967:68, 88).

Two types of projectile points were also discussed as diagnostic of the Albee Complex. These were "Mounds Stemless points" and pentagonally bladed and diagonally notched Jack’s Reef points (Winters 1967:68). Winters (1967:68) noted that isosceles triangular points with concave sides were rarely found on sites without an Albee component (Winters 1967:68).

The chronological position of the Albee Complex was tentatively defined between AD 800 and 1000 or slightly later. The archaeological ancestor of Albee in the Wabash Valley was uncertain as no predecessor was recognized. Artifacts in the Albee Complex were associated with materials from northern Illinois and southern Wisconsin. Mississippian ceramics found on Albee sites were postulated to represent a transition to Mississippian lifeways or a separate occupation (Winters 1967:68).

Almost 10 years after Winters defined the Albee Complex, Halsey (1976) included the Albee Phase as part of the Wayne Mortuary Complex, an early Late Woodland complex in the Eastern Woodlands. Halsey identified two phases of the Wayne Mortuary Complex in Indiana: the Walkerton Phase in northern Indiana and the Albee Phase across the remainder of the state. In the Albee Phase, Halsey (1976) incorporated three new sites, all cemeteries. The Mallott Mound from south central Indiana in the East Fork White River drainage was tenuously identified as Albee, although it was also recognized that the site might be Middle Woodland. Two east central Indiana sites were also included: Secrest-Reasoner in the Upper Wabash drainage; and Commissary in the East Fork White River drainage. The inclusion of these sites into the Albee Phase was not based on Albee Cordmarked ceramics, but on the general artifact assemblage and mortuary patterns (Halsey 1976).

In 1990, Anslinger (1990) updated the list of excavated cemeteries and habitation sites in Indiana with Albee components (Table 2.2). Albee was recognized as a poorly defined manifestation relying primarily on information from cemetery sites (Anslinger 1990:45). Of the 19 sites with recognized Albee components, seven were habitations. Many of the 11 cemeteries had associated habitation areas, but little data on the occupations were provided (Tomak 1970). All of the habitation sites were multicomponent. Only the Morell-Sheets site represented an almost exclusive Albee Phase site (McCord and Cochran 1994). Although not included by Anslinger (1990), the Neimoeller-Mace site was added to Table 2.2 based on data from Redmond and McCullough (2000).

After 30 years of research, the Albee Phase was identified as a regional variation of a generalized Late Woodland artifact assemblage the occurred throughout the Eastern Woodlands. The ceramics were grit tempered vessels with cambered or wedge-shaped rims. Diagnostic lithic artifacts included the Triangular Cluster and Jack's Reef Cluster points. Other artifacts associated with the Albee Phase included shell beads, copper beads, slate gorgets, copper gorgets, bone awls, antler drifts, antler arrow points, bone whistles or flutes, antler or bone hooks, antler harpoons, bone needles, bone beamers, modified deer phalanges, modified animal jaws, raccoon baculae tools, modified turtle carapace, gravers, perforators, lamellar blades, endscrapers, chipped stone adzes, bipolar cores, ceramic pipes, straight base platform pipes and sandstone abraders (Winters 1967:60; 68 -69; Tomak 1970; Halsey 1976:559-582; Kellar 1983:50; Cochran et al. 1988:48-65; Anslinger 1990:51; McCord and Cochran 1994:9-12) (Figure 2.2).

Albee Phase mortuary patterns were characterized as a local adaptation to a widespread Late Woodland mortuary complex (Halsey 1976:442). Burials were in cemeteries usually situated near a habitation site. The cemeteries were most often on natural knolls of gravelly soil, always overlooking river valleys or wetlands. One artificially constructed mound was documented (Halsey 1976:442; Cochran et al. 1988:83-87; Anslinger 1990:51).

The Albee Phase settlement and subsistence system was poorly known. Halsey (1976:561) stated that the Albee Phase economy was based on intensive hunting and gathering with no agriculture. He also stated that neither lacustrine nor swamp resources were widely exploited (Halsey 1976:561). Anslinger (1990:51) interpreted the typical pattern of Albee Phase settlement as one in which cemeteries and habitation sites were located in the valleys of major drainages or on elevations adjacent to extensive tracts of marsh or wetlands (Anslinger 1990:51).

Although the Albee Phase was an accepted and common archaeological unit in Indiana overviews (Kellar 1983:50; Swartz 1981:21, 27; Redmond and McCullough 2000), the definition was untested with data from excavated habitation sites of unmixed context. An opportunity to test and refine the definition of the Albee Phase occurred in 1992 with the discovery and excavation of a portion of the Morell-Sheets site (12My87). The site was an excellent proving ground for the definition of the Albee Phase, because only two artifacts from the entire site assemblage were not potentially identifiable with the Albee Phase.

MORELL-SHEETS SITE

The Morell-Sheets site was in the Middle Wabash drainage basin of west central Indiana. The site was located in the floodplain of Sugar Creek with a wide variety of exploitable resources nearby including floodplain, forested uplands, wetlands and prairie habitats. Less than 6% of the eastern side of the site, as defined by the surface distribution of artifacts, was excavated. The site area may, in fact, be larger than originally defined since buried deposits were found along Sugar Creek (McCord and Cochran 1994).

Investigations at the site revealed that it essentially represented a single phase habitation unmixed with earlier or later components. Portions of the site were plow disturbed, but intact cultural deposits were recovered at the base of the plowzone and in a buried A-horizon that was covered by over a meter of alluvium near Sugar Creek. The artifact assemblage included a specialized lithic tool collection and a large quantity of ceramics, but very few bone tools. The absence of bone tools was not the result of poor preservation. Features consisted of midden deposits and fire-cracked rock filled pits. Botanical remains indicated a subsistence pattern of horticulture supplemented with the gathering of wild plants, fruits and nuts. The faunal assemblage indicated that deer, turtle, beaver, wapiti, other small mammals and freshwater mussels were exploited. No evidence of permanent structures or storage facilities was recovered, and the site was apparently used during the temperate parts of the year (McCord and Cochran 1994).

The Morell-Sheets site was reoccupied by several Albee components over a 400 year time span between AD 800 and 1200. Only two artifacts recovered from the surface could be related to a non-Albee occupation of the site. No artifacts were recovered from the midden or features that were not associated with the Albee Phase. The artifacts, features and other materials, therefore, represented the best unmixed Albee context outside of mortuary sites documented to date. The information obtained from this site, even though biased by the small sample size and seasonal occupation, offered the most complete and reliable information on Albee Phase habitation that has been recorded (McCord and Cochran 1994).

Prior to the excavations at the Morell Sheets site, no Albee Phase habitations unmixed with other components were on record. This site, therefore, offered the unique opportunity to add significant new data about Albee Phase subsistence and settlement to the archaeological record. In particular, the Morell-Sheets site provided distinctive data on Albee Phase chronology, ceramics, lithics, and floral and faunal exploitation. These data were appropriate for comparison with the existing data from mortuary sites and other habitation sites to refine the definition of the Albee Phase

REFINING THE ALBEE PHASE

Chronology

The chronology of the Albee Complex was originally defined between AD 800 and 1000 or slightly later (Winters 1967:68). Prior to the excavation of the Morell-Sheets site, only a few sites with Albee components were dated. Most of these sites were multicomponent and the dates were from mixed components. Table 2.3 provides a list of sites with dates attributed to Albee components. The earlier dates from the Commissary and Hesher cemeteries, AD 635 $\pm$ 105 and AD 520 $\pm$ 60, may represent erroneous dates or an unrecognized earlier utilization of the sites. They were not considered to be indicative of the Albee Phase (Cochran et al. 1988:118).

Nine radiocarbon samples with clear contextual integrity dating the Albee Phase occupations were obtained from the Morell-Sheets site (Table 2.4). Seven of the dates were from fire-cracked rock filled pits, one was from a midden deposit, and one date was from the buried A-horizon that contained Albee materials. The dates clearly defined the temporal limits for the Albee Phase between approximately AD 800 and 1200 (Figure 2.3). Calibrating the dates extended the range from cal AD 800 to 1300 (Figure 2.3). The remaining dates from the site were post AD 1000. All other dates associated with the Albee Phase fall within the AD 800 to

1200 range (calibrated AD 800 to 1300). However, if the AD 800 dates from Morell-Sheets were dismissed, the Albee Phase may actually be later in time, circa AD 900.

Ceramics

Albee Cordmarked ceramics are the most distinctive artifacts of the Albee Phase (Winters 1967). In fact, the ceramics are the only truly diagnostic artifact of the Albee Phase since all the other artifacts in Albee assemblages also occur in other Late Woodland assemblages.

Winters (1967:88) outlined a type description for Albee Cordmarked ceramics. In the 30 years following the definition of Albee Cordmarked ceramics, additional attributes and variability were associated with the Albee Cordmarked type (Anslinger 1990:47). Until the excavation at Morell-Sheets, no comprehensive data set from a large assemblage was available for comparison.

Excavations at Morell-Sheets produced a large ceramic assemblage (n=6,093 sherds). Generally, the ceramics had a well mixed sandy paste, but coarse and unmixed pastes were also recorded. The temper was predominantly crushed granitic rock. In less than 1% of the assemblage, crushed limestone temper was noted. Grog and chert in the temper were also identified in thin section analysis. The temper size ranged from fine to coarse. In paste and temper, Albee ceramics appeared more variable than Winters (1967:67, 68) recognized (McCord and Cochran 1994).

Winters (1967:68, 88) characterized Albee ceramics as cordmarked or sometimes fabric impressed, slightly elongated or globular jars. The predominant surface treatment of the Morell-Sheets assemblage was cordmarking, but 2.9% of the assemblage was fabric impressed and 0.1% was plain. Although no complete vessels were recovered from Morell-Sheets, partial vessels and bases do suggest a vessel shape as described by Winters (1967). Medium to large vessels were represented by the rims with diameters between 12 and 42 cm, or an average of 25 cm. The vessels from Morell-Sheets were apparently larger versions of vessels recovered from mortuary sites (McCord and Cochran 1994).

While the wedge shaped rims are distinctive of Albee ceramics, the Morell-Sheets assemblage contained several uncollared rim forms (7%). These rims were consistent in manufacture and decoration with the rest of the assemblage. While Winters (1967:63) did not mention uncollared rims, he illustrated one from the Catlin site. In addition, the pottery vessels from the Shaffer cemetery used by Winters to define the Albee Complex did not appear to be collared (Black 1933). The association between the uncollared sherds and radiocarbon dates from Morell-Sheets suggested that the uncollared forms appeared early in the temporal sequence (McCord and Cochran 1994).

Winters (1967:88) stated that decoration on Albee Cordmarked ceramics were rare; however, 89% of the rims from Morell-Sheets were decorated. Decorations noted by Winters (1967:88) were located on the interior of the lip and consisted of vertical or diagonal, plain or cord-wrapped stick impressions. Cylindrical punctations and vertical incisions on the exterior neck of the vessel were also noted (Winters 1967:88). At Morell-Sheets, a variety of decorative techniques were documented including plain and cordwrapped tool impressions; incised vertical, diagonal and crosshatched lines; knot impressions and punctates (Figures 2.4 - 2.6). Decoration was most often placed on the interior of the rim but also occurred on the exterior of the neck, on the collar, on the lip, and on the interior of the neck. Decoration occurred in only one area or in as many as four areas. Horizontal cordmarking on the interior of the neck was also noted in nearly half of the assemblage (46.9%) (McCord and Cochran 1994). Peaked rims and an occasional channel around the interior of the rim were also noted by Winters (1967:68, 88). A few of the rims from Morell-Sheets (5%) were castellated (peaked), but no channeled rims were found (McCord and Cochran 1994).

Other ceramic artifacts recovered from the Morell-Sheets site included fragments of two ceramic pipes and one miniature vessel. No other Albee Phase sites have reported ceramic pipes. Two pipes are reported from the Baker-Lowe Mound, but no description of the material or form was given (Black 1933:234). A miniature vessel was recovered from the Albee Mound (MacLean 1933). Both miniature vessels have irregular incising on the exterior. Ceramic pipes and miniature vessels have been recovered from several Late Woodland sites in the Midwest (McCord and Cochran 1994:57).

Points

Winters (1967:68) documented two types of points that were diagnostic of the Albee Complex. Isosceles triangular points with concave sides were usually found on sites with an Albee component. Pentagonally bladed and diagonally notched points were also characterized as diagnostic of Albee (Winters 1967:68). These point styles are now recognized as belonging to the Triangular Cluster consisting of types such as Madison, Levanna, and Hamilton (Wright this volume) and the Jack's Reef Cluster consisting of Jack's Reef Corner Notched and Raccoon Notched points (Justice 1987).

Triangular Cluster points have a wide geographic range throughout the eastern United States, and some types are dated as early as AD 500 (Justice 1987:224-229). They are a general Late Woodland/Mississippian form and represent numerous cultural phases (Justice 1987:224). Jack's Reef Cluster points date between AD 500 and 905 $\pm$ 250. They are considered diagnostic of the Albee Phase in Indiana and Illinois and of the Intrusive Mound culture in Ohio. They are also distributed throughout the Northeast and Midwest (Justice 1987:217).

An intensive review of Albee assemblages raised the question of whether Jack's Reef Cluster points were in fact diagnostic of the Albee Phase. No Jack's Reef points were recovered from the Morell-Sheets site although it lies within the known distribution of the point type and dates from the site bracket the range for the point type. The only Late Woodland points recovered from the site were triangular (McCord and Cochran 1994) (Figure 2.7). The points recovered from the Albee Phase cemeteries in east central Indiana are triangular (Black 1935; Swartz 1976; Cochran et al. 1988). In actuality, Jack's Reef Cluster points occurred on very few sites with Albee ceramics. Most of the identified Albee Phase sites with associated Jack's Reef Cluster points were from surface collections and multicomponent sites (e.g., Tomak 1970).

The Albee Mound and Lattas Creek sites were the only excavated Albee sites that have documented points of this type. Notched points were also reported from the Hamlin Mound, but no descriptions were provided (Logan 1927). "Side notched arrows" were reported from the Shaffer cemetery but were not associated with any burials and were not described (Black 1933). The only non-triangular points found with burials in the Shaffer cemetery appeared to be Late Archaic in age. The Weise Mound in Porter County (McAllister 1932:47) contained Jack's Reef Cluster points, but this site was identified by Halsey (1976) as part of the Walkerton Phase.

Although Jack's Reef Cluster points were recovered from the Albee Mound, the context was questionable. The excavations of the mound were conducted in the 1920's (MacLean 1931). Over 41 burials were recovered and some were already disturbed. The Jack's Reef Cluster points were not associated with Albee Cordmarked ceramics and were not clearly associated with the Albee component.

The Lattas Creek site was multicomponent with Late Archaic, Allison LaMotte (late Middle Woodland) and Albee components. The Albee component at the site appeared limited to use as a cemetery (Pace 1986). One burial with an Albee vessel and associated charcoal was dated at AD 950 $\pm$ 80. The one burial with Jack's Reef points contained no Albee ceramics. The burial was intrusive into a feature that contained Allison-LaMotte ceramics (Pace and Anslinger 1986:28).

Jack's Reef Cluster points were identified as an early component of the Albee lithic assemblage in west central Indiana because the Albee Phase was of short duration due to the development of the Vincennes culture (Redmond and McCullough 2000). However, the data from Morell-Sheets do not support this interpretation. The Albee occupation at Morell-Sheets lasted until circa AD 1200, and no Jack's Reef Cluster points were recovered. Jack's Reef Cluster points may be part of an unrecognized early Late Woodland complex in western Indiana. In eastern Indiana, Jack's Reef points were found in Intrusive Mound assemblages (McCord 1994). There was no direct, reliable evidence supporting their association with the Albee Complex.

Other Artifacts

Other discrepancies between Winters (1967) trait list of Albee assemblages and what is currently recognized as Albee are discussed below. A few artifact types have been added to the Albee assemblage and some previously noted to represent Albee have not been documented in clear Albee contexts. Several artifact classes included by Winters (1967) were not directly comparable due to his use of a functional classification system and ubiquity throughout prehistory. A wider range of artifact types have been recovered from mortuary context than have been documented at habitation sites (Redmond and McCullough 1997:35).

Turtle Shell

Winters (1967) included turtle carapace in the original trait list for the Albee Complex and modified turtle carapace has been documented at several Albee Phase sites (Logan 1927; MacLean 1931; Black 1933; Swartz 1982; Cochran et al. 1988). Carapace were modified by the trimming, removal and/or grinding of marginal plates, perforations through the plate and scraping on the interior surface of the costals (MacLean 1931; Swartz 1982:29,30; Moore 1989:31; Richards 1994:104). The modified carapace were interpreted as containers and rattles (Black 1933, Swartz 1982:29). A previously unrecognized form of modification was documented at the Morell-Sheets site. Several fragments of burned and unburned carapace fragments were engraved on the exterior with a decorative motif of hatched grooves perpendicular, parallel or slightly oblique to the spine (Moore 1989:34) (Figure 2.8). A subsequent review of the Hesher and Commissary site collections housed at ARMS revealed additional engraved carapace fragments. While examples of engraved turtle carapace were known from Middle Woodland sites (Griffin et al. 1970:141), other Late Woodland examples were not found in the literature.

Pipes

Stone pipe forms were documented at the Commissary and Secrest-Reasoner sites in eastern Indiana (Swartz 1982:23, 24; Black 1935). The pipes were made from soft limestone and had a flat platform with the bowl positioned at the end of the platform (Figure 2.9). The Albee pipes were different from the preceding Intrusive Mound platform pipes where the bowl was placed in the center of the platform (Mills 1922). Because the pipes from Commissary and Secrest-Reasoner were very similar in style and were only found at eastern Indiana sites, they may indicate a further subdivision of the Albee Phase in Indiana.

As previously mentioned, the ceramic pipes from the Morell-Sheets sites were the only documented examples from Albee Phase sites. Ceramic pipes were reported from other Late Woodland (McCord and Cochran 1992:57) and Oliver Phase sites in Indiana (Dorwin 1971:255, 256; Redmond and McCullough 1996:43).

Flutes

Curiously, flutes or whistles were only found at the Hesher and Secrest-Reasoner sites in eastern Indiana (Cochran et al. 1988:56; Black 1935). They may further support the notion of a geographic subdivision within the Albee Phase. However, fragmentary flutes may simply not be recognized in early excavations. Flutes were documented in Late Archaic, Mississippian, and Fort Ancient sites (Schweinsberger 1950:28-33; Winters 1969:70-74).

Raccoon Baculae

Raccoon baculae were documented at several Albee Phase sites but were not formally included with the Albee assemblage (MacLean 1931; Black 1935; Swartz 1982; Cochran et al. 1988:58). The baculae from the Hesher site were all modified (Cochran et al. 1988), but other sources did not mention modification. Raccoon baculae were documented in various assemblages (Cochran et al. 1988:58).

Non-Albee Materials

In addition to revising the Albee material culture noted above, some artifacts in the original list do not appear to occur in an Albee Phase context. Endscrapers and antler harpoons previously listed in Albee assemblages (Winters 1967; Kellar 1983) do not occur in clear Albee contexts (McCord and Cochran 1994:12). Other artifacts that are of questionable Albee affiliation include copper beads and lamellar blades. These artifacts have not been found in direct association with diagnostic Albee artifacts (MacClean 1931; Black 1933; Kellar 1975).

Mortuary Patterns

The mortuary pattern of the Albee Phase was more complex and contained elements not previously recognized. For example, circular pits at the Hesher and Niemoeller-Mace sites may have served for defleshing bodies (Cochran et al 1988:18; Rackerby 1975:481) which suggested a more complex mortuary practice than just primary interment. Cemeteries were not apparently organized in a definable plan and burial orientations were varied. Burials were typically flexed and sometimes had associated grave goods. Artifacts were apparently segregated by age and sex. Dog burials occurred at Albee cemetery and habitation sites (Swartz 1982; Cochran et al. 1988:83-87; McCord and Cochran 1994:79).

Subsistence

Halsey (1976:561) believed that the Albee Phase economy was based on intensive hunting and gathering with no agriculture. He also stated that the exploitation of lacustrine or swamp resources was minimal (Halsey 1976:561). Halsey's (1976) interpretations were primarily based on information from mortuary sites. Morell-Sheets offered a different perspective.

Data from the Morell-Sheets site were the first information on the Albee archeobotanical record (Bush 1994) and faunal exploitation (Richards 1994). The subsistence remains indicated an occupation from late spring to early fall; therefore, the site was reflective of an incomplete subsistence pattern. The data obtained were similar to patterns documented for generalized Late Woodland subsistence (Cleland 1976; Styles 1981; Munson 1988; Wagner 1987), but was somewhat different.

At Morell-Sheets, little barley and corn were the main cultigens along with small amounts of maygrass, knotweed and, perhaps, squash. The exploitation of nuts was rare and consists primarily of hazelnuts, possibly explained by the seasonal occupation of the site. Other wild plant foods, such as raspberry/blackberry, blueberry/cranberry, elderberry, grape and persimmon, supplemented the diet. Verbena, sumac and other grasses were also documented (Table 2.5) (Bush 1994, this volume).

The faunal assemblage was dominated by white-tailed deer and turtle was common. Porcupine, wapiti, beaver, raccoon, turkey and other small mammals were also present. Freshwater mussels were probably exploited as a food source. Interestingly, the remains of large edible fishes and waterfowl were missing from the site (Table 2.6) (Richards 1994).

Settlement

Interpretations of the Albee settlement system indicated that the cemeteries and habitation sites were typically in the valleys of major drainages or adjacent to extensive tracts of marsh or wetlands (Anslinger 1990:51). But a settlement model was not clearly defined. One general Late Woodland model characterized settlement as permanent and semi-permanent occupational sites, often with storage features, residential structures and associated mortuary areas occurring in large and small valleys and in the uplands (Munson 1988:8). However, the Morell-Sheets site did not reflect this pattern. While the site was semi-permanent and located in a large valley, it did not contain storage features, residential structures or an identified mortuary area.

The recognition of Albee settlement in valleys or near extensive tracts of wetlands was a reflection of the subsistence practice. In east central Indiana, the Late Woodland settlement patterns were similar to Historic aboriginal occupations: they were dispersed due to dispersed resources. Planting sites, located in the floodplains, were focal points for the population during planting and harvesting (McCord and Cochran 1996:165). Sites such as Morell-Sheets and the Van Nuys site (McCord 1998:90) fit the pattern for temporary Late Woodland occupations focused on horticulture.

In several instances, Albee Phase habitations were associated with cemeteries, but little information was available (Tomak 1970). It presently appears that cemeteries and habitations were associated, but spatially segregated. For example, the Hesher and Commissary cemeteries (Cochran et al. 1988; Swartz 1982) were located in the uplands along the edge of the Big Blue River Valley. Within the valley and approximately 1/4 of mile from the cemeteries was the Van Nuys site, a multicomponent habitation with an Albee Phase component (McCord 1998). The lack of mortuary data from Morell-Sheets may indicate the segregation of habitation and mortuary activities. This pattern contrasts with Oliver Phase or Fort Ancient sites where mortuary and habitation activities were mixed at the same locality (Dorwin 1971; Redmond 1991:20; Henderson 1992).

The patterns discussed are unfortunately incomplete. They represent only components of a larger Albee Phase settlement system. Further work, especially at habitation sites is necessary.

SUMMARY

In refining the definition of the Albee Phase several problems were encountered. Information on the Albee Phase is drawn primarily from mortuary data. There are Albee Phase habitation sites, but those excavated to date have primarily been mixed with other components. Much of the data that is available for the Albee Phase are from early excavations that were not conducted according to modern standards and, therefore, the context of some data was questioned. Well documented information of the Albee Phase in central and northwestern Indiana was lacking.

In this paper, the original definition of the Albee Complex was reviewed in relation to new data from Albee Phase sites. An intensive search of the literature and data from the Morell-

Sheets site revealed that elements of the original definition need revision. Specifically, Albee ceramics and diagnostic points were refined.

Based on the Morell-Sheets assemblage and examinations of other ceramic collections (Anslinger 1990:47), revisions to the original type description for Albee Cordmarked ceramics are proposed. The purpose of revising the type description is not to include so much variability that the Albee Cordmarked type is no longer useful, but so that Albee Cordmarked is not misapplied (e.g., Lewis 1975). The purpose is to update and refine the concept of Albee ceramics. Perhaps varieties of Albee Cordmarked ceramics can be segregated with additional data.

The temper and paste of Albee Cordmarked ceramics were more variable than originally described. The tempering agents were predominately crushed granitic rock, but also included limestone, chert and grog. The temper size ranged from fine to coarse. The paste was sometimes well mixed but in other examples it was almost unmixed.

Decoration of Albee ceramics was more prevalent than recognized by Winters (1967). A wide variety of tool impressions occurred, including stamping, incising and punctations. The decorations were also variably placed on the interior and exterior of the vessel. Horizontal cordmarking on the interior of the neck was a prevalent attribute not previously recognized.

Jack's Reef points were not directly associated with Albee ceramics. By excluding Jack's Reef points from the Albee Phase, some sites incorporated into the Albee Phase will need to be reclassified. The distribution of the Albee Phase has been based in part by the recognition of Jack's Reef Cluster points. The preponderance of the current evidence indicates that triangular points were directly associated with the Albee Phase.

Several other artifact classes occur in Albee assemblages. Recent evidence indicates that turtle carapace in Albee contexts were sometimes decorated with incised patterns. Whether the decorated carapace were associated with rattles or containers was not determined. Pipes in the Albee Phase included both stone platform and ceramic types. The platform pipes were restricted to the eastern Indiana sites, and ceramic pipes were only known from the Morell-Sheets site. In addition, bone flutes were only recorded in the eastern sites. Modified raccoon baculae were documented at several Albee sites. Both chipped stone endscrapers and antler harpoons were listed in the original trait list for Albee, but subsequent research has not supported the inclusion of these artifacts in the Albee assemblage.

In addition to revisions to the artifact assemblage of the Albee Phase, this paper has revised and expanded the perception of the Albee subsistence and settlement system. Subsistence included cultivated and harvested wild crops. During the warmer seasons, subsistence was focused on cultivated crops and floral resources from wetlands. A wide variety of faunal resources from various habitats were exploited. Current subsistence data is, however, limited to one site primarily occupied during the warmer seasons. Interestingly, this site did not contain evidence for permanent or substantial structures.

Albee Cordmarked ceramics are the only truly distinctive artifact of the Albee Phase. Without these ceramics, surface sites cannot be clearly associated with the Albee Phase. Sites assigned to the Albee Phase based on Jack's Reef Cluster points need reevaluation. It is felt that excavated sites that lack ceramics, but do have a general Late Woodland artifact assemblage and mortuary pattern can be assigned to Albee (i.e., Secrest-Reasoner [Black 1935]).

Finally, it is the perspective of the authors that the Albee Phase is one of several regional expressions of a widespread and relatively homogenous Late Woodland material culture evident in the upper Midwest. The refined description of the Albee Phase presented in this paper is not complete. Several questions are unresolved. For instance, the relationships between the Albee Phase and its predecessors and successors in the regional chronology are still undefined. Data on habitation structures are missing, and subsistence data is only known from one site. This paper did, however, result in updated refinements to the definition of the Albee Phase.

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LIST OF TABLES

Table 2.1 Trait List of Albee Materials (Winters 1967:69)

GENERAL UTILITY TOOLS	DOMESTIC EQUIPMENT
Ovate blades	Simple pebble manos
Leaf-shaped blades	Albee Cordmarked and Fabric Impressed Jars
Rectanguloid blades	Notched fillet jars
Backed blades (leaf-shaped and free flake)	Nutting Stones
Lamellar flake blades	WOODWORKING IMPLEMENTS
Mounds Stemless blades (triangular and lanceolate)	Rectanguloid chert gouges (?)
Rectanguloid end-scrapers	ORNAMENTS
Flake side-scrapers	Cut deer jaws
Keeled scrapers	Cylindrical copper beads
Pebble hammerstones	Cylindrical shell beads (*Busycon* columella)
Chert choppers	Marginella shell beads
WEAPONS	*Littorina palliata* shell beads
Mounds Stemless points (triangular, lanceolate, side-notched, or diagonally notched)	Trapezoidal copper gorget
FABRICATING AND PROCESSING TOOLS	Rectanguloid copper gorget
Keeled gravers	Trapezoidal stone gorgets (single perforation near top)
Simple drills	AGRICULTURAL OR DIGGING IMPLEMENTS
Notched, “V”-Head drills	None reported
Deer bone awls	CEREMONIAL ITEMS
Bird bone awls	Turtle carapaces (?)
Bone shuttles	RECREATIONAL EQUIPMENT
Deer bone beamers	Rectanguloid bone gaming pieces
Antler flakers	Cut and perforated deer phalanges (cup-and-pin game)
Grooved sandstone abraders	MISCELLANEOUS ITEMS
	“Strike-a-lites”

Table 2.2 Inventory of Sites with Albee Components

Mortuary Sites		
Name	Number	Reference
Albee Mound	12Su1	MacLean 1931 Winters 1967
Akers Mound	12Wa258	Anslinger 1990
Baker-Lowe Mound	12Gr33	Logan 1927 Tomak 1970
Bucci	12Gr388	Tomak 1970
Catlin	12Ve4	Winters 1967 Pace and Coffing 1978
Commissary	12Hn2	Swartz 1982 Burkett and Cochran 1984
Hamlin	12Gr108	Tomak 1970
Hesher	12Hn298	Cochran et al. 1988
Secrest-Reasoner	12Bl1	Black 1935
Shaffer	12Gr109	Black 1933
Shepherd	12Gr60	Tomak 1970
Niemoeller-Mace	12B85	Kellar 1975 Rackerby 1975
Habitation Sites		
Cooke	12P5	Pace and Thiel 1983
Demerly	12T	Criss Helmkamp, personal communication 1999
Farrand	12Vi64	Anslinger 1990
Jarrett	12Dl1689	McCord 2000
Lattas Creek	12Gr29	Pace and Anslinger 1986
Morell-Sheets	12My87	Moore 1989 McCord and Cochran 1994
Smith-Phelps	12Vi86	Carpenter and Pace 1984 Jackson and Pace 1985
Summit Village	12O8	Helmen 1950
Van Nuys	12Hn25	Morris 1969 Ferguson 1970 McCord 1998

Table 2.3 Radiocarbon Dates from Albee Sites

Site	Conventional Age	Calibrated Age* (intercept date)	Sample No.	Reference
Smith-Phelps	AD 980 ± 70	AD 1011 to 1165 (1032)	Beta-13049	Anslinger 1990
	AD 990 ± 70	AD 1014 to 1168 (1037)	Beta-13047	Anslinger 1990
	AD 1160 ± 70	AD 1213 to 1288 (1263)	Beta-13048	Anslinger 1990
Lattas Creek	AD 950 ± 80	AD 984 to 1159 (1022)	Beta-18341	Pace 1986
Commissary	AD 635 ± 105	AD 646 to 861 (683)	UGa-299	Swartz 1972
	AD 1090 ± 60	AD 1064 to 1255 (1214)	Beta-10219	Burkett and Cochran 1984
Hesher	AD 520 ± 60	AD 599 to 663 (641)	Beta-22127	Cochran et al. 1988
	AD 900 ± 80	AD 895 to 1032 (1005)	Beta-22128	Cochran et al. 1988
	AD 950 ± 50	AD 1004 to 1150 (1022)	Beta-22126	Cochran et al. 1988
Farrand^	AD 710 ± 95	AD 673 to 892 (782)	UGa-2069	Anslinger 1990
	AD 745 ± 85	AD 710 to 961 (829, 832, 866)	UGa-536	Anslinger 1990
	AD 820 ± 115	AD 781 to 1018 (896, 914, 955)	UGa-537	Anslinger 1990
	AD 1080 ± 100	AD 1032 to 1278 (1195)	UGa-2068	Anslinger 1990
	AD 1085 ± 85	AD 1041 to 1276 (1212)	UGa-659	Anslinger 1990
	AD 1105 ± 100	AD 1044 to 1283 (1220)	UGa-657	Anslinger 1990
	AD 1140 ± 75	AD 1169 to 1285 (1245)	UGa-656	Anslinger 1990
Cooke^	AD 1040 ± 110	AD 1017 to 1254 (1162)	UGa-3148	Anslinger 1990
	AD 1170 ± 105	AD 1169 to 1299 (1275)	UGa-2529	Anslinger 1990
	AD 1305 ± 65	AD 1290 to 1400 (1306, 1364, 1376)	UGa-2527	Anslinger 1990
Niemoeller-Mace	AD 900 ± 100	AD 890 to 1150 (1005)	Dicar-235	Redmond and McCullough 1997
Jarrett	AD 930 ± 70	AD 980 to 1040 (1010)	Beta-127453	McCord 2000
	AD 1020 ± 60	AD 1025 to 1185 (1050, 1095, 1140)	Beta-127452	McCord 2000
	AD 950 ± 70	AD 990 to 1050 (1020)	Beta-127454	McCord 2000

*Calibrated by CALIB v.3.0.3 (Stuiver and Pearson 1993)
^From mixed component context and dates are problematic

Table 2.4 Radiocarbon Dates from Morell-Sheets (McCord and Cochran 1994:114)

Provenience	Conventional Age	Calibrated Age* (intercept date)	Sample No.
89F9	AD 790± 60	AD 789 to 973 (888)	Beta-30894
89F12	AD 1090 ± 60	AD 1064 to 1255 (1214)	Beta-30895
Feature 11	AD 840 ± 60	AD 885 to 1005 (967)	Beta-55448
Feature 37	AD 1040 ± 50	AD 1036 to 1215 (1162)	Beta-55451
Feature 26	AD 1080 ± 60	AD 1052 to 1248 (1195)	Beta-55449
Feature 3	AD 1110 ± 60	AD 1165 to 1276 (1222)	Beta-55457
Feature 42	AD 1150 ± 60	AD 1213 to 1284 (1253)	Beta-55452
Feature 28	AD 1190 ± 50	AD 1239 to 1291 (1280)	Beta-55450
N14E39	AD 1270 ± 70	AD 1281 to 1393 (1298)	Beta-55453
*Calibrated by CALIB v.3.0.3 (Stuiver and Pearson 1993)			

Table 2.5 Botanical Summary (Bush 1994)

Identification	Count	% of Identifiable Specimens	Identification	Count	% of Identifiable Specimens
Introduced cultigens			Greens and other:		
Zea mays, corn: kernels cupules	117 233	5.64 11.24	*Verbena* sp., verbena	26	1.25
Cucurbitaceae, rind fragments	2?	0.10	*Poaceae*, grass family	20	0.96
Native starchy seeds			*Galium* sp., bedstraw	4	0.19
Hordeum pusillum, little barley	1354 + 6?	65.6	*Euphorbia* sp., spurge	3	0.14
Phalaris caroliniana, maygrass	3	0.14	*Fabaceae*, bean family	4	0.19
Polygonum sp., knotweed	2 +1?	0.14	*Rhus* sp., sumac	2 + 1?	0.14
Nutshell fragments			*Lamiaceae*, mint family	1?	0.05
Carya sp., hickory	57	2.75	*Cyperaceae*, sedge family	1?	0.05
Corylus sp., hazelnut	49	2.36	**Other:**		
Juglans nigra, walnut	25	1.21	Bark	7	0.34
Wild plants			Bud	2	0.10
Fruits:			Pod	1	0.05
Rubus sp., raspberry/blackberry	115	5.55	Spore	1	0.05
Vaccinium sp., blueberry	18	0.87	Gall	1	0.05
Sambucus canadensis, elderberry	3	0.14	Unidentified seeds	13	0.63
Vitis sp., grape	1	0.05	Total identifiable	2074	
Diospyros virginiana, persimmon	1?	0.05	Unidentifiable	437	

Table 2.6 Summary of Vertebrate Remains (Richards 1994)

Taxon	No.	MNI	Taxon	No.	MNI
Mammalia			*Mammalia*, sp. Indet (large size)	2999	-
Blarina brevicauda, short-tailed shrew	2	2	*Mammalia*, sp. Indet (medium/large size)	17	-
Cryptotis parva, least shrew	1	1	*Mammalia*, sp. Indet (medium size)	57	-
Scalopus aquaticus, Eastern mole	7	2	*Mammali*a, sp. Indet	43	-
Sylvilagus sp., cottontail	1	1	*Vertebrata*, sp. Indet	78	-
Sciurus sp., tree squirrel	8	1	**Birds**		
Marmota monax, woodchuck	1	1	*Meleagris gallopavo*, turkey	1	1
Tamias striatus, chipmunk	4	1	*Aves*, sp. Indet., birds	5	2
Castor canadensis, beaver	16	2	**Reptiles**		
Ondatra zibethicus, muskrat	1	1	*Apalone*, sp. Indet., softshell turtle	30	1
Microtus sp., vole	3	1	*Testudines* cf. *Apalone* sp.	1	-
"Mouse" sp., indeterminate	3	2	*Teffapene*, sp. Indet., boz turtle	1	1
Erethizon dorsatum, porcupine	2	2	*Testudines* cf. *Shrysemys picta*, painted turtle	4	1
Rodentia sp. Indet., unid. Rodent	-	2	*Testudines* cf. *Graptemys* sp., map turtles	1	1
Canis familiaris, domestic dog	111	1	*Testudines*, sp. Indet., turtles	125	ca. 2
Canidae, sp. Indet., dogs, foxes, wolves	4	-	**Amphibians**		
Procyon lotor, raccoon	5	1	*Anura*, sp. Indet., toads and frogs	1	1
Camivora cf. *Procyon lotor*	1	-	**Fish**		
Carnivora, sp. Indet. (medium size)	3	-	*Centrarchidae*, sp. Indet., sunfishes and basses	1	1
Cervidae cf. *Crvus elaphus*, wapiti	6	1	*Osteichthyes* cf. *Centrarchidae*	1	-
Artodactyla cf. *Cervus elaphus*	1	-	*Ictaluridae*, sp. Indet., bullhead catfishes	2	1
Odocoileus virginianus, white-tailed deer	130	4	*Cyprinidae*, sp., Indet., minnows	4	ca. 3
Artiodactyla cf. *Odocoileus virginianus*	56	-	*Osteichthyes*, sp. Indet., bony fishes	117	-
Cirvidae, sp. Indet., deer and elk	32	-	Total: 25 species	3891	39
Artiodactyla, sp. Indet.	3	-			

LIST OF FIGURES

Figure 2.1. Location of Reported Albee Phase Sites Across Indiana.

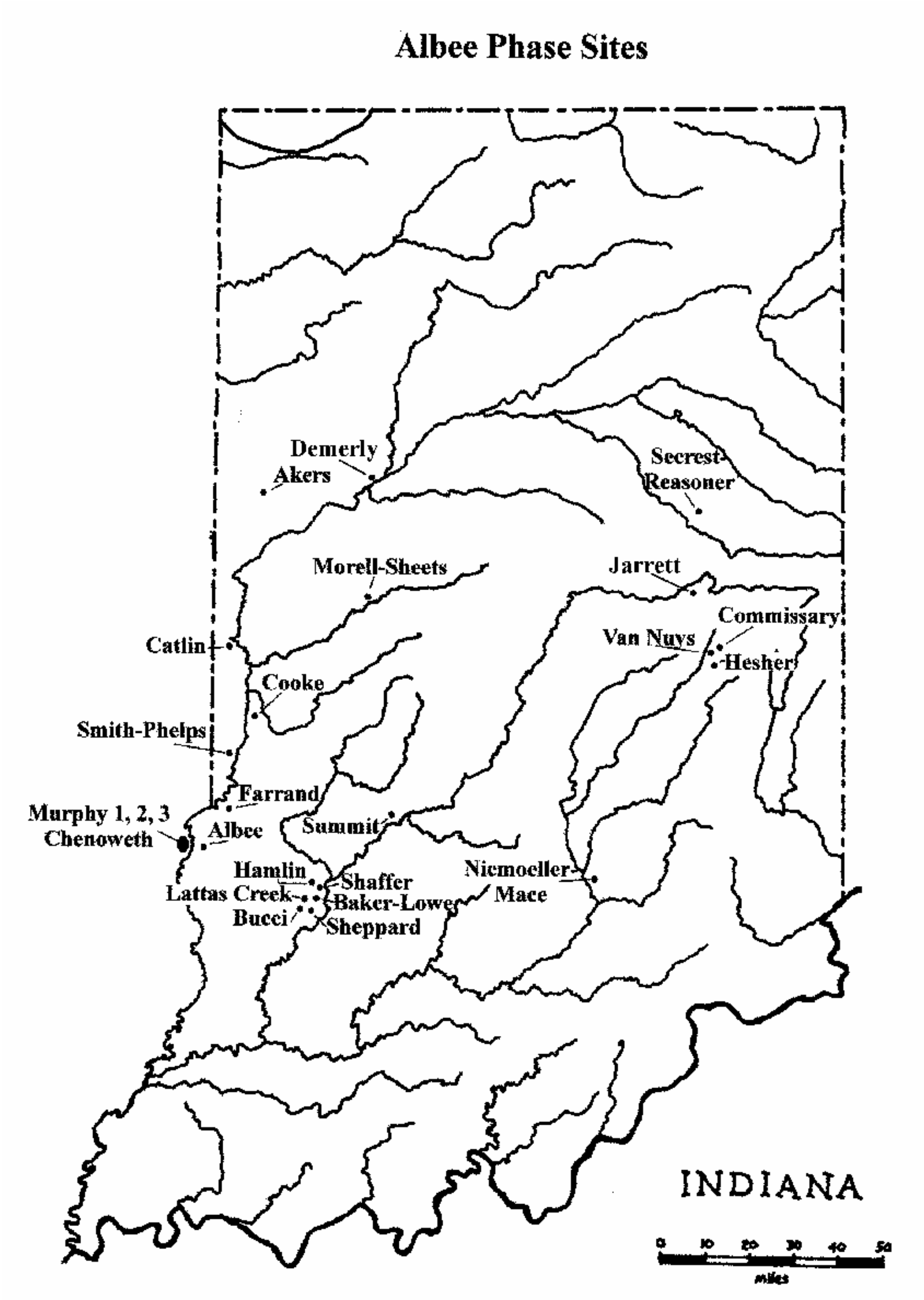


Figure 2.2. Representative sample of Albee Phase artifacts.

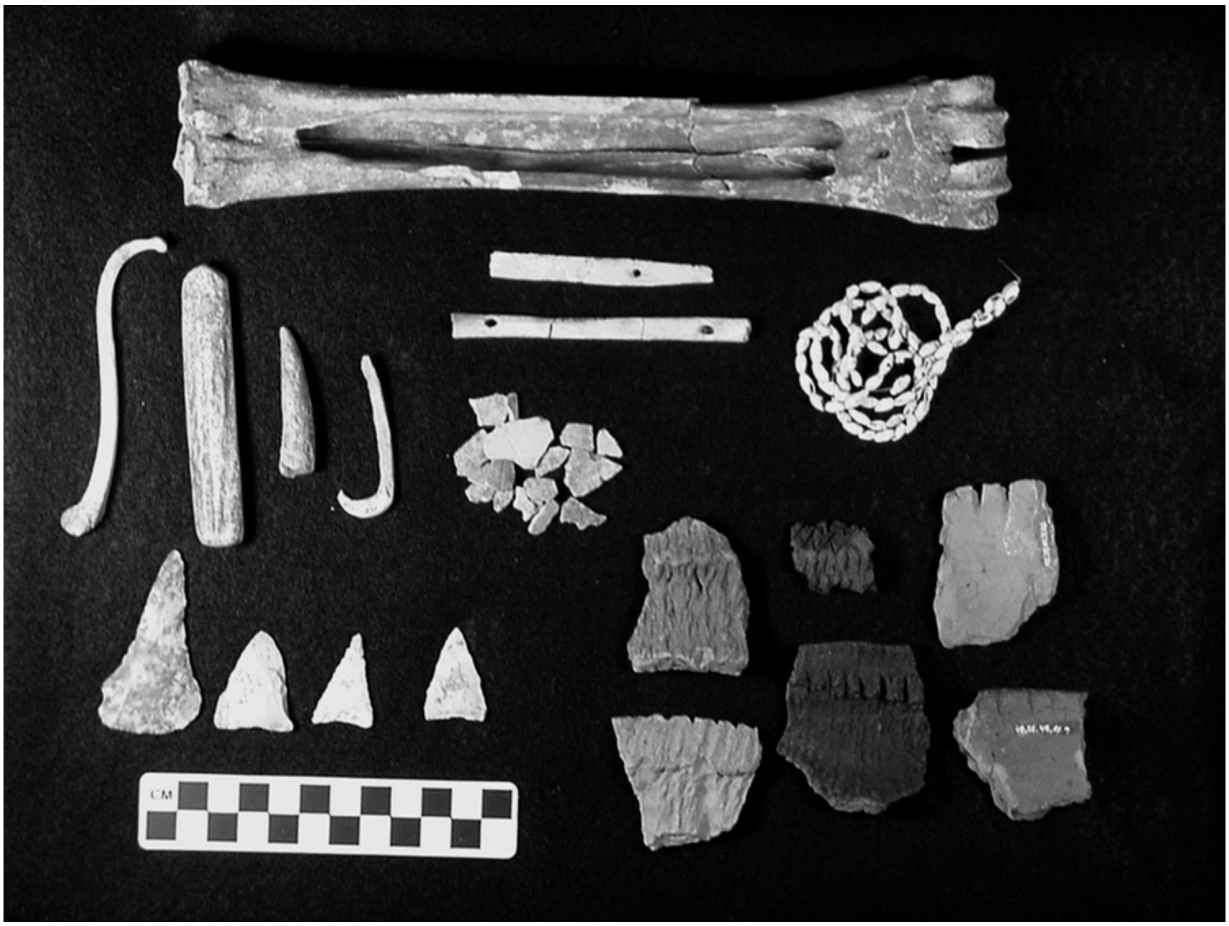
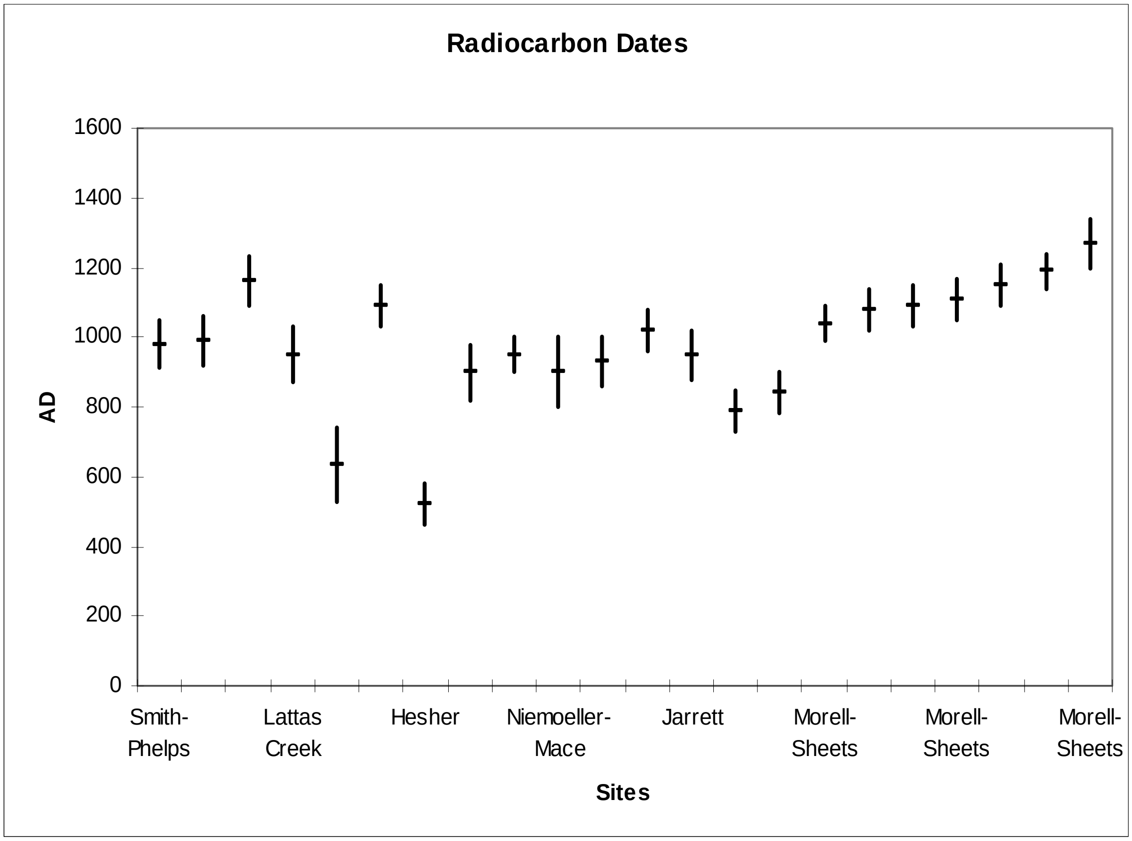


Figure 2.3. Radiocarbon dates.



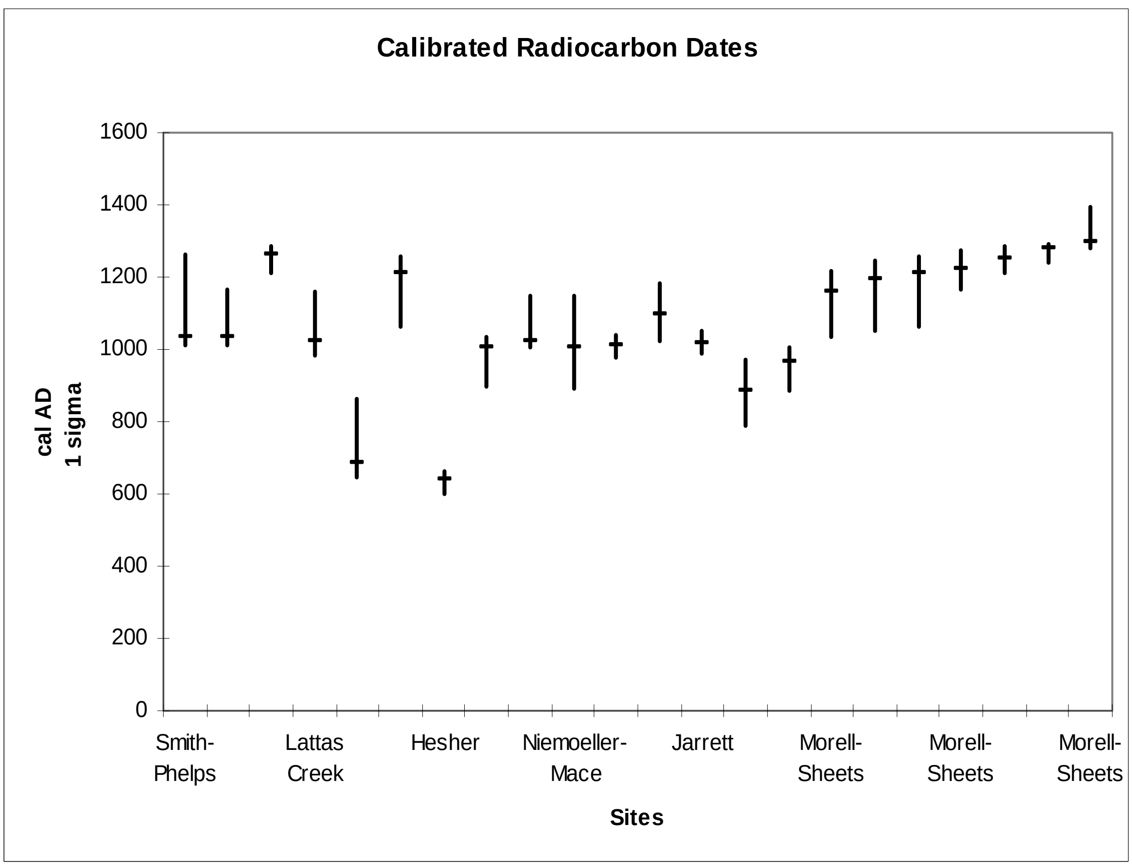


Figure 2.4. Albee rim sherds from Morell-Sheets.

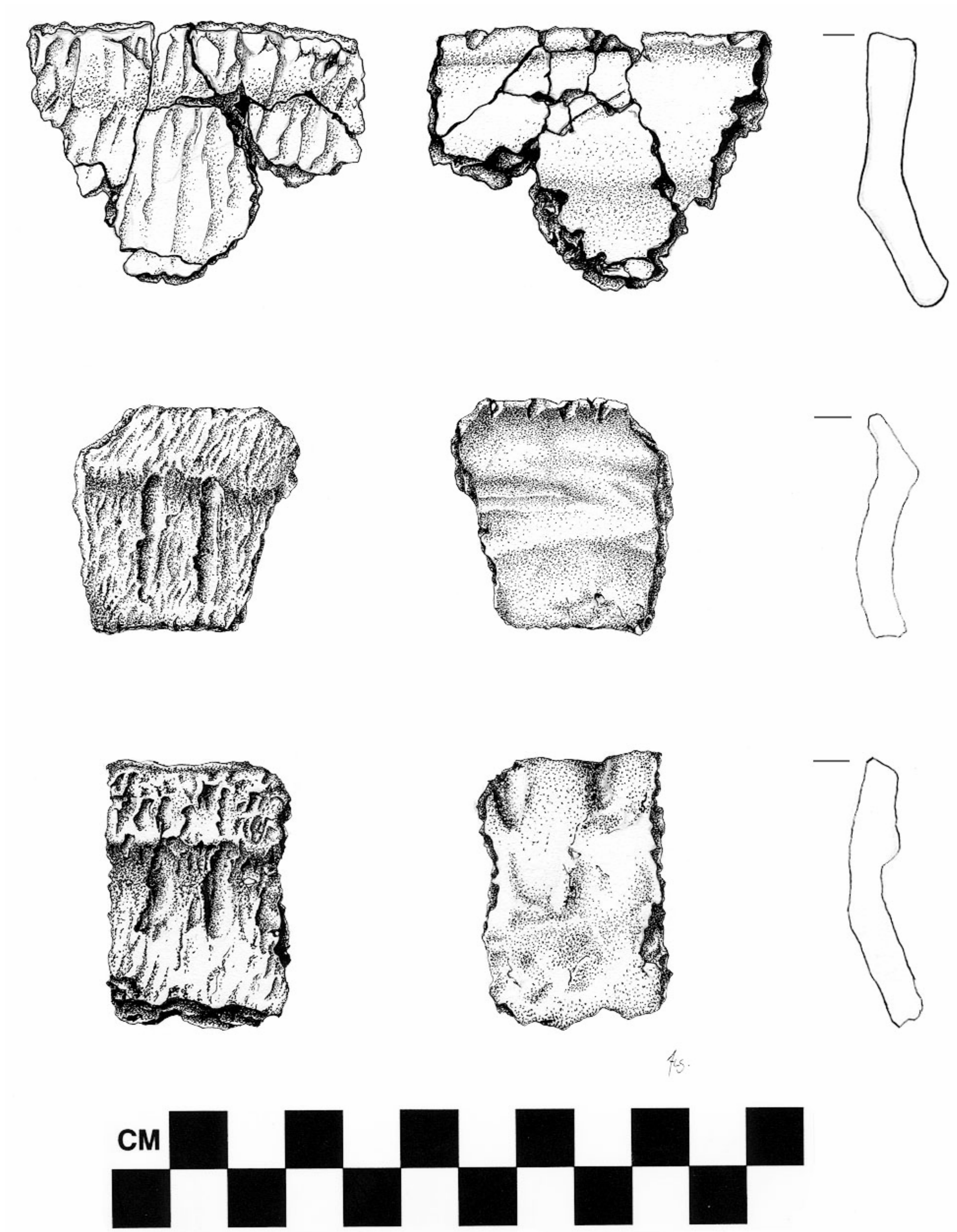


Figure 2.5. Albee rim sherds from Morell-Sheets.

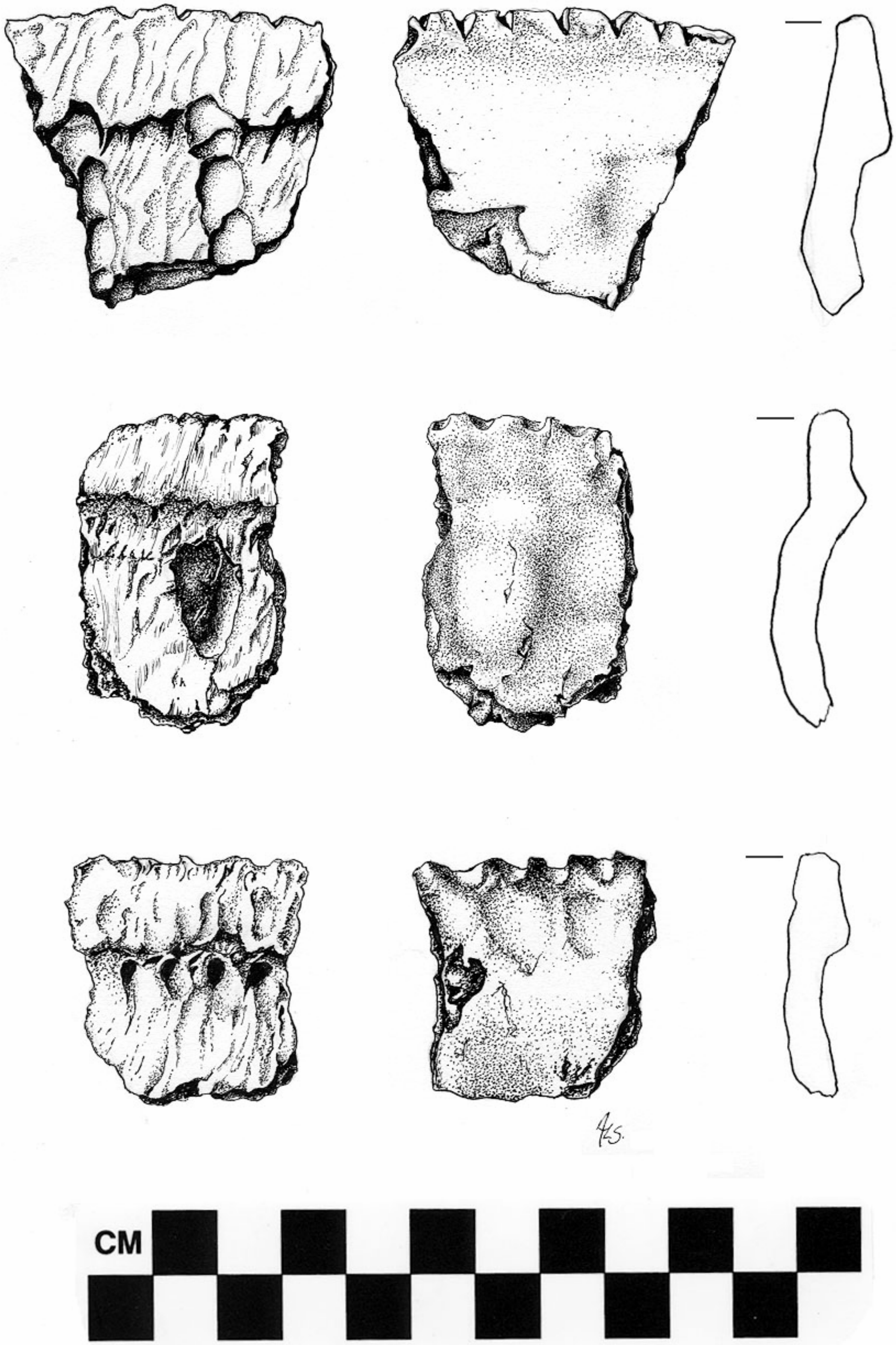


Figure 2.6. Albee rim sherds from Morell-Sheets.

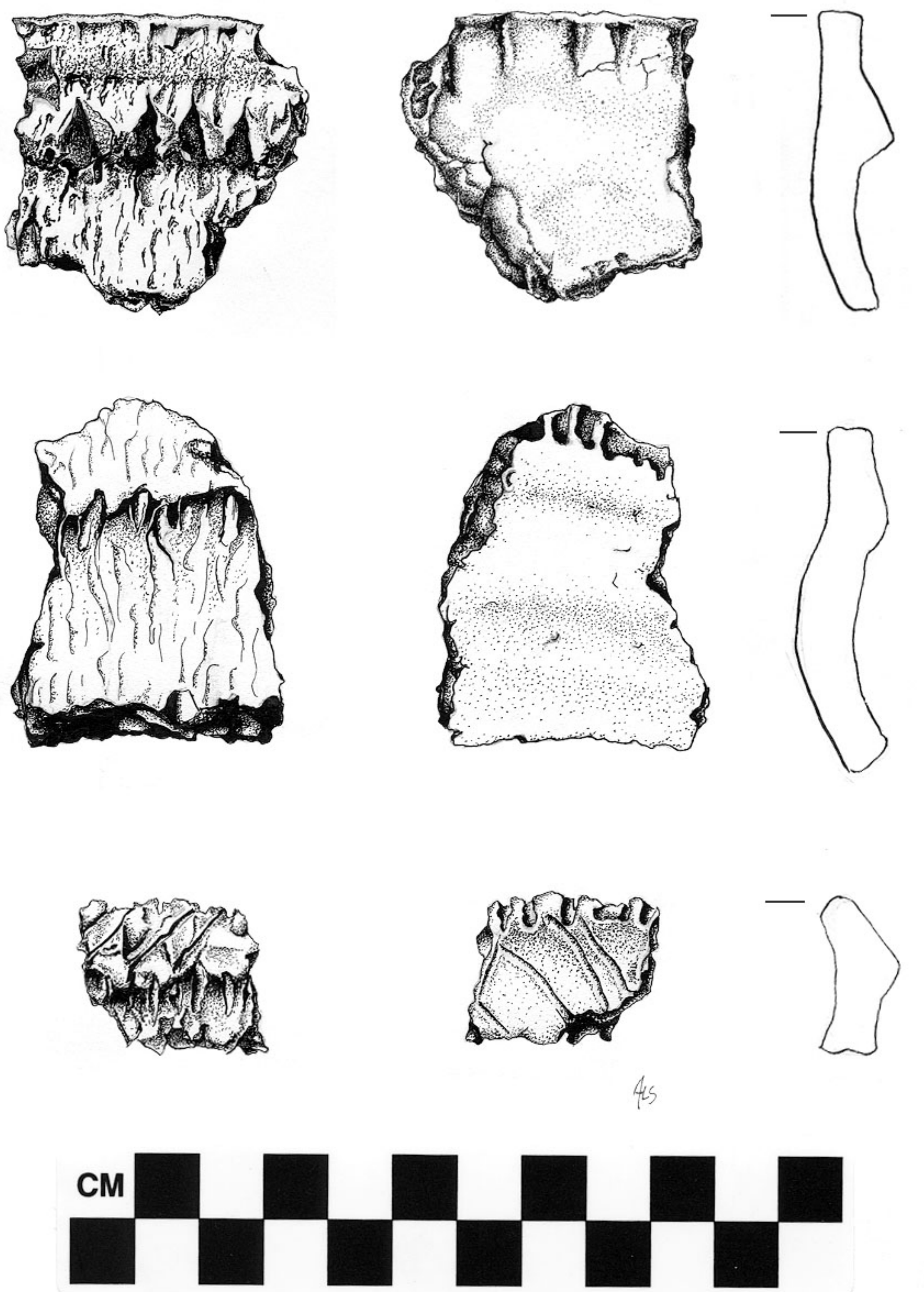


Figure 2.7. Points recovered from the Morell-Sheets site.

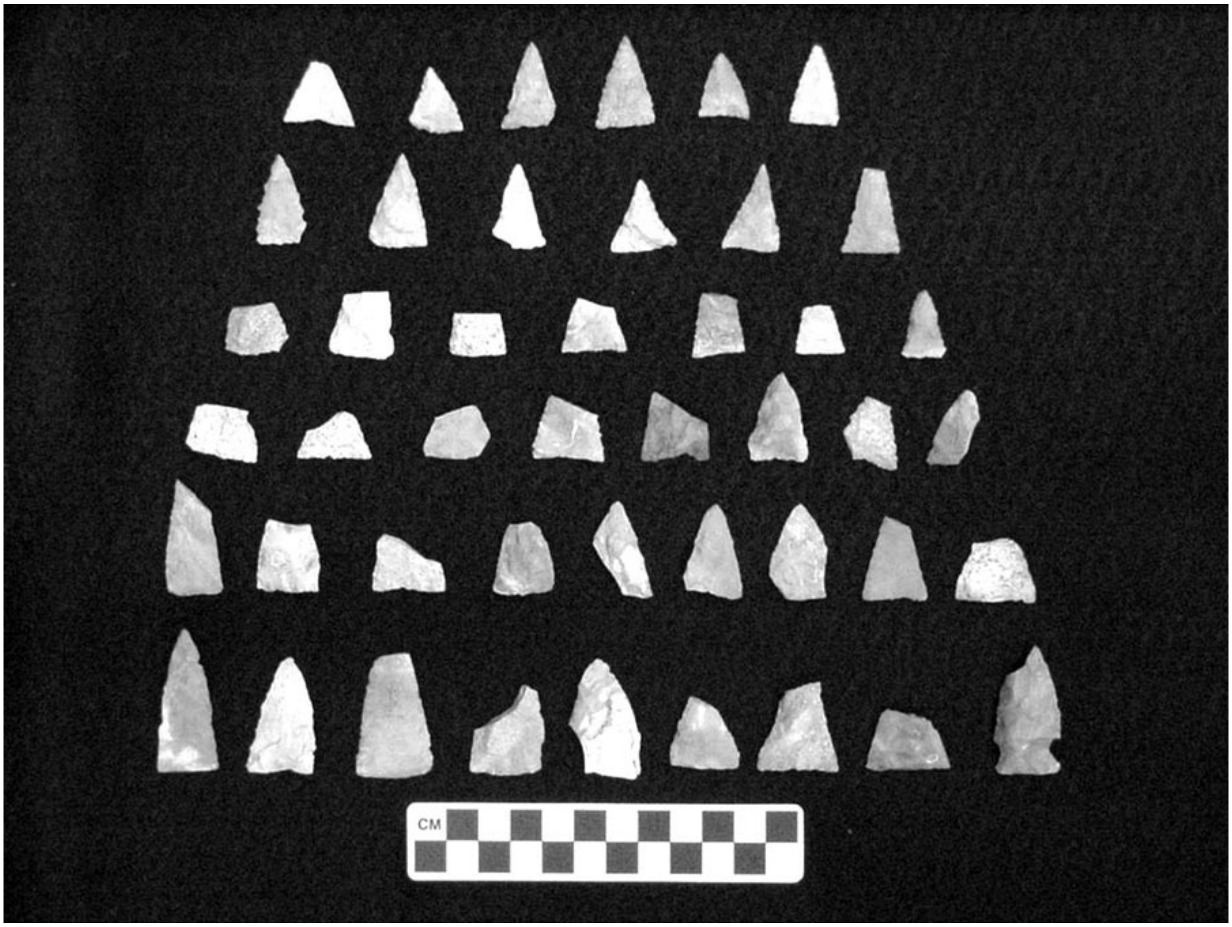


Figure 2.8. Engraved turtle carapace.

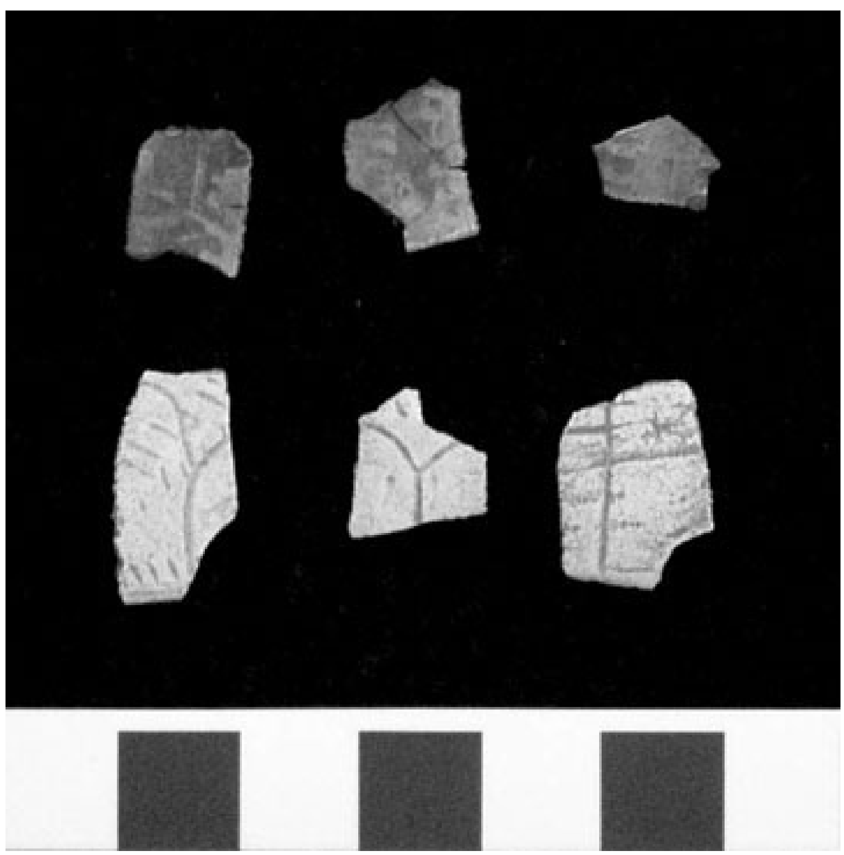


Figure 2.9. Limestone pipe from the Commissary site in Henry Co., Indiana.

CHAPTER THREE

DENTAL EVIDENCE FOR MAIZE CONSUMPTION DURING THE ALBEE PHASE IN INDIANA

Christopher W. Schmidt and Tammy R. Greene

INTRODUCTION

A panoply of paleoethnobotanical and human osteological studies have provided great insight into the timing of maize reliance for prehistoric Native Americans throughout much of the Midwest and Eastern Woodlands (e.g., Ford 1979; Chapman and Shea 1981; Johannessen 1984, 1987, 1993; Yarnell and Black 1985; Lynott et al. 1986; Ambrose 1987; Buikstra et al. 1987; Buikstra et al. 1988; Rose et al. 1991; Buikstra 1992; Yarnell 1993; Buikstra et al. 1994). A significant outcome of this research has been the elucidation of a number of local subsistence idiosyncracies and the realization that the onset of maize reliance did not occur at the same time or for the same reason in all places. For example, in Illinois maize is present in some Late Woodland botanical assemblages (e.g., Johannessen 1993) while during the same temporal period in Ohio, maize is generally absent (e.g., Wymer 1993). For whatever reason, until very recently few paleoethnobotanical or osteological studies had addressed the issue of incipient maize-reliance in Indiana, a circumstance which has left a local void.

In general, paleoethnobotanical studies illuminate the spectrum of resources that have been exploited by humans. On the other hand, osteological studies have shed light on the resources that were actually eaten, as many foods leave evidence of their consumption on the skeleton. Combined, paleoethnobotanical and osteological studies provide insight into the usage of potential food resources that, otherwise, would go undetected. An example of the complementary nature of paleoethnobotanical and human osteological analyses comes from a recent study by Rose et al. (1991) of incipient Mississippian populations from sites located in the central and lower Mississippi River Valley. Earlier paleoethnobotanical studies conducted at these sites had demonstrated that maize was ubiquitous. However, Rose and colleagues' osteological study found that maize was eaten by only a very small number of individuals. The osteological analysis clarified the role of maize. It was not a dietary staple and it did not accompany the initial Mississippianization of the central and lower Mississippi River Valley. Instead, its usage was probably more ritualistic or medicinal (Rose et al. 1991).

In the current study, we endeavor to better understand the use of maize by Late Woodland Albee Phase people from west-central and east-central Indiana via an analysis of human dental remains. Moreover, we see our study as a conceptual continuation of a subsistence reconstruction initiated by Bush (1994) which stands as the only substantive paleoethnobotanical study of Albee Phase subsistence. In addition, this study will address two scientific objectives. The first is to help archeologists place a potential Albee food resource, maize, into its proper cultural context.

The second is to facilitate eventual paleopathological studies of the human remains examined herein, by providing a dietary reconstruction that is as precise as possible.

HUMAN OSTEOLOGY AND DIETARY RECONSTRUCTION

Numerous osteological avenues exist for the reconstruction of diet, including the study of stable carbon and nitrogen isotopes, trace elements, and teeth. Carbon isotope studies have been particularly successful at discriminating between populations that had a dietary reliance upon maize from those that did not (Ambrose 1987; Keegan 1989; Schoeninger et al. 1990; Buikstra 1992; Larsen et al. 1992; Buikstra et al. 1994). Trace element studies have been more successful at determining the relative contribution of meat to the diet (Price and Kavanagh 1982; Sillen and Kavanagh 1982; Aufderheide 1989). Dietary indicators associated with teeth include macrowear, microwear, and pathology and are employed in the current study.

Dental Macrowear

Dental macrowear (or dental wear) is the normal (i.e., non-pathological) erosion of the tooth crown caused, primarily, by mastication. Severity of dental macrowear has been correlated with dietary abrasiveness. For example, extremely high levels of wear have been found among prehistoric Native American hunter-gatherers who consumed largely unprocessed wild foods (Schmidt 1998). Maize agriculturists have far less severe macrowear (e.g., Molnar 1968, 1971). Dental macrowear has been used successfully to distinguish maize-reliant from non-maize-reliant populations, the former tending to have markedly less rapid wear (Powell 1985).

Dental Microwear

Dental microwear analysis (DMA) is the study of microscopic features (pits and scratches) produced on dental enamel as a result of mastication. A number of studies have produced dietary reconstructions based upon relative expressions of microwear feature lengths and frequencies in non-human animals (e.g., Walker et al. 1978), non-human primates (e.g.,Teaford and Walker 1984; Teaford and Oyen 1989; Teaford and Robinson 1989), hominids (e.g., Grine 1981, 1987a, b) and recent human populations (e.g.,Moore-Jansen 1982; Rose 1984; Rose and Marks 1985; Teaford 1991). Abrasive diets are characterized by numerous wide scratches while hard diets leave behind a high percentage of pits (Teaford 1991; Schmidt 1998). Maize consumption tends to be characterized by relatively narrow scratches and few pits (Teaford 1991).

Dental Pathology

There are a variety of pathological conditions which affect the teeth. Some pathological conditions (such as dental caries) are directly related to food consumption. Dental caries is a focal demineralization of tooth enamel and dentin via the metabolization of sugars by oral bacteria (Powell 1985; Larsen et al. 1991). Cariogenic foods include starchy plants such as maize, and several authors have noted that caries frequencies in prehistoric humans increased as reliance on domesticates like maize increased (e.g., Milner 1984; Kelley et al. 1991; Larsen et al. 1991).

Dental pathology has been widely employed to distinguish populations which consumed different diets (e.g., Leigh 1925; Kelley et al. 1991; Larsen et al. 1991; Rose et al. 1991). These authors report that populations which rely heavily upon wild foodstuffs, especially non-starchy seeds, tend to have very low rates of caries. By contrast, maize agriculturists tend to have a much higher rate of caries (Schmidt 1998).

Strengths and Limits of Dental Macrowear, Microwear, and Pathology in Dietary Reconstruction

Some strengths of the dental dietary indicators are: 1) they focus on the teeth, which are directly affected by the foods that people eat and are usually well-represented at archeological sites; 2) the methods for data collection do not destroy the tissues; 3) all of the indicators are closely linked and, when studied together, provide a complementary reconstruction of the diet; 4) the ease and standardization of the data collection methods produces data sets that are readily comparable to other studies. Historically, of these avenues of dental study the strongest indicator of maize consumption is caries presence and frequency. In fact, Sciulli and Schneider (1986) argue that carious lesion frequencies are as competent an indicator of maize consumption as is carbon isotope analysis since maize is the only prehistoric food resource that is known to be highly cariogenic.

The primary limitation of macrowear and microwear analysis is that while they are direct indicators of diet, meaning they represent what resources entered the mouth, for the most part they can only place resources into general food type categories (e.g., soft, hard, abrasive, non-abrasive). The primary drawback to the study of dental caries is that seriously cavitated teeth tend to be shed (lost antemortem). This phenomenon reduces the number of teeth available for study. Fortunately, the rates of antemortem tooth loss for the populations that we studied were quite similar.

HYPOTHESIS

Several studies suggest that the Early to Middle Woodland subsistence base was built around nuts, wild berries and fruits, and some domesticates such as squash, sunflower, chenopod, and sumpweed (e.g., Buikstra 1984; Johannessen 1987; Smith and Cowan 1987). Maize, however, is virtually absent during this time and is only rarely found at Middle Woodland sites (see Scarry [1993] for further discussion).

During the Late Woodland maize begins to appear in some paleobotanical assemblages including at least one from Indiana. Bush (1994) found maize kernels in a number of features at the Albee Phase Morell-Sheets site in Montgomery County. She reports that as a domesticated food resource, maize is second only to little barley (*Hordeum pusillum*) in ubiquity. She adds "Cultivated maize and little barley thus appear to be the only cultivated plants at Morell-Sheets as well as the plant food staples for the inhabitants" (Bush 1994:100). Other botanical resources found there include nuts, wild berries, fruit, and perhaps squash.

By the Middle Mississippian in Indiana, maize was the dietary staple. Support for this comes from Schurr (1992) and Schurr and Schoeninger (1995) who conducted stable carbon isotopic studies of the Angel site inhabitants among whom they found strong evidence for maize consumption. Not surprisingly, maize was found throughout the Angel site (Kellar 1967).

The current study constructs dental macrowear, microwear, and pathology profiles for Late Woodland, Albee Phase individuals and compares them, quantitatively, to profiles generated from non-maize reliant people (represented by several Middle Woodland populations) and from maize reliant people (represented by two Mississippian populations). Based upon Bush's (1994) discovery of maize at the Morell-Sheets site, our working hypothesis is that the Albee macrowear, microwear, and pathology profiles are largely inconsistent with those representing the Middle Woodland and are more consistent with those representing the Mississippian.

MATERIALS

A total of 224 adults from 14 sites representing three temporal periods were studied. Fifty-five individuals represented the Middle Woodland group, all of whom came from the following sites located in Indiana: Anderson Mounds (12M2a), Hr-6 (12Hr6), New Castle (12Hn1), White (12Hn10), and Windsor (12R1). The Middle Woodland in this study is actually comprised of individuals from both Early and Middle Woodland sites. However, paleoethnobotanical evidence suggests that subsistence resources differed only slightly between these cultural traditions (e.g., Yarnell 1993); thus, allowing us to bolster the Middle Woodland sample size without contaminating it.

The Late Woodland is represented by 90 individuals from seven Indiana sites, including: Albee (12Su1), Behem (12Vi688), Bucci (12Gr388), Commissary (12Hn2), Hesher (12Hn298), Shaffer (12Gr109), and Shepherd (12Gr60). Except for the Behem site, where temporal affiliation is simply thought of as Late Woodland (Schmidt and Nawrocki 1995), all of these sites are recognized as Albee Phase or at least having an Albee Phase component to which the burials studied here belong (Tomak 1970; Cochran 1988; McCord and Cochran 1994). Because this study has a specific interest in the diet of Albee Phase individuals, Late Prehistoric Oliver Phase populations were intentionally excluded.

The Mississippian is represented by individuals from two sites, Angel (12Vg1) in southwestern Indiana and Wickliffe (15Ba4) in western Kentucky. Seventy-nine individuals were suitable for the current study. Table 3.1 summarizes the sample sizes for all of the study sites.

METHODS

Age, Sex, Temporal Period

Any cross-cultural study of dental tissues must account for the affects of age and sex on the expression of wear features and carious lesions. In a previous study (Schmidt 1998), it was determined that sex was not a factor that affected the expression of any of the variables within any of the populations analyzed here. However, age was found to be an important factor.

Fortunately, the study populations are comprised of very similar percentages of young and old adults, thus, eliminating age bias in any particular group (for detailed demographic information concerning these populations, see Schmidt 1998). Therefore, in the current study the parametric statistical tests (discussed below) include only one independent variable: Temporal Period (e.g., Middle Woodland, Late Woodland, Mississippian).

Macrowear Scoring

Several researchers have developed systems for recording the degree of enamel wear on human teeth (e.g., Murphy 1959; Miles 1963; Molnar 1968; Scott 1979; Brothwell 1981; Smith 1984; Lovejoy 1985). In the current study, the Smith (1984) method was employed for the non-molar teeth (incisors, canines, and premolars), and the Scott (1979) method was used for the molar teeth as recommended by Buikstra and Ubelaker (1994). Each method involves the assignment of a wear score based on the morphology of the tooth crown and the degree of dentin exposure. Teeth with little wear are given lower scores, while teeth showing greater wear receive higher scores. The Smith (1984) method ranges from 1 to 8 and assesses the entire crown simultaneously. The Scott (1979) system ranges from four to 40. Each molar quadrant is scored independently on a scale of one to 10, and the four quadrant scores are summed to provide an overall tooth score. All teeth present in a dentition were scored. If fracturing or large carious lesions obscured the surface a score was not given.

Dental Microwear Analysis

Predominantly mandibular, left, second molars were studied. However, right M2's were used if the left was not present. Additionally, to bolster samples sizes, a few maxillary M2’s and mandibular M1’s were also studied. Teaford (1991) reports no difference in microwear between maxillary and mandibular teeth. Likewise, Pastor (1993) found no significant difference in microwear features between M1's and M2's.

Casts of the molars were made following procedures described by several researchers (e.g., Waters and Savage 1971; Scott 1982; Rose 1983; Gordon 1984; Teaford 1991; Buikstra and Ubelaker 1994). See Schmidt (1998) for a more detailed discussion of the molding and casting procedures employed here. Molds were made with a polyvinylsiloxane molding material, Coltene's President Light Body. The molds were allowed to degas overnight, washed with a 95 % ethanol solution, and filled with Super Hard Epoxy Resin at a base-to-hardener ratio of 4:1. Casts were mounted on an aluminum stub, sputter-coated with 200 angströms of gold-palladium, and viewed with a JEOL JSM-840 scanning electron microscope (SEM) in secondary electron emission mode. The SEM is housed at the Electron Microscopy Laboratory in Agriculture at Purdue University. Magnification was standardized at 500X.

Only phase II wear facets (as defined by Maier and Schneck 1982) on the protoconid were viewed. The surface of the wear facet was placed as perpendicular to the image collector as possible in order to minimize foreshortening (e.g., Gordon 1988). Micrographs were taken using Polaroid 55 positive/negative film. These were scanned with a Microtek ScanMaker E3 personal scanner at a resolution of 150 dpi as 256 shades of gray images. In turn, the digital images were analyzed via a semi-automated computer program, *Microwear 2.2* (Ungar 1995). Summary data of pit and scratch size and frequency were imported into SPSS 6.1.3 for Windows.

Caries Scoring

Carious lesions were scored as present if a clearly defined pit (often outlined with a dark stain) could be detected via gross visual inspection or with the aid of a 10X hand lens. Although carious lesions can be found on a variety of tooth surfaces, only the most commonly found, occlusal lesions, were addressed in this study. The caries data were segregated into two groups: those from the molars and those from the anterior teeth. This facilitated convenient comparisons between the macrowear and caries data sets.

Statistical Procedures

Each of the dietary indicators was broken down into several variables so that specific questions could be addressed (these variables and their abbreviations are summarized in Table 3.2). For example, the study of macrowear was divided into two variables -- one that addressed the mean wear score for the anterior teeth and one that addressed the mean wear score for the molars. Among all of the dental dietary indicators eight variables were tested: two macrowear, three microwear, and three caries.

Statistical analyses were conducted using analysis of variance (ANOVA) and chi-squared tests (x^2) with alpha values of 0.05. ANOVA is a robust statistical test able to handle groups of data with uneven sample sizes and those that deviate modestly from normality (Collyer and Enns 1987; Sokal and Rohlf 1992). Despite this, all data were tested to ensure that they met the underlying assumptions of ANOVA (i.e., independence, normal distribution, homoscedasticity).

For the macrowear and microwear variables, the data were quite normal in distribution but the caries data had a negative skew (due to many individuals having no carious lesions). Heterogeneity of variance was tolerable for the macrowear data set, but it was too great in some of the microwear and caries variables. To accommodate the heteroscedastic microwear data, rank transformations were necessary. The caries data were bimodally distributed, forcing us to only include individuals with at least one carious lesion. This necessity severely affected our Middle Woodland sample size, limiting us to parametrically testing only a single caries variable.

Post hoc tests were used in conjunction with the *a priori* ANOVA tests. We used the very sensitive Least Significant Difference (LSD) test because small sample sizes, particularly of Middle Woodland individuals with carious lesions, precluded more conservative approaches. All of the statistical tests were conducted using SPSS for Windows, 6.1.3.

Macrowear

For the testing of the macrowear data, Model I, one-way ANOVA tests were run on the anterior teeth and molar teeth wear scores. Because of the categorical nature of macrowear scores, some researchers have chosen to use categorical data analysis procedures when comparing dental macrowear scores (e.g., Hens et al. 1996). Others have suggested that dental wear scores are nominal data and should be tested with x^2 and other non-parametric procedures. While these approaches are valid, they are no more so than the ANOVA approach employed here. Statisticians have demonstrated the efficacy of treating categorical data as interval rather than nominal data.

> . . . in many respects, ordinal variables more closely resemble interval variables than nominal variables. They possess important quantitative features: Each level has a *greater* or *smaller* magnitude of the characteristic than another level; and, though not often possible to measure, there is usually an underlying continuous variable present (Agresti 1990: 4).

This sentiment is echoed by Bernard (1988:42): "Ordinal variables can have any number of ranks. For purposes of statistical analysis, though, ordinal scales with five or more ranks can be treated as if they were interval level variables." These arguments suggest that the dental wear scoring data meet the criteria necessary to test them statistically as if they were interval in nature: the scores are carefully ranked with an underlying magnitude of continuity and the categories are so numerous that they take on a continuous character.

Since anterior and molar teeth were scored using different systems, these two groups were never lumped together. Instead, mean macrowear scores were determined for each individual for each of the following macrowear variables: molar mean (mmean) and anterior teeth mean (antmen). Table 3.2 provides a summary of each of the macrowear variables.

Microwear

Three microwear variables were studied: pit length (pitl), pit percentage (pit%), and scratch width (scratw). Unfortunately, the earlier-mentioned problematic heteroscedastic raw pit percentage (pit%) and scratch width (scratw) data required rank-transformations that made the data distribution-free and limited the variance to that within the ranks (e.g., Maas 1991; Ungar 1994). The ANOVA test was then conducted on the ranked data. The pit percentage raw data conformed to the conditions of ANOVA and, thus, required no transformation. Table 3.2 summarizes the microwear variables.

Caries

NOVA tests were performed on a single caries variable: mean number of carious molars among those individuals with at least one carious lesion (pcmol). We were unable to test the mean number of carious anterior teeth (pcant) because no Middle Woodland individuals had carious lesions on their anterior dentition. Two caries variables were compared via chi-squared tests: 1) number of individuals with at least one carious anterior tooth (cant%); 2) number of individuals with at least one carious molar (cmol%). All chi-squared tests were performed as 2x2 contingency tables with a single degree of freedom.

The parametric and non-parametric comparisons tell two separate and important parts of the caries story. The non-parametric tests compare the number of individuals within each population who suffered from caries. On the other hand, the parametric tests compare the severity of the caries expressed in each mouth. Table 3.2 summarizes the caries variables.

Results Presentation

The statistical test results are presented separately for each of the dental dietary indicators. For simplicity sake in the tables and figures, the variables are referred to by their abbreviations (as listed in Table 3.2). In addition, the temporal periods are abbreviated in Tables 4 and 6. These abbreviations are: MW, Middle Woodland; LW, Late Woodland; MI, Mississippian. Lastly, p-values that indicate statistical significance are accompanied by an asterisk.

RESULTS

Macrowear

The results of the macrowear ANOVA tests for mean molar wear score (mmean) suggest that significant differences exist between all of the groups. The means for each population are: Middle Woodland, 25.3; Late Woodland, 20.7; Mississippian 16.7 (see Table 3.3). For the mean anterior teeth wear score (antmen), significant differences were found between the Middle Woodland and Mississippian, and between the Late Woodland and the Mississippian. No difference was found between the Middle Woodland and the Late Woodland. Table 3.4 summarizes the macrowear ANOVA results.

Microwear

The mean values for all three variables decline through time. The results of the microwear ANOVA tests for mean pit length (pitl), however, fail to distinguish the populations at the .05 level. For pit percentage (pit%), the only statistically significant difference was between the Middle Woodland and the Mississippian. The scratch width results suggested significant differences between the Middle Woodland and the Mississippian, and between the Late Woodland and the Mississippian. In none of the variables did the Late Woodland differ significantly from the Middle Woodland. The mean values for each microwear variable are presented in Table 3.3. The ANOVA results are summarized in Table 3.4.

Caries

The mean number of carious molars among those with at least one carious molar (pcmol) for each population suggests a noticeable trend toward increased cariosity from the Middle Woodland to the Mississippian. The ANOVA results indicate statistically significant differences between all of the populations. The non-parametric tests mirror the trend seen in the parametric tests. The percentage of individuals with carious molars (cmol%) and carious anterior teeth (cant%) increased dramatically from the Middle Woodland through the Mississippian. Chi-squared results indicate that, for the molars, all temporal periods differ significantly. For the anterior teeth, the Middle Woodland was distinguished from both the Late Woodland and the Mississippian, while no difference existed between the Late Woodland and the Mississippian. These results are summarized in Tables 3.5 and 3.6.

DISCUSSION

The macrowear and the microwear analyses provide little evidence for a dietary difference between the Middle and Late Woodland. The only wear variable that differentiated the Late Woodland from the Middle Woodland was mmean, where the Late Woodland mean is intermediate to the greater Middle Woodland and the lesser Mississippian means (Figure 3.1). The anterior teeth macrowear suggests no difference between the Middle Woodland and the Late Woodland, although they both differ significantly from the Mississippian. Moreover, the Middle and Late Woodland do not differ statistically for any of the microwear variables. For pit percentage, the Late Woodland cannot be distinguished from either the Middle Woodland or the Mississippian. For scratch width, the Middle and Late Woodland can be distinguished from the Mississippian. Qualitatively, the Late Woodland has microwear values that are intermediate to the other populations, but quantitatively the Late Woodland is more similar to the Middle Woodland (Figure 3.2).

The picture changes noticeably, however, when viewing the caries data. The results of the parametric caries test suggests that for the frequency of carious molars among those with at least one lesion (pcmol), the Late Woodland can be distinguished from both the Middle Woodland and the Mississippian. The non-parametric tests suggest that for the number of individuals in each group with at least one carious anterior tooth (cant%) the Late Woodland is indiscernible from the Mississippian, while they are both distinguishable from the Middle Woodland. The number of individuals with at least one carious molar is statistically unique for each group. All can be distinguished from each other (Figure 3.3).

Interestingly, the caries data suggest a marked increase in cariosity from the Middle to Late Woodland. The average Late Woodland person (among those with at least one carious lesion) has twice as many carious molars as does the average Middle Woodland individual. No Middle Woodland individuals have carious anterior teeth, but nearly 16 percent of the Late Woodland people do. Moreover, the percentage of Late Woodland people with carious molars is more than double that of the Middle Woodland. Although the Late Woodland caries values are, likewise, statistically distinguishable from the Mississippian, qualitatively, the jump from the Middle to the Late Woodland appears to be much greater than that from the Late Woodland to the Mississippian.

In sum, the dietary profiles for each temporal period are: Middle Woodland, abrasive, hard, not particularly cariogenic; Late Woodland, abrasive, hard, rather cariogenic; Mississippian, soft, not abrasive, very cariogenic. All told, it appears that the dental macrowear, microwear, and pathology profiles for the Late Woodland are not identical to either the Middle Woodland or the Mississippian. The Late Woodland has characteristics of both.

Based upon the statistical analyses, of the eight variables that were tested, the Middle Woodland and the Late Woodland could be distinguished in four of them, the Late Woodland and the Mississippian could be distinguished in five of them, and the Middle Woodland and the Mississippian could be distinguished in seven of them. Although it is apparent that the Late Woodland individuals were not intensive maize consumers like the Mississippian, it would be misleading to believe that the Late Woodland diet was not substantially different from that of the Middle Woodland. Some type of dietary supplement during the Late Woodland noticeably increased cariogenesis in those populations.

At least two scenarios explain the caries increase during the Late Woodland, 1) the Late Woodland diet was more processed, making the existing starchy seed-based foods (such as *Chenopodium*) or grasses (like little barley) softer and more likely to become lodged in occlusal fissures (where cariogenic bacteria proliferate) as well as less likely to be removed by dietary abrasives; 2) a cariogenic food was introduced into the diet. Our findings do not support the first scenario. Given the similarity of the Middle and Late Woodland macrowear and microwear profiles, it is unlikely that the carious lesions are the result of major alterations in food preparation. The hardness and the abrasiveness of these two diets remained virtually unchanged even after the increase in cariosity.

Thus, we contend that the second scenario is more likely. Because of this, there is no reason for us to reject our working hypothesis even though the Late Woodland Albee diet is not identical to that of the Mississippian. Bush's (1994) contention that maize is a part of the Albee diet is not refuted by the dental data and it is plausible that maize was consumed by Albee Phase individuals. It is possible that the disparity between the Late Woodland and the Mississippian caries rates is a result of relative dependence and it would appear that during the Late Woodland maize comprised only a fraction of the diet.

We encourage a follow-up stable carbon isotope study of the Albee remains. It is hoped that the current study will serve to place the isotope values into their proper context. Intermediate isotope ratios, that without this dental study might otherwise be considered inconclusive, may be thought of as congruous with the, now, anticipated minor contribution of maize to the Albee diet. If the isotope study suggests that maize was not consumed at all, then we must seek to understand in greater detail the cariogenic properties of indigenous crops such as little barley.

CONCLUSION

The dental macrowear, microwear, and pathology profiles constructed herein suggest that the diet of the Late Woodland Albee Phase people in Indiana is not inconsistent with some level of maize consumption. Thus, our results are congruous with Bush's (1994) paleoethnobotanical study that implicated maize as a constituent of the Albee diet.

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Table 3.1. Sample sizes for each of the populations.

Site	Sample Size	Totals
Middle Woodland		
Anderson Mounds	1	
Hr-6	10	
New Castle	9	
White	7	
Windsor	28	
		55
Late Woodland		
Albee	17	
Behem	1	
Bucci	4	
Commissary	36	
Hesher	8	
Shaffer	10	
Shepherd	14	
		90
Mississippian		
Angel	50	
Wickliffe	29	
		79
All Combined		224

Table 3.2. Description of macrowear, microwear, and caries variables.

Macrowear Variables	**Abbreviation**	**Description**
Molar mean	mmean	average wear score for all molars
Anterior mean	antmen	average wear score for all anterior teeth
Microwear Variables		
Pit length	pitl	mean pit length
Pit percentage	pit%	percentage of pits (pit n/feature n)
Scratch width	scratw	mean scratch length
Caries Variables		
Percentage of carious anterior teeth per mouth	pcant	only includes individuals with at least one occlusal lesion, tested parametrically
Percentage of carious molars per mouth	pcmol	only includes individuals with at least one occlusal lesion, tested parametrically
Percentage of individuals with carious anterior teeth	cant%	tested non-parametrically
Percentage of individuals with carious molars	cmol%	tested non-parametrically

Table 3.3. Mean values for those variables that were tested via ANOVA. The macrowear values are mean wear scores. The caries values are percentages. The microwear values for pitl and scratw are in microns, the pit% values are percentages. The microwear means are based upon raw data, not their rank-transformations.

Macrowear Variables	**Middle Woodland Mean**	**Late Woodland Mean**	**Mississippian Mean**
mmean	25.3	20.7	16.7
antmen	4.7	4.7	4.0
Microwear Variables			
pitl	12.8	10.5	9.7
pit%	27.2	24.1	19.5
scratw	1.4	1.3	1.0
Caries Variable			
pcmol	22.9	42.1	61.7

Table 3.4. Summary of macrowear, microwear, and caries ANOVA results.

Macrowear Variables	**D.F.**	**F**	**p-value**	**Post hoc results (only significant differences are shown)**
mmean	2	15.95	.005*	MW-LW, MW-MI, LW-MI
antmen	2	3.33	.038*	MW-MI, LW-MI
Microwear Variables	**D.F.**	**F**	**p-value**	**Post hoc results (only significant differences are shown)**
pitl (ranked)	2	1.50	.232	
pit%	2	3.33	.036*	MW-MI
scratw (ranked)	2	4.80	.012*	MW-MI, LW-MI
Caries Variable	**D.F.**	**F**	**p-value**	**Post hoc results (only significant differences are shown)**
pcmol	2	14.01	.000*	MW-LW, MW-MI, LW-MI

Table 3.5. Summary of caries data tested non-parametrically.

	Middle Woodland	**Late Woodland**	**Mississippian**
Cmol%	18.18 % (10 of 55)	40 % (36 of 90)	69.62 % (55 of 79)
Cant%	0 % (0 of 55)	15.6 % (14 of 90)	22.8 % (18 of 79)

Table 3.6. Summary of chi-squared tests on caries data.

Tests	**D.F.**	**x^2**	**p-value**
cant%			
MW-LW	1	9.47	.01 - .001*
MW-MI	1	14.48	.001 - .0001*
LW-MI	1	1.43	> .20
cmol%			
MW-LW	1	7.5	.01 - .001*
MW-MI	1	34.3	< .0001*
LW-MI	1	14.85	.001 - .0001*

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Figure 3.1 Macrowear variables.

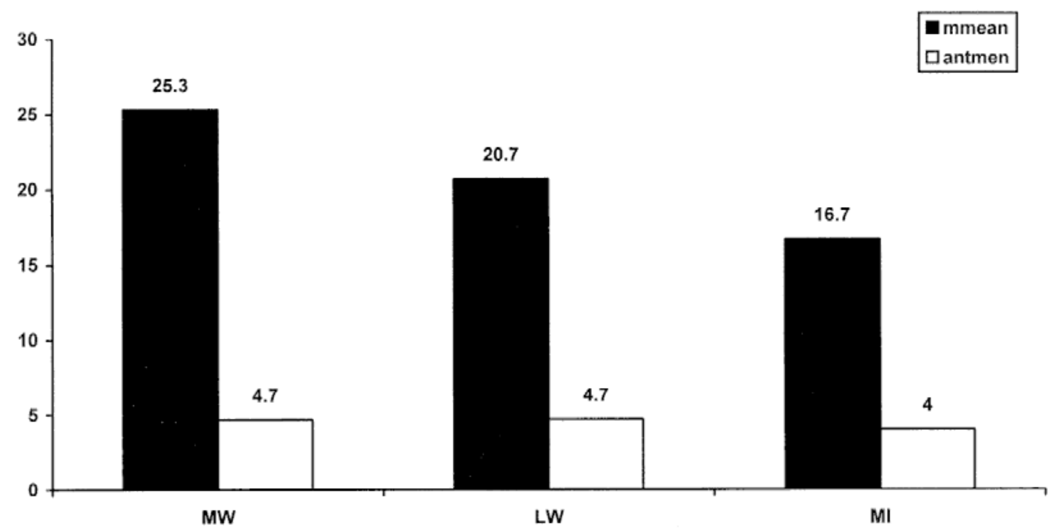


Figure 3.2 Microwear variables.

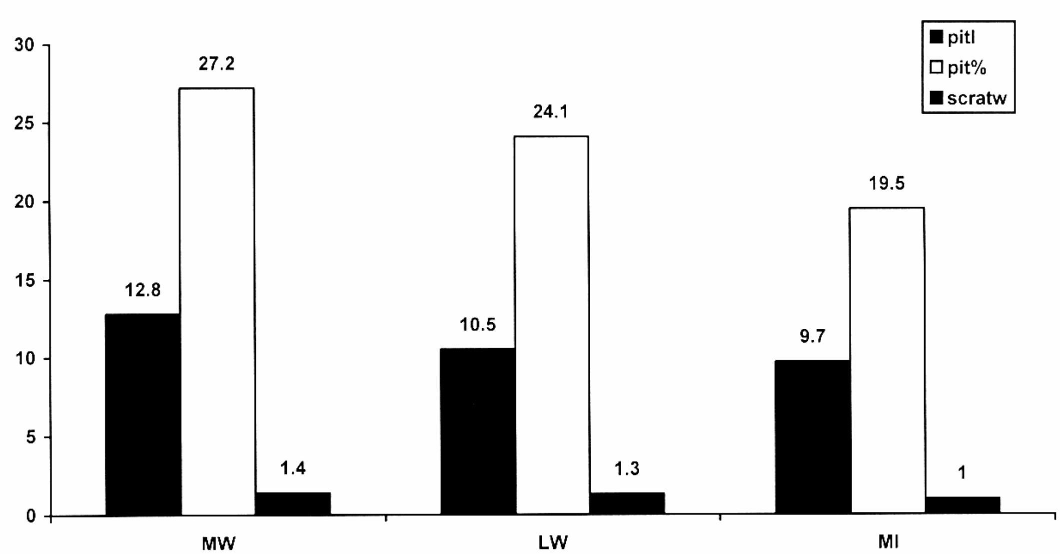
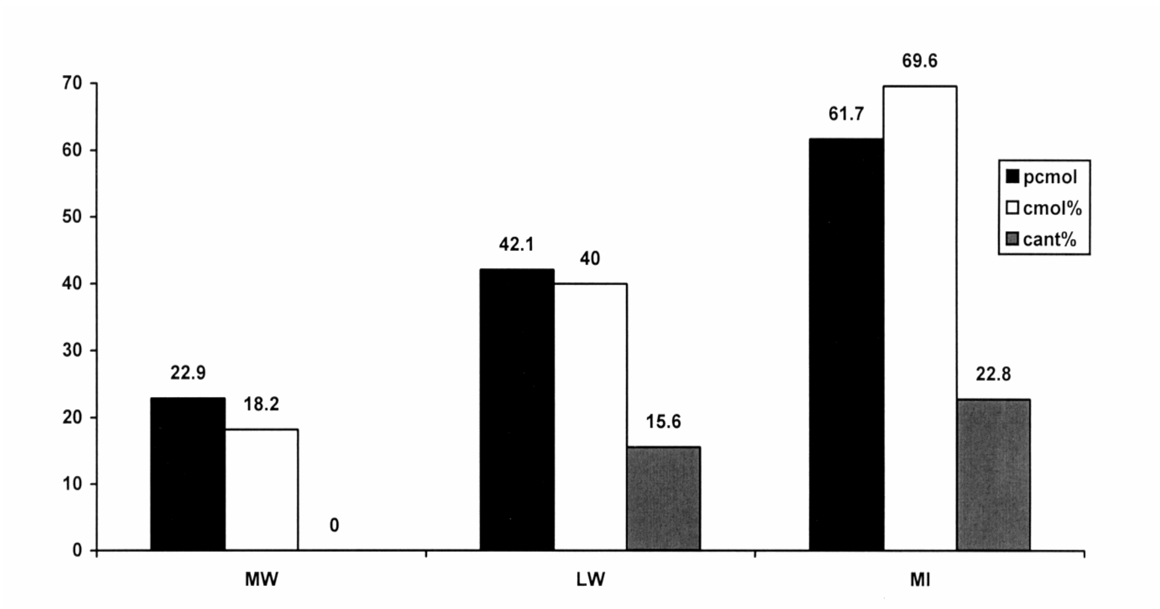


Figure 3.3 Caries variables.



CHAPTER FOUR

MADISON TRIANGLES: THERE MUST BE A POINT

Timothy Wright

INTRODUCTION

This research is still in its preliminary stages, so any findings presented here are subject to revision in the future. My objective is to describe a set of Madison points in such a way that their temporal and cultural diagnostic value is maximized. The focus of this research is a set of points from Burial 14 at the Secrest-Reasoner site (12Bl1) in Blackford County, Indiana. This set of points contains considerable morphological variation. Shapes range from long-bladed isosceles triangles to equilateral triangles. The bases and blade edges can be straight, concave, or convex.

BACKGROUND

The Secrest-Reasoner site is in Blackford County, in east central Indiana. The site was first professionally investigated by Glenn A. Black in April 1933 (Black 1933). To the best of my knowledge, no site maps exist. Black excavated five human interments, one refuse pit, and two fire pits. He characterized the site as a cemetery/habitation site. Depth of features ranged between 29 inches for the fire pits to approximately three feet below the surface for the burials.

SETTING

The Secrest-Reasoner site is in the Tipton Till Plain physiographic region of Indiana (Schneider 1966:40) in an area crosscut by the Mississinewa recessional moraine of the Late Wisconsin (Leverett cited in Black 1935:148). Gravel deposits are a common feature in this area and indeed the site was first discovered during gravel removal operations. Within these gravel deposits there is an abundance of chert which could have been easily exploited by the prehistoric inhabitants of the Secrest-Reasoner site.

CULTURAL AFFILIATION FOR SECREST-REASONER

The Secrest-Reasoner site was originally associated with the Albee Phase of east central Indiana by John Halsey in his dissertation (Halsey 1976). Halsey saw the Albee Phase as a local expression of a larger Late Woodland, Wayne Mortuary Complex (Halsey 1976) with its origins in Michigan. The association between Secrest-Reasoner and other Albee Phase sites in east central Indiana has been supported by subsequent excavations at the Commissary site (12Hn2)(Swartz 1982; Burkett and Cochran 1984), at the Hesher site (12Hn298) (Cochran et al. 1988), and the Van Nuys site (12Hn25) (Morris 1969).

A limestone pipe recovered at the Commissary site is strikingly similar to the two pipes that reportedly came from burial context at Secrest-Reasoner. These pipes are documented in Black's report (Black 1933, 1935), but unfortunately, neither is available for study. Other artifact classes, like bone and antler tools and Madison points, all offered as grave goods, support this Albee Phase cultural relationship between Secret-Reasoner, the Commissary site, the Hesher site, and the Van Nuys site. By archaeological standards, the Albee affiliation for Secret-Reasoner is unambiguous. An examination of triangular points from these other Albee Phase sites shows that the potential for morphological variability within this point type is staggering even though they are all the product of one archaeologically defined culture. Granted, these other points are from different context and have less temporal control when compared to a burial cache, but these are all Madison points associated with the Albee Phase. A frustration with the accepted range of variation is what prompted this research.

SECREST-REASONER: BURIAL 14

For a description of Burial 14 (Figure 4.1), I quote Glenn Black's report of 1935. Burial 14 at Secret-Reasoner was "the interment of an adult male, on the right side, legs flexed, arms extended to the knees. The head was north northwest . . ." (Black 1935:149). Black also states:

> At the skull frontal 43 triangular projectile points had been deposited, with the long axis of the points extending parallel with the burial and the apexes all oriented towards the northwest. The earth immediately southeast of the points, starting at the base, and extending for a distance of 23 inches, contained much humus and fibrous matter which might be taken to indicate that the points were hafted when deposited (Black 1935:149).

This is a large burial cache of triangular points even by Albee Phase standards; however, ethnographic data indicate that twenty to forty arrows would be a reasonable number for a hunter to possess at any one time (Weltfish 1977:138). And the stain mentioned by Black coincides well with the length of a typical aboriginal arrow shaft as reported by Pope (1923:360).

RESEARCH POTENTIAL FOR GRAVE GOODS

The Law of Association establishes the significance of grave goods (Rowe 1962). Objects deposited in burials were probably in use at the same time. This set of points represents a single depositional event. Variation in artifact form due to synchronic factors is all but ruled out by the context. It is also apparent these points were not specially manufactured for this event. Most show evidence of some resharpening. This is a utilitarian assemblage that was usable up until its deposition. The funerary relationship between this set of points and this individual can be viewed as a symbolic continuation of an association that almost certainly existed during the individual's lifetime.

Burial context also implies that these points were defined as a set in accordance with an emic logic. This set was deemed appropriate for a significant public event. This would imply, in turn, that variation of artifact form attributable to functional differences is also minimized

(Whittaker 1984). The above mentioned characteristics of grave goods make this set of points an ideal data set for an attempt to describe a Madison Point that is distinctively Albee and to locate this Albee Point style at a specific moment in time.

RESEARCH ORIENTATION

For a prehistoric archaeologist, the context of this data set establishes the tightest temporal, and cultural parameters possible. The research objective begs a processual approach. I need to identify, if possible, patterns in this data set that can be described as distinctively Albee. I will gladly leave it to others to figure out what Albee is. Metric attributes are listed in Table 4.1; however, observations regarding gross morphology and/or statistical tests of metric attributes do not appear to be the best way to approach the problem. Sample size is small and the variations of size and shape within this set have already been mentioned. A technological approach to the problem seems more likely to yield meaningful results. A culturally and temporally distinct technology could be revealed through raw material procurement, a consistent manufacturing strategy, or a unique tool kit that leaves a signature (Cobb and Pope 1998:2).

TECHNOLOGICAL ATTRIBUTES

Several lines of evidence indicate that this group of points may be the work of one individual. At a subjective level, the workmanship is consistently high throughout the group (Figure 4.2). The overwhelming choice of one chert type as a raw material can indicate a conscious choice or habit on the part of the knapper. Thirty-nine of the forty-two points are made from the Huntington variant of Liston Creek chert (Wepler and Cochran 82:34; Donald R. Cochran, personal communications 1989). One point is of glacial chert and two are made of Attica chert. The presence of Attica chert (Cantin 1994:8), even at such a low percentage, provides a tenuous connection to the Morell Sheets site (12My87) and other Albee Phase sites in northwestern Indiana. Another feature of this cache that supports the hypothesis of a single manufacturer is that several points in this set appear to come from the same core.

My long-term, intimate relationship with these points has also allowed me to orient most of them in what I consider a to be consistent manner. There is a front side and a backside that show differing flake scar patterns. What I call the front corresponds to the dorsal surface of the original flake blank. Due to the convex shape of this surface, flakes driven off from the lateral margins tend to terminate at the center and form a medial ridge. The ventral surface of the flake blank is slightly concave so thinning flakes removed from this side tend to overlap. The result is a plano-convex point with a relatively consistent flake scar pattern on the front or dorsal side and a random pattern on the back in terms of flake scar termination.

A different pattern for front and back is also evident in flake scar orientation. Most pressure flakes removed in the initial manufacturing of a point are removed from the front. Starting at the tip, small flakes are removed at an acute angle to the long axis. This strategy distributes the force of flake removal to an area of the point that has the greatest mass. The angle flattens out as it approaches the base. The pressure flaking that is done on the ventral side is minimal and might be just to facilitate more controlled flake removal on the dorsal side.

The final stages of manufacture involve basal thinning and the final shaping of the lateral margins. The flake scars from basal thinning often impinge upon the lateral thinning flake scars which verifies this sequence. The side from which these basal thinning flakes are removed seems random at this time. The microscopic step fractures and crushed margin associated with final shaping also appear to be random. This flaking pattern and orientation holds true for the equilateral and the isosceles shaped points.

REALITY CHECK

As I said earlier, this research is only in its initial stages. The tidy manufacturing sequence I just presented obviously represents the best of all possible worlds. Flint knapping is a process of problem-solving, and a good knapper will not be confined by one rigid sequence. A skilled knapper will have a whole repertoire of tricks to meet almost any circumstance. Ultimately, resharpening will obliterate any flake scar pattern associated with the original manufacture. These patterns I have tentatively identified, will have to be somehow quantified.

CONCLUSION

For a prehistoric archaeologist, this set of points is from the best possible context. Burial context insures that variation in form due to spatial, temporal, and cultural factors is reduced to an absolute, realistic minimum. But, even if I can show this set of points to be the work of one individual, how do I know this individual is representative of Albee Phase flint knappers?

While no one argues with the proposition that material remains are end products of cultural ideas and behavior, no one knows which attributes are prescribed by culture (Wiessner 1983:253) and which are the result of an individual's skill or whim. This set of points, this expression of culture that I am examining, is a small sample taken from an unknown sample that existed in an unknowable time in space. Is it really a representative example of Albee culture or, does it only represent the wishful thinking of a contemporary archaeologist?

ACKNOWLEDGEMENTS

I would like to thank Dr. Brian Redmond for organizing this symposium and including me within this star-studded line up. I also need to thank Dr. Christopher S. Peebles, Director of the Glenn A. Black Laboratory of Archaeology and Mr. Noel Justice, Assistant Director and Curator of Collections. They have loaned me the materials for this research and given me access to their archives. I would also like to thank all the instructors and graduate students at Indiana University and at Ball State University who have encouraged me through the years.

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LIST OF TABLES

Table 4.1. 12BL1 Blackford County Cache Metric Attributes (in mm) .

Case #	Spec #	Gram Weight	Base Width	Max Length	Mid Length	Width 1/3	Width 2/3	Thick 1/3	Thick 2/3	Max Thick	Max-Mid Length	Left Blade	Right Blade	Length Width
1	1	2.4	20.82	39.10	39.10	15.67	9.44	3.27	3.21	3.74	0.00	39.11	39.66	1.88
2	2	1.2	27.91	28.10	27.93	14.43	7.93	2.83	2.01	2.89	-0.17	29.61	29.80	1.01
3	3	1.3	20.87	37.31	35.88	12.61	6.88	2.72	2.08	2.72	-1.43	39.00	38.61	1.79
4	4	1.5	19.78	27.45	27.35	14.00	7.66	3.26	3.39	3.64	-0.10	28.95	29.00	1.39
5	5	1.9	22.85	36.45	36.32	16.12	9.35	2.69	2.36	2.94	-0.13	37.93	37.22	1.60
6	6	1.5	20.91	29.61	29.42	14.97	8.12	2.73	2.46	3.18	-0.19	31.18	30.37	1.42
7	7	1.7	21.05	28.25	27.79	17.58	10.99	2.97	2.51	3.17	-0.46	29.68	30.37	1.34
8	8	1.3	19.10	31.92	31.09	13.18	8.62	2.73	2.56	3.03	-0.83	32.76	33.30	1.67
9	9	1.2	21.02	32.17	31.11	13.30	7.31	2.76	1.91	2.82	-1.06	33.35	33.65	1.53
10	10	1.0	20.90	27.52	27.25	12.36	7.26	2.63	2.25	2.86	-0.27	29.53	28.80	1.32
11	11	1.6	20.94	35.45	34.86	13.80	8.48	3.11	2.22	3.20	-0.59	36.47	36.82	1.69
12	12	1.3	21.28	32.25	31.23	12.85	6.35	3.11	2.37	3.15	-1.02	33.54	34.00	1.52
13	13	2.0	22.44	41.42	41.14	14.57	7.80	3.01	2.13	3.26	-0.28	42.47	42.45	1.85
14	14	2.0	23.47	41.24	41.51	13.21	8.34	2.79	2.35	3.28	0.27	42.38	42.24	1.76
15	15	1.5	20.63	25.25	25.19	16.18	9.32	2.36	2.29	3.12	-0.06	26.47	26.50	1.22
16	16	1.8	22.19	29.28	28.72	16.02	9.43	4.02	3.34	4.21	-0.56	31.38	33.01	1.32
17	17	2.0	22.81	38.94	37.62	15.17	9.51	3.03	2.30	3.28	-1.32	40.16	40.47	1.71
18	18	1.3	22.99	33.31	31.75	13.83	6.71	2.60	1.94	3.36	-1.56	35.16	35.10	1.45
19	19	2.0	21.15	39.73	39.18	13.33	7.69	2.65	2.82	3.19	-0.55	40.40	41.29	1.88
20	20	1.3	20.79	25.89	25.37	16.11	8.88	2.69	2.32	2.90	-0.52	27.92	27.75	1.25
21	21	1.7	20.44	37.78	36.60	12.95	8.96	3.30	2.47	3.42	-1.18	39.06	38.83	1.85
22	22	1.5	21.33	28.72	28.52	14.63	7.26	3.12	2.72	3.33	-0.20	30.35	31.13	1.35
23	23	1.3	19.48	31.48	30.64	12.70	7.23	2.73	2.55	2.85	-0.84	32.70	32.91	1.62
24	24	1.3	21.83	27.67	28.00	14.46	7.98	2.61	2.43	2.84	0.33	29.68	29.61	1.27
25	25	2.2	21.35	48.33	47.61	13.79	7.89	2.22	2.09	2.69	-0.72	48.96	49.66	2.26
26	26	1.7	20.37	34.92	34.56	13.69	8.80	3.42	2.76	3.16	-0.36	35.99	36.32	1.71
27	27	1.5	22.17	31.72	30.15	15.05	9.09	2.67	2.45	3.24	-1.57	33.39	33.49	1.43
28	28	1.1	19.88	30.63	30.00	13.20	7.36	2.50	2.17	2.70	-0.63	31.81	32.26	1.54

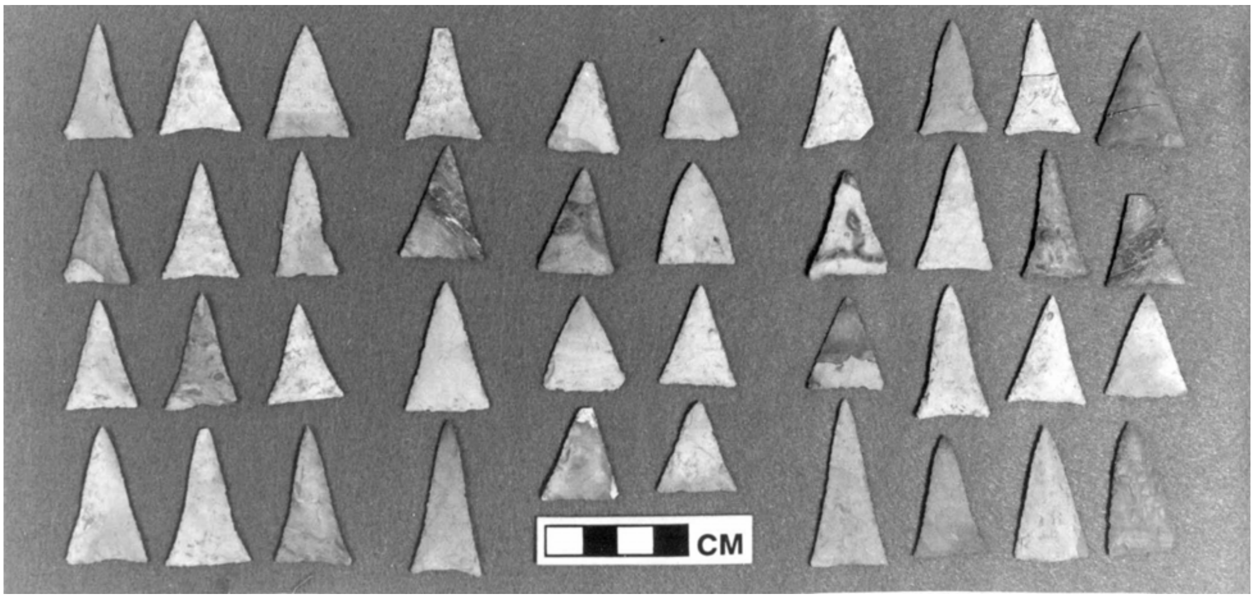
TABLE 4.1 (Continued)

Case #	Spec #	Gram	Base	Max	Mid	Width	Width	Thick	Thick	Max	Max-Mid	Left	Right	Length
		Weight	Width	Length	Length	1/3	2/3	1/3	2/3	Thick	Length	Blade	Blade	Width
29	29	1.4	19.97	32.24	31.38	12.59	7.26	2.86	1.99	3.24	-0.86	34.63	32.15	1.61
30	30	1.2	19.09	32.28	32.01	12.02	6.66	2.56	2.34	2.86	-0.27	33.43	33.21	1.69
31	31	1.5	22.28	33.61	33.02	14.79	8.06	2.97	2.25	3.11	-0.59	35.08	35.37	1.51
32	32	1.6	20.31	36.48	35.60	12.06	7.25	2.85	2.39	3.37	-0.88	38.06	37.89	1.80
33	33	1.6	22.89	36.54	35.03	13.68	8.26	3.01	2.50	3.20	-1.49	38.82	37.53	1.60
34	34	2.1	24.52	32.80	31.75	17.99	9.79	2.68	3.01	3.44	-1.05	34.70	34.46	1.34
35	35	1.8	22.96	29.70	29.17	17.18	10.35	3.03	2.64	3.19	-0.53	30.93	30.88	1.29
36	36	2.7	19.96	38.08	37.97	16.86	11.35	3.09	3.30	3.47	-0.11	38.88	38.38	1.91
37	37	1.5	22.52	27.12	26.89	18.25	9.82	2.73	2.34	2.79	-0.23	27.96	28.08	1.20
38	38	1.3	22.04	30.63	29.92	15.12	8.53	2.90	2.28	2.98	-0.71	32.45	32.38	1.39
39	39	1.3	17.42	35.00	34.66	12.09	7.52	2.64	2.45	2.80	-0.34	35.56	35.91	2.01
40	40	1.8	19.48	44.01	42.42	12.70	7.79	2.84	2.39	3.17	-1.59	44.80	45.19	2.26
41	41	1.6	22.97	31.83	31.13	14.94	8.13	3.11	2.10	3.16	-0.70	33.58	33.52	1.39
42	42	1.6	22.51	31.60	30.92	16.39	9.98	2.75	2.37	2.97	-0.68	32.26	33.30	1.40
MAX		2.70	27.91	48.33	47.61	18.25	11.35	4.02	3.39	4.21	0.33	48.96	49.66	2.26
MIN		1.00	17.42	25.25	25.19	12.02	6.35	2.22	1.91	2.69	-1.59	26.47	26.50	1.01
RANGE		1.70	10.49	23.08	22.42	6.23	5.00	1.80	1.48	1.52	1.92	22.49	23.16	1.26
AVG		1.60	21.42	33.42	32.80	14.44	8.37	2.87	2.45	3.14	-0.62	34.77	34.83	1.57
STD		0.36	1.72	5.07	4.96	1.67	1.16	0.31	0.36	0.30	0.49	4.86	4.90	0.27
VAR		0.13	2.98	25.73	24.64	2.80	1.35	0.10	0.13	0.09	0.24	23.63	23.97	0.07

LIST OF FIGURES

Figure 4.1 The DHPA has removed this image from the public version of this electronic document because it contains sensitive information regarding human remains. If you need access to this information for professional research purposes, please contact the DHPA.

Figure 4.2 Projectile points from the Secrest-Reasoner site (12Bl1).



CHAPTER FIVE

SKELETAL BIOLOGY AND CEMETERY USE AT THE ALBEE MOUND, BUCCI, SHAFFER, AND SHEPHERD SITES

Lorena M. Havill, Andrew A. White, and Kimmarie A. Murphy

INTRODUCTION

The term "Albee" is generally used to describe a Late Woodland manifestation in central Indiana dating to approximately A.D. 800 to 1300. Though mortuary sites in west central Indiana were especially important to Winters's original (1967) definition of Albee, little substantive research has been performed on the skeletal remains from those sites. Remains from related mortuary sites excavated subsequent to Winters's definition have likewise gone largely unanalyzed.

Here we examine skeletal remains from the Albee Mound (12Su1), Bucci (12Gr388), Shaffer (12Gr109), and Shepherd (12Gr60) cemeteries. The Albee Mound cemetery was situated on a natural knoll near the Wabash River in Sullivan County, Indiana. The Bucci, Shaffer, and Shepherd cemeteries are located along the West Fork of the White River in Greene County (Figure 5.1). Primary published information on theses sites is rather limited (Black 1933; Harrel 1979; MacLean 1927; MacLean 1931; Tomak 1970). Additional information is available in Mangold et al. 1994 and in unpublished field notes (Black 1932; Neumann n.d.) and unpublished papers (Faust 1961; Lynch 1975). Available information on the excavation of these sites has been summarized previously (White 1998). At least 163 burials have been excavated from the four sites. Skeletal remains of approximately 135 individuals from these burials are presently curated at Indiana University in Bloomington, Indiana.

Several recent studies suggest diversity in mortuary practice and skeletal biology during the Late Woodland in west central Indiana (Havill and Murphy 1998; Schmidt 1998; White 1998). Given the 500 year duration of "Albee" and the social and dietary changes which occur during the Late Woodland, it seems likely that some variation in the occurrence of pathologies may be related to temporal factors. We present an analysis of skeletal biology and duration of cemetery use in light of White's (1998) identification of early and late mortuary components among the four sites considered here. It should be noted that the term component is used in the context of this paper to describe artificial chronological groups of burials, but does not imply that those groups are components in the sense of the Midwestern Taxonomic Method (McKern 1939).

MATERIALS AND METHODS

Early and late components (Component 1 and Component 2, respectively) were separated from the total series based on burial position, diagnostic artifact associations, and superposition

(White 1998). Carr (1995) notes that burial position, orientation, and the arrangement of artifacts in the grave are more often influenced by ideological factors rather than social factors. Hodder (1982) has advanced similar ideas. For the purposes of the present research, differences in burial position (in combination with diagnostic artifacts when available) were used to identify two "ends" of a continuum beginning with those individuals interred on their backs with hips loosely flexed (angle between femur and spinal column > 60°), and ending with those interred on their sides with hips tightly flexed (angle between femur and spinal column < 60°). Hip flexure of 60° was considered "indeterminate." Figure 5.2 illustrates the burial positions representative of Component 1 and Component 2. In many cases, burials could not be assigned to either component because information on burial position was either insufficient or unavailable. One burial (12Gr60-15) was assigned to a component based solely on diagnostic artifact associations. Table 5.1 lists the attributes of each component (see White 1998 for a more detailed justification of component construction). The analysis presented here involves only those burials from the four sites that could be confidently assigned to a component. These burials are listed in Table 5.2.

Extended burials were excluded from this analysis because they are most likely of Middle Woodland origin (see White 1998). Among the four cemeteries, extended burials occurred only at Shaffer, a site with a Middle Woodland occupation. Based on an analysis of burial superposition and fluoride content, extended burials seem to predate the loosely flexed (Component 1) burials (White 1998).

The temporal ordering of Groups 1 and 2 is suggested by diagnostic artifact associations. When associated with diagnostic artifacts, burials assigned to Component 1 were interred with Jack's Reef Cluster (Justice 1987) projectile points and uncollared ceramic vessels. Diagnostic artifact associations were relatively uncommon in Component 2. A single Component 2 burial from the Shepherd cemetery was associated with serrated and un-serrated triangular projectile points. Also, one burial from Albee Mound was associated with a vessel that is possibly collared (MacLean 1931: 168, Plates 41 and 42).

Seeman (1992) suggests that Jack's Reef Cluster projectile points date to approximately A.D. 700-900 and represent the first true arrowheads in eastern North America. Though it is difficult to precisely estimate the age of the triangular projectile points from the Shepherd burial, they are generally isosceles in shape (Neumann n.d.), and are most likely later than the equilateral triangles which tend to predominate in early triangular assemblages (e.g., Geier 1983: 205; Stothers and Pratt 1981). Similar to other ceramic sequences in the upper midwest and Great Lakes areas, uncollared vessels occur early in the Albee sequence (McCord and Cochran 1994:68), eventually being replaced by collared forms. Further implications of these artifact associations are discussed below.

As shown in Table 5.1, 12 individuals represent Component 1, while 24 individuals represent Component 2. These groups were assessed for age, sex, and pathologies. Though bone preservation is good, many individuals are incomplete or fragmentary. A summary of the demography and representation within the skeletal sample is provided in Table 5.3. Age and sex estimations are based on the criteria presented in Buikstra and Ubelaker (1994) and Bass (1987). Dental wear scores are based on Scott's (1979) methodology. These scores are treated as ordinal data using median values to compare components. Comparisons are limited to middle adults because Component 1 includes no old adults, and Component 2 includes no young adults with teeth. Dental health is assessed in terms of frequency and type of dental caries, antemortem tooth loss and abscesses.

RESULTS

Dental Wear

There is a clear difference in median tooth wear between the two components (Figure 5.3). For the first mandibular molar (nM1), middle adults from Component 1 show a median wear score of score of 29 of a maximum score of 40. (A score of 40 would indicate that there is no enamel left on the tooth crown.) Component 2, however, yields a median wear score of 36 of 40. This difference is statistically significant at p=.04 (Wilcox on two sample test). The pattern is similar for the mandibular second molar. Component 1 shows a median score of 21 compared to the Component 2 median of 30.5. This indicates greater tooth wear in the later component, but the difference is not statistically significant (p=.34, Wilcoxon two sample test).

Dental Health

Caries data were examined for frequency of total teeth affected by caries, subdivided by tooth category (Powell 1988; Turner 1979). In both components caries are more common in teeth with morphological complexity (i.e., premolars and molars), as would be expected. The complicated morphology of these teeth, including many pits and fissures, increases their susceptibility to dental caries. Caries frequency data are shown in Table 5.4. Of all teeth from Component 1, only 2% are carious, compared to 6.6% for Component 2. Because some individuals are represented by more than one tooth, statistical tests for significance were performed using only the second molars. Eight percent of second molars from Component 1 are carious, compared to 21% in Component 2. A Fisher's exact test shows that this difference in caries frequency is not statistically significant (p=0.16). Chi-square tests performed using all teeth, and using only molars and premolars, also yield values that are far from statistical significance.

The two components do, however, differ significantly in the type of caries present. Figure 5.4 shows that all of the individuals with caries in Component 1 developed the pit and fissure variety. In Component 2, however, CEJ caries (those initiating at the cemento-enamel junction) are the most common type. A Fisher's exact test indicates that the difference between the two components in type of caries developed is statistically significant (p=.03).

Antemortem tooth loss and abscesses occur more frequently in Component 2 individuals; however, the accuracy of these two measures of dental health is suspect due to the fragmentary nature of the remains. Many individuals were not represented by enough alveolar bone to be evaluated. The apparent higher frequencies in Component 2 make sense in light of the higher caries rates and dental wear in this component. In 22% of the individuals with teeth in Component 2, dental wear has resulted in pulp cavity exposure, as compared to zero individuals in Component 1.

Anemia

Healed cribra orbitalia is a porosity of the orbital roof resulting from diploic expansion at the expense of the outer bone table that is indicative of anemia. The anemic state most often results from either a dietary iron deficiency or a high pathogen load (Stuart-Macadam 1992). This condition is not present in any of the five Component 1 individuals with scorable orbits. In Component 2, however, 25% (3 of 12) of the individuals with scorable orbits display this condition (one infant, one subadult aged 15-20, and one middle adult female). This difference is interesting, but not statistically significant (Fisher's exact, p=.32).

Metabolic Disturbance

In addition to cribra orbitalia, another condition occurs exclusively in Component 2. Three of the 24 individuals from this component (two middle adults and one adult of unknown age) present signs of aberrant bone mineralization. These manifestations are listed in Table 5.5. These symptoms clearly stem from a problem with the bone modeling and remodeling systems, but a specific diagnosis is difficult. A porotic form of rickets is unlikely because the metaphyses are neither flared nor cupped (Ortner and Putschar 1981). The lack of endosteal deposition of osteoid makes hyperplastic rickets another unlikely candidate (Ortner and Putschar 1981). Because there is no reason to suspect a lack of dietary vitamin D, it is likely that the disorder involves vitamin D metabolism. Hereditary conditions such as renal tubular disorders, hypophosphatemia, and pseudo-deficiency rickets are possibilities to be explored (Glorieux 1991). The frequency of this condition in the later component may be higher than the current analysis indicates. Two individuals from Shaffer cemetery who could not be assigned to a component also show remodeling abnormalities. In both cases, tooth wear suggests that they belong to Component 2, but they cannot be included as part of this analysis due to the circular reasoning involved in their component assignment.

DISCUSSION

Skeletal Biology

Differences in the types of caries that occur in the two components are intriguing. Hillson (1996) notes that an introduction of starchy foods into the diet is associated with an increase in root and CEJ caries. The exclusive occurrence of this type of caries in the later component is interesting in light of Bush's research (this volume) identifying an apparent decline in nut use, and concurrent increase in maize use during the Late Woodland. At Morell-Sheets, the only Albee site yielding botanical remains, Bush finds a clear increase through time in the cultivation of maize and little barley. The differences in dental health between Component 1 and Component 2 reflect the same trend. Nevertheless, heavier use of maize and little barley in Component 2 does not explain the more heavily worn teeth of these individuals. It is possible that the heavy dental wear actually results from methods of food processing which introduce grit into the diet.

The presence of healed cribra orbitalia in Component 2, but apparent absence from Component 1, may be related to the intensification of maize use as well. Increased reliance on horticultural products over time at Albee sites would likely be accompanied by increased sedentism. Higher parasite load associated with sedentism may explain the anemia present in Component 2 individuals. (See Stuart-Macadam and Kent 1992 for an in depth explanation of the relationships among sedentism, parasite load, and iron-deficiency anemia.) An iron-poor diet could be the cause, but since iron is common in many foodstuffs, the presence of anemia more likely reflects the effects of increased sedentism. It is important to note, however, that sample size for Component 1 is extremely small in this part of the analysis. For this reason, the apparent difference in the occurrence of anemia between the two components will be the subject of further research involving other Albee mortuary populations conforming to the other Component 1 and Component 2 attributes.

The significance of the metabolic disturbance affecting bone mineralization, occurring only in Component 2, is currently unknown. The peculiarity and frequency of the condition merits further investigation. Histological analysis is in progress. This analysis should provide insight into the precise nature of the remodeling aberration (Burr and Martin 1989), thereby affording greater interpretive value.

Cemetery Use

While it is difficult to assign a specific date range to each of the cemeteries, it is possible to propose a general chronology of cemetery use based upon the proportion of Component 1 and 2 burials present at each site and the artifacts associated with those burials (Figure 5.5). The occurrence of projectile points and ceramics at more securely dated sites assists in assigning dates to the cemeteries considered here. At the Morell-Sheets site, collared sherds dominate the ceramic assemblage, accounting for 93% of the rim sherds collected (McCord and Cochran 1994: 44). Jack's Reef Cluster projectile points were absent from Morell-Sheets, and the triangular projectile points from the site fit variously into the Levanna, Madison, and Hamilton Incurvate varieties as defined by Justice (1987) (McCord and Cochran 1994). The data from Morell-Sheets suggest that many of the Component 1 burials from the four cemeteries considered here probably predate the heaviest use of the Morell-Sheets site (ca. A.D. 850-1200). The uncollared vessels from Shaffer and Albee Mound are perhaps roughly analogous to the uncollared Wayne Cordmarked vessels described by Fitting (1965: 158-159), which were associated with Jack's Reef Cluster projectile points at the Fort Wayne Mound in southeastern Michigan (Halsey 1968). Though the vessel forms used in funerary ritual are not necessarily the same as those used in everyday activities, it seems unlikely that collared rims, if frequently used, would be so drastically under-represented.

The loosely flexed, supine burials at Hesher suggest that use of this rather distinctive burial position continued after the disappearance of Jack's Reef Cluster projectile points, as burials were associated with triangular projectile point forms tending towards an equilateral shape (Cochran et al. 1988: 32). A single vessel associated with a burial at Hesher was collared (Cochran et al. 1988: 44-45). Radiocarbon dates for the site suggest an occupation within the period A.D. 850-1000.

The temporal placement of Component 2 is more difficult. The majority of burials at the Commissary site (12Hn2) were interred on the side with the legs flexed, though loosely flexed burials also occurred (Swartz 1982). Burials at the Secrest-Reasoner site (12Bl1) were interred on the side with legs flexed (Black 1935). Jack's Reef material was absent from both of these sites, replaced by various triangular forms (occasionally as burial associations). Given the burials at Hesher, it seems likely that most of the burials in Component 2 may have been interred subsequent to the peak in popularity of the earliest triangular forms, perhaps sometime after A.D. 1000. Oliver Phase materials in the White River Valley date to the period A.D. 1200-1450 (Redmond and McCullough 2000), suggesting a terminal date of approximately A.D. 1200 for Component 2.

Given the general chronology of projectile point types and ceramic vessel characteristics established by the Morell-Sheets and Hesher sites, the Albee Mound cemetery was probably the first of the four cemeteries considered here to be used during the Late Woodland. Based upon the suggested (Seeman 1992) age of Jack's Reef projectile points, the cemetery was probably used most heavily in the period A.D. 700-900. The presence of several burials assigned to Component 2 indicates that use of the cemetery probably continued into the later portion of the Albee sequence. A range of A.D. 700-1050 is proposed for the Albee Mound cemetery.

Shaffer cemetery was in use during the early part of Albee as well. Jack's Reef material is absent from burials at Shaffer, suggesting that establishment and/or use of the cemetery may have been later than at the Albee Mound. The cessation of cemetery use at Shaffer is difficult to fix, as Shaffer is a complex site of unknown size, with occupations dating to at least the Middle Archaic (Justice 1987: 112). While no Component 2 burials were identified at Shaffer among the burials excavated by Black, undated burials have since been recovered that show the same plastic disease as was observed among Component 2 burials. The absence of collared vessels among the burials at Shaffer, however, and the absence of Component 2 burials from the cemetery area reported by Black (1933), suggest that the Shaffer cemetery was also in use most heavily early in the Albee sequence. A range of A.D. 750-1100 is proposed for the Shaffer cemetery.

Bucci cemetery seems to have been in use throughout Albee, though use was heaviest in the later portion. Artifact associations are uncommon at Bucci, and the available data on burial position suggest that most of the burials were tightly flexed and interred on their sides. The presence of several loosely flexed burials, however, and one individual interred with an uncollared vessel (Tomak 1970: Figure 39), suggest that the cemetery was in use early in the Albee sequence. A range of A.D. 850-1200 is proposed for the Bucci cemetery.

Based upon the number of burials assigned to Component 2, Shepherd cemetery reflects use during later Albee. No Component 1 burials were identified on the basis of burial position or diagnostic artifact associations. Information about the site, however, is limited, and many of the burials were recovered after being looted. It is plausible that Shepherd was in use throughout more of the Albee sequence, but the burials for which there is good information are late. This would result in earlier burials being excluded from the analysis of Components 1 and 2. A range of A.D. 900-1200 is proposed for the Shepherd cemetery.

Differences in the skeletal biology of Components 1 and 2, and among the four cemeteries, support the chronology of cemetery use presented in Figure 5.5. Bush (1994, this volume) demonstrates noticeably greater maize use during the later portion of the occupation of the Morell-Sheets site, corresponding to Component 2. Stable carbon isotope analysis of one burial from Hesher indicated that maize was a very small component of the diet (Cochran et al. 1988: 85). An analysis of the Hesher, Commissary, and Secrest-Reasoner sites in light of the data presented here may help to refine the chronology proposed here.

CONCLUSION

In all, the data suggest that Winters's (1967) definition of the Albee Complex is in need of refinement. The inclusion of Jack's Reef material within what has commonly come to be called the Albee Phase is questionable (Cochran et al. 1988; McCord and Cochran 1994; Redmond and McCullough 2000). The presence of Jack's Reef Cluster projectile points and uncollared ceramic vessels with burials from the Albee Mound and Shaffer cemeteries, coupled with the absence of CEJ caries and aberrant bone remodeling from Component 1 burials suggests that an early portion of the Albee mortuary sequence is related to a predominantly non-agricultural component using Jack's Reef technology. Clearly, this is different from the common conception of Albee. It is also clear that there is considerably continuity in the burial practices and material assemblages of early and late Albee, and that early Albee eventually becomes late Albee. Given that the term "Albee," used in reference to material culture, is now generally understood to exclude Jack's Reef material and include the use of maize and collared ceramic vessels, it seems that it is the earlier portion of the sequence considered here that requires the most vigorous re-examination. Skeletal and mortuary evidence from west-central Indiana indicates that both early and late "Albee" should be understood as parts of a continuing tradition. It seems there is also much to be gained by examining Albee in a broader temporal and geographical context, and by further analyses integrating mortuary and non-mortuary data.

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LIST OF TABLES

Table 5.1. Attributes of Component 1 and Component 2 Burials

Component 1 (n=12)	Component 2 (n=24)
Loosely flexed burials, supine.	Tightly flexed burials on their sides.
Jack's Reef Cluster projectile points.	Artifact associations less common than in Component 1.
Ceramic vessels with uncollared rims.	Sole ceramic vessel found has collared rim.
	Triangular projectile points.

Table 5.2. Burials Assigned to Component 1 and Component 2

Component	Site	Burial	Age Category	Sex	Back/side	Flexure
2	12Gr60	15	--	m	?	?
2	12Gr60	20	subadult	n/a	side	indeterminate
2	12Gr60	10	subadult	n/a	side	tight
2	12Gr60	26	old adult	f	side	tight
2	12Gr60	40	middle adult	f?	side	tight
2	12Gr60	39	middle adult	f	side	tight
2	12Gr60	37	old adult	m?	side	tight
2	12Gr 388	33	middle adult	m?	side	tight
2	12Gr 388	42	young adult	f	side	tight
2	12Gr 388	36	middle adult	indeterminate	side	tight
2	12Gr 388	34	middle adult	f	side	tight
2	12Gr 388	32	middle adult	f	side	tight
2	12Gr 388	10	young adult	f	side	tight
2	12Gr 388	25	old adult	m	side	indeterminate
2	12Gr 388	43	middle adult	m?	side	tight
2	12Gr 388	24	?	indeterminate	side	tight
2	12Gr 388	39	old adult	m?	side	tight
2	12Gr 388	13	old adult	m?	side	tight
2	12Gr 388	2	middle adult	m?	side	unknown
2	12Gr 388	1	old adult	m?	side	unknown
2	12Su1	33(36)	subadult	n/a	side	tight
2	12Su1	(41.b)	middle adult	m?	side	tight
2	12Su1	35(41.a)	Subadult	n/a	side	indeterminate
2	12Su1	18(19)	old adult	f	side	unknown
1	12Gr 388	17	subadult	n/a	back	loose
1	12Gr 388	11	middle adult	m	back	tight
1	12Gr 388	18	young adult	f?	back	loose
1	12Gr 388	16	middle adult	m?	back	loose
1	12Gr109	25	subadult	n/a	back	loose
1	12Gr109	4	young adult	m	back	loose
1	12Su1	1(1)	?	m?	--	--
1	12Su1	30(32)	subadult	n/a	back	loose
1	12Su1	(32)25	middle adult	f	back	tight
1	12Su1	20(21)	middle adult	f	back	loose
1	12Su1	27(30)	middle adult	m?	back	loose
1	12Su1	11(14)	middle adult	m	back	loose

Table 5.3. The Skeletal Sample: Demography and Skeletal Representation

	Component I					Component II				
	Shepherd	Shaffer	Bucci	Albee	Total N	Shepherd	Shaffer	Bucci	Albee	Total N
Demography										
Subadults	-	1	1	1	3	2	-	-	2	4
Adults	-	1	3	5	9	5	-	13	2	20
Females	-	-	1	2	3	3	-	4	1	8
Males	-	1	2	3	6	2	-	7	1	10
Unknown	-	-	-	-	-	-	-	2	-	2
Sample Total	-	2	4	6	12	7	-	13	4	24
Skeletal Representation										
Cranial only	-	-	-	-	-	-	-	1	1	2
Postcranial only	-	-	1	1	2	2	-	2	-	4
Both: poor*	-	-	2	1	3	2	-	7	-	9
Both: fair to good	-	2	1	4	7	3	-	3	3	9
Sample Total		2	4	6	12	7	-	13	4	24

* <50% of skeleton complete

Table 5.4. Frequency (%) of Carious Teeth by Tooth Type: Total Adult Sample

	Component I								Component II							
	Shaffer		Bucci		Albee		Total		Shepherd		Bucci		Albee		Total	
Tooth	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Maxilla																
I1	1	0.0	1	0.0	4	0.0	6	0.0	3	0.0	3	0.0	0	0	6	0.0
I2	2	0.0	1	0	2	0	5	0	4	0	4	0	0	0	8	0.0
C	2	0.0	4	0.0	3	0.0	9	0.0	3	33.3	6	0.0	0	0	9	11
P3	1	0.0	2	0.0	4	0.0	7	0.0	3	33.3	6	0.0	0	0	9	11
P4	1	0.0	4	50.0	5	0.0	10	20.0	5	0	5	0.0	0	0	10	0
M1	1	0.0	4	0.0	5	0.0	10	0.0	6	16.6	6	16.6	2	0	14	14
M2	2	0.0	4	25.0	6	0	12	8.3	4	25.0	7	28.6	0	0	11	27
M3	2	0.0	3	0.0	5	0.0	10	0.0	3	0.0	5	20.0	0	0	8	13
Mandible																
I1	2	0.0	2	0.0	5	0.0	9	0.0	5	0.0	2	0.0	4	0.0	11	0
I2	2	0.0	0	0.0	5	0.0	7	0.0	4	0.0	3	0.0	2	0.0	9	0
C	2	0.0	2	0.0	5	0.0	9	0.0	4	0.0	6	0.0	1	0.0	11	0
P3	2	0.0	1	0.0	5	0.0	8	0.0	4	0.0	3	0.0	1	0.0	8	0
P4	2	0.0	3	0.0	4	25.0	9	11.1	4	0.0	4	0.0	0	0.0	8	0
M1	2	0.0	3	0.0	5	20.0	0.0	0.0	6	0.0	9	0.0	3	33.3	18	5.6
M2	1	0.0	5	0.0	6	16.6	12	8.3	3	33.3	9	0.0	1	100.0	13	15
M3	1	0.0	3	0.0	6	16.6	10	10.0	1	0.0	11	0.0	1	0.0	13	0.0
TOTAL	26	0.0	42	0.0	75	4.0	143	2.0	62	8.1	89	4.5	15	13.3	166	6.6

Table 5.5. Skeletal Manifestations of Metabolic Disturbance at Shaffer & Shepherd Cemeteries

Loosely organized cortex consisting of a mixture of woven and sclerotic bone.
Later expansion of medullary cavity and osteoporosis.
Anterior and lateral bowing of longbones.
Other indications of increased or prolonged plasticity (i.e., atypical muscle markings).
Periostosis and subsequent remodeling.

LIST OF FIGURES

Figure 5.1. Locations of Albee Mound, Bucci, Shaffer, and Shepherd cemeteries.

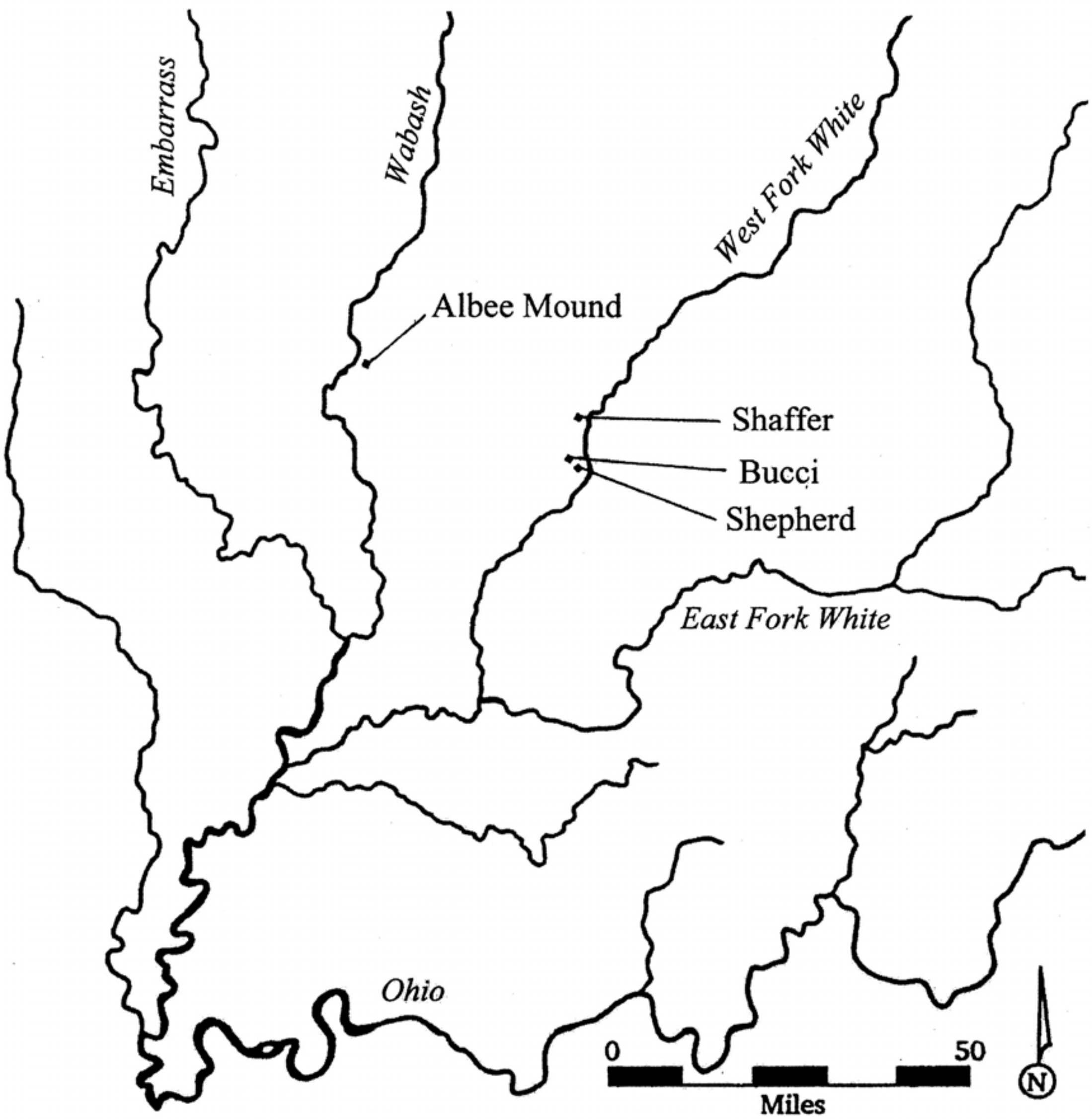

Figure 5.2. The DHPA has removed this image from the public version of this electronic document because it contains sensitive information regarding human remains. If you need access to this information for professional research purposes, please contact the DHPA.

Figure 5.3. Median Scott molar wear scores for each component by age category.

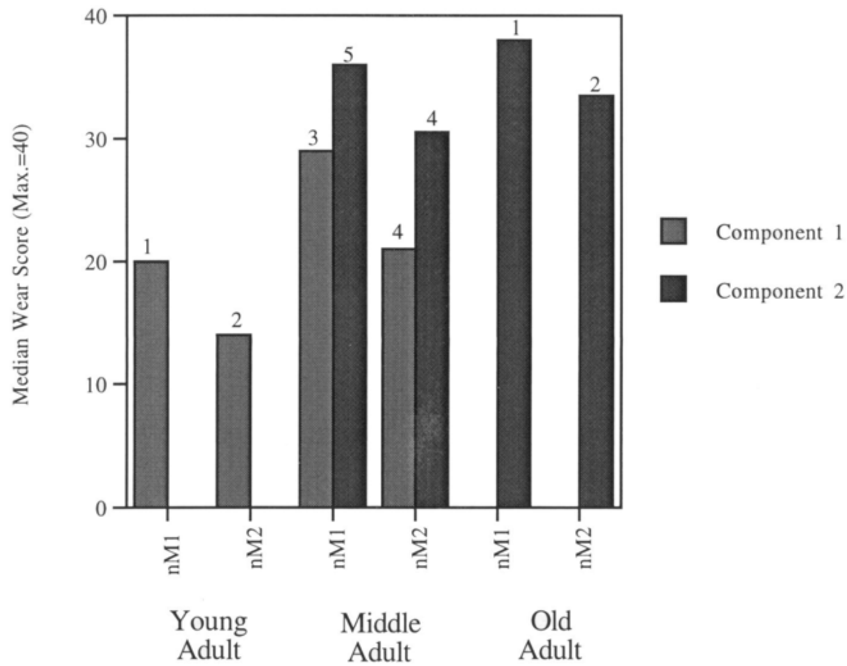

Figure 5.4. Caries type by component.

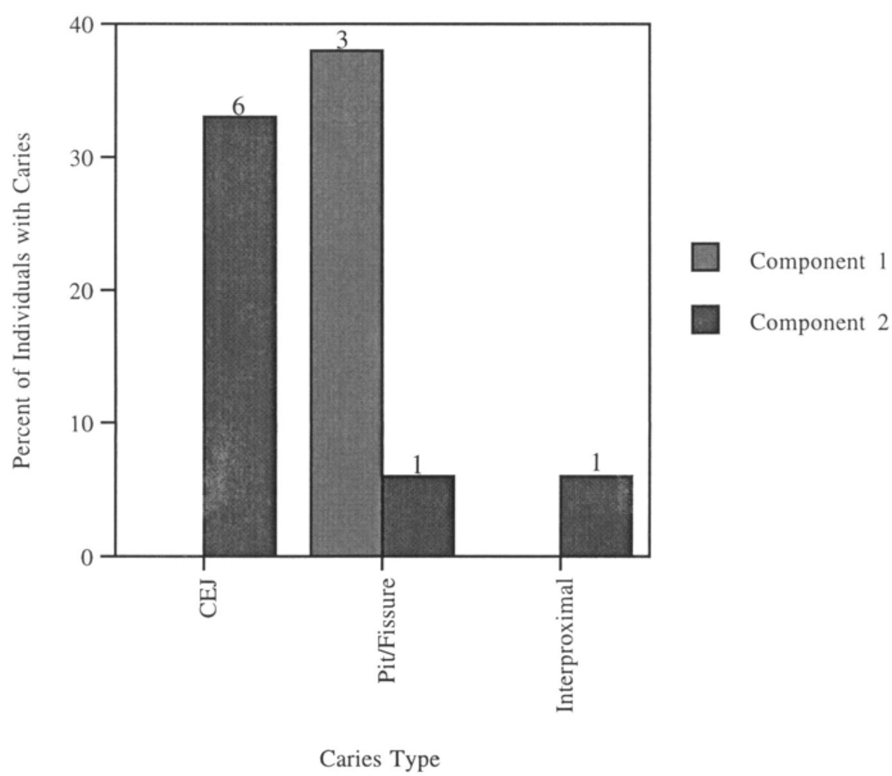

Figure 5.5. The DHPA has removed this image from the public version of this electronic document because it contains sensitive information regarding human remains. If you need access to this information for professional research purposes, please contact the DHPA.

CHAPTER SIX

PATTERNS OF CHANGE IN BOTANICAL REMAINS FROM SOUTHERN INDIANA DURING THE LATE WOODLAND AND LATE PREHISTORIC

Leslie L. Bush

INTRODUCTION

The period from roughly A.D. 700 through European contact saw vast cultural changes throughout the Eastern Woodlands. Some of the most important of these have to do with plant subsistence practices, most notably an increase in the intensity of cultivation and the introduction of maize. Much of our knowledge about these practices comes from a few well-known areas such as the American Bottom and the lower Illinois valley. Botanical remains from sites in what is now Indiana have been almost entirely unavailable until very recently. The purpose of this paper is to gather what data on Late Woodland and Late Prehistoric plant remains exist for southern Indiana and to incorporate them into a regional framework. Because the data set is relatively limited, this work is necessarily qualitative and descriptive.

In keeping with other articles in this volume, this paper focuses on the Albee and Oliver phases, on the Wabash and White Rivers in central and southern Indiana. Before those phases are discussed, plant use in the study area immediately prior to A.D. 700 is outlined briefly.

SETTING THE SCENE

Botanical Data Set

The quality and quantity of data for Late Woodland sites dating prior to A.D. 700 vary considerably. All the sites included in this study were flotation-processed, but some were processed in systems with fairly large bottom mesh sizes, the largest being 1/8" at the Bratfish site.

All sites in the study have been assigned cultural phase designations by their principal investigators. Of course cultures are in a continual process of change, negotiated by those within and without and in response to circumstances foreseen and unforeseen. Or, as Hegel so famously put it, everything is always becoming. Nonetheless, phase designations have a long and (mostly) respectable tradition in archaeology and have functioned as useful heuristic devices for those trying to make sense of the past. It is for this reason that phase designations are used here.

The seven Late Woodland sites for which data were compiled for this study belong to the Late Woodland Allison-LaMotte and Newtown phases. In addition, three features from two Emergent Mississippian Yankeetown Phase sites are included for comparison (Figure 6.1). All of these sites are from the southern half of the state, and all are on major rivers. Five are in the floodplain, with the other four sites being at the edge of terraces of bluffs immediately above the river or floodplain. While the Newtown Phase as a whole dates from approximately A.D. 300-800, in this sample the Newtown sites tend to date earlier than the Allison-LaMotte sites. That phase runs approximately A.D. 200-700, with sites included here being in the later part of the period. The two Yankeetown sites date to the eighth century.

Cultural Background

The Newtown Phase is centered geographically on the Middle Ohio and Lower Scioto river drainages. Newtown ceramics are characterized by flattened lips, direct rims, vertical cordmarking and a particular kind of angular shoulder on some jars, which is currently the only unique diagnostic trait recognized for Newtown. Projectile points typically belong to the Steuben/Lowe/Chesser cluster. Newtown sites are found in a wide variety of environmental zones, but to date there seems to be no seasonal pattern of variation in settlement. Burial mounds are associated with some sites (Ahler 1988:39-40). Botanical data for the three Newtown Phase sites are from Reidhead (1976), O'Brien (1997) and Scarry (1992).

The spatial distribution of the Allison-LaMotte Phase is shown in Figure 6.1. It is often characterized as a "southern" culture because of the similarity between its Embarrass series pottery and other surface stamped pottery in what is now the southeastern United States. Allison-LaMotte ceramics belong to either the Stoner or Embarrass series and projectile points are typically Lowe Flared Base points. Allison-LaMotte sites tend to be large villages located on sandy terraces in ecotonal locations. Small mounds or groups of mounds are often found near Allison-LaMotte sites (Redmond and McCullough 1997:7-15). Botanical data for the four Allison-LaMotte sites are taken from Bush (1997, 1998 and 1999).

Two Emergent Mississippian Yankeetown sites are also included in the study, to round out the chronology and to show sites contemporary with early Albee whose inhabitants embarked on a very different historical path. The spatial distribution of the Yankeetown Phase is show in Figure 6.1. Botanical data for the Yankeetown sites are taken from Redmond (1990) and Scarry (1991).

Chronology

Figure 6.2 shows the radiocarbon dates from the seven Late Woodland and Emergent Mississippian sites for which dates have been reported. It should be noted that Van Reidhead, the original excavator of the Leonard Haag site, rejected the two earliest dates for this site when he received them more than 20 years ago. Such an interpretation would place the site later in the chronology than it appears here (Reidhead 1976:49). We now know that the Newtown Phase extends farther back in time, and I follow Steve Ahler (1988:115) in allowing these earlier radiocarbon dates.

Discussion

In general, Indiana Late Woodland sites are characterized by botanical collections typical of Late Woodland elsewhere in the Eastern Woodlands. The collections reflect a horticultural economy based on native starchy seeds and cucurbits, supplemented by the gathering of wild plant resources, especially nuts. The oily-seeded crops grown in some parts of the Eastern Woodlands are sparse here. For example, the nine sites in this sample yielded a total of three sunflower and sumpweed fragments.

The cultivated status of many plants in the eastern woodlands has been discussed in detail elsewhere (e.g., Asch and Asch 1985; Cowan 1978; Dunavan 1993; Fritz 1990; Smith 1992). Pepo squash, sunflower, sumpweed and goosefoot all exhibit morphological correlates of domestication by at least 1000 BC, and erect knotweed may exhibit changes associated with domestication by Late Woodland times. Two other native, starchy-seeded plants (little barley and maygrass) are believed to have been cultivated based on their occurrence in large quantities, association with known crops, and archaeological occurrence outside their "natural" ranges. Bottle gourds are presumed cultivated for the latter two reasons. For purposes of this paper, all of the above-mentioned plants will be presumed to have been cultivated — or at least strongly encouraged in wild stands — by the people who used them. In terms of human scheduling, the difference between domestication and cultivation probably matters very little, as the economics of agricultural decision-making would be similar in either case. The difference between cultivation and encouragement is perhaps greater, because a planting season would have to be scheduled in the former case. The reliance on particular plant species as an important part of subsistence, however, is similar whether the plant in question is domesticated, cultivated, or encouraged. Since the relative economic importance of these plants is the focus of this study, plants falling in all three categories are treated similarly here under the heading "cultivated plants."

Three trends in the Indiana Late Woodland botanical data are of special interest. First is the apparent decline in nut use over time. The graph of nutshell quantities shown in Figure 6.3 is standardized by weight to wood charcoal, but the trend holds up well to standardization by seeds too, both in comparisons of nutshell weight to counts of seeds and counts of nutshell to counts of seeds. This decline in nutshell in botanical collections probably represents a real change in nut use rather than simply a change in archaeological visibility, since nutshell is among the most highly visible of plant remains. In addition, all nine sites share broadly similar ecological situations, so earlier data are unlikely to be biased towards locales with easier access to nut resources. It should be noted, though, that little is known about the seasonality of these sites, so this could be a source of bias. Nevertheless, the apparent trend toward decreasing nut utilization presages the low nutshell quantities seen on Late Prehistoric Oliver sites in central Indiana and on Fort Ancient sites in the eastern part of the state. The trend parallels similar trends in the Ohio Valley and Central Illinois and Missouri river valleys sites surveyed by Simon (1997). Jack Rossen, who sees the same trend in Kentucky, suggests that the actual peak may have occurred in the Late Archaic period and that the Middle Woodland also sees fewer squash remains (Rossen in Davis 1997). The trend toward decreased nut utilization in these areas contrasts with the trend in the Illinois Uplands, where nut usage remains important throughout the Late Woodland (Simon 1997). It is likely that the decline in nut utilization is related to scheduling conflicts and increasing cultivation of fall-maturing crops.

The second trend is that there is—probably—a peak in the archaeological visibility of cucurbits (mostly squash rind) in southern Indiana during the middle Late Woodland (Figure 6.4). Whether or not this is a real trend is much less clear than for declining nutshell. Cucurbit remains, even when relatively abundant, are typically much less numerous on archaeological sites than are nutshell fragments. For that reason, in addition to the vagaries of some of the data sets used here, a ubiquity index is the best standardization option available. It is used here despite its obvious problems for sites represented by a single feature. There are other reasons to believe that Figure 6.4 may represent an actual trend, however. First is the presence of squash effigies at the Daugherty-Monroe site, suggesting that cucurbits were important to Allison-LaMotte people (Pace and Apfelstadt 1980). Later Late Prehistoric peoples, in the same part of Indiana, for whom we are starting to have very good botanical data, leave almost nothing in the way of archaeological cucurbit remains. Further, this apparent trend occurs not just in Indiana but in many areas of the eastern Woodlands (Simon 1997). Gayle Fritz (1990) has suggested that this decline in archaeological visibility is not a decline in actual use, but rather a result of the development, or perhaps importation, of more succulent squash less likely to be preserved by carbonization.

Not surprisingly, given what is known about other regions of the Eastern Woodlands, the third Indiana Late Woodland trend is an apparent increase in corn use over time (Figure 6.5). Corn has been found associated with components of sites that date prior to A.D. 700 (e.g., Mann, Heaton Farm, Bratfish), but as far as I am aware, none has been reported from a single-component Middle Woodland or early Late Woodland site. Since none of the corn remains has been AMS dated, the possibility of contamination cannot be ruled out. Corn appears to increase in archaeological visibility over the course of the Late Woodland, and it is a significant crop by Emergent Mississippian times. Large quantities of corn kernels (725 grams) were recovered from Feature 9 at the Yankeetown site. It is also an important part of the assemblage at the Foster site. The native starchy seeds goosefoot, knotweed and maygrass (but not little barley) are important in the Emergent Mississippian as well.

In sum, the uses of plants seen in southern Indiana during the Late Woodland are generally similar to those seen in other regions of the Eastern Woodlands, at least most of those in the Ohio and Mississippi drainages. Cultivated starchy seeds contribute the vast majority of plant remains, supplemented by remains of cultivated oily-seeded plants and cucurbits. Wild plants are also present in significant quantities. Corn remains are present, but in small quantities until A.D. 800 or 900.

ALBEE PHASE

Cultural Background

Calibrated radiocarbon dates for Albee range from A.D. 800-1300. Albee is known primarily as a mortuary complex, but one single-component habitation site has been excavated, and this site has provided the only Albee botanical analysis to date. Albee's cultural ties tend to be to the north, with its closest ceramic affinities being the Aztalan Collared and Starved Rock Collared wares (McCord and Cochran 1994:61). Until recently, Jack's Reef points were thought to be characteristic of Albee, but we now know that triangular points are more typical (Redmond and McCullough 1997:25). Albee habitation sites in general tend to be much more diffuse and ephemeral than the large villages that characterize the earlier Allison-LaMotte. The spatial distribution of the Albee Phase is shown in Figure 6.6 (but see also McCord and Cochran, this volume).

Botanical Data Set

Botanical data for Albee come from a single habitation site, Morell-Sheets. As far as single site data sets go, however, one could certainly do worse than Morell-Sheets. When Cochran and McCord directed excavations at Morell-Sheets in 1992, they took large flotation samples from 36 contexts in 19 features. Flotation processing produced almost perfect separation of botanical material. Radiocarbon dates were performed on material from five of the features with analyzed botanical remains. The dates span almost the entire 500-year occupation of the site (which was seasonal and not continuous), so it is possible to see temporal trends very clearly in this data set.

Cultivated Plants

The plant assemblage at Morell-Sheets is dominated by the crop plants corn and little barley. Corn is ubiquitous, appearing in all but two of the features. It is only moderately abundant, with many features having only 10-20 kernel or cupule fragments. No cob fragments were recovered, so determination of corn row number is not possible. Perhaps the most interesting aspect of corn use at Morell-Sheets is temporal. As shown in Figure 6.7, the trend toward increasing cultivation of corn suggested by earlier Late Woodland data is very clear at Morell-Sheets.

Standardization of samples posed a particular problem at the Morell-Sheets site, since only the weight (in kilograms) and not the volume of flotation samples was recorded. When samples are not dried prior to flotation, weight data are not terribly reliable, given their sensitivity to the wetness of the sample. Other standardization metrics such as wood charcoal and nutshell are also likely to be unreliable at Morell-Sheets since relatively little nutshell and wood charcoal were encountered. Rather than risk the inaccuracies of a bad standardization, the data for Figures 6.7 and 6.8 have not been standardized at all. Sample size, as measured in kilograms, did vary by context, with by far the largest sample coming from Feature 3. The trend toward increasing maize use seems clear, however.

While the site as a whole does not contain extraordinarily great densities of starchy seeds per gram of wood charcoal or per flotation sample, there is a definite trend toward increasing starchy seed use over the site's occupation. In other words, starchy seed cultivation at this site is being intensified along with corn. This trend parallels what we see in the American Bottom during Emergent Mississippian times (Johannessen 1984), and it contrasts strongly with the replacement of starchy seeds by corn in the middle Ohio valley (Simon 1997).

As indicated in the legend for Figure 6.8, the starchy seeds at Morell-Sheets are almost exclusively little barley, which is usually the rarest of the native starchy seeds. At Morell-Sheets, little barley makes up about two-thirds of the entire botanical collection by count. It is almost certainly cultivated at Morell-Sheets, both because it is almost certainly cultivated elsewhere and because it is probably not native to Indiana (Deam 1940). Little barley is one of the two spring-maturing starchy seeds cultivated in the eastern woodlands. There is some tendency for little barley to be grown in the north, with maygrass more popular to the south (Simon 1997).

Nutritional Implications

The emphasis on little barley at Morell-Sheets is interesting for two reasons. First, most sites, both in Indiana and throughout the range of starchy seed cultivation, tend to be dominated by the fall-maturing goosefoot and erect knotweed. It is possible that these crops were grown but were simply not preserved on this early season site. Another fall crop, corn, is preserved here, however, so this possibility seems unlikely.

The preponderance of little barley is also an odd choice nutritionally, especially to cultivate along with corn. Corn is a notoriously poor source of protein, with green corn having only about 3.2 grams of protein per 100 grams fresh weight; mature corn is a bit higher (Kuhnlein and Tuner 1991). Therefore, alternative sources of dietary protein—or at least sources of complementary amino acids—are necessary to people who eat a substantial amount of corn. As a grass, little barley almost certainly has an amino acid profile similar to that of corn. Amino acid profiles of various grasses are shown in Figure 6.9. Although no profile was available specifically for little barley, comparison of the domestic and wild oat profiles indicate that wild grains do not differ significantly from their domesticated counterparts. A comparison of wild and domestic buckwheat (Figure 6.10) suggests that the same is true for some other seeds as well.

Proximate analysis has been performed on several native seed crops, but none specifically on little barley. Reported results of protein content from proximate analysis from various sources are given in Table 6.1. For reasons that remain unclear, the protein values quoted in the archaeological literature tend to be among the very highest values reported anywhere. Perhaps the species chosen for domestication by native Americans was always the species with the highest protein value in its genus. Perhaps archaeologists have simply stumbled across specimens with high protein values. The intent of this observation is neither to start nor to resolve disputes about the exact values, merely to point out that only a small number of measurements have been reported and that measurement and reporting error, however small, undoubtedly exists. The only information for a close North American relative of little barley is given by Kuhnlein and Turner, who report that *Hordeum jubatum* has about 3.8 grams of protein per 100 grams fresh weight (Kuhnlein and Turner 1991). It is used here as a proxy for *H. pusillum*.

The other starchy seeds of the Eastern Woodlands have considerably higher protein contents. Various species of goosefoot have been reported anywhere from 16 to 21 grams, with *Chenopodium berlandieri* in the high end of the range. Knotweed species range from 8 to 17 grams, again with *Polygonum erectum* in the high part of the range. Maygrass and close relatives range between 18 and 24 grams.

If *H. jubatum* is a reliable indicator of the protein content of *H. pusillum*, it would seem that little barley is the poorest source of protein among these plants. Even if the old world domesticate *H. vulgare* is chosen as a proxy for *H. pusillum*, it is still only in the *Polygonum* range and well below that of *Chenopodium* and *Phalaris*. None of the archaeological plant remains at Morell-Sheets suggest protein sources that would complement the corn and little barley, since nutshell and squash are extremely sparse and beans are non-existent. Presumably, then, most of the Morell-Sheets protein needs were met by animal products.

Wild Plants

In addition to the crop plants, there is a wide range of wild plants represented at Morell-Sheets. The most common of these is bramble (raspberry, blackberry and the numerous hybrids thereof). This fruit matures in late June and early July. Remains of fall-maturing fruits such as persimmon, grape and nuts were also present, but in very low numbers. Nutshell was well-represented in absolute numbers but sparse compared to earlier Late Woodland sites. Nutshell remains were divided roughly evenly among hickory, walnut, and hazelnut.

Discussion

Botanical remains from the Morell-Sheets site suggest that Albee peoples who lived there concentrated on local resources available in the late spring to early fall, the occupational season of the site. Farming was important, but specialized, in that it was limited to the cultivation of two grasses and possibly some cucurbits (there are two tiny, tentatively identified cucurbit rind fragments from the site). The two likely crops, corn and little barley, could have been grown together in the same floodplain fields. Little barley would most likely have been sown first, perhaps even in the fall since it is a winter annual in some places (Asch and Asch 1985). As a grass, it could easily withstand being walked on as people planted and tended young corn. Villagers would, however, have to avoid walking on it later, during the time the seed head was developing. Since little barley matures in mid to late June, its harvest would be complete before the maturing corn plants shaded it out.

Morell-Sheets site botanical remains suggest that Albee peoples were engaged in a subsistence strategy very different from that at other reported Late Woodland sites. The only other reported sites with such a preponderance of little barley are the Early Woodland component at Ambrose Flick, where 91% of the seeds are little barley, and the Middle Woodland component at Naples-Abbott, where 75% of the seeds are little barley (Hunter 1992: Tables 4 and 5). If anything, the little barley/corn pattern seems most related to the later Oneota combination of wild rice and corn, a comparison that makes a certain amount of sense, given the similarities between Albee ceramics and ceramic wares generally found to the north.

OLIVER PHASE

Cultural Background

Oliver Phase sites have been dated between roughly A.D. 1000 and A.D. 1450. Three types of sites are known: villages represented by surface scatters of more than one hectare, small habitation sites, and extractive camps (Redmond 1991). Villages tend to be located on terraces within one kilometer of the White River and a secondary stream. Oliver ceramics are characterized by the "unique congregation" of motifs found in Great Lakes Late Woodland and Fort Ancient wares, specifically cord-wrapped dowel impressions on lips and rims of jars and guilloche motifs on the necks and shoulders (Dorwin 1971:384). Triangular points are the most common formal chipped stone tool form (Redmond and McCullough 2000). The spatial distribution of the Oliver Phase is shown in Figure 6.10.

Botanical Data Set

The available data set for Oliver Phase plant use has very different biases than that for Albee. While Albee gave good temporal information at a single geographic location, Oliver data provide broad spatial coverage of the phase but within a limited time frame. Flotation-processed remains have been analyzed from nine sites, for a total of 1033.75 liters of soil representing 71 contexts in 55 features. Geographic coverage is good, with several sites from each fork of the White represented. Both villages and smaller habitation sites, but not extractive camps, are represented in the data set. The resulting picture of Oliver plant use is synchronic, rather than diachronic, though, because most of the sites, especially those from which many samples have been analyzed, date to the fourteenth century of the common era. The nine sites and reports from which botanical data have been taken are given in Table 6.2; their locations are shown in Figure 6.10.

Cultivated Plants

Corn remains are both ubiquitous and abundant on Oliver Phase sites, appearing in approximately 80% of all features, or 95% if post holes and otherwise botanically empty features are omitted from the calculation. At least one of the corn varieties grown appears to be Eastern 8-row, predecessor of the Northern Flint corns that were grown well into this century. Determination of row number comes from a total of two cob fragments, one from the Bowen site (Dorwin 1971) and one from Clampitt (Bush 1994), so clearly much work remains to be done in determining what varieties—or even how many varieties—of corn were grown.

Domesticated beans are conspicuous mostly by their absence in the Oliver archaeobotanical record. A few cotyledon fragments are found at the Clampitt and Sugar Creek sites, but in nowhere near the abundance in which they are found on many Fort Ancient sites (see Wagner 1987). Beans are first found on archaeological sites in the eastern woodlands around A.D. 1000 and become common around A.D. 1200, well before the period from which most Oliver botanical data are taken.

Like beans, squash remains are also sparse on Oliver Phase sites, continuing the trend seen in the earlier Late Woodland period. They consist of two tentatively-identified rind fragments from Cox's Woods site. Tobacco seeds found on several Oliver sites offer evidence of a fourth cultigen for Oliver peoples.

The native starchy and oily seeds cultivated by earlier peoples in the region are rare or absent on Oliver Phase sites. This pattern is consistent with Fort Ancient agricultural strategies and contrasts with the pattern seen among Mississippian peoples of the American Bottom. The highest concentrations of maygrass and little barley are found in two features at the Cox's Woods site, each of which contains 20 or 25 specimens of one grain. The only notable occurrence of goosefoot on an Oliver site is at Bundy-Voyles, where more than 21,000 goosefoot seeds and fruits were recovered from a single feature. None of these specimens have been measured under SEM. The less reliable method of visual examination of margin morphology suggests that these may be from a feral population no longer cultivated. Thus, Bundy-Voyles goosefoot use seems analogous to that in the fourteenth century ("early") component at the Fort Ancient Madisonville site (Dunavan 1999). Erect knotweed is thus far unknown on Oliver sites.

Oily seeds tend to preserve less well under carbonization than do starchy seeds. Even given the biases of preservation, however, the extreme scarcity of sunflower and sumpweed remains on Oliver sites suggests that they were not important components of the Oliver agricultural economy. To date, no sunflower has been recorded for an Oliver Phase site. The lone Oliver sumpweed remain shown in Figure 6.12 measures within the domesticated range.

Wild Plants

A diverse and interesting collection of wild plants is typical at Oliver Phase sites. Continuing the trend seen over the earlier Late Woodland, nutshell is relatively less abundant than at earlier Late Woodland sites. The nutshell density is comparable to that at the Albee Phase Morell-Sheets site, and nutshell is less abundant in both Albee and Oliver than at contemporary Mississippian and Caborn-Welborn sites. It is possible, though, this may have to do with differences in fall/winter usage of Oliver and Mississippian sites rather than with actual differences in nut utilization. Sumac is especially common, as is bramble. Blueberry, verbena, grape and purslane are all common and all have obvious uses as food resources. To date, the total number of wild taxa recorded on Oliver sites is 51. Plant taxa recorded for Oliver sites are shown in Table 6.3.

Discussion

Oliver subsistence practices have been characterized as "Fort Ancient-like," which is certainly true as far as it goes. Like their neighbors to the east and southeast, Oliver Phase peoples relied on maize as their agricultural staple but also collected a wide variety of wild plant foods, including the signature Fort Ancient fruit, sumac. Rossen and Edging (1987) compared Fort Ancient and Mississippian floral remains in Kentucky; not surprisingly, the situation seems to be roughly analogous in Indiana. Fort Ancient botanical collections do contain some concentrations of native starchy and oily seeds, but—except for goosefoot—these appear to have been minimally cultivated except in very early Fort Ancient times. Within the broad similarities, though, there are important differences in Oliver plant use when compared to that of Fort Ancient populations to the east, only some of which can be attributed to environmental factors.

As noted above, beans are far less common on Oliver sites than they are on most Fort Ancient sites of the same time period. There are no clear geographic or climactic barriers to bean cultivation in the Oliver region, so cultural barriers are the most likely explanation here. Corncobs also are not encountered as often on Oliver sites as on Fort Ancient sites. Because corn kernel and cupules are so common in both areas, lesser cultivation of corn is unlikely. Rather, differences in corn processing are the most likely, including perhaps a greater tendency to store corn off the cob and/or to shell corn in the field. Among the wild plants, environment is more likely to account for differences in use by Oliver Phase and other Fort Ancient peoples. For instance, nightshade is common at the Anderson Phase Fort Ancient Sunwatch site (Wagner 1987), but it occurs only on two Oliver Phase sites. Blueberry/deerberry, in contrast, is common on Oliver sites but rare or absent in other Fort Ancient areas. Gail Wagner (pers. comm.) has suggested that the difference may lie in the more acidic soils of the Oliver region, where blueberry would thrive.

CONCLUSION

Conclusions drawn from such a small data set are necessarily tentative. Indeed, the speculations already made above are probably more than sufficient for a single paper. A summary, rather than a true conclusion, seems more fitting given the data.

To summarize, then, the Late Prehistoric in what is now southern Indiana sees the continuation of three trends that began in the Late Woodland: declining use of nut resources; declining visibility of cucurbits (related possibly to declining use but perhaps also to new varieties of squash); and increasing intensity of cultivation, particularly corn cultivation. The Albee Phase is as yet little known, but the remains from the Albee site, showing cultivation of little barley in conjunction with corn, suggest that future research will be extremely rewarding. In all time periods examined here, plant subsistence patterns are recognizably like those of adjacent areas but reflect unique cultural history and natural resources of the White and Wabash River valleys.

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Table 6.1. Reported protein content of some food plants cultivated in Late Woodland times and their close relatives.

"Seed"	**Protein (g) per 100 grams fresh weight**						
	Corn						
Zea mays (green)	3.2[a]						
(mature)	8.2[a]	8.9[h]					
	Goosefoot						
Chenopodium spp.	19.1[f]	18.6[k]	17.5[i]	17.2[k]	16.8[d]	16.7[j,a]	15.6[i]
	15.4[k]	15.2[k]	14.8[k]	14.3[i]	13.5[k]	12.1[k]	7.6[a]
	21.4[c]	19.4[i,l]	16.6[a]	16.4[l]			
Chenopodium album							
	17.5[l]	15.6[l]	12.1[l]				
Chenopodium ambrosioides							
Chenopodium quinoa (modern domesticate)	16.2[e]	12.5[i,l]	12.1[i,l]	12.3[l]			
Chenopodium berlandieri (ancient cultigen)	19.1[f]						
	Knotweed						
Polygonum spp.	14.4[i,j]	13.8[i]	12.1[k]	11.6[i]	11.2[a]	11.0[i]	10.2[a]
	8.8[i]	8.1[j,a]	7.7[j]	9.9[l]	8.1[a]		
Polygonum erectum (ancient cultigen)		16.9[f]					
	Maygrass						
Phalaris canariensis	22.0[k]	21.3[i]	20.5[i]	18.0[a]			
Phalaris caroliniana (ancient cultigen)		23.7[g]					
Foxtail barley (close North American relative of H. pusillum)							
Hordeum jubatum	3.8[a]						
	European domesticated barley						
	12.5[b]	10.5[l]	10.0[l]	9.7[l]	8.2[l]		
Hordeum vulgare							

[a]Kuhnlein and Turner 1991
[b]USDA Nutrient Database for Standard Reference
[c]Harrold and Nalewaja 1977
[d]Tkachuk and Mellish 1977
[e]Quinoa Corporation publicity literature
[f]Asch and Asch 1985
[g]Crites and Terry 1984
[h]Asch and Asch 1978
[i]Earle and Jones 1962
[j]Earle and Jones 1966
[k]Barclay and Earle 1974
[l]Duke and Atchley 1986

Table 6.2. Oliver sites with reported botanical data used in this study.

Number	Name	Type
12 H 46/6	Moffitt Farm	village
12 H 807		
12 Jo 289	Sugar Creek	village
12 Lr 329	Clampitt	village
12 Lr 431	Abner	habitation
12 Mg 195		habitation
12 Mg 1	Bundy-Voyles	village
12 Mo 624		
12 Or 1	Cox’s Woods	village

Table 6.3. Oliver Phase plant taxa.

Presence data

	12 Lr 329	12 Mg 1	12 Or 1	12 Jo 289	12 H 807	12 H 6/46	12 Lr 431	12 Mg 195	12 Mo 624	%sites
Wood charcoal	X	X	X	X	X	X	X	X	X	100%
Nutshell										
Hickory	X	X	X	X	X	X	X	X		89%
Hazelnut	X	X	X	X		X	X	X	X	89%
Walnut	X	X	X	X		X	X	X	X	89%
Hickory/Walnut family	X	X	X			X		X	X	67%
Acorn	X	X				X		X		44%
Chestnut		X								11%
Butternut		X								11%
Pecan			X							11%
Nutmeat	X	X								22%
Maize										
Kernel	X	X	X	X	X	X	X	X	X	100%
Cupule	X	X	X	X	X	X	X		X	100%
Tobacco		X	X							22%
Squash			?							11%
Phaesolus bean	X			X						22%
Dry and Fleshy Fruits										
Grape	X	X	X	X				X	X	67%
Sumac	X	X	X	X	X	X				67%
Bramble	X	X	X	X	X	X				67%
Blueberry	X	X	X			X				44%
Plum/cherry	X		X				X			33%
Hawthorn	X				X	X				33%
Nightshade			X		X					22%
Pawpaw		X								11%
Elderberry			X							11%
Pokeweed					X					11%
Strawberry						X				11%
Native cultigens										
Goosefoot	X	X	X		X					44%
Maygrass	X		X					X		33%
Sumpweed					X					11%
Little barley			X							11%
Sunflower										0%
Erect knotweed										0%

Table 6.3. (cont.) Oliver Phase plant taxa.

Presence data

	12 Lr 329	**12 Mg 1**	**12 Or 1**	**12 Jo 289**	**12 H 807**	**12 H 6/46**	**12 Lr 431**	**12 Mg 195**	**12 Mo 624**	**% sites**
Grasses										
Mannagrass		X	X		X					33%
Gammagrass		X								11%
Goosegrass			X							11%
Redtop					X					11%
Other plants										
Purslane	X	X	X	X		X				56%
Vervain		X	X	X		X		X		56%
Bedstraw	X	X			X					33%
Smartweed		X	X						X	33%
Honey locust	X									11%
Catchfly	X									11%
Wild bean		X								11%
Morningglory		X								11%
Spurge			X							11%
Trifolium			X							11%
Maianthemum			?							11%
Wood sorrel			X							11%
Pepperweed			X							11%
Wild geranium				X						11%
Bladderwort				X						11%
Dodder					X					11%
Prickly pear					X					11%
Tick trefoil					X					11%
Ragweed						X				11%
Bulrush						X				11%
Spiderwort						X				11%
Plants identified to family only										
Legume family	X	X	X					X	X	56%
Grass family	X	X	X			X				44%
Daisy family				X		X				22%
Nightshade family		X								11%
Lily family		X								11%
Sedge family		X								11%
Mallow family						X				11%

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Figure 6.1. Spatial extent of Allison-LaMotte, Yankeetown, and Newtown sites.

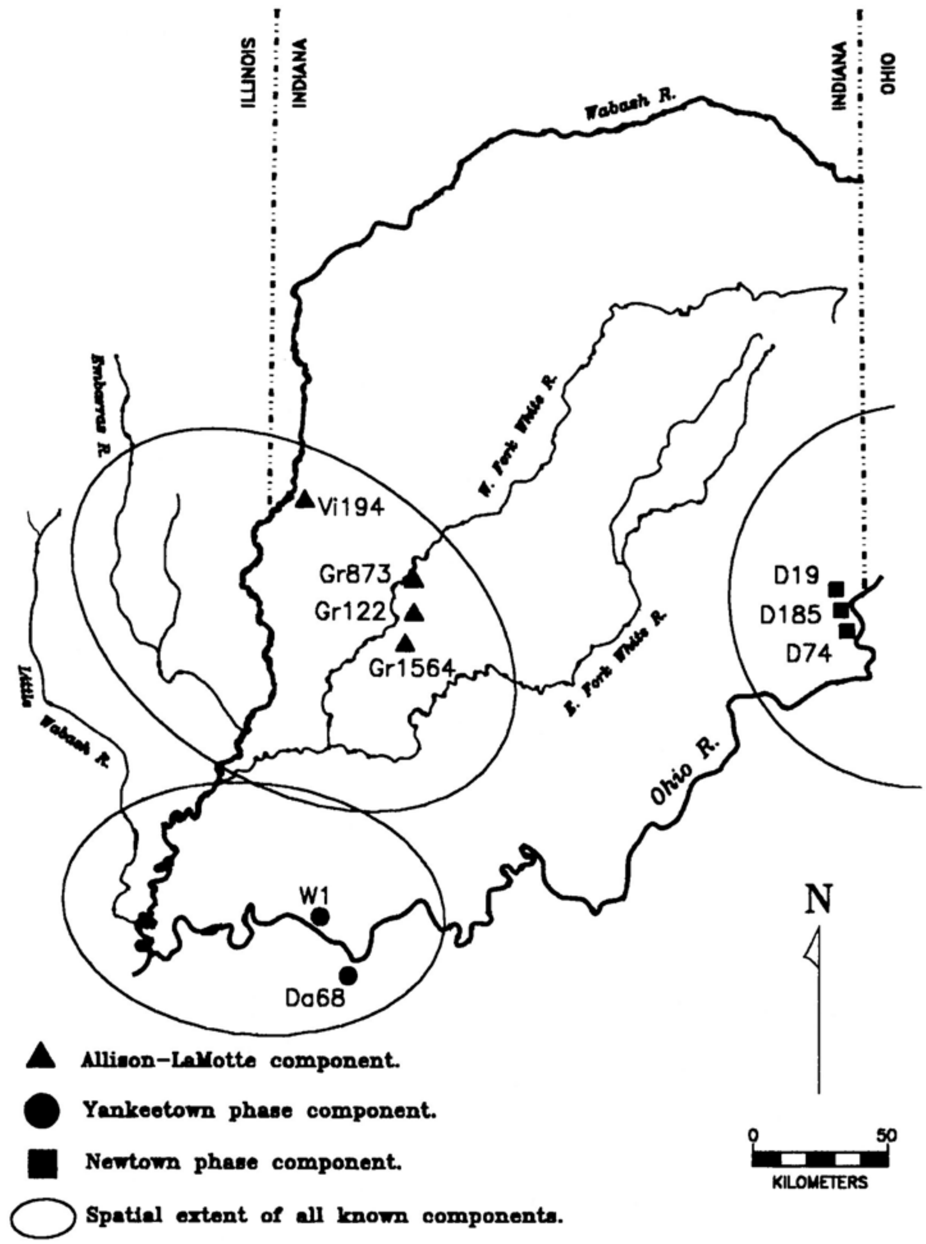


Figure 6.2. Indiana Late Woodland radiocarbon dates.

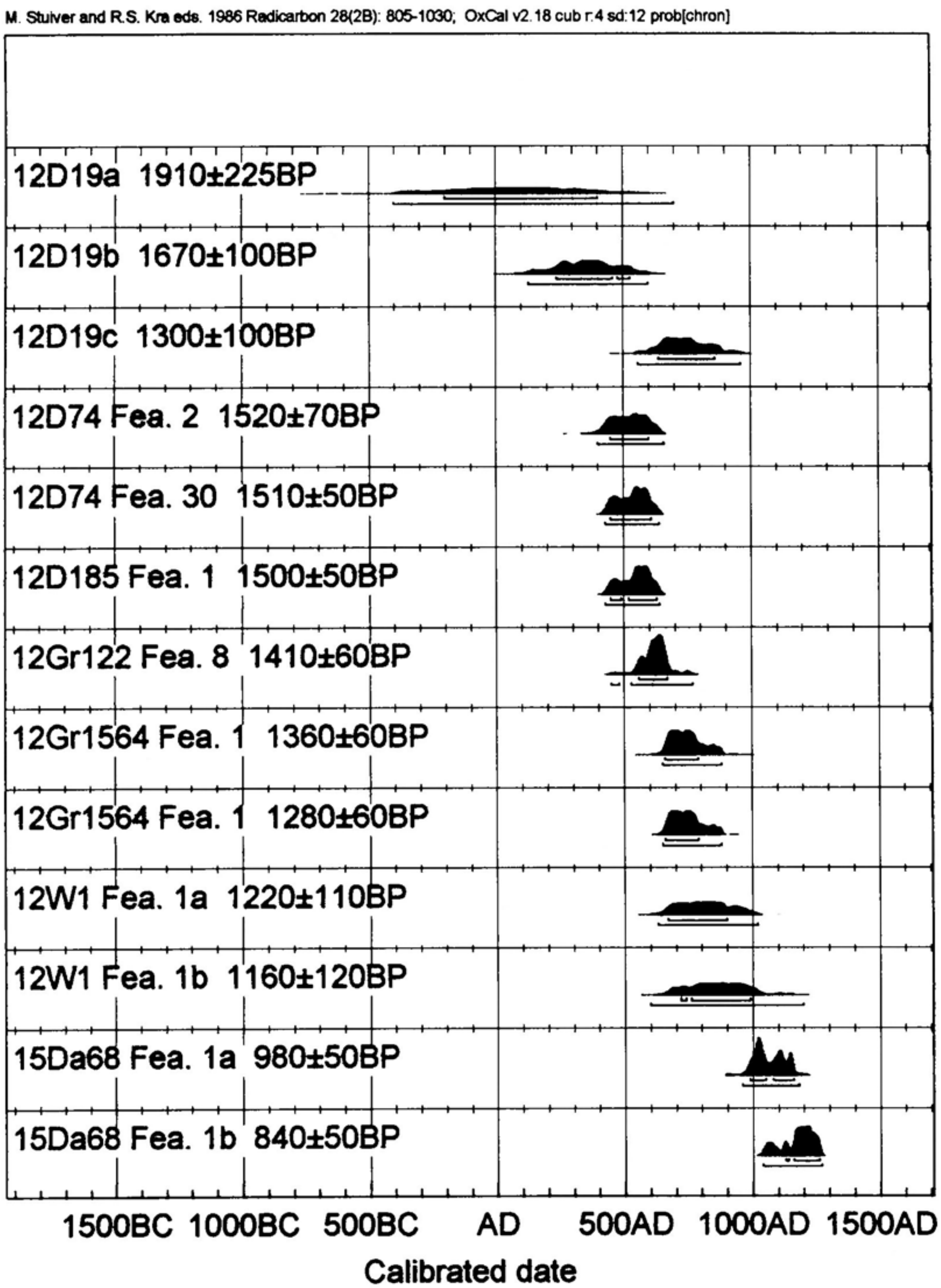


Figure 6.3. Histogram of Nutshell/Wood weights in grams.

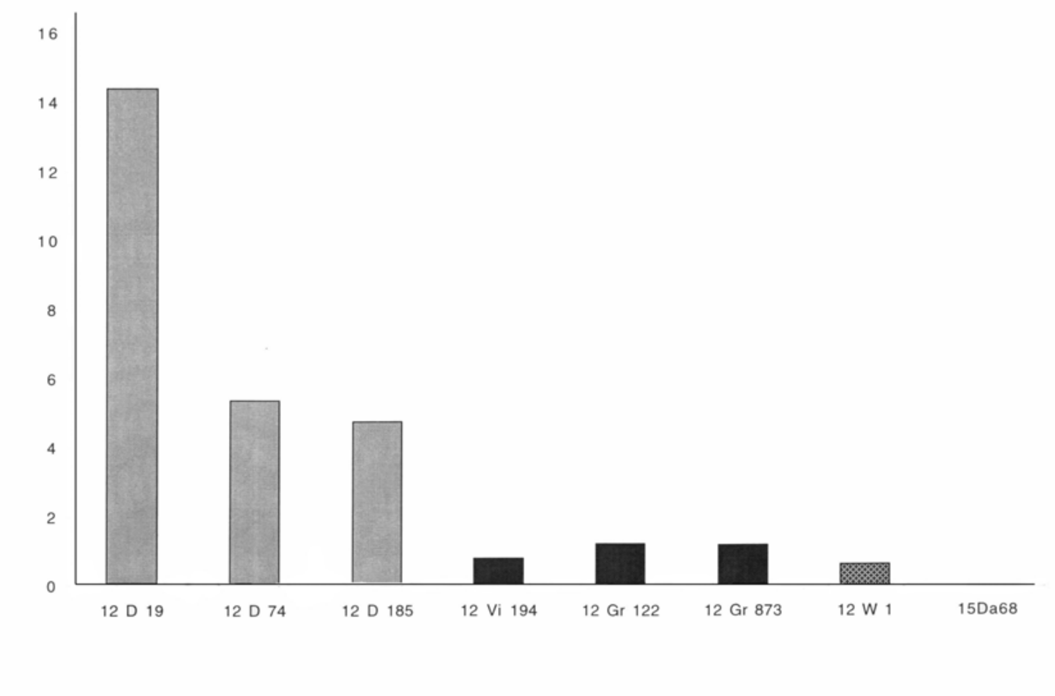


Figure 6.4. Histogram of cucurbit ubiquity.

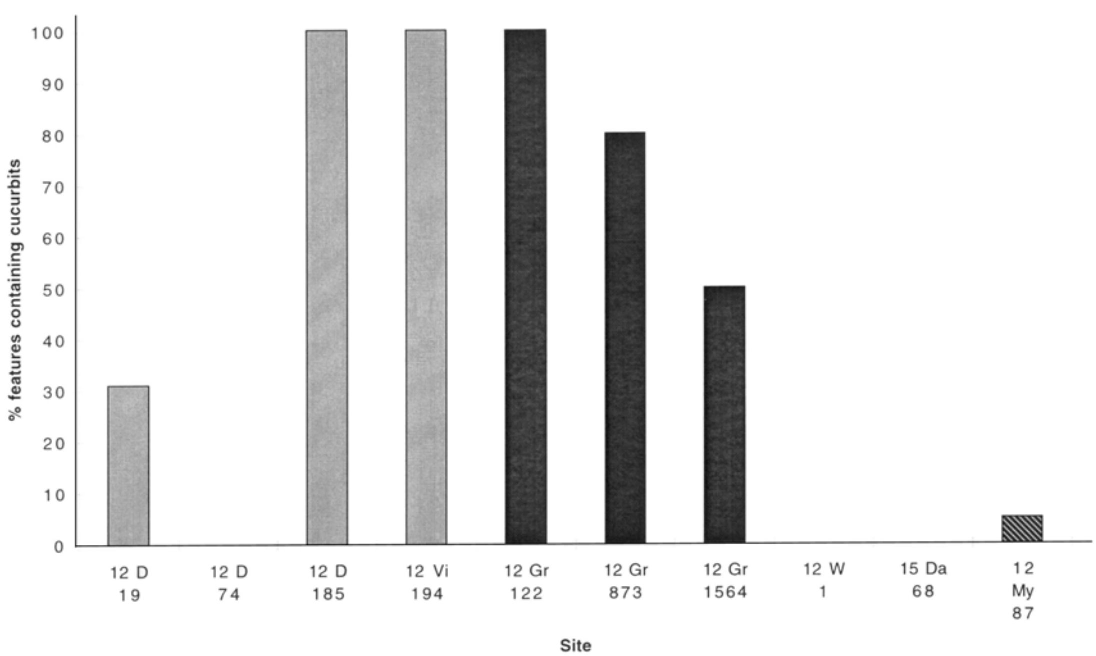


Figure 6.5. Histogram of corn ubiquity.

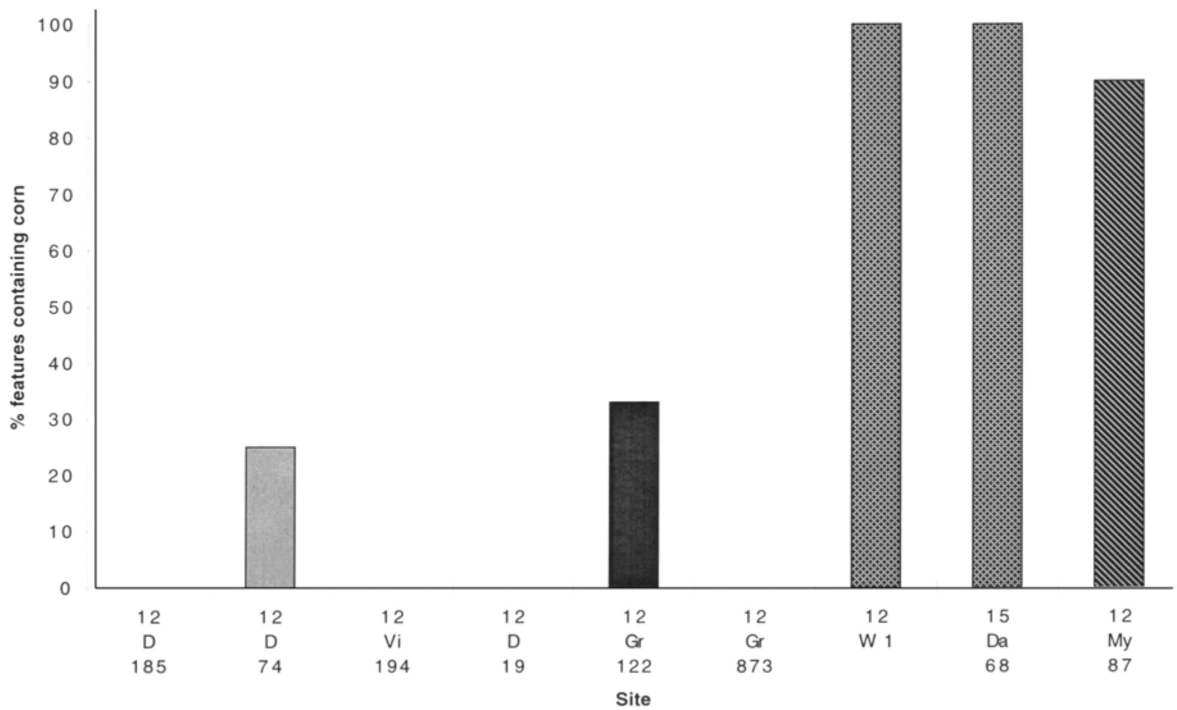


Figure 6.6. Spatial extent of Albee Phase sites.

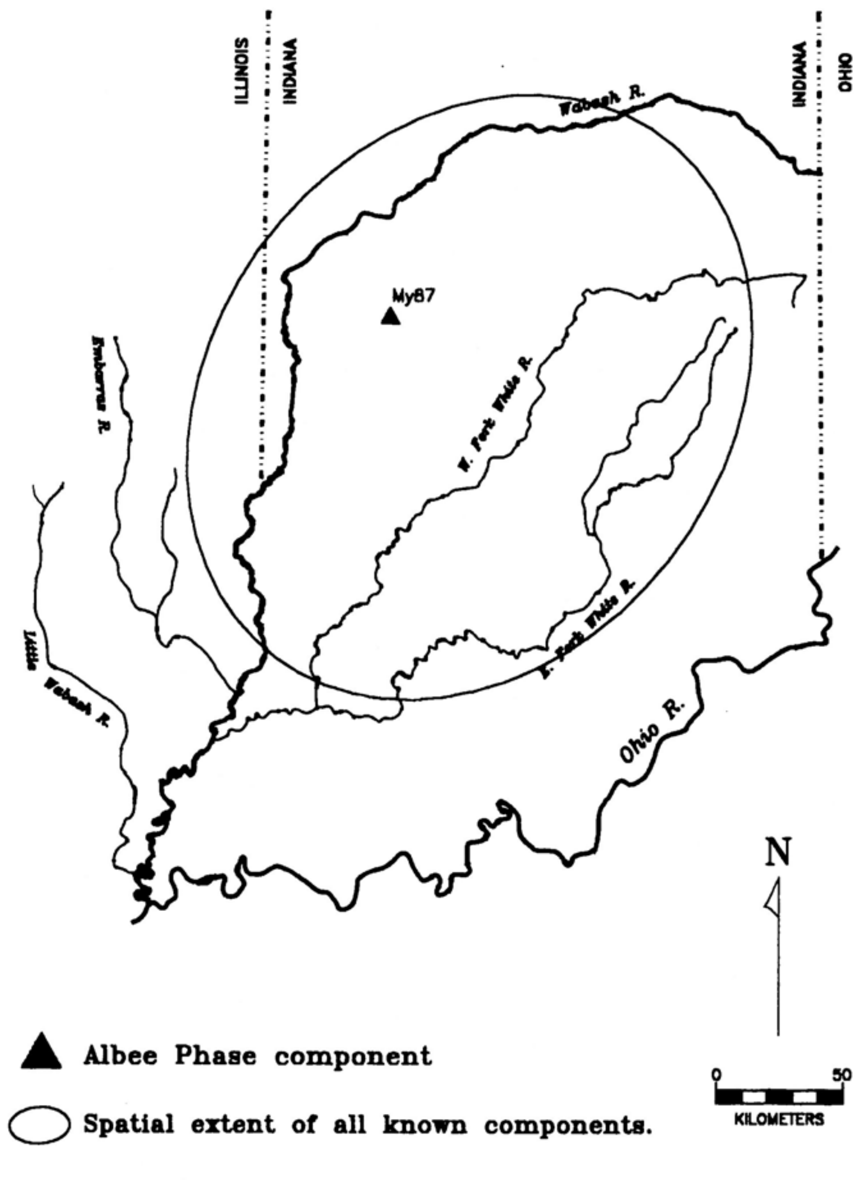


Figure 6.7. Histogram of corn remains in dated features at 12My87.

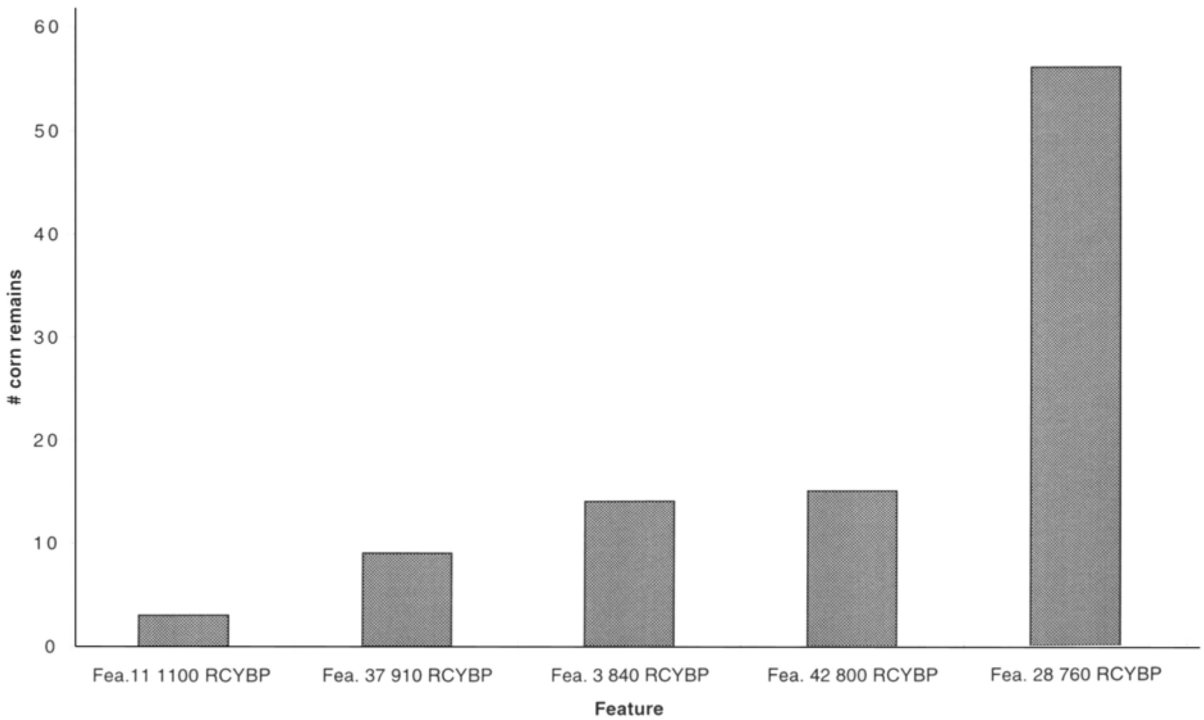


Figure 6.8. Histogram of cultigen remains in dated features at 12My87.

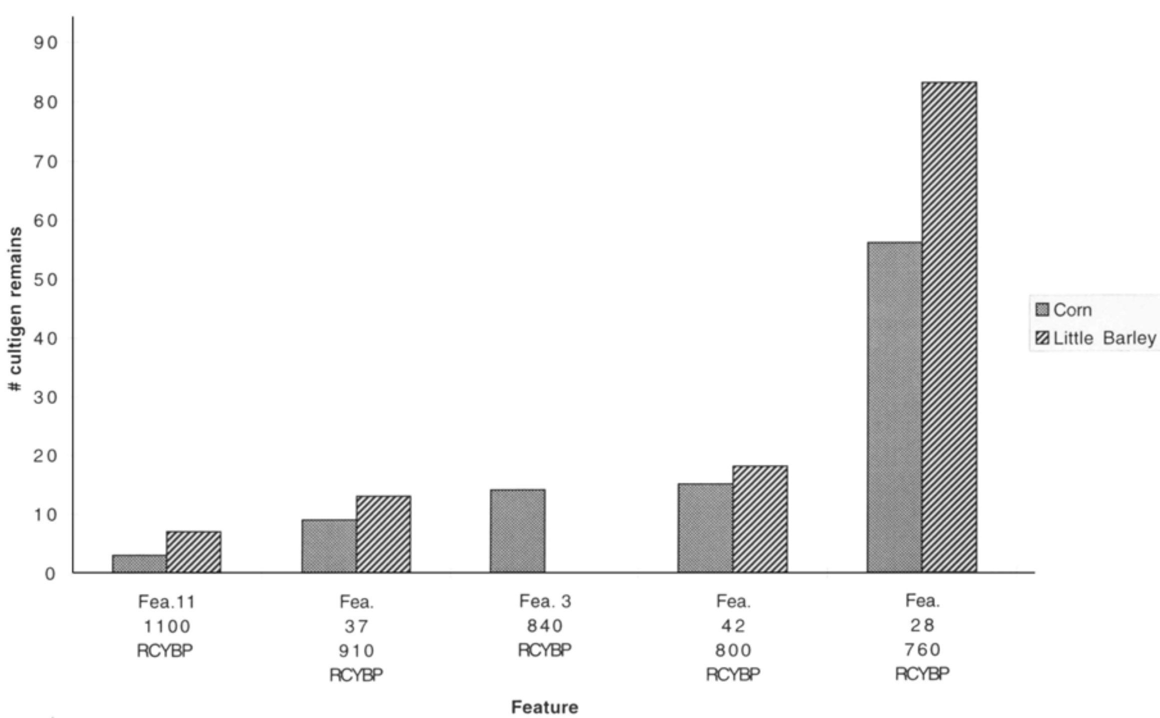
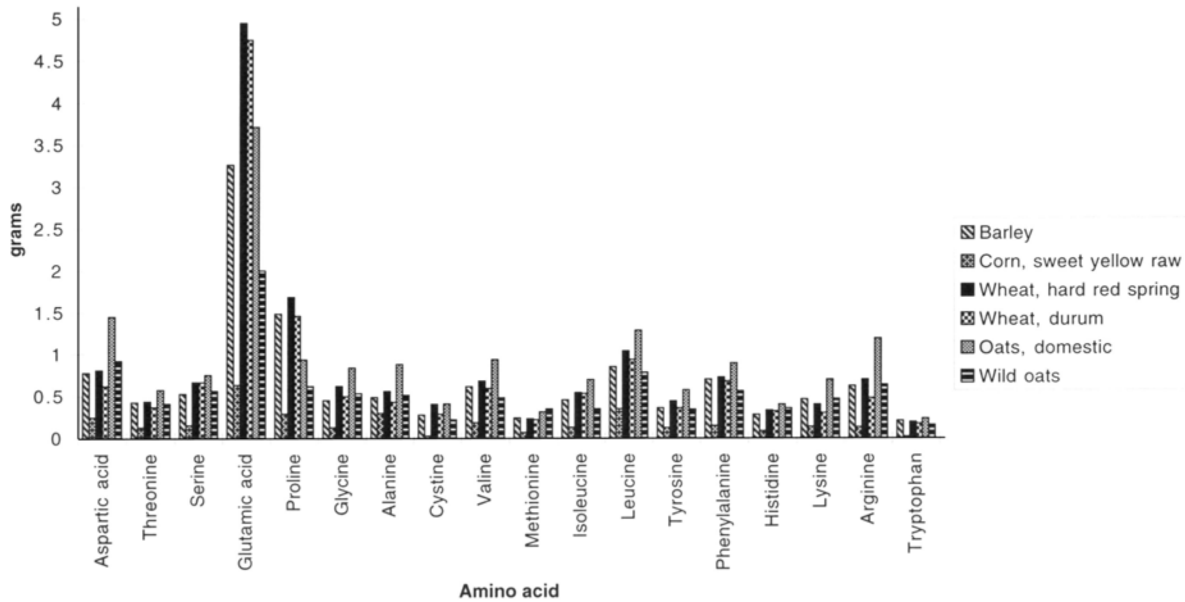
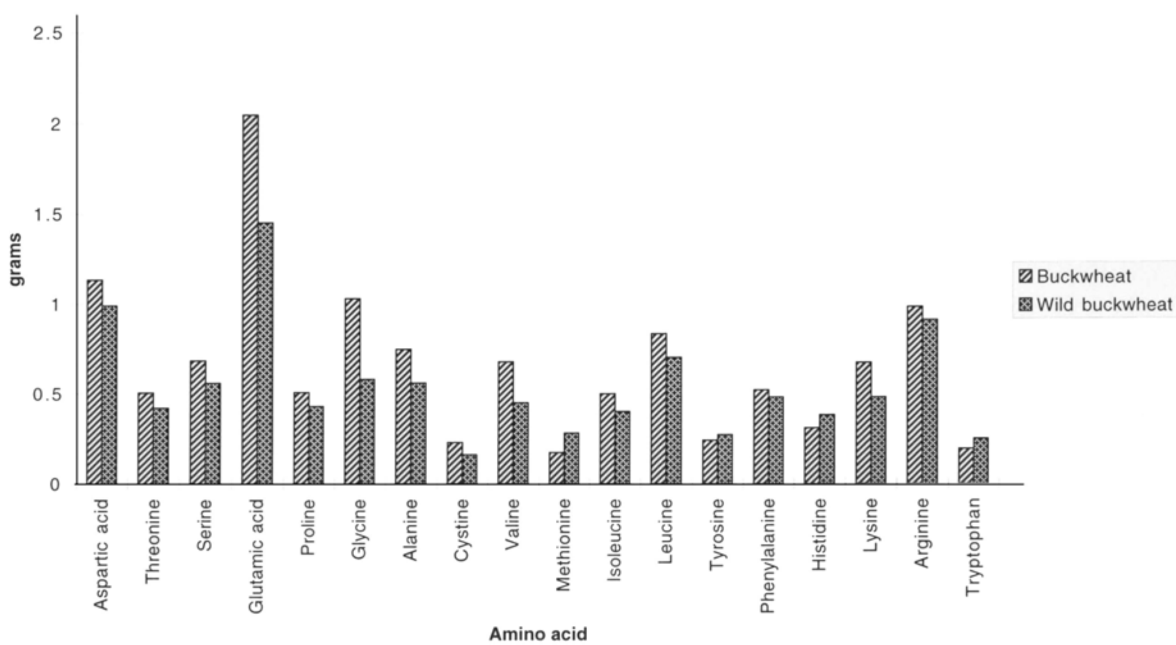


Figure 6.9. **Histogram showing amino acid content of some grains (per 100g dry weight).**



*Data for wild oats are from Harrold and Nalewaja 1977. All others from USDA Nutrient Database for Standard Reference.

Figure 6.10. **Histogram showing amino acid content of wild and domestic buckwheat (per 100g dry weight).**



*Data for buckwheat are from USDA Nutrient Database for Standard Reference. Wild buckwheat data are from Harrold and Nalewaya 1977.

Figure 6.11.   Spatial extent of Oliver Phase sites.

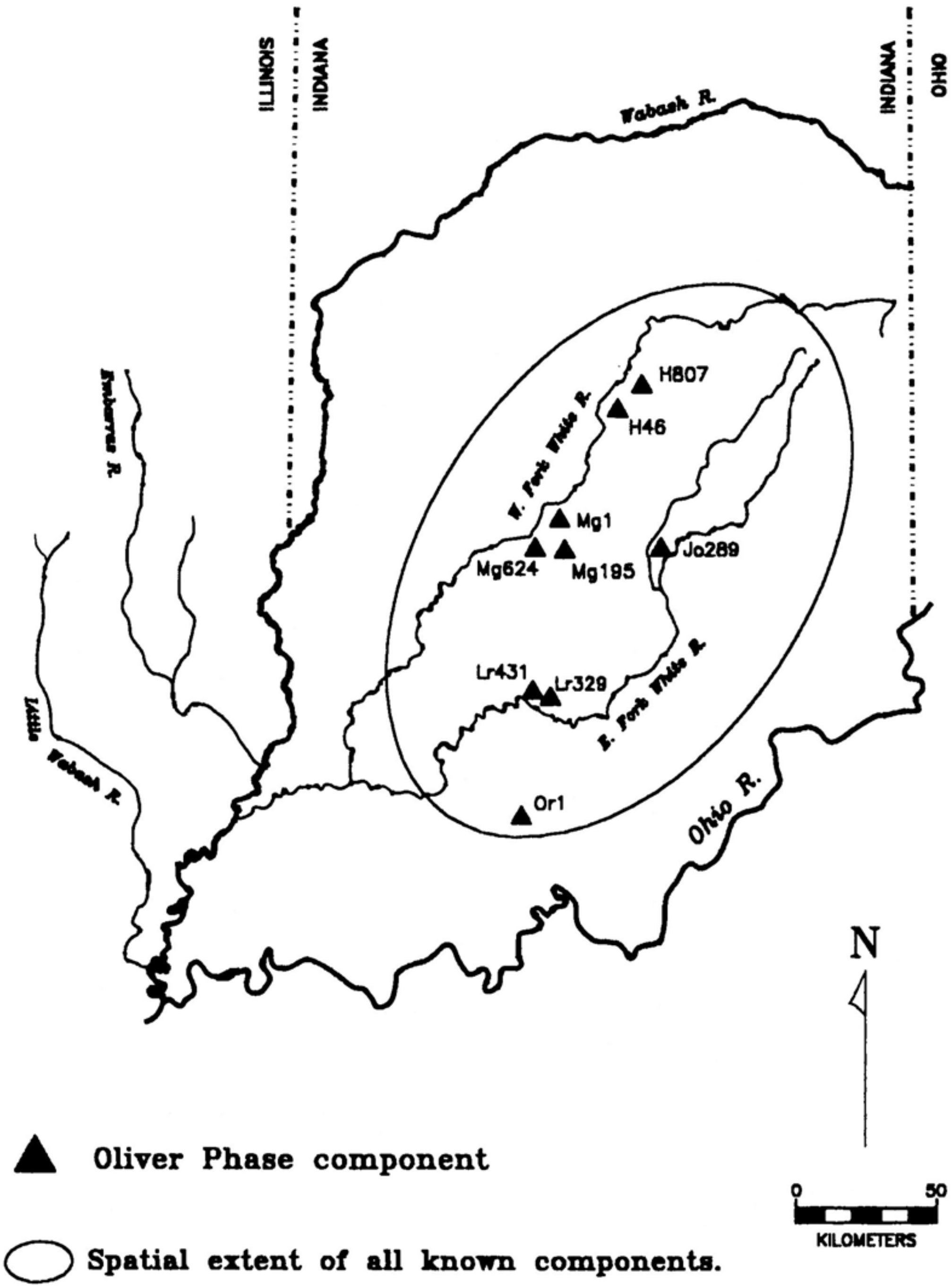
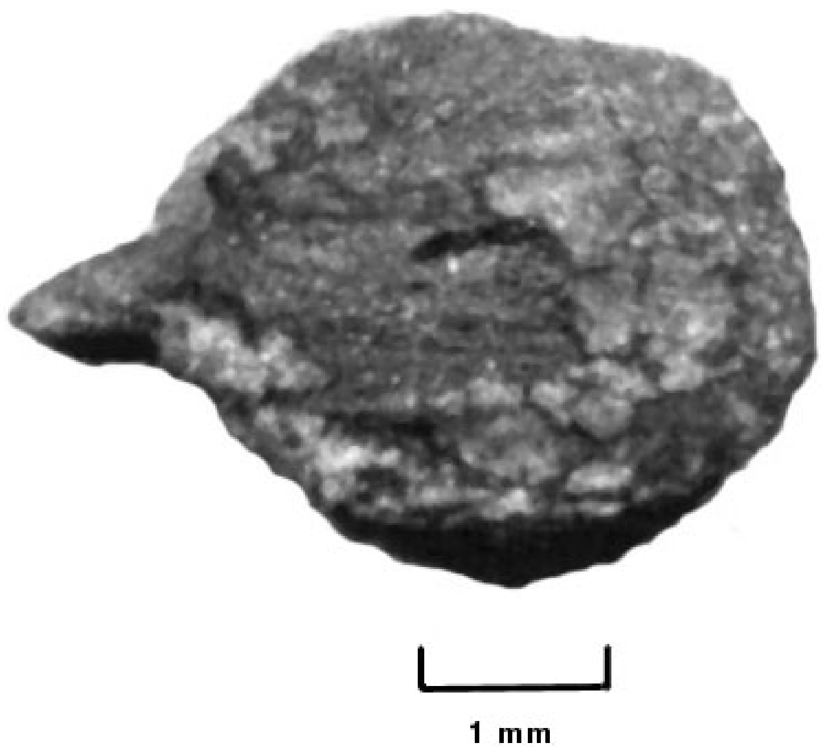


Figure 6.12. Sumpweed (*Iva annua*) specimen from 12H807 (scale in millimeters).



CHAPTER SEVEN

CULTURAL INTERACTION ALONG THE WEST FORK OF THE WHITE RIVER DURING THE LATE PREHISTORIC PERIOD

Robert G. McCullough

INTRODUCTION

This paper describes the cultural continuity and variation found among the Late Prehistoric inhabitants of the West Fork White River in central Indiana. Extensive excavations have been conducted in the East Fork White River, and a presentation of village structure and settlement variability in the East Fork is provided by Redmond (this volume). Although, the Oliver Phase occupation of the West Fork was the most pervasive, Upper Mississippian Huber and Fisher-like settlements associated with groups from northern Illinois, and Western Basin Tradition influences from the western edge of Lake Erie were present as well. Vincennes Phase peoples from the central Wabash Valley also occupied this river valley. Earlier attempts to understand such variability were hampered by a limited amount of (and possibly incorrect) radiocarbon dates, previously unidentified cultural complexes, and a paucity of Late Prehistoric research, which had a profound influence on the interpretation of this time period. To date, most of the data from the West Fork consists of surface collections and unpublished salvage excavations, thus most of this discussion by necessity focuses on variations in pottery assemblages.

OLIVER PHASE

The Oliver Phase of central and south-central Indiana can best be described as a collection of sedentary village-dwelling societies that settled along the drainages of the East and West Forks of the White River between about AD 1200 and 1450 (Figure 7.1). These people were farmers with a heavy reliance on maize (for a wider discussion on subsistence, see chapters by Bush, and Schmidt and Greene this volume), who utilized the more easily worked loamy alluvial soils within or immediately adjacent to large floodplains. Swidden cultivation techniques were very likely employed to create garden plots from forested floodplain areas. Undoubtedly, this land expansive economic system influenced the structure and location of Oliver Phase communities. Diminishing soil fertility and/or fuel supplies within the vicinity of a settlement necessitated shifting village locations on a relatively regular basis. The settlements reflect a great deal of diversity, ranging from nucleated circular villages, some surrounded by closely spaced wooden post stockade walls and ditches, to small dispersed farmsteads distributed across the low terraces and higher floodplain elevations, or even linear settlements along natural levees (Redmond 1991, 1994; Redmond and McCullough 1993, 1996, 2000; McCullough 1997; McCullough and Wright 1997a, 1997b).

The boundaries of this cultural complex are so arbitrarily defined because of the fluid nature of this population as reflected in the material culture. Ceramic assemblages, distinguished by the presence of two distinct pottery traditions, are the most diagnostic indication of Oliver Phase sites. This co-occurrence of pottery forms has been documented from numerous surface collections and excavated contexts across central Indiana. The pottery traditions differ in vessel rim and neck morphology, method of execution, placement of decorative element, and design motif. Later site assemblages in the Oliver Phase sequence witness a merging of these pottery traditions on individual vessels (Redmond and McCullough 1996).

One pottery tradition is undoubtedly associated with the middle Fort Ancient Tradition, Anderson Phase, of southwestern Ohio (Essenpreis 1982). These Fort Ancient-like jars are subglobular in shape with rounded bottoms and broad excurvate necks. Rims often exhibit a rim fold that may be impressed with short, wide, alternating oblique lines. The primary field of decoration, however, is on the neck and shoulder of the vessel. The decoration was executed with trailed lines (or broadline incision) to create curvilinear or rectilinear designs and occasionally line-filled triangles and alternating long oblique lines. Sometimes punctations were added to the trailed line design on the neck. The vessel bodies are cordmarked with the neck and rim folds mostly smoothed over (Figures 7.2 and 7.3). Grit temper predominates (with the exception of the Heaton Farm site [see McCullough and Wright 1997b]), but a few shell-tempered examples (less than 2%) are recovered from most site assemblages. Some vessels have two V-shaped strap handles that occasionally have two small castellations above each handle (for numerous Fort Ancient examples, see McCullough 1991).

The other distinct pottery tradition associated with Oliver ceramic assemblages is similar to Late Prehistoric pottery styles in the lower Great Lakes where the primary method of decorative execution is impression using smooth objects, a variety of cordage, or cordwrapped implements. Decoration was exclusively placed on the top of the lip and rim portions of the vessels. The rims often exhibit a thickened or a collared profile. Decoration does not occur below these collars, on the neck, or on the interior of the vessel. Decorative motifs mostly consist of horizontal, vertical, or oblique lines, or a combination of these. Many vessels have some form of castellation, and, if decorated, the design is integrated with the peak of the rim (i.e. horizontal lines bend upward with the lip). For more abrupt castellations, oblique, vertical or chevron lines, often interrupting a horizontal line motif, correspond with the upward projection (Figure 7.4). Vessel shape ranges from globular to subglobular, often with pronounced shoulders and rounded bottoms. This pottery is grit tempered with cordmarked and occasionally fabric-roughened surface treatments. Most vessels exhibit straight rims with rim/neck angles ranging from moderate to sharply everted (Figure 7.5). Some vessels, however, have a cambered or recurved rim profile that exhibits an applied vertical node associated with chevron designs (Figure 7.6). The upward projection of the chevron decoration occurs over the vertical node, which occasionally forms an abrupt castellation above the lip. These applied nodes represent the only appendages; handles are absent from this pottery tradition.

Until recently, most of what was known about the late prehistory of central Indiana came from the efforts of an avocational archaeologist named John C. (Jack) Householder. Over the course of four decades, Mr. Householder repeatedly collected Oliver Phase sites and conducted salvage excavations on numerous sites in central Indiana (Householder 1941, 1945; Helmen

1950; Dorwin 1971; Weer 1935). Fortunately, Mr. Householder took notes on many of his activities, cataloged the collections, and donated these materials to academic institutions. These collections are currently housed in the Glenn A. Black Laboratory of Archaeology (GBL) at Indiana University and the Indiana State Museum. Thus, his efforts left a legacy of information concerning the prehistoric occupation of an area that has been virtually destroyed by the development of the Indianapolis metropolitan area.

John Dorwin's (1971) report of Householder's excavations at the Bowen site formed the basis of what has became known as the Oliver Phase. Dorwin concluded that the wide range of ceramic variability was due to interaction and the diffusion of ideas along a linear, frontier transfer zone that extended possibly from West Virginia to as far as South Dakota. This transfer zone occurred along the borderlands of Mississippian influence and interaction to the northeast (the Michigan, Ohio, and Indiana tri-state area) and southwest (the Mississippian polities) was limited.

Convinced that the great amount of diversity in the Oliver ceramic assemblages was due to the mixing of separate components on the Bowen site, the author conducted a reevaluation of the pottery (McCullough 1991; 1992). Significant differences in the spatial distributions of pottery styles across the site, plus similarities to Great Lakes Impressed pottery, led to the conclusion that Western Basin Tradition Springwells Phase populations inhabited this site and the upper and middle West Fork Valley of the White River subsequent to the Oliver occupations. The radiocarbon dates (Figure 7.7) available at the time supported this conclusion, since the Oliver occupation appeared to date from about AD 950 to 1300 (uncalibrated). Furthermore, information then available suggested that the Springwells Phase began about AD 1200 and persisted until AD 1350, or perhaps as late as AD 1400 (Stothers and Pratt 1981; Stothers and Graves 1983, 1985; Stothers and Abel 1989). While the number of superimposed features and fluoride data (Ruby 1990) at the Bowen site do suggest some time depth to the deposits, alternative explanations can be offered for the differential distribution of the ceramic assemblage. For instance, it may be due to discrete residential areas within the village, as has been suggested for the roughly contemporary Sunwatch, or Incinerator, site (Cook and Sunderhaus 1999; Nass 1989).

A series of more recent archaeological investigations of Oliver Phase sites (Redmond 1994; Redmond and McCullough 1993, 1996; McCullough and Wright 1997a, 1997b; Cochran et al.1997; O'Brien et. Al. 1996) have produced calibrated dates that range as late as the early fifteenth century in southern Indiana (Figure 7.8). Also, it is now believed that the Western Basin Tradition ended by AD 1300, when the Wolf Phase peoples of the Sandusky Tradition moved into the area around the western edge of Lake Erie (Stothers 1995; Stothers and Bechtel 2000). Thus, the earlier hypothesis that Springwells Phase populations migrated to occupy lands formerly inhabited by Oliver populations no longer appears to fit the data, since the basic temporal associations for a replacement hypothesis no longer correlate. While the Great Lakes Impressed ceramic tradition most closely resembles the Western Basin Springwells-type pottery associated with the western edge of Lake Erie more than any other contemporary pottery tradition, the assemblages from central Indiana appear to represent a distinct local variant and are quite dissimilar to western Lake Erie materials from the core Springwells occupations along the lower Maumee Valley (Stothers, personal communication 1998), although a few examples from

Oliver sites do appear to be the result of direct interaction with these populations (discussed in more detail below).

The boundaries of the Oliver Phase, as defined by the presence of middle Fort Ancient, or Anderson Phase, pottery, become blurred in the upper and lower West Fork Valley. Where the West Fork turns eastward toward its headwaters (Figure 7.1), the occurrence of Fort Ancient ceramics becomes increasingly less frequent. There is also a decrease in both the number and size of Late Prehistoric occupations. Instead, Fort Ancient styles are replaced by Great Lakes Impressed styles. Environmental factors may be responsible for influencing the northern limit of the Fort Ancient-related materials. As with other drainages in northeastern Indiana, the upper West Fork of the White River has a far narrower valley than the middle and lower portions of the river, thereby restricting the expanses of workable floodplain soils typically selected by Oliver Phase groups. Also, the upper portion of the river is subject to frequent floods that rise and fall fairly quickly, scouring the valley and limiting the development of extensive wetland or slough resources that were important to Late Prehistoric subsistence economies and the maintenance of sedentary life. In the upper White River valley, research by personnel from Ball State University demonstrated that there is a strong correlation between Late Woodland (i.e. Late Prehistoric) pottery sites and the well-drained Ross soils that are found along the major drainage ways (Cochran 1996; McCord and Cochran 1996:163-168). These soils only account for approximately 2% of the soils present in the upper West Fork region, demonstrating the scarcity of suitable Late Prehistoric habitation areas.

In the lower West Fork, the Oliver Phase distribution continues as far as southern Greene County, Indiana, and overlaps slightly with the northern distribution of Vincennes Phase Mississippian societies. From this point, the Vincennes Phase distribution extends down the White River to its confluence with the Wabash River, north to the Terre Haute area, and westward into central Illinois in the Embarras and the upper Kaskaskia drainage basins. A survey of Oliver Phase occupations south of Indianapolis along the West Fork (McCullough and Wright 1997b) found a more dispersed type of village settlement pattern; here Oliver sites consist of clusters of smaller farmsteads spread across the floodplains and nearby terraces, instead of the denser occupations and circular villages that are present in the Indianapolis area and along the East Fork of the White River and smaller drainages in Orange County. The Heaton Farm site (12Gr122), located in Greene County, Indiana (Tomak 1970:167-168, 175-178; 1983:76-77; McCullough and Wright 1997b; Bush et al. 1999; Strezewski et al. 1999), represents an exception to the apparent dispersed village model. This site has both Mississippian Vincennes-like and Oliver Phase pottery associated with substantial wall-trench structures and storage features, and, based on current information, it marks the southern terminus of the Oliver Phase distribution along the West Fork White River.

WESTERN BASIN TRADITION INFLUENCES ON THE OLIVER PHASE

A complete description of the Western Basin Tradition is beyond the scope of this paper and is treated in depth elsewhere (Stothers and Schneider this volume; Stothers and Pratt 1981; Stothers and Graves 1983, 1985; Stothers and Abel 1989; Stothers et al. 1994; Stothers and Bechtel 2000; Bechtel and Stothers 1993; and Stothers 1995). As it is currently understood, the Western Basin Tradition (formerly the Younge Tradition, [Fitting 1965]) comprises four sequential phases: Gibralter (AD 500-700), Riviere au Vase (AD 700-1000), Younge (AD 1000-1200), and Springwells (AD 1200-1300). It is the latest phase, Springwells, that is of concern here because of its contemporaneity with the Oliver Phase and the general similarities of Springwells ceramics to the Great Lakes Impressed decorative style of pottery found along the West Fork of the White River, as well as a few sherds that may indicate some form of direct interaction. It has been suggested that the Springwells populations were militarily dispersed and replaced by the Wolf Phase of the Sandusky Tradition by AD 1300. This dispersal is evidenced by the presence of Springwells pottery in southwestern Ontario, northeast Georgian Bay, the Straits of Mackinac, northeast Lake Superior, and northern and central Indiana. In Indiana the presence of Springwells-like ceramics are hypothesized to be the result of refugee populations moving westward to escape the onslaught (Stothers 1995; Stothers et al. 1994; Stothers and Bechtel 2000).

As noted, the Fort Ancient-style pottery becomes less prevalent in the ceramic assemblages in northern Hamilton County and apparently feathers out along the upper West Fork Valley. Along this northern edge, the Great Lakes Impressed cord- or tool-impressed pottery has been surface collected from a few sites that lack Fort Ancient-style vessels; conversely, a few sites with Fort Ancient-style vessels but without a Great Lakes Impressed component have also been identified. However, almost all of these sites are represented by very small samples from surface collections (often consisting of only one or two decorated sherds). Thus, it appears that the single component attribution is most likely a product of sample size.

The Moffitt Farm site (12H6) offers an exception to the small sample size. Here 65 rim and neck sherds representing the Great Lakes Impressed ceramic tradition (Figures 7.9, 7.10, and 7.11) have been recovered, while no Fort Ancient examples were found. All of the pottery from the Moffitt Farm site was surface collected by Jack Householder during visits in 1939 and 1942 when plowing exposed small clusters of pit features. This opportunistic collection was non-systematic, and interpretations drawn from these data should be pursued with caution. The paucity of materials and the lack of developed midden deposits typical of many Late Prehistoric settlements—which were also recognized and collected by Householder from northern Marion and Hamilton counties—probably indicate that no more than a few households occupied this site and only for a relatively short period of time. The decorated vessels exhibited linear, oblique, and alternating rows of oblique impression executed with a cordwrapped or smooth implement impressed into weakly collared vessel rims. Some rims had various types of castellations, often with a slightly cambered (also referred to as channeled) rim profile. Two examples protruded outward from the rim beneath the castellation, forming a rim profile that was slightly cambered. Other sites with small scatters of pottery similar to that found on Moffitt Farm also have been located along this stretch of the White River. Even in the absence of Fort Ancient styles, there does not appear to be a link between the Moffitt Farm materials and the other sites in the vicinity. For example, two rim sherds identical in terms of vessel morphology, method of decorative execution, and motif to a sherd from Moffitt Farm were recovered from both the Jose (12Ma47) and the Bosson (12Ma4) sites. Both Jose and Bosson have both the Great Lakes Impressed and Fort Ancient materials.

While the Moffitt Farm materials have not been directly associated with a radiocarbon sample, the Prairie View Golf Course site (12H46) (Plunkett et al. 1995), represented by at least two feature clusters located on the same landform as the Moffitt Farm site, produced three calibrated dates in the thirteenth century and one calibrated to AD 1030 (Figure 7.8) that probably represents a statistical outlier and should be interpreted with caution. The pottery from this site also lacks the Fort Ancient style typical of most Oliver Phase assemblages, and the limited number of diagnostic sherds recovered are similar to the Moffitt Farm materials. Thus, even though spatial proximity does not indicate temporal correlation, these dates are probably consistent with the Moffitt Farm ceramic component (Plunkett et al. 1995, figures 20, 23).

While the motifs and the method of decorative execution on pottery vessels from central Indiana resemble the Springwells Phase of the Western Basin Tradition more than any of the other contemporary ceramic traditions surrounding central Indiana during the Late Prehistoric period, significant differences are evident. It has been suggested (Stothers 1995:29) that the Great Lakes Impressed pottery found in central Indiana is characteristic of the Macomb Linear Corded and Macomb Interrupted-Linear types (Fitting 1965:157, plates XIII to XVI; Fitting et al. 1968:128, 129, and 157), which are considered a primary indication of Springwells populations. However, neither of these pottery types constitute the majority of the Great Lakes Impressed-type pottery included in the Oliver Phase of central Indiana. The Great Lakes Impressed types associated with Oliver assemblages do not have decoration at the base of the rim or on the neck, nor do they have vertical lines underneath horizontal lines that curve upward on castellated vessels. Furthermore, neither Springwells decorative stamping nor net-impressed pottery have been recognized thus far in any Oliver assemblage.

Besides variation in the use of additional decorative fields and motifs, the most notable and significant difference between the Late Woodland vessels from central Indiana and those associated with the western basin of Lake Erie is in vessel morphology. The Springwells vessels shown in publications or made available for examination usually have broad excurvate necks and elongated to extremely elongated bodies (e.g., Stothers 1995, plates 4 to 10; Stothers et al. 1994, Figure 12). The Great Lakes Impressed-style vessels, such as those recovered from the Moffitt Farm site and other sites from central Indiana (Figures 7.4, 7.5, and 7.12), usually have strongly everted rims/shoulder angles and subglobular shapes (compare profiles in McCullough 1991:Appendix 1 with the plates and figures cited above). Interestingly, pottery recovered from the Baden site in the mid-Maumee region in Ohio (McCullough 1991:128-129; 1992:54) and other sites in northeastern Indiana (Cochran 1985; 1987:199-208; Mohow 1987:149-155) also exhibit some differences from Springwells sites in the lower Maumee and show similarities to materials found in central Indiana. Perhaps such variability indicates a transitional zone, or clinal variation, in material culture across northeastern Indiana and northwestern Ohio (see Stothers and Schneider this volume) instead of a mass migration of Springwells people, as has been suggested (e.g., Stothers 1995; Stothers et al. 1994; Bechtel and Stothers 1993; Stothers and Bechtel 2000). It is worth noting that a few vessels do exhibit somewhat elongated body shapes and broad excurvate necks similar to those illustrated from the western edge of Lake Erie (Figure 7.11, top sherd Figure 7.13). The presence of these vessels indicates some degree of interaction during this period, such as trade or the movement of small numbers of people joining distant relatives, perhaps as a result of the Wolf Phase dispersal. But these vessels occur in such relatively low frequency (ones like the everted sherd shown in bottom of Figure 7.13 and 7.12 and 7.5 are more common) that they cannot be evidence of a mass migration.

More important than the differences in attributes and vessel morphology that argue against a mass migration are aspects of the Springwells peoples' belief system that are absent in central Indiana. Ossuaries, which are the only Springwells mortuary treatment (Stothers and Bechtel 2000:26,28; Stothers et al.1994:161), have not been identified in central Indiana. Nor is there evidence in central Indiana of Late Prehistoric postmortem skeletal alterations such as shaved or drilled long bones, misaligned skeletal elements, drilled or cut crania, defleshing prior to burial, cranial plaques—or evidence of their removal—or clay funerary masks, many of which have a long tradition with Western Basin populations (Stothers and Bechtel 2000; for examples of postmortem modification, see Stothers et al. 1994:168). During both the Younge and Springwells phases, secondary burial was the most frequent method of interment (Stothers et al. 1994:173). Thus far, secondary burials have not been associated with Oliver sites in central Indiana. The lack of evidence for cranial plaque removal, or for the plaques themselves, is especially significant because these traits appear elsewhere with displaced Springwells populations (Stothers and Bechtel 2000:34-35). Without evidence of the continuation of Western Basin Tradition religious institutions, domestic architecture, and other items of material culture, the possibility that the occurrence of selected elements of decorative motifs is the product of refugee population movements is tenuous. The significant differences in vessel morphology make this supposition even less likely.

For the most part, then, Oliver Phase sites with adequate sample sizes do exhibit Great Lakes Impressed and Middle Fort Ancient types of vessels in association, although on a few sites there is some degree of spatial separation between the two pottery traditions. A limited excavation at the Bakers Trails site (12H837) recently conducted by the Indiana University-Purdue University Indianapolis field school in southern Hamilton County (Putty et al. 2000) found an overwhelming frequency of Anderson Phase Fort Ancient sherds and a few fragmentary pieces of cord-impressed decorated pottery. Both had roughly contemporary radiocarbon dates (Figure 7.8). The Moffitt Farm site (as with nearby 12H46 and 12H695) and Baker's Trails are farmsteads like many that are found scattered along the natural levees and terraces in northern Marion and Hamilton counties. Such a scattering of smaller habitation sites with varying percentages of Great Lakes Impressed and Fort Ancient-style pottery may indicate ethnic differences in these smaller residential units. The differential distribution of stylistic elements, like that identified at the Bowen site (McCullough 1991), may reflect ethnically differentiated residential areas within the villages.

Perhaps what the archaeological record is reflecting, along the West Fork in central Indiana during the thirteenth century, is the beginning and subsequent evolution of an archaeological culture, the Oliver Phase, distinguished by the consistent co-occurrence and subsequent blending of two pottery traditions, each with distinctive morphology, motifs, and methods of decorative execution. Although there are a limited number of sites north of the Indianapolis area that exhibit either small samples of Great Lakes Impressed or of Fort Ancient styles (as discussed above), the majority of sites along the middle West Fork Valley exhibit the Oliver Phase combination of styles. Hundreds of sites with Oliver Phase components have now been documented across central and south-central Indiana with these two distinct ceramic traditions in direct association from numerous excavated contexts and surface collections. The sites in southern Indiana, which consistently exhibit this combination and tend to date during the latter portion of the Oliver sequence, show this mixture on the same vessels (McCullough 2000; Redmond and McCullough 1996; Cochran et al. 1997).

UPPER MISSISSIPPIAN IN CENTRAL INDIANA

Although the Oliver Phase dominated the central West Fork Valley, evidence of other groups, some similar to those from northern Illinois, has been recognized in central Indiana. An Upper Mississippian site complex (12Jo5, 12Jo4, 12Jo6, and 12Jo8) has recently been identified approximately 15 miles south of downtown Indianapolis, near the town of Smith Valley (McCullough and Wright 1997a). This cluster of sites differs from Oliver Phase occupations in terms of material culture, location, feature morphology, site structure, and, to some degree, botanical remains. Typically, Oliver Phase villages are located adjacent to large floodplains along the major drainage ways, often at the confluence of substantial creeks. They are roughly circular in configuration, or they may be in a linear distribution along the riverbank. Unlike Oliver Phase villages, the Crouch site (12Jo5) is not only approximately three miles from a major drainage, but it lies on a sand dune formation adjacent to a former grassy wetland. Sedentary settlements located on sandy soils adjacent to similar, poorly drained wetland areas and prairie remnants are not uncommon locations for Huber-Fisher populations from northern Illinois (Brown and O'Brien 1990) and northwestern Indiana (Faulkner 1972). Ten calibrated radiocarbon dates (Figure 7.14) from the Crouch and Center Grove School sites (located 150 meters from each other) indicate a solid fourteenth-century association, with occupation dates possibly ranging between the late thirteenth and early fifteenth centuries. Several superimposed features indicate some degree of time depth to these deposits, but the paucity of material culture and midden development suggest a nonintensive occupation, despite the size and number of features present. The fourteenth-century dates from the Crouch site place it temporally closer to the Oliver Phase sites investigated in southern Indiana than to those in the Indianapolis area (Figure 7.1).

Feature classes also differed from those commonly associated with Oliver Phase sites, which usually have permanent structures, fire hearths, and cylindrical and basin-shaped pits, as well as occasional stockade walls. At the Crouch site, no stockade walls or permanent structures were identified, but there were broad, shallow, ovoid features measuring up to 3 meters long, with darkened soil delineating decomposed feature liners. These may represent the bottom portions of hut-like structures or, perhaps, covered storage facilities, but neither interpretation can be demonstrated with certainty. Storage pits were also much larger than those typically found at Oliver sites, and they exhibited decomposed basal liners in many instances. Even medium-sized storage pits, which were common, measured between 1 and 2 meters across and penetrated about 1.5 meters below the base of the plowzone (McCullough and Wright 1997a). Some of the deep storage features penetrated more than 2.0 meters below the base of the plowzone; originally they were much deeper, because a century of plowing has severely eroded and deflated the ground surface.

The village was laid out on the highest sandy elevation around a central storage facility consisting of all the deep and almost all the medium-sized storage pits identified at this site complex. All the other feature types were also present in this central storage facility area. The site had an expanded, or sprawling structure, with several smaller habitation areas (northern portions of 12Jo5, 12Jo4, 12Jo6, and 12Jo8) situated on the minor ridges surrounding, at a maximum distance of 250 meters, from the concentration of large storage features (O'Brien 1996a, 1996b, 1997a, 1997b; O'Brien and Pirkl 1996; O'Brien et al. 1997; McCullough and Wright 1997a; Helmkamp 1992; McCullough and Kearney 1992). These smaller site areas consisted of clusters of basin-shaped pits, fire hearths, a medium-sized storage pit, and a higher density of cultural material per volume of feature fill (even though the overall density was still low) than was recovered from the central storage facility. Midden areas were either completely lacking or were very limited and ephemeral in extent. Wild rice (Bush 1997), which has never been documented from Oliver contexts, was recovered from feature context at 12Jo5.

In terms of material culture, this site complex exhibited a surprisingly low number of artifacts given the size and number of features encountered (over 80 from 12Jo5). The ceramics recovered indicated a non-Oliver cultural affiliation, although interaction with Oliver Phase populations is suggested by the limited number of both Fort Ancient-style (Figure 7.2) and cord-impressed rim sherds (center, Figure 7.15). The few Oliver Phase vessel fragments recovered were from features that also contained shell-tempered pottery (see Figure 7.2), which made up the vast majority of the sherds recovered from the Crouch site. The shell-tempered rim sherds are sharply everted, which produced a short thick neck (Figure 7.15). Most vessels either lack cordmarking or exhibit smoothed-over cordmarking on the body of the vessel, but the most distinctive trait is heavy cordmarking on the rim, or, rather, the underneath side of the rim, given the sharp eversion. Often where the neck everts outward (Figure 7.16), clay has been added to the interior of the vessel to form a sharp crease. These vessels lack decoration, except for one example that carried deep scalloping by a large cordwrapped dowel along the lip (Figure 7.17). This pottery appears most similar to Fisher materials from northern Illinois, such as those at the Hoxie site (Brown and O'Brien 1990; for similar examples, see Griffin 1943:CXXXVIII, figures 24-26, 31-36), rather than to Vincennes Phase material, as suggested previously (McCullough and Wright 1996; 1997a). This type of pottery also represents a minor component (two rim sherds in the GBL collections) at the Wea Village (12T6) near Lafayette, Indiana. The ceramics associated with these sites, however, are different enough from the Hoxie Farm and related Fisher materials to warrant a different name (James Brown, personal communication 1998). The author is referring to this manifestation as the Smith Valley complex until additional sites and cultural attributes can be identified and compared.

A scapula hoe (Garniewicz 1997) from a large mammal (elk or deer) was recovered from feature context on 12Jo5. Bone, shell, or stone hoes are not typically part of Oliver Phase assemblages, although a single scapula hoe was recovered from the Bowen site (not mentioned in the Dorwin 1971 report). Interestingly, a single, sharply everted shell-tempered vessel section with cordmarking on the underneath side of the rim, like those recovered from the Crouch site, was also found at the Bowen site (Dorwin 1971:278; McCullough 1991:112; 1992:50). Those items at the Bowen site, along with the presence of a few pieces of Oliver pottery from 12Jo5, suggest interaction between the groups. A single shell-tempered rim sherd similar to the Smith Valley material also was observed in a surface collection of Oliver pottery in Owen County along the lower West Fork (12Ow154) and lends further evidence of interaction. However, the paucity of Oliver sherds associated with this Smith Valley material (and vice versa), along with the deviation from the Oliver settlement-subsistence system, suggests that, while contact between the groups definitely occurred, the Smith Valley groups maintained their autonomy.

The mechanisms that brought together and blurred the boundaries between populations associated with the Fort Ancient and Great Lakes Impressed ceramic traditions, which created the Oliver Phase in the thirteenth century, evidently did not significantly influence this Fisher-related population.

A later Oneota population also is found along the West Fork Valley in northern Hamilton County, about 15 miles north of Indianapolis. Where the White River Valley begins to open up to larger expanses of floodplain as it flows southward, two important sites, the Strawtown circular earthwork (Lilly 1937:106-109; Griffin 1943:265) and Taylor Village (Cochran et al. 1993) are situated across the river from each other. The majority of the pottery from Taylor Village is shell tempered with the rims mostly set at sharp angles to the shoulder. Many of the rims' interiors have short, trailed lines that run perpendicular to the lip and are executed with a wide smooth implement; some of the lips display small scalloped impressions (Figure 7.18). The shoulders are mostly decorated with parallel trailed lines running vertically to the rim or with chevrons bordered by diagonal lines or punctations. Small circle-and-dot motifs are also present within the chevrons. Small loop or punched handles are associated with these vessel forms (see Griffin 1943:CXXXVI, CXXXVII, top row, figures 7, 31, and 32). This pottery is characteristic of a Huber cultural affiliation and probably dates sometime between AD 1400 and 1550 (Faulkner 1972:129; McCullough 1992:56). A large number of bifacial endscrapers (Cochran et. Al. 1993) also indicates a post-AD 1400 date; these are rare in other late prehistoric assemblages from central Indiana, although one example is reported from the Bowen site (Dorwin 1971) and one was collected in the vicinity of the Crouch site (12Jo5) near Smith Valley. Based on the Taylor Village date, one would have to concur with the conclusion by Cochran et al. (1993) that, despite conventional wisdom, central Indiana was not completely abandoned by the mid-fifteenth century.

Across the river from Taylor Village, the extant Strawtown earthwork (12H3) measures about 280 feet in diameter and 2 feet high and is surrounded by an exterior ditch that, at one time, was reportedly 6 feet deep. These works are located about 400 feet from the West Fork of the White River where a high (about 30 feet above annual flood stage) upland prominence extends into the river bottoms. At the time of European settlement, the upland overlooked a large prairie on the opposite side of the river. A smaller circle 500 yards south of the larger Strawtown earthwork that was barely visible in 1875 was estimated to be 50 feet in diameter. Two mounds were also reported in the vicinity of the earthwork, one about 500 or 600 feet north on the valley terrace and the other on the extreme west end of the upland landform upon which the large enclosure rests. Only the large circular earthwork is still visible (Lilly 1937:106-109).

The cultural affiliation of the Strawtown earthwork has yet to be determined, because no diagnostic artifacts have been documented from contextual deposits. Some past literature has attributed the limited amount of pottery in curated collections to the earthwork (Lilly 1937:106; Griffin 1943:265) and related it to the Oliver Phase (Dorwin 1971), or the materials recovered from the Taylor Village site have been confused with the earthwork at Strawtown (McCullough 1991:130, 1992:55). However, closer examination of the Indiana State Museum collections (Cochran et al. 1993) demonstrated that the Huber materials (mentioned above) came from the Taylor Village site across the river. A re-examination by the author of the materials curated at the Glenn A. Black Laboratory of Archaeology also confirms that the Huber occupation was located on the opposite, or north side, of the river. The limited number of Late Prehistoric pottery recovered from the vicinity of the enclosure exhibits the same similarities to Springwells pottery as do the Great Lakes Impressed sherds found with several other Oliver assemblages. Only one Anderson Phase Fort Ancient sherd with a decorated handle and a guilloche design is present in the collection available for study (Lilly 1937:106; Griffin 1943: Plate CLVII, figures 1-8).

VINCENNES PHASE MISSISSIPPIAN IN THE LOWER WEST FORK

The Vincennes Phase in Indiana is poorly understood, primarily due to the lack of excavated contexts and any systematic survey along riparian resources. Howard Winters (1967:71) originally suggested that four Mississippian-like complexes were present in the Wabash Valley. In the lower Wabash, he recognized the materials from the Murphy site (now known to be Caborn-Welborn) and the artifacts recovered from the top of McCleary's Bluff to be distinct from the Angel-Kincaid occupations in the central Wabash Valley. What he called the Vincennes cultural occupations were originally believed to be located within a five-mile radius of Lawrenceville, Illinois, with a possible related hilltop fortress/cemetery named Merom Bluff located about 40 miles away on the Indiana side of the river. In the north-central Wabash Valley, Winters (1967:71) tentatively identified the "Etchison Complex," east of West Union in Clark County, Illinois. Barth (1982:83) suggests that the Etchison Complex actually represents an earlier variant of the Vincennes culture, implying that these materials are more widespread (see also Moffat 1985). The distribution of Vincennes occupations roughly corresponds to that of the earlier Allison-LaMotte Phase (Barth 1982; 1991), but no Vincennes Phase sites are located along the Wabash drainage south of the confluence of the White River in southern Knox County (Higginbotham 1983). Sonner (1976) states that site 12K133, which is 2.5 miles south of Vincennes, represents the southern extent of the Vincennes Phase Mississippian occupation along the Wabash, while the distribution extends northward to southern Parke County, Indiana.

Basic to these formulations is the Otter Pond site, which occupies between 60 and 100 acres and supposedly has 12 platform mounds arranged around a central plaza, leading to suggestions that it was the central town in a hierarchical settlement system (Winters 1967:71; Barth 1982:86). However, investigations at the Otter Pond site have not been conducted to confirm either the cultural origin of these mounds or whether this site actually represents such a political center. Smaller hamlets, sometimes accompanied by a single mound and a central plaza, have also been identified, as well as small habitation and extractive camp sites. The pottery consists of shell-tempered, plain-surfaced jars, plates, and simple bowls and shell-tempered, cordmarked jars. The plain-surface ware was more popular, but a great deal of variation in the relative frequencies occurs between sites. Vincennes pottery vessels exhibit very little decoration, and adornos, lugs, and handles are also rare (Winters 1967:83). Winters (1967) suggests there are similarities between shell-tempered, cordmarked pottery like that found at Cahokia and shell-tempered, plain-surfaced pottery typically recovered from the Kincaid site in southern Illinois and Angel in southwestern Indiana. However, the lack of decoration and the variety of vessel forms indicate significant differences among the ceramic assemblages.

Temporally, the Vincennes Phase has been as difficult to understand as its material culture. Winters (1967:83) originally suggested that the Vincennes culture probably dated to the very late portion of the Mississippian period. However, radiocarbon determinations indicate a possible 400-year span for Vincennes Phase occupations in the central Wabash valley. Charcoal samples from the Farrand site (12Vi64) in Vigo County returned three uncalibrated dates that are believed to be associated with Vincennes contexts: AD 1085 +/- 85 (Uga-659), AD 1105 +/- 100 (Uga-657), and AD 1140 +/- 70 (Uga-656). The Reed-Walker site (11Co18) on the middle Embarras River near Charleston, Illinois, produced an uncalibrated date of AD 1430 +/- 70 (ISGS-404) (Barth 1982:85). Moffat (1985:220) notes similarities between the ceramic assemblages of the upper Kaskaskia River Valley in the Lake Shelbyville area and the Vincennes material in the central Wabash. He suggests that during the early range of occupation the pottery is more like Vincennes materials than those present in the lower Kaskaskia, Mississippi, or Ohio valleys, but, after about AD 1200, these styles began to diverge. A total of 15 radiocarbon dates from the upper Kaskaskia area reveal a range of calibrated intercepts (MASCA 1973) between AD 1020 and 1500 (Moffat 1985:12).

In southwestern Indiana, archaeological investigations of Vincennes Phase components have consisted of limited surface collections and the excavation of an isolated feature at 12K262 and two features at Blann Village (12K81) by Sonner in 1979. Blann Village was first recorded by Green (1972) during a survey for the proposed Wabash channelization project and is probably the site mentioned in the *History of Daviess and Knox Counties, Indiana* (Anonymous 1886). It is located in northwestern Knox County along an oxbow lake referred to as Gray's Pond. Sonner conducted surface collections and a very limited test excavation at this site, but a report of the investigation was never completed. Sonner (1976) did, however, conduct a pottery analysis from Blann Village and from surface collections at another Vincennes Phase hamlet, the Gray's Pond site (12K129) southwest of Blann Village along the same oxbow lake. Prior to the investigation at the Heaton Farm site**,** this analysis was the only significant study of Vincennes Phase artifacts from southwestern Indiana (see McCullough and Wright 1997b, plates 1.1 and 1.2). Sonner's description of the pottery was similar to that offered by Winters (1967): the jars could have plain or cordmarked surface treatments, but if cordmarking is present, it does not extend beyond the shoulder; the rim surfaces were always plain; and the everted rim was the most popular profile, with both angular and rounded shoulders present. As noted by Winters (1967), the frequency of cordmarked sherds varied between sites, with the plain-surface specimens predominating: 72% were plain surfaced at 12K129, 59% were plain surfaced at 12K81. Two types of temper predominated: one consisted of medium to coarse shell, and the other consisted of finely ground shell mixed with sand or made from clay with a high sand content. The latter was more prevalent at site 12K129, and both types were observed in sherds with either cordmarked or plain-surface treatments. An extremely small number of red-filmed sherds also occurred in the collections. In terms of other vessel forms, small numbers of plates and bowls were present, but no water bottles were observed. Two possible fabric-impressed sherds were present but could not definitely be identified as salt pans. A fragment of a shell-tempered pottery disc or spindle whorl similar to the one illustrated by Winters (1967:79) was also recovered from 12K81.

Many other nonceramic artifacts identified as belonging to the Vincennes Culture assemblage by Winters (1967:82) were also recovered from these sites, most notably a Mill Creek chert hoe flake. Mussel shell was too fragmentary to identify any hoes manufactured from this material. Although scapula hoes were not mentioned by Winters (1967), Sonner reported their presence at the Farrand site (12Vi64). Except for the manufacture of hoes, pebble cherts were used almost exclusively for manufacturing stone tools. Projectile points consisted of triangular points without evident serration or notching. Triangular-shaped, grooved abraders were recovered, and some triangular bifaces that fit the description of hump-backed knife forms were also present (Sonner 1976).

The Heaton Farm site on the lower West Fork of the White River near Bloomfield, Indiana (12Gr122), exhibits a mixture of Oliver Phase and Vincennes-like pottery and was used as the basis for the formulation of the Heaton Phase (Tomak 1983). Indiana University field school excavations from 1996 to 1998 identified storage pit features and domestic structures indicating a substantial Late Prehistoric village (McCullough and Wright 1997b; Bush et al. 1999; Strezewski et al. 1999). This site also contains an Allison-LaMotte component as well as various Archaic components. 12Gr122 is the only site where significant amounts of both Oliver and Vincennes wares have been recovered, and it marks the southern extent of the Oliver occupation along the West Fork. Tomak (1970:169) reports other sites that have produced minor amounts of shell-tempered or shell- and sand-tempered pottery similar to that recovered from the Heaton Farm site (see Black 1933: plate 24e for an example of a shell-tempered pottery disc common on 12Gr122) from central Greene to Knox counties, but none of these sites represent substantial village occupations, nor have Oliver components been documented in association with the shell-tempered pottery, which underscores the importance and uniqueness of the Heaton Farm site. The report currently under preparation of the excavations at 12Gr122 will shed new light on the dynamics of Late Prehistoric settlement of the lower West Fork of the White River valley (Ball 2000).

SUMMARY

Although the Oliver Phase represents the predominant archaeological culture during the Late Prehistoric period, the West Fork of the White River was a cultural borderland during the Late Prehistoric period (AD 1200 to 1450). Upper Mississippian Fisher and Huber populations have been identified in central Indiana at the Crouch site complex and at Taylor Village, respectively. Both of these sites represent the easternmost settlements documented thus far for these groups. In the lower West Fork Valley, the Vincennes Phase is found in the broad lowlands south of the Oliver distribution. The Heaton Farm site, situated where the two distributions meet, has revealed substantial amounts of both Oliver-style pottery (represented by Great Lakes Impressed and Fort Ancient-style decoration on the same vessels) and of Vincennes-like material (Ball 2000).

With its blending of two distinct pottery traditions that very likely originally represented two separate populations, the Oliver Phase occupation of central Indiana presents a great deal of variability. One pottery tradition, which generally has been called the Great Lakes Impressed style, is associated with vessels that are decorated by impression on thickened or collared rims and is stylistically most similar to Springwells Phase Western Basin Tradition pottery, although there are significant differences. This pottery is found mostly in association with Fort Ancient-like materials, both from feature context and on single vessels, across central and south-central Indiana. In the upper West Fork and northeastern Indiana where the Fort Ancient components are lacking, the small scatters of Great Lakes Impressed pottery indicate small pit clusters that probably represent scattered farmsteads.

What we now know of the date ranges for the various cultures during this period also indicates the possibility of interactions. Recent overviews of the Fort Ancient Tradition (Henderson 1992; Sharp 1990; Drooker 1997) essentially delineate three development stages: early (ca. AD 1000-1200); middle (ca. AD 1200-1400), and late (ca. AD 1400-1700?). Only aspects of material culture from the Anderson Phase, or middle stage (Griffin 1943; Essenpreis 1982), such as pottery, mortuary treatments, and a pattern of nucleated circular villages along a major tributary, are present in central Indiana (Redmond and McCullough 2000; McCullough 2000). Based on many more radiocarbon dates processed during the last seven years, it appears that the Oliver Phase occupied central Indiana between AD 1200 and 1450.

The material record and the newly emerging temporal sequence for the Oliver Phase of central Indiana suggest that a "billiard ball" model of cultural interaction, where cultures consisting of tightly bounded entities bang together and attempt to displace each other, does not fit the data. Rather, a model of interaction, with fluid cultural boundaries in a dynamic social landscape seems more applicable to Oliver occupations. The co-occurrence of people with distinct ceramic traditions in the northern portions of the Oliver distribution strengthens this suggestion. In the south at Heaton Farm, Oliver ware appears along with Vincennes-type pottery. In between the northern portions and the south, despite the preponderance of Oliver sites, there are vessels that suggest trading patterns. Without clear evidence of violent conflict along the West Fork (for the archaeological signatures of warfare, see Emerson 1999), it seems that the boundaries between cultures were neither fixed nor impermeable.

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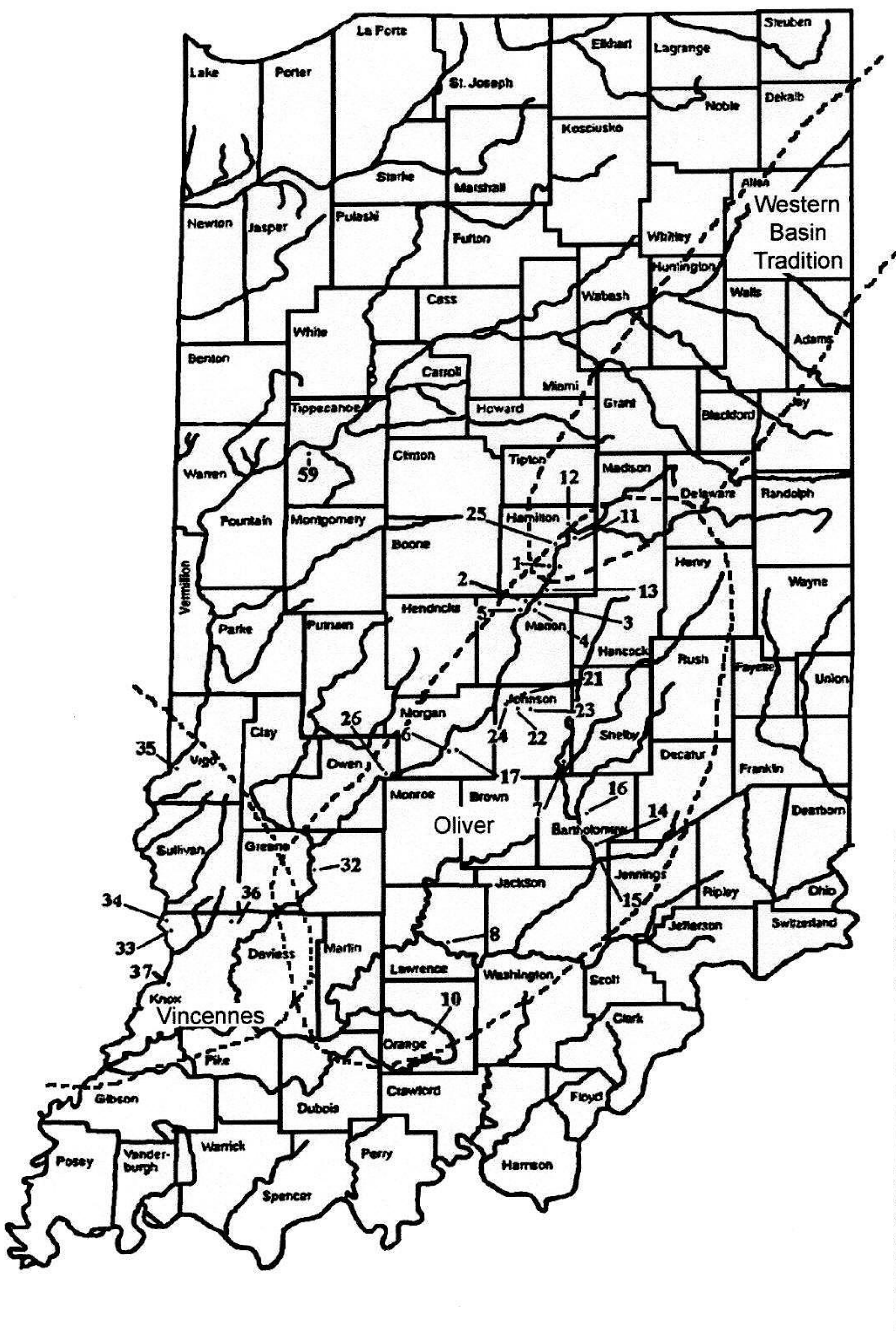
LIST OF FIGURES

Figure 7.1. Location of sites mentioned in the text (adapted from Indiana Historical Bureau map).



1. Moffitt Farm (12-H-6/46)
2. Oliver Farm (12-Ma-1)
3. Jose (12-Ma-47)
4. Bosson (12-Ma-4)
5. Bowen (12-Ma-61)
6. Bundy-Voyles (12-Mg-1)
7.Sugar Creek (12-jo-289)
8. Clampitt (12-Lr-239)
10. Cox's Woods (12-Or-1)
11. Strawtown (12-H-3)
12. Taylor Village (12-H-25)
13. Baker's Trails (12-H-837)
14. Lykins (12-B-184)
15. Melvin (12-B-401
16. McCullough's Rum (12-B-1036)
17. Martinsville Plaza (12-Mg-52)
21. 12-Jo-4
22. Crouch (12-Jo-5)
23. 12-Jo-6
24. Center Grove School (12-Jo-8)
25. Noblesville (12-H-807)
26. 12-Ow-154
32. Heaton Farm (12-Gr-122)
33. Gray's Pond (12-K-129)
34. Blann Village (12-K-81)
35. Farrand (12-Vi-64)
36. 12-K-262
37. 12-K-133
59. Wea Village (12-t-6)

Figure 7.2. Fort Ancient-like rim sherds recovered from pit context with shell-tempered Smith Valley pottery (excavated by ASC Group, Inc., and GBL).

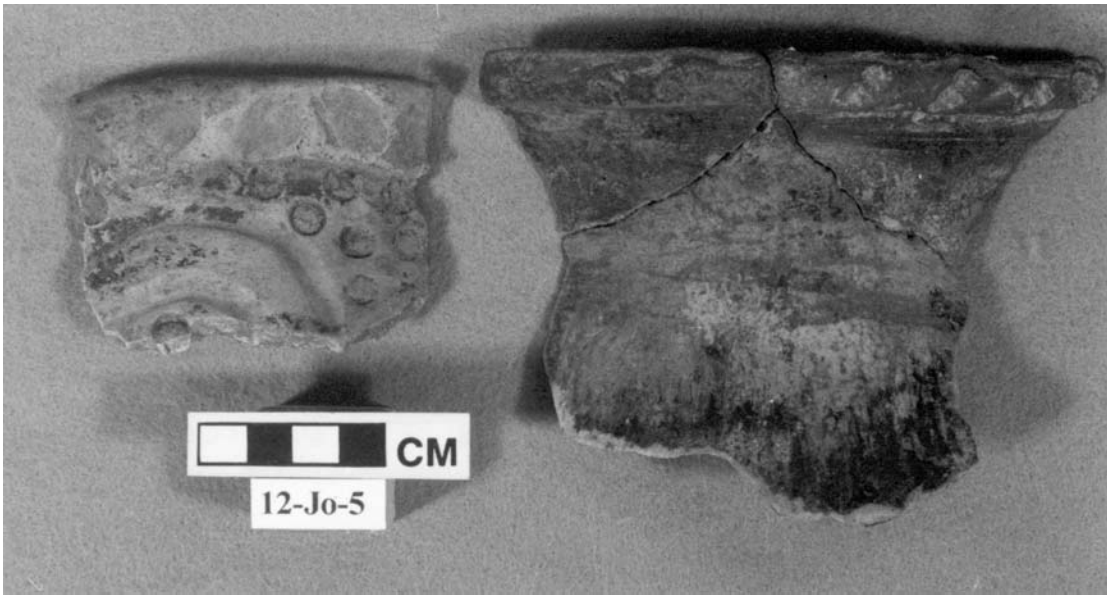


Figure 7.3. Fort Ancient sherds from the Jose site (12Ma47).

Figure 7.4. Horizontal lines of various cordage impression on castellated rim sherds from the Bowen site (12Ma61).

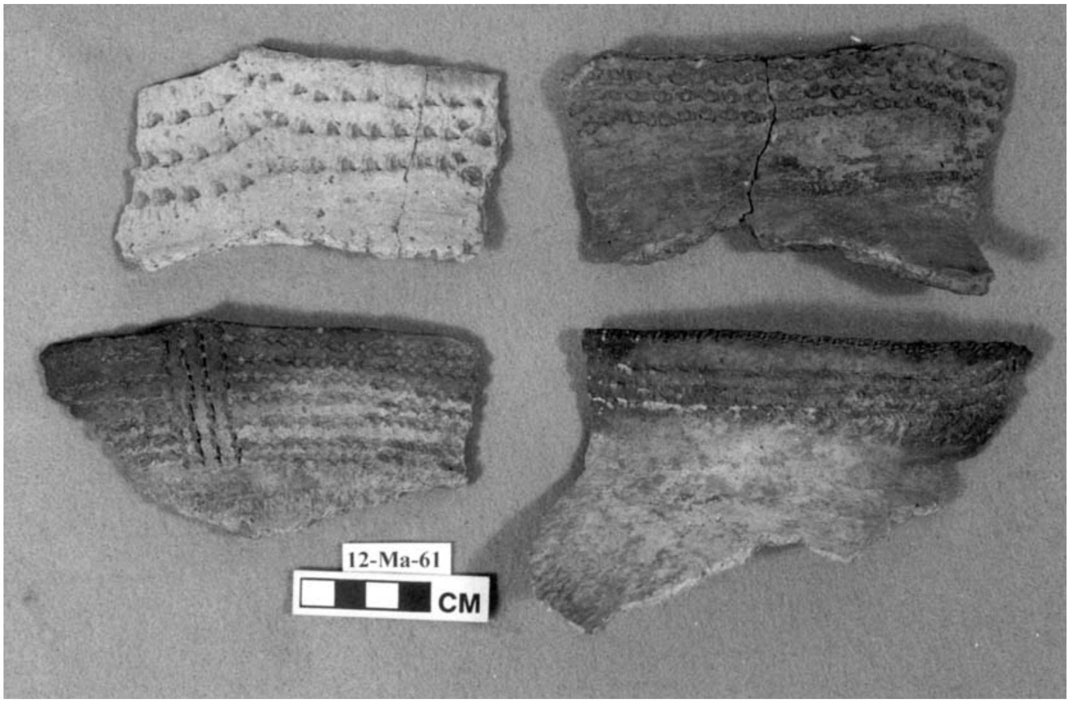


Figure 7.5. Rim sherds showing strongly everted rim angles from the Bundy-Voyles site (12Mg1).

Figure 7.6. Cambered rim sherds with vertical nodes and cord-impressed chevron designs from the Oliver site (12Ma1, area exposed in 1967).

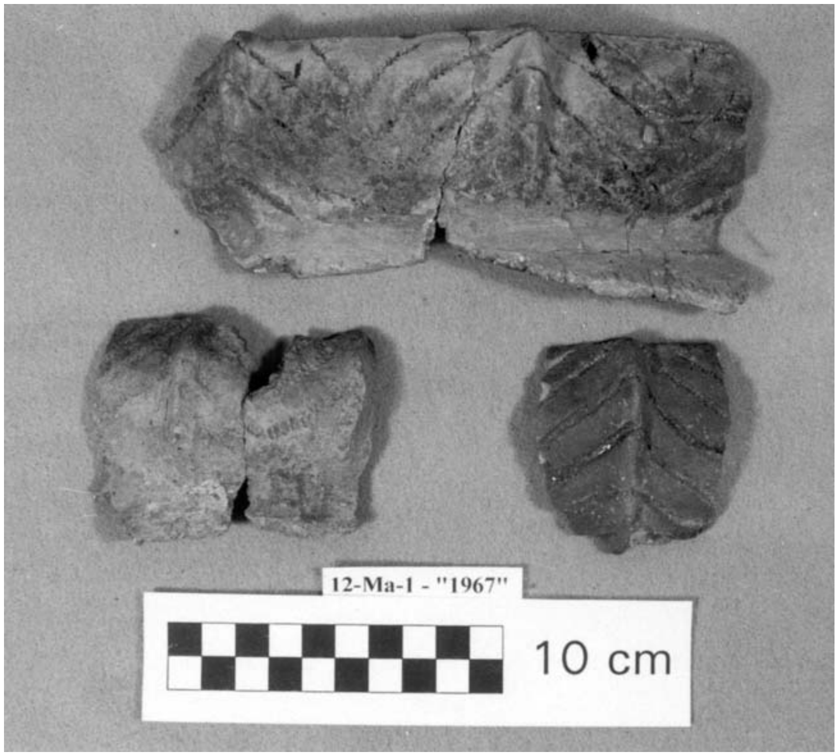


Figure 7.7. Uncalibrated Late Prehistoric period radiocarbon dates available from central Indiana and from the upper Maumee River Valley as of 1991 (adapted from McCullough 1992).

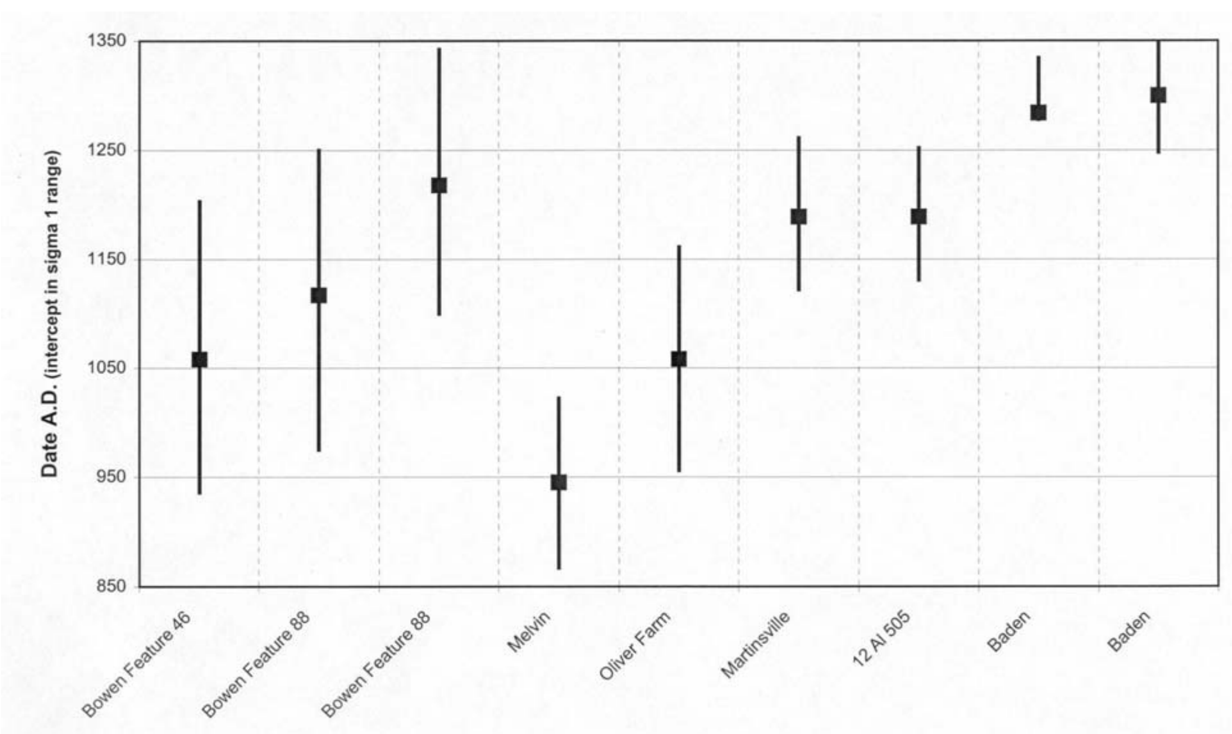


Figure 7.8. Calibrated radiocarbon dates from Oliver components (excluding Heaton Farm) arranged north (left) to south (right) (calibrated according to Stuiver and Pearson 1993).

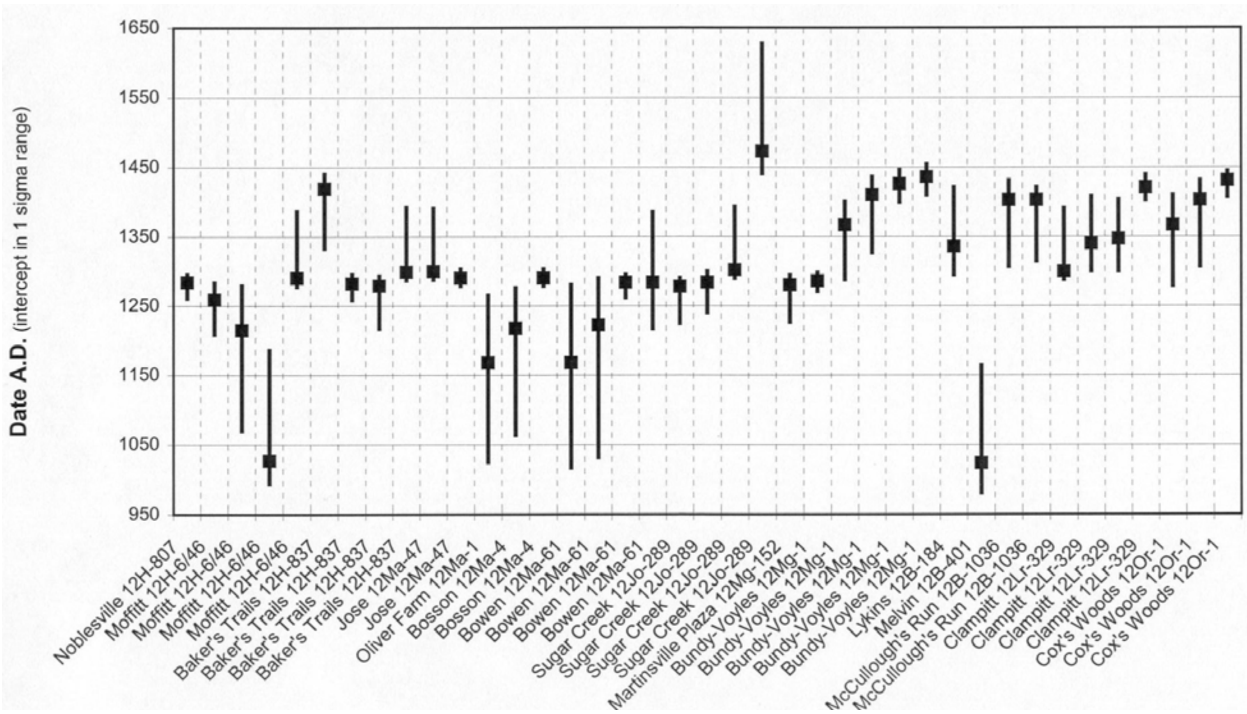


Figure 7.9. Rim sherds showing impressed designs from the Moffitt Farm site (12H6, Indiana State Museum collections).

Figure 7.10. Horizontal impressed lines with castellations from the Jose site (12Ma47) and Moffitt Farm (12H6, Indiana State Museum collections).

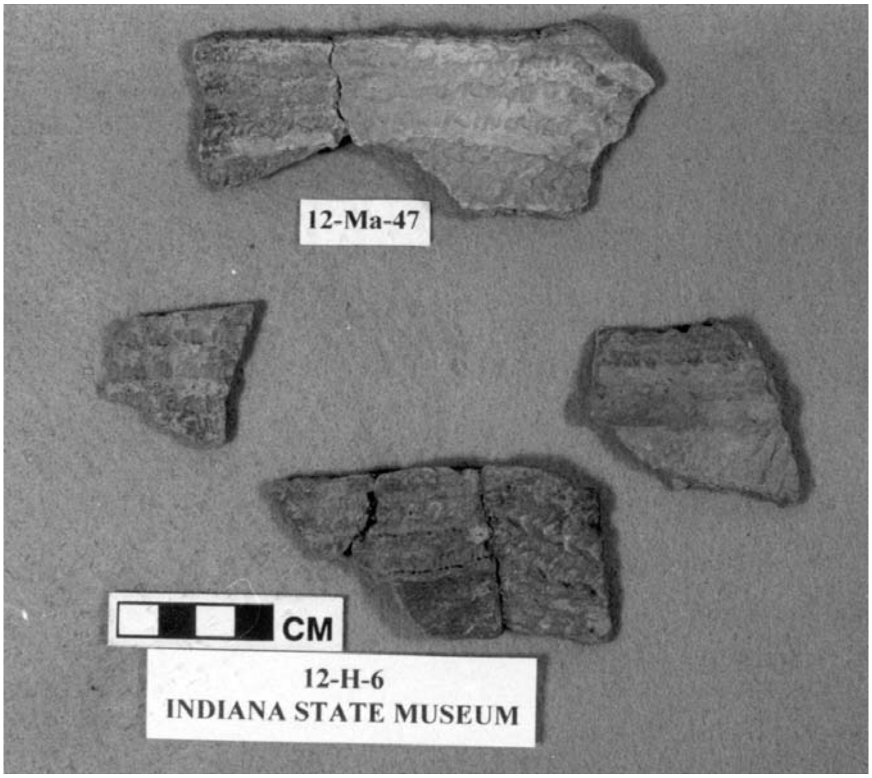


Figure 7.11. Rim sherd with impressed design and broad excurvate neck from the Moffitt Farm site (12H6, Indiana State Museum collections).

Figure 7.12. Plain, strongly everted rim sherds from the Jose site (12Ma47).

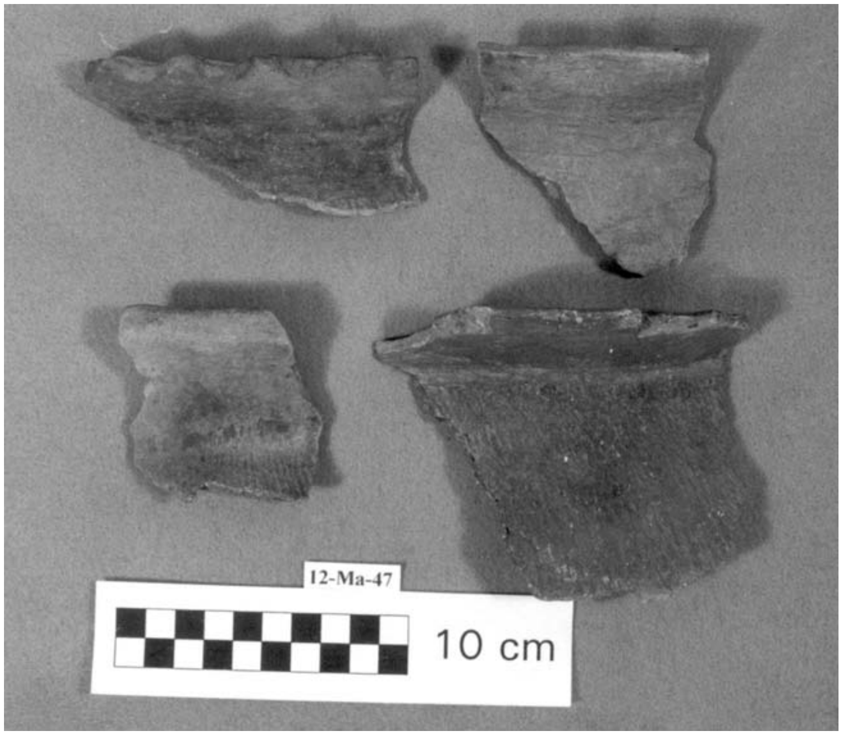


Figure 7.13. Two rim sherds with horizontal cord-impressed designs showing broad excurvate necks (top) and more typical strongly everted profile (bottom) from the Jose site (12Ma47).

Figure 7.14. Calibrated radiocarbon dates from the Smith Valley Complex (calibrated according to Stuiver and Pearson 1993).

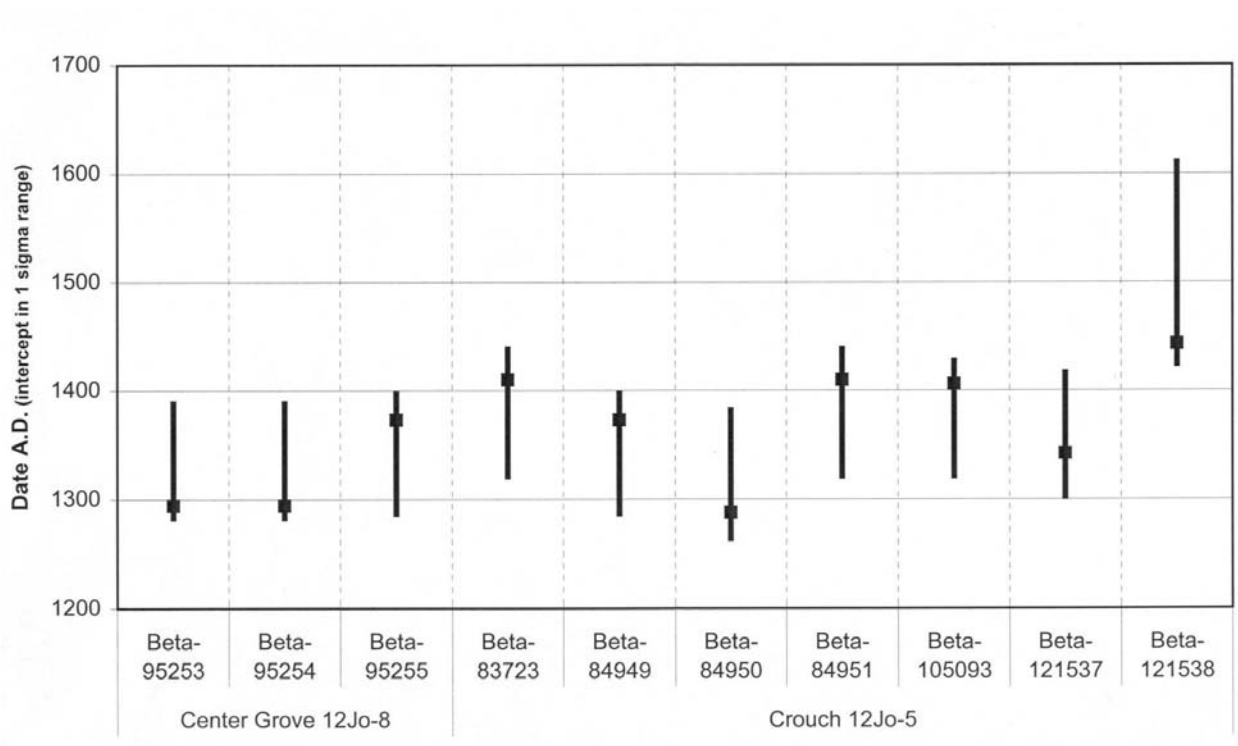


Figure 7.15. Rim sherds from the Crouch site: bottom center, cordwrapped dowel-impressed, grit-tempered Oliver Phase sherd; the remainder are cordmarked, shell-tempered, sharply everted rims (from McCullough and Wright 1997a).

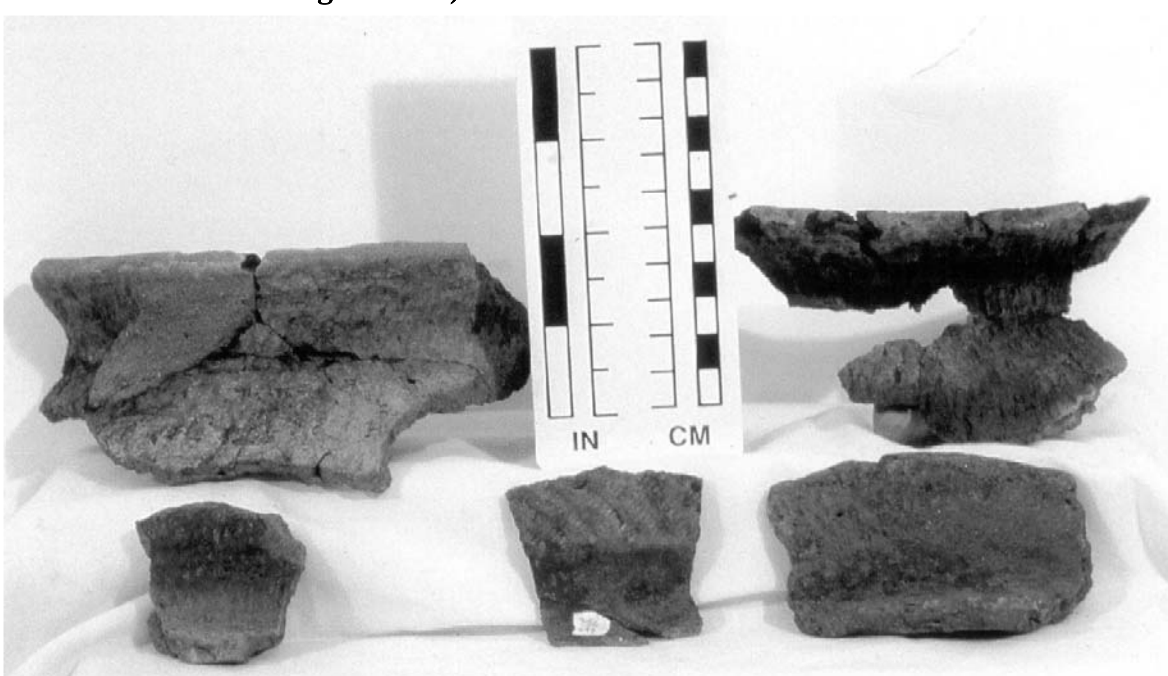


Figure 7.16. **Typical rim profiles of sherds recovered from the Crouch site (12Jo5). The upper left example is the grit-tempered, cord-wrapped dowel-impressed sherd shown at the bottom-center of Figure 7.15; the remainder are shell-tempered Smith Valley ware (drawing by Laura Pate).**

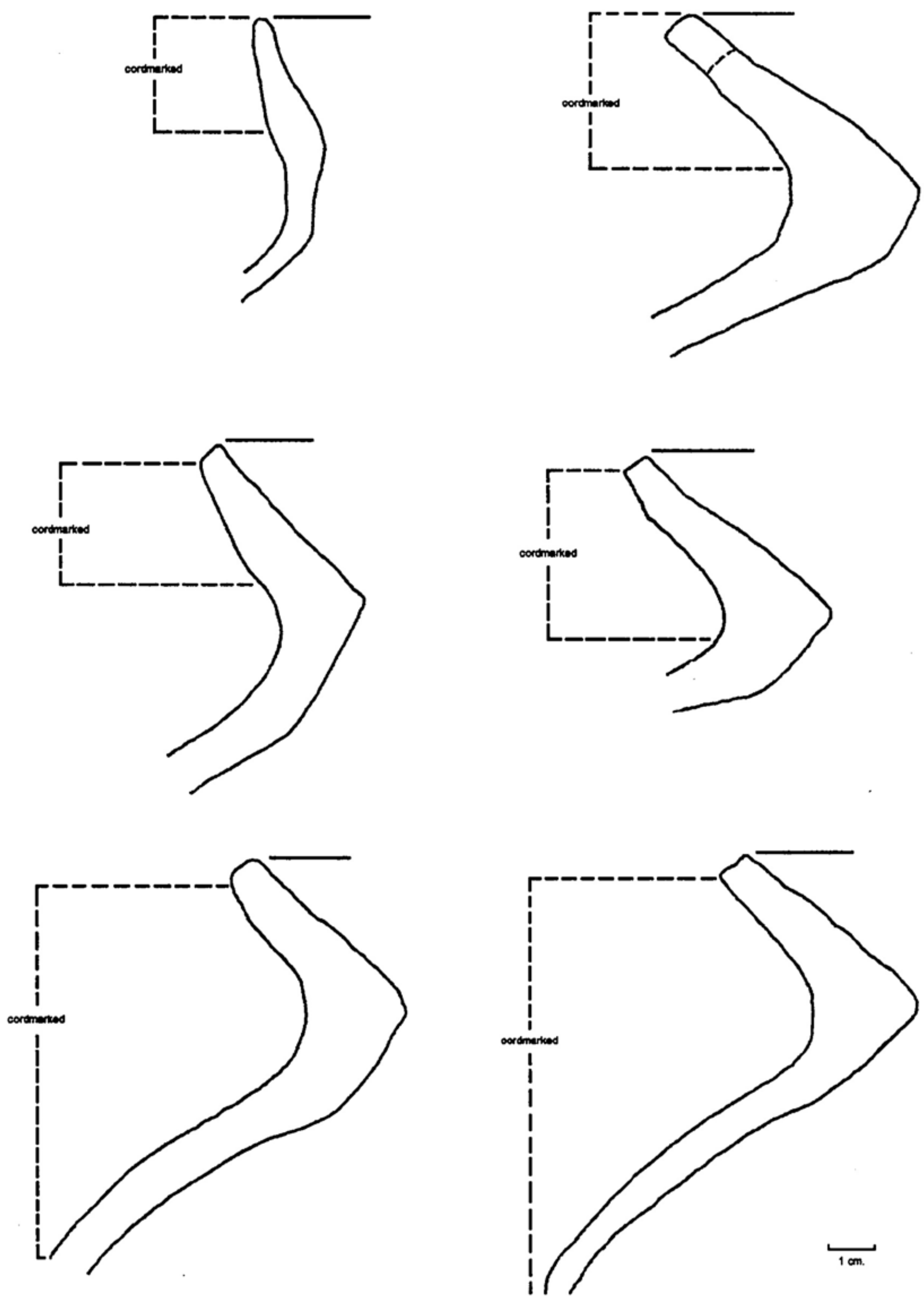


Figure 7.17. Shell-tempered vessel section from the Crouch site, with lip scalloped by large cordwrapped dowel, cordmarked rim, and smooth body (from McCullough and Wright 1997b).

Figure 7.18. Shell-tempered rim and shoulder portions of pottery recovered from Taylor Village (12H25) (Indiana State Museum collections).

CHAPTER EIGHT

IMPLICATIONS OF THE WOLF PHASE DISPERSAL OF TERMINAL WESTERN BASIN TRADITION POPULATIONS INTO NORTHERN INDIANA DURING LATE PREHISTORY

David M. Stothers and Andrew M. Schneider

INTRODUCTION

This chapter considers aspects of long-term archaeological research in the regions of southeast Michigan, northwest Ohio, and northeast and central Indiana. Specifically, an attempt is made to interpret the data base within a framework of cultural interaction between the resident Late Woodland populations within these contiguous regions. It must be stated at the outset, that a major theoretical position taken within this chapter, is that ethnicity is attainable from the archaeological record. Specifically, the assumption is made that ceramics, among other cultural attributes, can reflect ethnicity. While the debate over this issue is extensive, it is beyond the scope of this chapter and will not be addressed here. The reader is referred to publications where these and other issues of this multi-faceted theoretical issue are considered on general and specific levels (Barth 1969; Jones 1997; Mason 1976; Sackett 1977; Shennan 1989; Stothers et al. 1994; Wiessner 1989; Wobst 1977).

The chapter begins with an outline of evidence from northwest Ohio and southeast Michigan data bases, characterized by firm cultural chronologies and ceramic sequences, which forms the foundation for interpretations representative of territorial expansion, cultural displacement, and ultimately population migration. Various criteria have been suggested as essential in order to demonstrate migration in prehistory (see Anthony 1990; Rouse 1986; Snow 1995; Trigger 1969, among others). Most importantly, however, an argument for migration should include evidence of a homeland or place of origin as well as a cause or impetus for the population movement. It is herein suggested that these criteria are supported by the data base. Among the evidence that has been presented for the multiple directions in which the population radiates from northwest Ohio, are new aspects relating directly to the culture prehistory of Indiana. Not only do the implications of such a population migration affect Indiana Late Woodland prehistory, but they also lend new insight into the ‘Oliver Phase’ of central and southern Indiana, and offer a test case scenario for ethnic interaction and cultural miscegenation in prehistory.

BACKGROUND

The regions surrounding the western end of Lake Erie were inhabited by two separate cultural traditions during late prehistory, the Western Basin Tradition (Stothers 1978) and the Sandusky Tradition (Bowen 1980; Stothers and Pratt 1980). Our understanding of these cultural traditions has been continually and significantly refined since their inception. This process of refinement has been synthesized and outlined in several recently published papers (Abel 1995, 1998, 1999; Bechtel and Stothers 1993; Stothers and Bechtel 2000; Stothers 1995, 1998a, 2000; Stothers et al. 1994; Stothers et al. 1998) and is beyond the scope of this chapter. For the purposes of the present chapter, we will present brief descriptions of the most current interpretations of these cultural manifestations as supported and argued on the basis of an extensive data base.

WESTERN BASIN TRADITION

The Western Basin Tradition was originally defined in 1965 as the Younge Tradition (Fitting 1965). The Younge Tradition phase sequence included the Wolf Phase (Fitting 1965), which was later demonstrated to be associated with a separate cultural tradition in northern Ohio. As a result, and in an effort to eliminate taxonomic confusion between the Younge Tradition and the Younge Phase, the cultural tradition was refined and renamed the Western Basin Tradition (Stothers 1978). After three decades of continued research and refinement, the Western Basin Tradition is now characterized as an in situ cultural development represented by four sequential phases: Gibraltar (ca. A.D. 500-750), Riviere au Vase (ca. A.D. 750-1000), Younge (ca. A.D. 1000-1200), and Springwells (ca. A.D. 1200-1300) (Figure 8.1). While others have reached differing interpretations (e.g., Halsey 1976; Murphy and Ferris 1990) regarding the cultural sequence and cultural affiliations of the Western Basin Tradition that are well beyond the scope of this chapter, these alternative interpretations have been addressed in several recent publications (Stothers 1994, 1995, 1999b; Stothers and Bechtel 1993; Stothers et al. 1994; Stothers et al. 1999).

The Western Basin Tradition as it is currently understood (Bechtel and Stothers 1993; Schneider 2000; Stothers 1994, 1995, 1999b; Stothers et al. 1994), originated in extreme southwestern Ontario, the St. Clair-Detroit River and western Lake Erie regions and was ultimately derived from Princess Point Complex ‘daughter’ population groups which had spread westward from the Grand River Valley into the region ca. A.D. 500-600. As such, the Western Basin Tradition is viewed as “. . . another branch of the Ontario Iroquois Tradition that was dispersed . . .” (Fitting and Zurel 1976:248-249; Stothers 1975, 1978, 1995; see also Stothers and Bechtel 2000). Radiation of Western Basin Tradition populations from this early (ca. A.D. 500-600) homeland in the Lake St. Clair-Detroit River area established resident ‘daughter populations’ in the Saginaw drainage area of Michigan and the regions surrounding the western end of Lake Erie in both Canada and the United States. While Western Basin Tradition sites have been recorded in northwest and northcentral Ohio, there are no Springwells Phase sites east of the Maumee River Valley. Current evidence suggests that Western Basin Tradition populations never achieved a formal village lifestyle, and while there is evidence of maize agriculture, it does not appear to have been more than a supplement to an economy based on fishing, hunting and gathering (Bechtel and Stothers 1993; Stothers and Abel 2000; Stothers and Bechtel 1987, 2000; Stothers et al. 1994).

THE 'FIRE-NATION' CO-TRADITION

The Sandusky Tradition was recognized, formally defined, and entered the professional literature in 1980 (Bowen 1980; Stothers and Pratt 1980). It has been characterized as an in situ development from a Middle Woodland Esch Phase cultural base within northcentral Ohio (Stothers and Abel 1989; Stothers et al. 1994). The Late Woodland Sandusky Tradition is characterized by the sequential in situ cultural continuum which comprises the Green Creek (ca. A.D. 500-1000), Eiden (ca. A.D. 1000-1250), the Upper Mississippian Wolf (ca. A.D.1250-1450) and Fort Meigs (ca. A.D. 1450-1550), and the Proto-historic Indian Hills (ca. A.D. 1550-1643) phases. The ceramic sequence of the Sandusky Tradition has been firmly dated from assemblages throughout northern Ohio (Abel 1995, 1998, 1999; Koralewski 2000; Stothers et al. 1998; Stothers et al. 1994), as well as Michigan and Ontario (Abel 1999; Stothers et al. 1999). Major components from each of these phases have been excavated, including one stratified site containing components from four phases (Stothers et al. 1994, 1998).

A large data base, composed of ethnobotanical remains, settlement pattern analyses, and carbon isotope fractionation studies, have added refinement to interpretations regarding the cultivation of, and dependence upon, maize agriculture in late prehistoric times (Bechtel 1986; Stothers and Abel 2000; Stothers and Bechtel 2000). It is during the Wolf Phase (ca. A.D. 1250-1450), that the intensification of maize agriculture within the Sandusky Tradition triggered a set of social consequences involving the nucleation of village communities, as well as increased territoriality and hostility (Stothers and Abel 2000). Concurrent with this increase in social and economic stress, was an increase in local population size (Stothers and Graves 1983, 1985; Stothers and Abel 2000). The archaeological record indicates Sandusky Tradition-derived "daughter Populations" from northcentral Ohio, spread into southeastern Michigan, the Saginaw drainage basin and southwestern Ontario, all traditional homeland areas of Western Basin Tradition populations (Abel 1995; Bechtel and Stothers 1993; Stothers 1995, 1999b; Stothers and Bechtel 2000; Stothers et al. 1994). The latter appearance of Sandusky Tradition components in these extra-regional areas has been interpreted as representing a Wolf Phase population radiation accomplished by means of a segmentary lineage system (Sahlins 1961). Although commonly interpreted as "predatory", village fission along segmentary lineage lines provides an efficient means of alleviating internal stresses within a small nascent community (Trigger 1990).

Archaeological, linguistic, and cartographic data, tempered with a cultural-historical perspective, has suggested that geographically separated population segments, which as a result of the late 13th and 14th century Wolf Phase radiation, established residence in the Saginaw drainage basin, the St. Clair-Detroit River region, as well as northwest and northcentral Ohio, achieving increasing social and political autonomy in each of these areas while still retaining a cultural commonality and continued cultural interaction into later prehistory, protohistory, and early history (Abel 1995; Stothers 1998a,b, 1999b, 2000; Stothers and Graves 1983, 1985, 1992; Stothers and Koralewski 1996). Populations living in these specific areas less than 100 years after the Wolf Phase ended, are referred to in ethnohistoric accounts as the "Fire-Nation" Confederacy, which was composed of five constituent tribes. It has been suggested (Stothers 1998a,b, 1999a,b) that the Totontaratohnronon of the Maumee River valley, the Houatoehronon of the Saginaw drainage basin, the Skenchioronon of the Lake St. Clair region, and the

Aictaronon of the northcentral Ohio region, the Ontarraronon of the Cleveland area, in addition to the Berrien Phase populations of southwestern Michigan (Bettarel and Smith 1973; Cremin 1992, 1996), whom have been suggested to represent the Ouiatonon (or Wea, see Stothers 1998a, 1999b; Stothers et al. 1999), together represented the Assistaeronon or "Fire Nation," an Algonquian speaking confederacy which had its origins in prehistory (Stothers and Koralewski 1996; Stothers 1998a, 1999a, 1999b). Consequently, to refer to all these groups in prehistory under the single appellation of "Sandusky Tradition" would be masking the socio-cultural and political autonomy which characterized each of these groups. Therefore, as proposed elsewhere (Stothers 1998a, 1998b, 1999b), the terms Saginaw Tradition and Lake St. Clair Tradition, will henceforth be used to characterize these separate but derivative groups within the Saginaw drainage basin and the Lake St. Clair regions respectively, during and after the Wolf Phase. Until more refinement in village sequencing is established in the Maumee, Portage, Sandusky, and Huron River valleys, an expansion of terminology/taxonomy is not warranted for these populations. Future research will need to determine whether groups occupying these drainages represent separate tribal units of the confederacy, or whether the archaeological record reflects one, or possibly two, population groups re-locating to different river drainages through time (Stothers and Abel 1989; Stothers et al. 1998:85-88).

WESTERN BASIN TRADITION POPULATION DISPERSAL

Evidence for the dispersal of Western Basin Tradition populations ca. A.D. 1200 to 1300 has been well documented. During the Springwells Phase (ca. A.D. 1200-1300), evidence indicates that small refugee Western Basin Tradition populations (probably family units) dispersed as far north as the Straits of Mackinac, Whitefish Island at Sault Ste. Marie, Isle Royal and northern Lake Huron. Such evidence is predicated upon the appearance of diagnostic Western Basin Tradition ceramics on several sites beyond the core area of the western Lake Erie and Saginaw drainage regions. Stothers (1995) presents a detailed discussion of Western Basin Tradition ceramics within the site assemblages of Beyer, Dunk's Bay, Inverhuron-Lucas, O'Neill, and Providence Bay sites. Sites such as Juntunen, Nodwell, Shebisikong, Whitefish Island and Metal Toad have also been argued to include Western Basin Tradition ceramics within the site assemblages, although they may not have been recognized or interpreted as such when first reported (Stothers 1995).

Sites in southern Ontario have yielded evidence of Western Basin Tradition dispersal documented by the appearance of Riviere Ware ceramics of the Springwells series, as well as the blending of certain Riviere Ware and Ontario Iroquois Tradition ceramic ware attributes on the same vessels (Stothers 1978, 1995; Stothers and Graves 1983, 1992; Stothers et al. 1994). Because of the similarity in ceramic type definitions for the Western Basin Tradition and the Ontario Iroquois Tradition, there are likely other examples of misidentified or unidentified ceramics within assemblages from Ontario Iroquois Tradition sites in southern Ontario. Indeed, of those collections which do exist, most were analyzed earlier in time, when knowledge regarding the socio-cultural dynamics of the region were less understood.

Prior to A.D. 1200-1300, what is interpreted as Springwells Phase ceramics are not archaeologically recorded within these extra-regional areas. In addition, the corresponding Sandusky Tradition Wolf Phase radiation is represented by sites located in areas which had previously been inhabited by the Western Basin Tradition, including the Saginaw drainage, the Lake St. Clair/Detroit River, and the western Lake Erie and Maumee River drainage regions (Bechtel and Stothers 1993; Schneider 2000; Stothers 1995; Stothers and Bechtel 2000; Stothers et al. 1994). In summary, between A.D. 1200-1400, the archaeological record reflects the decreasing number of Springwells Phase sites in their traditional homelands, coupled with the appearance of Wolf Phase Sandusky Tradition sites in these same regions. Further, Springwells Phase ceramics appear on sites in areas of northern Michigan and southern Ontario during this time period. It is suggested that these observations represent additional evidence to support an interpretive inference which suggests a Springwells Phase population dispersal prompted by a Sandusky Tradition Wolf Phase population radiation.

INDIANA EVIDENCE FOR WESTERN BASIN TRADITION DISPERSAL

Western Basin Tradition population withdrawal, westward up the Maumee River Valley into Indiana, is also documented by the occurrence of diagnostic ceramics on sites in northeastern Indiana/northwestern Ohio and southwestern Michigan tri-state area (Bechtel 1988; Bechtel and Stothers 1993; Stothers 1995). In his synthesis of LaGrange County, Indiana, Schurr (1991:44) reports the presence of ceramics which are clearly affiliated with the Western Basin Tradition on sites throughout the county. In his survey of Fox Island County Park, located near the head-waters of the Maumee River, Cochran (1980) reports eight sites with possible Western Basin Tradition cultural affiliations. While most of these sites are represented by small ceramic assemblages, three of the sites, 12Al121, 12Al122, and 12Al123 contain relatively large ceramic assemblages including diagnostic Springwells series vessel rims (Cochran 1980, 1984).

The Strehler site (12We240), located on the upper Wabash River in Wells County, Indiana, (Cochran 1984, 1985, 1986) has also produced a relatively large Western Basin Tradition ceramic assemblage. Included within the assemblage of 37 rim sherds are at least five Springwells Phase Macomb Linear Corded vessels, as well as collared varieties of Vase Dentate and Vase Tool Impressed vessels (Cochran 1985: Figures 1-3). The presence of collars on the latter types are common in the Springwells Phase (Fitting 1965; Stothers 1995). Diagnostic Springwells Phase ceramics have also been surface collected at several sites in Steuben and LaGrange counties (Schurr 1993; personal communication).

Other ceramic sites such as Bracken (12H289) (Cochran 1984:102), 12Al502 and 12Al505 (Mohow and Cochran 1987:149-155, 199-206), 12W10 and 12Hu4 (Cochran 1985) also document the presence of Younge and Springwells Phase ceramics in northeastern Indiana. The appearance of these and other Younge Phase ceramics (see also Schurr 1991:44) in northeast Indiana indicates that populations may have been shifting up the Maumee Valley, earlier than A.D. 1200, away from the lower Maumee-Lake Erie wetlands (Bechtel and Stothers 1993; Stothers et al. 1994), as well as a settlement-subsistence clash involving Sandusky and Western Basin Tradition competition for arable land (Stothers and Abel 1999; Stothers and Graves 1985).

Western Basin Tradition vessel rims also occur in northwestern Indiana at the Fifield site (Faulkner 1972:163, Plate XXIIId). Analogies are drawn by Faulkner (1972:163) between several rims from the Fifield site, and rims from the Oliver and Bowen Sites, while simultaneously comparing these ceramics to ceramic wares characteristic of the "Younge

Tradition" of southeast Michigan. In addition, Schurr (1993:34) has suggested that certain Late Woodland ceramics in the Kankakee Valley of northwest Indiana most closely resemble ceramics of the Late Woodland Western Basin Tradition (formerly Younge) of southeastern Michigan.

THE 'OLIVER PHASE'

While these sites in northeast Indiana are suggested to be Western Basin Tradition Younge and Springwells Phase sites, ceramics which are similar occur on sites farther to the south in the east and West Fork of the White River valley (Figure 8.2). These ceramics however, have been interpreted as being representative of the 'Oliver Phase.' Throughout this chapter, 'Oliver Phase' appears in single quotes. This has been done not only because we question the usefulness of the taxonomic construct (see below), but also because no formal definition of the construct has ever been proposed. To facilitate discussion however, the authors have chosen to use the term 'Oliver Phase' in single quotes.

While the 'Oliver Phase' has never formally been defined, it has been suggested that the manifestation is characterized by two distinctly different ceramic wares (Dorwin 1971; McCullough 1991, 1992; Redmond and McCullough 2000). One of these wares, which may be termed 'Oliver' Ware, is characterized by incised designs while the other, which is herein suggested to actually represent Western Basin Tradition Riviere Ware, is characterized by cord-impressed motifs. These separate and different wares occur on sites together in the same contextual associations (Redmond and McCullough 2000), on the same sites in separate and distinct contexts, and sometimes on other sites where one ceramic ware is found in the absence of the other. However, both ceramic wares are currently interpreted as hallmark components of the 'Oliver Phase' (Redmond and McCullough 2000).

The first of the two distinctive ceramic wares, the so-called 'Oliver' Ware, typically exhibits curvilinear guilloche designs representative of Fort Ancient series ceramics from nearby southeastern Indiana and southwestern Ohio. These guilloche motifs are represented by what is perhaps more correctly referred to as a trailed technique, executed by a wide stylus. The vessels most often display sharply everted rims. In the East and West Fork areas of the White River, trailed guilloche assemblages have been recorded as ranging from mostly grit tempered to mostly shell tempered. These vessels were classified as 'Oliver' series ceramics in Dorwin's (1971) analysis of the Bowen site.

The second ceramic ware interpreted to be characteristic of the 'Oliver Phase' is represented by cord-impressed motifs executed on the rim sections, which are usually collared and channeled. These vessels are always grit tempered. This ceramic ware was classified as "Bowen" series ceramics by Dorwin (1971). Faulkner draws comparisons between these ceramic wares as well, stating that sherds at the Fifield site (Figure 8.2), "are similar to a Late Woodland type at the Bowen and Oliver sites in Marion County, Indiana, and they are also like the type Macomb Linear Corded in southeastern Michigan" (Faulkner 1972:163).

In his ceramic analysis of the Oliver Farm site, Vernon R. Helman (1950:9) defines his "Unclassified Type I" as grit tempered vessels, characterized by cord-roughened bodies and a thick collar. Decoration is represented by "punch and drag punctuates form[ing] four horizontal bands on the smooth collar" (Helman 1950:9). As early as 1950, Helman recognized a relationship between his "Unclassified Type I" and vessels derived from the Riviere au Vase and Younge sites in Michigan. These vessels at Riviere au Vase and Younge sites were later defined as "Macomb" series ceramics, indicative of the Springwells Phase of the Western Basin Tradition (Fitting 1965; Stothers 1995). Helman also draws comparisons to ceramics from the Oliver Farm site detailed as "Unclassified Type III" and "Unclassified Type IV," with vessels recovered in Ontario at the Uren site (Helman 1950:11-12). Fitting (1965) and Stothers (1995) have indicated the temporal and ceramic assemblage correspondences between the Springwells and Uren sites. In fact, Stothers (1995) has suggested that these correlations indicate a population coalescence of Detroit River Springwells populations with Ontario Iroquoians, in response to the Wolf Phase radiation. Maumee Valley Younge and Springwells Phase populations are suggested to have withdrawn into Indiana and apparently assimilated differentially across space and through time.

A DISCUSSION OF CERAMIC VARIATION

Personal inspection of several 'Oliver Phase' as well as similar ceramic assemblages has been undertaken by the authors with the assistance of Brian Redmond, Robert McCullough, Donald Cochran, and Mark Schurr, in addition to several collections from northeastern Indiana sites viewed and briefly noted during survey work (Bechtel 1988). These opportunities, supplemented with published site information regarding 'Oliver Phase' ceramic assemblages, form the foundations for our observations regarding the "Oliver Phase" cord-impressed ceramics. As mentioned, Helman (1950) and Faulkner (1972) observed parallels between ceramic assemblages from sites in central and southern Indiana and Late Woodland sites in the greater western Lake Erie and Lake St. Clair-Detroit River region. It is important to note however, that attribute variability does exist between representative ceramic assemblages. It is perhaps more interesting to note that when and where this attribute variability occurs, it is typically more common on sites in southern Indiana (East Fork White River Valley) than on sites in central Indiana (West Fork White River Valley). It is our suggestion that this difference is perhaps indicative of a cline, from north to south, in cultural interaction between already resident 'Oliver Phase' populations and immigrant Western Basin Tradition population segments. The variability in attribute form and style between the West and East Fork ceramic assemblages may additionally reflect temporal differences.

When comparing Western Basin Tradition ceramics with the cord-impressed ceramics on 'Oliver Phase' sites, several observations regarding similarities, as well as dissimilarities, can be made. As defined by Fitting (1965), Macomb series vessels are elongate in shape and are always grit tempered. While collars and castellations are common, earlier variants may not display one or both of the attributes. Surface treatment of the vessel body is predominantly cord-roughened, although smoothed cord-roughened and fabric impression do occur infrequently. Decoration consists of several encircling horizontals on earlier uncollared and later collared vessels which are often "peaked" or embellished below castellations, when such are present. Macomb Linear Corded vessel types display cord-wrapped stick or cord-impressed horizontals along the upper rim while Macomb Interrupted Linear vessel types display the push-pull (often called stamp and drag or interrupted linear) technique which characterizes the encircling horizontal motif.

One of the most common characteristics shared between the Riviere Ware ceramics recorded on 'Oliver Phase' sites and those from Western Basin Tradition sites is the series of horizontals executed in cord-impressions along the collar of the vessel. As mentioned, these horizontals rise to form peaks under castellations when they occur. While the motif and technique are identical, some of the cord-impressions on vessels within 'Oliver Phase' assemblages are wider and the cordage twining appears much wider and courser than the narrower and finer cordage in Western Basin Tradition assemblages. As mentioned, these differences appear to occur more frequently within assemblages from southern Indiana than central Indiana. In addition, the cord impressed and cord-wrapped stick impressions are typically more widely spaced on East Fork 'Oliver Phase' sites than on West Fork and northeast Indiana sites.

While "cambered" rims do appear within some 'Oliver Phase' assemblages, truly cambered rims are presently undocumented on Western Basin Tradition sites, although common punctuates does occur on collared vessels in northwest Ohio and southeast Michigan. Care must be taken by researchers not to confuse and confound true "cambering" with "punctuates." One of the largest Springwells Phase ceramic assemblages in northwest Ohio was recovered from the Baden No. 1 site (33Hy168). The Baden No. 1 site is located on the south bank of the Maumee River, less than one kilometer southwest of the city of Napoleon, Ohio (Figure 8.2). The Baden No. 1 site, consisting of a shell midden eroding into the river (Figure 8.3), was excavated by the University of Toledo Laboratory of Archaeology in 1981. Excavations recovered a total of 24 ceramic vessels and subsequent collection the following year produced another 36 ceramic vessels (see Figures 8.4 to 8.6 for representative sample). Several vessels (18%, n=11) in the assemblage display channeled collars (Figure 8.4 C, D; Figure 8.5 E, I, J, K; Figure 8.6 A, B), while one vessel (Figure 8.4 B) displays a vertical node and has a squared orifice. In addition, the shapes of several body segments clearly indicated globular rather than elongate bodies. Uncalibrated radiocarbon determinations of A.D. 1280+50 (DIC-2351) and A.D. 1300 $\pm$55 (DIC-2352) were derived from charcoal directly associated with the diagnostic cultural materials in the shell midden deposit.

Some variability does exist within the element of body morphology. Springwells Phase vessels are typically bag-shaped and elongate, although globular bodies certainly exist (Stothers 1995). From the data which exists, cord-impressed vessels within 'Oliver Phase' assemblages tend to be more globular in shape. It is also worth mentioning that while the majority of vessel bodies from both regions are characterized by a cord-roughened surface treatment, a small number of vessels from each area display fabric impressed surface treatments. It must be stressed that, at present, these differences are qualitative. It is suggested that future studies are needed to quantify these qualitative differences and assemble a data base with which to test models of interpretation. This is part of any scientific advancement regardless of the discipline (VanPool and VanPool 1999).

DISCUSSION OF RADIOCARBON DATES

In addition to ceramic data, we would also argue that the radiocarbon dates from Indiana also lend support to this model of migration. It must first be mentioned that the established sequence in the western Lake Erie region is presently based on raw, uncalibrated radiocarbon dates. To maintain consistency, published Indiana dates which have been calibrated are discussed herein as uncalibrated dates (Table 8.1). In other words, all discussion of dates will take place in terms of radiocarbon years before present (A.D. 1950) or their equivalent in our present calendar.

To our knowledge, the Moffit Farm/Prairie View Golf Course site (12H6/12H46) represents the only documented, radiocarbon dated ceramic assemblage of cord-impressed ceramics in the absence of "Fort Ancient-like" guilloche vessels. The sites are on two contiguous properties separated only by a fence and therefore likely represent one site. The ceramic assemblage is relatively homogeneous containing what are herein interpreted as Younge Phase and Springwells-like ceramic vessels. Four radiocarbon determinations have been obtained which include A.D. 1150±60 (Beta-83332), A.D. 1110±80 (Beta-83333), A.D. 970±80 (Beta-83334), and A.D. 1250±60 (Plunkett, Trudeau, and Hilton-Plunkett 1995). These dates are consistent with a late Younge/early Springwells Phase temporal placement for which the ceramic assemblage is in support.

Several sites which are located in the West Fork area of the White River, contain ceramic assemblages characterized by both the 'Oliver' Ware and what we suggest represents Riviere Ware. It is observed that at least some of these wares occur in contextual association (Redmond and McCullough 1996:45, 1997:26). We acknowledge that contextual association does not necessarily indicate that the ceramics were deposited contemporaneously. Radiocarbon dates from these sites fall within the 13th and 14th centuries (McCullough 1997:87-95; Redmond and McCullough 2000). Two sites in the East Fork area of the White River, not only contain both ceramic wares in direct association, but also contain vessels on which attributes from both ceramic wares are blended to form a unique mixture. Multiple vessels from the Clampitt and Cox's Woods sites are characterized by trailed Fort Ancient guilloche motifs on the necks of vessels which also display cord impressions on the lips or upper rims (Redmond 1994a,b; Redmond and McCullough 1996:45). Interestingly, radiocarbon dates from these two sites suggest a later temporal placement than more northern sites in the West Fork area of the White River. These two village sites, while characterized by earthwork enclosures and palisades, are circular in shape with a concentric distribution of features around a central plaza. It is for these reasons that we suggest that the Clampitt and Cox's Woods sites represent important aspects of the possible ethnic integration of two cultural traditions.

Though dates for the Bowen site in the West Fork area of the White River fall between the mid 11th century and the early 13th century, we would argue that at least one component at the Bowen site may be temporally grouped with the Clampitt and Cox's Woods sites. It has previously been suggested that more than one component exists at the Bowen site (McCullough 1991, 1992). As mentioned, ceramic attribute variation on the cord-impressed wares at these sites have certain similarities. Specifically, the cord- impressions on the rims appear more widely spaced, with wider and thicker cordage being utilized. These ceramic characteristics are minimally differentiated from documented Western Basin Tradition assemblages, or of earlier 'Oliver Phase' sites in the West Fork area of the White River, which are herein suggested to represent initial Western Basin Tradition immigrant population segments. A further correlation between the Bowen site and the Clampitt and Cox's Woods sites exists in the fact that these three sites all appear to have been oriented in a concentric fashion, possibly suggesting a central area for communal activities distinct from the areas of habitation.

Therefore, we suggest that during the 13th century, Western Basin Tradition populations were radiating southward into northeast and central Indiana, as attested to and represented by single component, single ware sites in these regions. By the 14th century, Western Basin Tradition population segments may have been co-habitating with resident 'Oliver' Ware producing populations as evidenced by sites with respective ceramic wares in direct association. In effect, as Western Basin Tradition population segments settled into Indiana, they became increasingly more acquainted with the indigenous populations and began to interact in the form of trade and marriage. The most reliable evidence for most of this interaction is found in the southern Indiana (East Fork White River) area and at the Bowen site in central Indiana. By the 15th century, it is possible that the refugee Western Basin Tradition population segments may have been culturally subsumed by resident populations in central and southern Indiana as suggested by the combination of attributes on vessels from at least two sites on the East Fork of the White River, namely Clampitt and Cox's Woods (Redmond 1994a,b; Redmond and McCullough 1996).

SUMMARY

The purpose of this chapter has been to synthesize the data supporting the "dispersal/migration model" relating to Maumee Valley Western Basin Tradition populations, and their withdrawal into Indiana during late prehistory. In addition, the implications of this model for Indiana prehistory are considered. This model of Western Basin Tradition dispersal has been discussed extensively in the published literature (Bechtel and Stothers 1993; Stothers 1995, 1999b; Stothers and Bechtel 2000; Stothers et al. 1994). Maumee River Valley population segments of the Western Basin Tradition are suggested to have withdrawn into Indiana as a result of a Sandusky Tradition Wolf Phase expansion around the west end of Lake Erie from northcentral Ohio. For the past decade, Western Basin Tradition ceramics have been reported on various sites in northeast Indiana. Similar ceramics occur in assemblages from central and southern Indiana on sites classified as 'Oliver Phase' sites. As far as ceramics are concerned, 'Oliver Phase' sites are classified as such based on the presence of at least one of two distinctly different ceramic wares which co-occur on some sites, while other sites are characterized by only one or the other of these two wares. One ceramic ware, which we have labeled "Oliver" Ware for the purpose of discussion, is characterized by collarless grit tempered and shell tempered Fort Ancient-like trailed guilloche vessels. The other ware is described as a grit tempered ware displaying cord-impressed motifs on the lip and exterior rim, which is frequently collared. While some have suggested that the cord-impressed ceramics are reminiscent of the Western Basin Tradition (McCullough 1992:51), we herein argue that these cord-impressed ceramics are not only characteristic of Riviere Ware, but are indicative of Western Basin Tradition population segments inhabiting sites in central and southern Indiana.

Although the 'Oliver Phase' has not been formally defined, it has long been described as being characterized by two different ceramic wares, occurring on sites separately as well as on others together. Dorwin, who first described the Oliver Phase, characterized the cultural manifestation as a "unique congregation of culture elements" (Dorwin 1971:384). We would agree with this observation and suggest that enough data now exists with which one may make a logical argument for the existence of at least two separate ceramic traditions within what has been formerly thought of as one, and which has been called the 'Oliver Phase.' Of course, we also concede that as even more data and information becomes available for later prehistoric times, it is likely that these two ceramic traditions, representing culturally distinct population groups earlier in time, eventually undergo a process of cultural amalgamation. Indeed, a small degree of evidence may support such "miscegenation" as demonstrated by the blending of ceramic attributes representing both ceramic traditions on the same vessels from sites in southern Indiana. Notwithstanding this, we maintain that prior to ca. A.D. 1350-1400, to view these two ceramic series as representative of one cultural manifestation (which has been classified as the 'Oliver Phase'), would be masking the social dynamics of population movement and cultural interaction. Of course such implications have even greater relevance to the archaeological and anthropological understanding of ethnogenesis during the late prehistory of Indiana.

This chapter presents a model of interpretation offering a test case for migration theory and cultural miscegenation in prehistory. Early 20th century migration paradigms had been viewed with much skepticism with the coming of the New Archaeology in the 1960s and the emphasis on in situ cultural development (Sutton 1995). However, the stigma associated with these migration theories is unwarranted since population movement (migration), coalescence, and dispersal in early historic times are attested to in ethnohistoric documentation, such as the Jesuit Relations (specific sources listed in references below). Indeed, archaeological and ethnic modeling, with respect to cultural amalgamation as derived from the archaeological record of late prehistory and protohistoric times, is attainable and has been elucidated in past studies (Fitting 1975; Niemczycki 1984, 1986, 1993; Mason 1976, 1981; Pendergast 1980, 1981, 1985; Ridley 1973; Rouse 1986; Snow 1995; Stothers 1995, 1998b, 1999b; Stothers et al. 1999; Stothers and Bechtel 2000; Trigger and Washburn 1996; Wright 1966, among others). We would argue that migration likely occurred on a frequent basis on several levels (i.e. whole populations, population segments, etc.) during prehistory. There is no reason to assume that ethnic group boundaries separating many societies during prehistoric times, were other than flexible. A complex system of population bifurcation, miscegenation, and migration may all have been contributing factors in the cultural evolution of a particular group as well as contiguous populations. This theoretical consideration, while beyond the scope of this chapter, has been debated and discussed on both general and specific levels elsewhere (see Anthony 1990; Barth 1969; Jones 1997; Rouse 1986; Snow 1995; Stothers 1995, 1998a, 1998b, 1999a, 1999b). For the purposes of this chapter however, suffice it to say that interpretations and models involving prehistoric population migration must be evaluated based upon their specific case study merits. We therefore wish to confine ourselves to the issue at hand, that being the specific example of the northwest Ohio-Indiana connection.

DIRECTIONS FOR FUTURE RESEARCH

The model of interpretation presented in this chapter has several implications regarding population interaction in late prehistoric Indiana. As is the case in any scientific discipline, models can be tested by the creation of inferences which have been deduced from observations. The inferences themselves then take the form of testable hypotheses which may be applied to an expanding data base (Trigger 1989). If arguments for the existence of at least two cultural traditions can be advanced on the basis of ceramic evidence, what other evidence in the archaeological record could support or refute this hypothesis? With this proviso in mind, the authors would suggest that the following inferences should stand as testable hypothesis or considerations within avenues of future research.

1) As more settlement data becomes available for sites, what are the possible patterns that exist in the form of habitation structures, internal site layout or configuration, or other settlement data? While relatively little data exists at present for the 'Oliver Phase,' certain settlement data for the Western Basin Tradition have been documented. Consideration of similarities and differences between these data sets will require explanation as more information becomes available.

2) As Western Basin Tradition population segments withdrew westward up the Maumee River Valley and into Indiana, they may also have brought elements of their lithic technology as well as lithic raw materials with them. Are there identifiable lithic raw materials within 'Oliver Phase' assemblages which have origins in the western Lake Erie region? Western Basin Tradition lithic tool kits contain characteristic unifacial endscrapers unlike those bifacial endscrapers which characterize their Algonquian neighbors in northern Ohio. This nearly ubiquitous differentiation in lithic technology represents another data set which could potentially provide insight.

3) What patterns may exist with regard to dates derived from future radiocarbon determinations? If the scenario outlined is this chapter represents some reality, it would follow that the single component, single ware sites would date earlier in time than the single component, multiple ware sites. Ceramic site assemblages which are characterized by vessels with a blending of attributes from the two ceramic traditions should date later than the single component, single ware sites as well as single component, multiple ware sites which display no attribute blending (i.e., separate and distinct occupations). It should be noted however, that if cultural amalgamation took place between the two ceramic traditions, it very well may have taken place differently across time and space in various occupied drainage systems within the state of Indiana.

4) Biocultural and osteological avenues of research may also elucidate characteristics of a population movement. A relatively large amount of data exists for Western Basin Tradition biological populations in northwest Ohio and southeast Michigan (Lozanoff 1977; Lozanoff and Stothers 1975; Redmond 1982; Sciulli 1993; Stothers et al. 1978), specifically in the form of discrete trait characteristics. While data relating to human skeletal material is still limited for the 'Oliver Phase,' such data sets are increasingly being recovered. While Griffin (1978:551) references Robbins and Newman (1972) regarding the observation of 'Oliver Phase' populations belonging to the Ilinid physical type, Robbins and Newman (1972) refer more generally to the Fort Ancient type and do not specifically deal with the 'Oliver Phase' as their data base is not derived from any 'Oliver Phase' sites. Nevertheless, comparison of discrete genetic skeletal traits (such as Anderson 1964, 1968) can be especially useful and should be considered in this case as skeletal information becomes more prevalent within each respective region.

5) If populations are more likely to migrate into areas about which they have had some knowledge, there is high probability for interaction between these groups prior to the Western

Basin Tradition population migration. Specifically, there may have been connections between northwest Ohio/southeast Michigan and central Indiana in the form of trade relationships operationalized through an "interaction sphere" during early Late Woodland times. This correlation is reflected in the analogous manifestations of the Albee Phase in Indiana and what was formerly referred to as the "Wayne Mortuary Complex" (Halsey 1976) in the southern Great Lakes. The latter has been reinterpreted and reclassified as the Gibraltar Phase (ca. A.D. 500-750) of the Western Basin Tradition (Stothers 1994, 1999b).

If these and other such directives are considered within future research, and the archaeological record presents further evidence for cultural miscegenation, significant potential for investigating ethnic interaction and cultural transformation may be elucidated. The interpretive position forwarded herein presents a test case scenario for the anthropological study of ethnic interaction, migration theory, and cultural amalgamation within the context of the late prehistory of Indiana.

In conclusion, our intentions in this chapter are to reconsider and attempt to clarify the issue of the 'Oliver Phase' taxonomic construct. While the 'Oliver Phase' has yet to be formally defined, we have presented evidence and interpretations with respect to a segment of the "Oliver Phase." If one of the ceramic wares thought to be characteristic of the 'Oliver Phase' is representative of a separate and distinct cultural entity, one which has radiated into Indiana during the late 13th to early 14th centuries as is suggested herein, then caution and reconsideration must be exercised with regard to the taxonomic label 'Oliver Phase.'

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Table 8.1. Radiocarbon Dates from Sites Discussed in the Text.

SITE	STATE NO.	LAB NO.	B.P.	A.D.	±	CALIBRATED**	A.D. CAL. RANGES (1 SIGMA)	REFERENCE
Oliver Farm	12Mal	M-2010	890	1060	100	1168	1025 to 1265	Dorwin 1971
Bosson	12Ma4	Beta-104402*	850	1100	70	1218	1064 to 1276	Redmond and McCullough 1997
Bosson	12Ma4	Beta-104403	710	1240	50	1290	1279 to 1303	Redmond and McCullough 1997
Bowen	12Ma61	IU-121	890	1060	130	1168	1017 to 1280	Dorwin 1971
Bowen	12Ma61	IU-122	840	1110	130	1222	1032 to 1290	Dorwin 1971
Bowen	12Ma61	M-2422	740	1210	110	1284	1217 to 1385	Dorwin 1971
Martinsville P.	12Mg52	Uga-4707	760	1190	65	1280	1227 to 1294	McCullough 1991
Noblesville	12H807	Beta-98531*	740	1210	50	1284	1261 to 1295	O'Brien et al. 1996
Sugar Creek	12Jo289	Beta-88932*	770	1180	60	1270	1225 to 1290	McCullough and Wright 1997a
Sugar Creek	12Jo289	Beta-88933*	660	1290	50	1300	1290 to 1325 and 1340 to 1390	McCullough and Wright 1997a
Sugar Creek	12Jo289	Beta-98651*	740	1210	70	1284	1240 to 1300	McCullough and Wright 1997b
Sugar Creek	12Jo289	Beta-88931*	400	1550	60	1470	1400 to 1520 and 1340 to 1390	McCullough and Wright 1997a
Jose	12Ma47	Beta-104400*	670	1280	50	1300	1288 to 1391	Redmond and McCullough 1997
Jose	12Ma47	Beta-104401*	710	1240	50	1290	1279 to 1303	Redmond and McCullough 1997
Clampitt	12Lr329	Beta-47539	680	1270	60	1298	1283 to 1391	Redmond 1994a
Clampitt	12Lr329	Beta-47542	670	1280	50	1300	1288 to 1391	Redmond 1994a
Clampitt	12Lr329	Beta-47541	610	1340	60	1340	1300 to 1408	Redmond 1994a
Clampitt	12Lr329	Beta-47538	620	1330	50	1347	1300 to 1403	Redmond 1994a
Clampitt	12Lr329	Beta-47540	520	1430	50	1421	1402 to 1439	Redmond 1994a
-	12Jo8	Beta-95255	650	1300	60	1305	1290 to 1400	O'Brien and Pirkl 1997
-	12Jo8	Beta-95253	680	1270	50	1295	1285 to 1310 and 1355 to 1385	O'Brien and Pirkl 1997
-	12Jo8	Beta-95254	680	1270	50	1295	1285 to 1310 and 1355 to 1385	O'Brien and Pirkl 1997
Bundy-Voyles	12Mg1	Beta-85618*	730	1220	50	1285	1265 to 1295	McCullough and Wright 1997a
Bundy-Voyles	12Mg1	Beta-85619*	650	1300	70	1305	1285 to 1400	McCullough and Wright 1997a
Bundy-Voyles	12Mg1	Beta-85617*	510	1440	70	1425	1400 to 1450	McCullough and Wright 1997a
Bundy-Voyles	12Mg1	Beta-83724*	540	4110	60	1415	1395 to 1435	McCullough and Wright 1997a
Bundy-Voyles	12Mg1	Beta-84952*	480	1470	60	1435	1415 to 1455	McCullough and Wright 1997a
Crouch	12Jo5	Beta-84950	710	1240	60	1290	1270 to 1305	McCullough and Wright 1997a
Crouch	12Jo5	Beta-84949	650	1300	60	1305	1290 to 1400	McCullough and Wright 1997a
Crouch	12Jo5	Beta-84951	550	1400	80	1410	1310 to 1355 and 1385 to 1435	McCullough and Wright 1997a
Crouch	12Jo5	Beta-83723	550	1400	80	1410	1310 to 1355 and 1385 to 1435	McCullough and Wright 1997a
Prairie View	12H46	Beta-83332	800	1150	60	1250	1205 to 1280	Plunkett et al. 1995
Prairie View	12H46	Beta-83333	840	1110	80	1220	1065 to 1075 and 1155 to 1275	McCullough 1997
Prairie View	12H46	Beta-83334	980	970	80	1030	995 to 1170	McCullough 1997
Prairie View	12H46	Beta-83337	700	1250	60	1290	1275 to 1310 and 1365 to 1375	McCullough 1997
Cox's Woods	12Orl	Beta-62263*	650	1300	110	1367	1279 to 1410	Redmond and McCullough 1993
Cox's Woods	12Orl	Beta-62262*	570	1380	70	1403	1307 to 1431	Redmond and McCullough 1993
Cox's Woods	12Or1	Beta-98652*	500	1450	50	1431	1407 to 1444	McCullough and Wright 1997b
Lykins	12B184	Uga-3149	605	1345	85	1336	1295 to 1421	McCullough 1991
McCulloughs Run	12B1036	Beta-94795*	570	1380	70	1403	1307 to 1431	Cochran et al. 1997
McCulloughs Run	12B1036	Beta-94796*	570	1380	50	1403	1315 to 1421	Cochran et al. 1997

- Corrected for Isotope Fractionation

** Calibrations (Stuiver and Pearson 1993)

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Figure 8.1. Cultural Chronology of Western Lake Erie and Indiana Region.

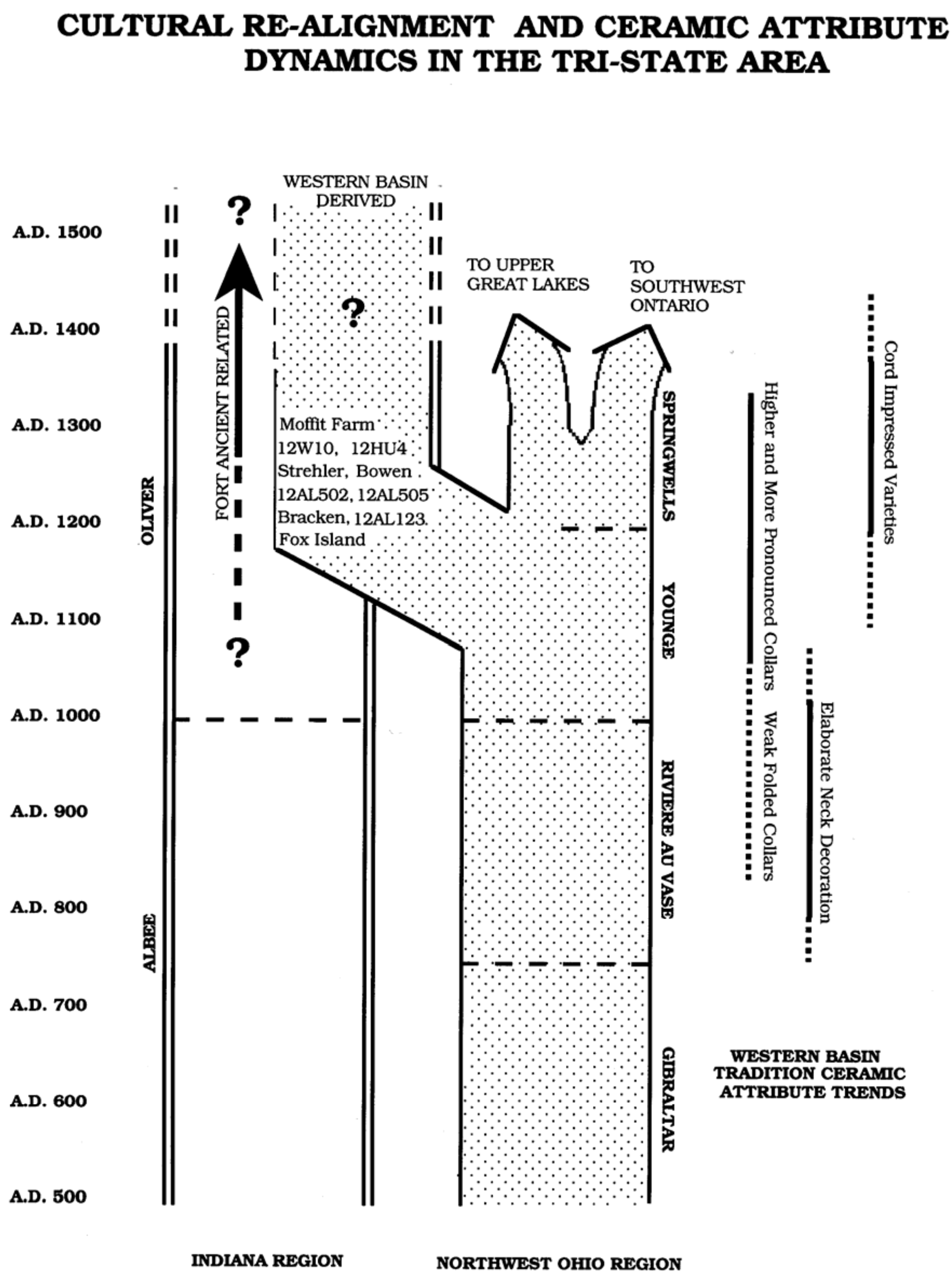


Figure 8.2. Sites Listed on Overview Map and Discussed in Text (Adapted from Stothers 1995; Stothers et al. 1994) 1-Moffit Farm, Prairie View; 2-Oliver; 3-Bowen; 4-Haueissen; 5-Bussbee; 6-Strawtown; 7-Conner Prairie; 8-Jose; 9-Bosson; 10-Bundy-Voyles; 11-Martinsville Plaza; 12-Sugar Creek; 13-Crouch; 14-Clampitt; 15-Pless; 16-Cox's Woods; 17-Lykins; 18-Melvin; 19-Woods; 20-Libben; 21-12W10; 22-12HU4; 23-Strehler; 24-Fox Island Site complex; 25-Bracken; 26-Fifield; 27-12AL505; 28-12AL502; 29-Baden; 30-Crosby's Ridge; 31-Patyi-Dowling; 32-Cufr; 33-Butler; 34-Turkey Creek; 35-Edwards; 36-Port Royal; 37-Uren; 38-Inverhuron-Lucas; 39-Nodwell; 40-Dunks Bay; 41-Providence Bay; 42-Juntunen; 43-Beyer; 44-O'Neil; 45-Whitefish Island; 46-Shebishikong; 47-Fletcher; 48-Bussinger; 49-Mikado; 50-Rifle River; 51-Fort Wayne Mound; 52-Riviere au Vase; 53-Draper Park; 54-Tessmer; 55-Maxwell, Clock, EX-11; 56-Nettle Lake Mounds; 57-Whittlesey Mound, North Bass Mound; 58-Myriel Ryersee; 59-Brooke.

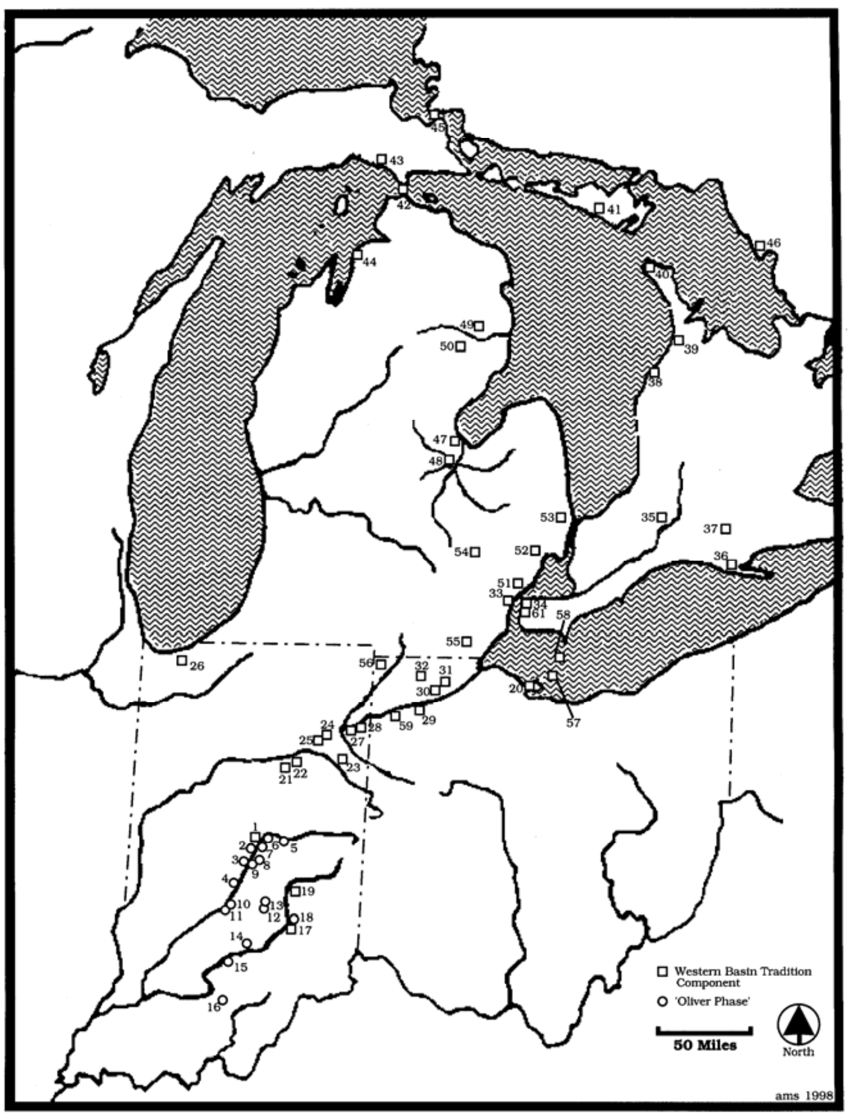
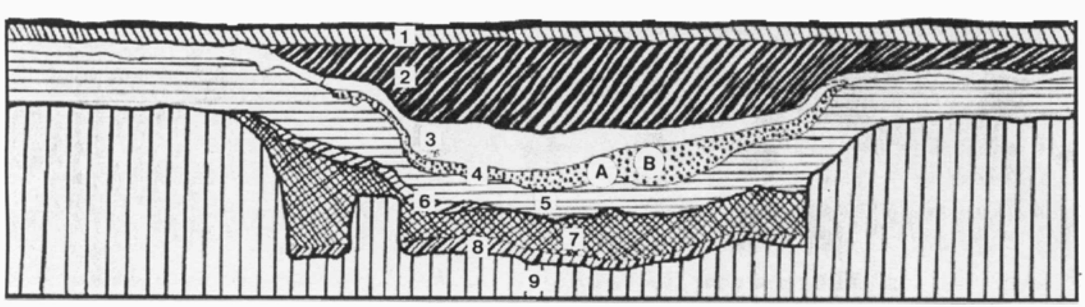


Figure 8.3 A-Baden Site Wall Profile (note shell midden feature), B-Baden Site Schematic of Profile Wall; 1-Humus, 2-Light Grayish Brown Silty Clay, 3-Dark Grayish Black Shell Midden, 4-Cultural Layer, 5-Dark Layer Under Shells (Sandy Orange Buff Clay), 6-Light Yellow Sand Lens, 7-Brown Clay Layer, 8-Sandy Shell Layer, 9-Unexcavated Area, A-Radiocarbon Sample A.D. 1280"50 (DIC-2351), B-Radiocarbon Sample 1300"55 (DIC-2352).

A



B

Figure 8.4. **Sample of Baden Site Ceramic Assemblage: A-Macomb Interrupted Linear variant, B-Macomb varient (vertical node, squared orifice), C-Macomb Interrupted Linear variant (channelled collar), D-Undefined dentate stamped opposed motif vessel (channelled collar), E-Macomb Interrupted Linear, F-Vase Cordmarked (fabric impressed surface treatment). All scales in centimeters.**

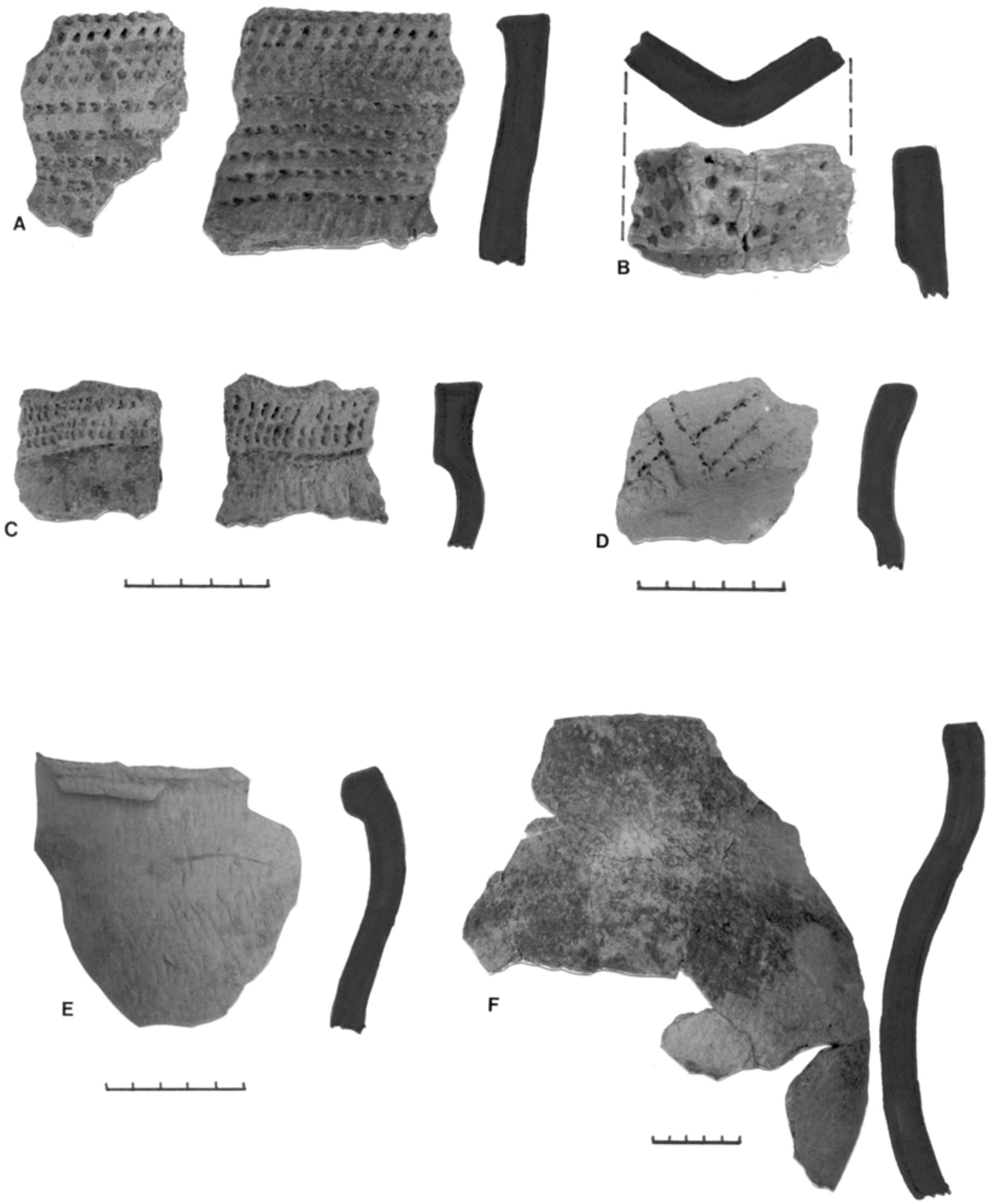


Figure 8.5. **Sample of Baden Site Ceramic Assemblage: A and B-Undefined Vase Dentate variant, C-Vase Dentate, D-Vase Cordmarked, E-Vase Cordmaked (channelled collar), F-Vase Cordmarked (collared variety), G-Vase Cordmarked, H-Vase Cordmarked (collared variety), I-Vase Punctate (variety collared, channelled collar), J-Vase Cordmarked (collared variety), K-Macomb Interrupted Linear (channelled collar), L-Vase Cordmarked (collared variety, fabric impressed surface treatment). All scales in centimeters.**

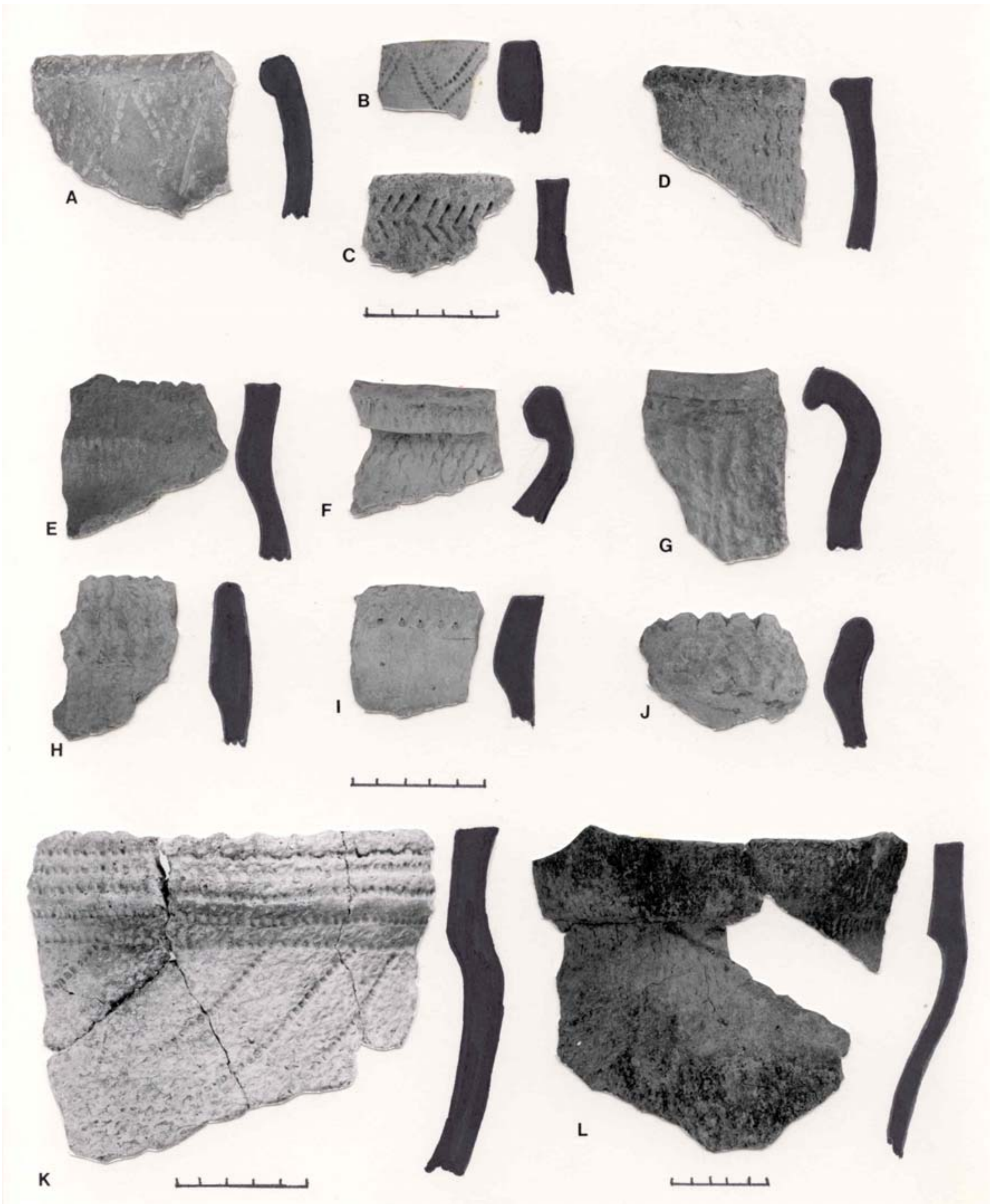
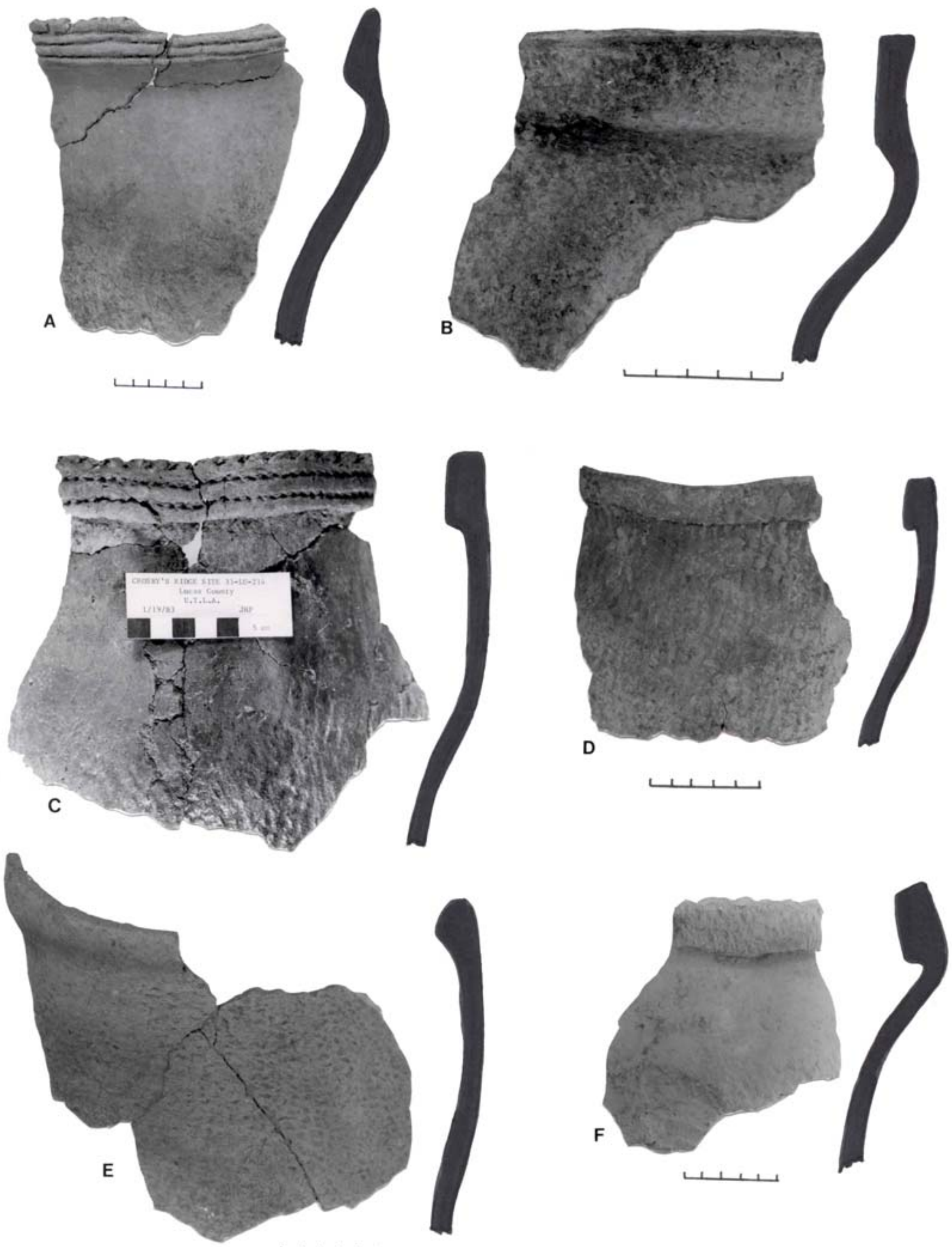


Figure 8.6. Sample of Baden Site Ceramic Assemblage (unless otherwise noted): Macomb Linear Corded (channelled collar), B-Vase Cordmarked (collared variety, channelled collar), C-Crosby's Ridge Site Macomb Linear Corded Vessel Fragment, D-Vase Cordmarked (collared variety), E-Vase Cordmarked (collared variety, fabric impressed), F-Vase Cordmarked (collared variety). All scales in centimeters.



CHAPTER NINE

THE OLIVER PHASE OCCUPATION OF THE EAST FORK WHITE RIVER VALLEY IN SOUTH CENTRAL INDIANA

Brian G. Redmond

INTRODUCTION

This purpose of this chapter is to summarize the results of recent archaeological investigations of the East Fork White River Valley in south central Indiana. Over a period of four years (1990-1994), archaeologists from the Glenn A. Black Laboratory of Archaeology at Indiana University, Bloomington carried out a series of comprehensive surveys of late prehistoric (post A.D. 1000) sites in a four county area and conducted test excavations of varying scope at five habitations sites. The archaeological components under investigation are affiliated with the Oliver Phase of central Indiana (Dorwin 1971).

Archaeological information derived from the current study strongly suggest that Oliver Phase archaeological culture extended well beyond the Indianapolis area and into southern Indiana by at least the thirteenth century A.D. Survey and excavation data collected to date point to a widespread and intensive occupation of Oliver Phase peoples in both the West and East Forks of the White River between ca. A.D. 1250 and 1450. This occupation essentially consisted of a complex of small nucleated village settlements centered, for the most part, in the main river valleys as well as a number of seasonal habitations and extractive campsites located in both upland and lowland settings. Details of the lifeways of these prehistoric farming populations are only now beginning to be recognized. The research described herein represents only the initial attempts to understand this major prehistoric occupation, and, consequently, the conclusions and interpretations presented here should be viewed as preliminary and open to revision. Related studies have been completed (see McCullough this volume) and others are currently underway. Undoubtedly, related research will continue well into the future. Much of the following is based on more detailed accounts provided in Redmond (1991, 1994a, 1994b); and Redmond and McCullough (1993).

THE OLIVER CERAMIC COMPLEX

The label "Oliver" was originally used to describe a distinctive prehistoric pottery complex centered in the valley of the West Fork of White River in Hamilton and Marion counties of Indiana. Pottery from the Oliver Farm site was described in detail by Vernon Helmen in 1950, but prior to this, James B. Griffin (1966:261-267) reported on similar-looking ceramics from several other sites in central Indiana. Both of these researchers remarked on the unusual nature of these assemblages that appeared to be a mixture of Great Lakes Late Woodland and Fort Ancient stylistic expressions.

One of the most significant excavations of the time took place at the Bowen site in Marion County where Jack Householder of the Indiana Historical Society uncovered the remains of an Oliver habitation at the Bowen site. The Bowen site excavations revealed a small village consisting of several clusters of storage/refuse pits, cooking pits, and hearth features arranged in an oval to circular configuration of between one and two acres in extent. No house patterns or defensive works were defined; however, several burials were recovered. The Bowen site excavation produced significant samples of pottery, Madison type projectile points, other lithic tools and debris, bone tools, and plant and animal remains. Data from Bowen were used by John Dorwin (1971) to define the material attributes of what became the Oliver "Phase" (Dorwin 1971).

The ceramic assemblage recovered from the Bowen site was of particular interest due to the fact that pottery was found in abundance (and on occasion in large pieces) and, even more importantly, because specimens of both the Late Woodland and Fort Ancient styles were found to be mixed together in discrete pit features. Dorwin classified the Late Woodland style as the Bowen series and, following Helmen (1950), the Fort Ancient material was subsumed into the type Oliver Cordmarked because of its resemblance to Griffin's (1966) Anderson Cordmarked and Incised taxon (Dorwin 1971). The co-occurrence of what appeared to most archaeologists as two distinctly different-looking kinds of pottery in the same features has led to quite a bit of uncertainty and some debate as to the cultural affiliation of the Bowen site inhabitants and, by extension, the Oliver Phase as a whole (Dorwin 1971; Griffin 1978; Stothers and Schneider, this volume). In an attempt to remedy the initial confusion, the Bowen site ceramic assemblage was re-analyzed by Robert McCullough (1991). In this study the Fort Ancient-like pottery forms were described as predominantly grit-tempered, weakly shouldered, globular-shaped jars with cordmarked bodies. The rim areas of these vessels commonly exhibited folds or short collars which were frequently decorated with incised or □unctuates design motifs. The necks of vessels were usually smoothed prior to the application of incised designs consisting of curvilinear or rectilinear guilloche motifs or, more rarely, line-filled triangles. Rim sherd profiles were gently flared or excurvate and some vessels exhibited thick and wide strap handles (McCullough 1991:6-7).

The vessel fragments described by McCullough (1991) as "Late Woodland" were exclusively grit-tempered with a variety of horizontal or oblique line decorations executed in either plain tool- or cord-impressed techniques. These distinctive designs were usually confined to thick rim bands or collars and the lips of vessels. The neck area was either cordmarked or smoothed. Rectangular or "cigar-shaped," vertically-oriented nodes were the sole type of appendage, and some vessels exhibited recurved, channeled, or cambered profiles (McCullough 1991:7-8). McCullough concluded that the Late Woodland-style ceramics contained a subset of vessel forms that most closely resembled Springwells Phase pottery of the Western Basin Tradition in northwest Ohio and southeast Michigan (Stothers and Pratt 1981). McCullough's analysis demonstrated that at the Bowen site, the Springwells-like ceramics were deposited in spatially segregated features and, consequently, these materials were not included in the representative range of Oliver Phase ceramics (McCullough 1991: 83-84).

ENVIRONMENTAL SETTING OF THE STUDY AREA

The valley of the East Fork White River originated as a channel for glacial meltwater and, consequently, contains deposits of Pleistocene age. By mid-Wisconsinan times, glacial outwash sands and gravels of the Atherton Formation had filled the valley of the East Fork River and subsequent wind and water erosion converted these deposits to elevated terrace landforms which border the sides of the present valley (Wayne 1963). Late Pleistocene to Holocene deposition of alluvial and lacustrine sands and silts of the Martinsville Formation (Wayne 1963) make up much of the current floodplain of the valley and its tributary streams. Erosion and redeposition of medium- to fine-grained sands of the Atherton Formation created massive dune formations which today cover large portions of the terraces and adjacent uplands (Wayne 1963; Gray, Jenkins, and Weidman 1963:18-20). The well-drained, sandy terraces of the East Fork White River proved to be attractive locations for settlement of prehistoric people during all prehistoric time periods (Tomak 1984).

Today, the East Fork White River flows through the unglaciated portion of south central Indiana and drains five major physiographic units (Figure 9.1). Proceeding downriver from central Bartholomew County, the river passes in turn through the Scottsburg Lowland, the Norman Upland, the Mitchell Plain, and the Crawford Upland before entering the Wabash Lowland in Daviess and Knox counties (Schneider 1966). Each of these physiographic zones possesses distinctive forms of geology, topography, soils, and drainage that significantly affected the settlement of aboriginal populations in the valley.

The native (i.e., pre-settlement) vegetation of the study area was dominated by upland climax forest of oak, hickory, beech, and maple. The limestone-derived soils of the Mitchell Plain in Lawrence County supported a mixed mesophytic forest consisting of these same trees but also contained significant numbers of ash, tulip poplar, white basswood, and yellow buckeye (Petty and Jackson 1966:279-281). Studies of preserved floodplain plant communities in the East Fork River Valley have recorded such major tree species as silver maple, sycamore, American elm, cottonwood, hackberry, cork elm, box-elder, black willow, white ash, and red elm. Understory vegetation included hawthorn, redbud, wild plum, and flowering dogwood trees as well as herbaceous shrubs like elderberry, spicebush, swamp-privet, and pawpaw (Petty and Jackson 1966:276). The primary forest communities of the region were home to a wide range of animal species (see Gammon and Gerking 1966; Minton 1966; Mumford 1966). River and creek valleys supported an abundant variety of fish as well as reptiles, mussels, waterfowl, and aquatic mammals like beaver and muskrat. Terrestrial mammals were most likely relatively mobile and moved regularly from lowland to upland habitats. In terms of human subsistence needs, the most important of these mammals were undoubtedly, deer, raccoon, and turkey.

PREVIOUS RESEARCH IN SOUTHERN INDIANA

Prior to 1990, archaeological research in the East Fork White River Valley of south central Indiana amounted to only a few non-systematic field surveys and very limited test excavations by both professionals and amateurs. In the 1920s an avocational archaeologist named E.Y. Guernsey of Bedford, Indiana conducted a general survey of Lawrence County. His report, published by the Indiana History Bureau in 1924 (Guernsey 1924), contained summary descriptions of known prehistoric sites and artifact collections of all time periods but lacked specific locational information. In 1946, William R. Adams (1946) carried out a more systematic survey in Martin County which included some test excavations. This study generated most of the first 130 site records for that county and provided useful archaeological information about Oliver Phase components in one portion of the East Fork White River Valley. In the 1970s and 1980s, Curtis Tomak of the Indiana Department of Transportation has conducted surveys and test excavations in both forks of the White River Valley (Tomak 1970, 1983, 1984). Much of this work has documented Paleoindian and Archaic occupations; however, Tomak's 1984 summary of regional prehistory described a late prehistoric occupation represented by a number of sites containing Oliver Phase ceramics and triangular projectile points (Tomak 1984). Tomak compared these materials to artifact assemblages recovered from so-called "Heaton Phase" sites in the West Fork White River Valley of Green and Morgan counties (Tomak 1983). In fact, Tomak's "Heaton Phase" closely resembles Oliver Phase components such as Bowen and Oliver Farm located upriver near Indianapolis.

In the late 1970s and early 1980s, salvage excavations were carried out at several Oliver Phase components in Bartholomew County. Test excavations at the Melvin site (12 B 401) by members of the Wabash Archaeological Society produced evidence of an Oliver Phase habitation site that was radiocarbon dated to A.D. 955 $\pm$100 (uncalibrated)(Wolfal and McClure 1982). Limited salvage excavation at the nearby Whipker site (12 B 170) revealed one pit feature containing Oliver Phase ceramics and triangular projectile points (Wolfal and McClure 1981). Both the Whipker site and the nearby Lykins site (12 B 184) were reported to have each produced charred maize remains dating to A.D. 1345 (personal communication, Mark Wolfal, 1990). Additional work within the East Fork Valley has been carried out through numerous (unpublished) Cultural Resource Management surveys in Martin, Lawrence, and Jackson counties.

INITIAL ARCHAEOLOGICAL SURVEY OF THE EAST FORK WHITE RIVER VALLEY

The author's initial investigation of the Oliver Phase occupation of the East Fork White River Valley was a comprehensive survey and identification of the existing late prehistoric (including Late Woodland) archaeological resources. The primary goal of this research project was to define the nature and extent of these resources through the analysis of material culture and settlement distributions. By the summer of 1990, the information derived from previous work in the study area (particularly Tomak 1984, see above) was sufficient to identify the late prehistoric occupation of the Valley with the Oliver Phase of central Indiana. Data were lacking, however, as to the full range of indigenous late prehistoric material culture, the actual areal distribution of the components, the possible determinants of settlement, the specific chronological placement of the occupation, and the nature of external relationships with other late prehistoric cultural manifestations in the rest of Indiana and surrounding states. Consequently, a research plan was designed to provide archaeological data that would be useful for addressing—at least in a preliminary fashion—these important questions.

The research strategy that was adopted consisted of in-depth record review, informant interviews, collection documentation, and directed field reconnaissance. The area selected for study was the central portion of the East Fork White River Valley in Martin, Lawrence, and Jackson counties (Figure 9.2). This area possessed a high potential for site identification due to a large population of known informants. In addition, since the selected study area cross-cut four physiographic provinces (see above), the project offered an opportunity for studying differential settlement-subsistence adaptations across a relatively diverse series of environmental zones. During the course of the survey, a total of 96.9 hectares were surveyed at the reconnaissance level. Oliver Phase components were recognized by the presence of diagnostic Oliver Phase ceramics and/or triangular, Madison type (Justice 1987), arrow points. Significantly, no substantial evidence of a pre-Oliver Phase, Late Woodland occupation (e.g., Albee Phase) was recognized in the study area during this investigation.

As a result of these investigations, a total of 25 Oliver Phase components were identified and recorded in the field within the study area, and an additional 38 previously unrecognized Oliver Phase sites were identified as the result of site records review. Within the East Fork White River drainage basin as a whole, the survey project identified a total of 99 Oliver phase/late prehistoric components. These sites were spatially distributed from the headwaters of the East Fork White River in Bartholomew County, through Jackson and central Lawrence counties to the mouth of Lost River in southern Martin County. Outside the main valley, Oliver Phase components were identified in the Salt Creek valley of northern Lawrence, southern Monroe, and central Brown counties and in the upper reaches of the Lost River valley in central Orange County (Figure 9.2).

A comparison of site locations with landform data revealed that the majority (n=84, 84.8%) of Oliver Phase sites in the East Fork White River watershed were situated on riverine floodplains or terraces and near to major tributary streams such as Salt Creek and Lost River. The remaining sites (n=15, 15.1%) were located on upland ridges, interior creek terraces and bottom lands at distances of five kilometers or more from the East Fork White River. Taken at face value, these data portray an essentially riverine-oriented settlement adaptation; however, it is suspected that the recorded site distributions may be biased toward lowland occupations. This bias results from the lack of intensive surveys in the upland regions of the study area due to the existence of poor conditions for surface reconnaissance. Until a truly representative sampling of archaeological resources in the upland areas of the valley can take place, the apparent riverine focus of Oliver Phase settlement activity should remain hypothetical.

With this caveat in mind, the survey data were used to construct a number of functional settlement types that were based on relative densities and areal distributions of surface materials at individual sites. Large habitation sites ("villages") were represented by dense concentrations of ceramic, lithic, and bone covering an area greater than one hectare. At a number of these sites, plowing had revealed the presence of pit features, hearths, and dense midden deposits. The wide range of functional artifact classes at each village site provided evidence of long-term (i.e., multi-seasonal to year-round) occupation and diverse subsistence activities that included maize horticulture, hunting, fishing, clamming, and nut collecting. Surface accumulations of human skeletal material revealed the presence of cemeteries within village limits.

Small habitation sites were indicated by the presence of triangular points and relatively low densities of Oliver Phase pottery. The exact size range for this site type remains unknown; however, collector information suggests that they covered significantly less than one hectare of surface area. The presence of both pottery and projectile points indicates that these sites represented significant encampments that were occupied by both men and women. Small-sized artifact scatters containing triangular points and debitage but no pottery were classified as extractive camps. These sites most likely represented temporary camps used for the exploitation of seasonally available floral and faunal resources in both upland and lowland settings. The limited tool assemblages from these sites point to activities involving tool maintenance and perhaps limited animal processing. The lack of midden debris and pottery suggests that these occupations were specialized as well a transitory in nature.

Of the 63 Oliver Phase sites examined within the three-county study area (i.e. Martin, Lawrence, and Jackson counties), large habitations or village sites were exclusively divided between floodplain (9.5%) and terrace (7.9%) situations (Figure 9.3) and occurred within one kilometer of a tributary stream (see Figure 9.4). This apparent preference for lowland habitation also reflects a likely preference for the well-drained sandy loam soils of the alluvial terraces for settlement and the nutrient rich silt loam soils of the floodplains for plant cultivation. As with villages, small habitation sites were most often found in lowland habitats (floodplain=20.6%; terrace=15.9%), within 1.5 kilometers of the East Fork White River and less than 2.0 kilometers of a tributary stream (Figures 9.3 and 9.4).

Extractive camps also occurred on floodplain (17.5%) and terrace (15.9%) landforms but were the predominant site type in the uplands (9.5%) (Figure 9.3). These small sites were bimodally distributed at distances of less than 2.5 kilometers from the East Fork White River and beyond 5.0 kilometers (see Figure 9.4). This dichotomy may reflect the existence of at least two functional types of extractive camps: those located close to the main river channel and used for the exploitation of lowland resources, and campsites situated outside the main valley (greater than 5.0 kilometers) in proximity to upland resources. As a group, the extractive camps ranged from less than 100 meters to over 5.0 kilometers from a secondary water source. It seems likely that the upland occupants of sites lying more than one kilometer from one of these streams depended upon a nearby, perhaps impermanent, water source such as a spring, seep, or intermittent creek that required less travel time to reach than the “permanent” streams identified in this study.

INTENSIVE SURVEY AND TESTS EXCAVATIONS

Between 1990 and 1994, the author and Robert McCullough (Southern Illinois University) collaborated on a number of archaeological field projects that were designed to further elucidate the Oliver Phase occupation of the East Fork White River Valley. These investigations included reconnaissance level surveys, intensive site surveys, and limited test excavation of selected Oliver Phase components during 1992 and 1993 in a study area comprised of Lawrence, Martin, and Orange counties, Indiana (Redmond and McCullough 1993). Prior to this, extensive excavations of Oliver Phase village settlements had been carried out in 1991 and 1992 at the Clampitt site in Lawrence County (Redmond 1994b) and at Cox’s Woods in Orange County (Redmond and McCullough 1996). Information derived from such investigations was deemed necessary for the construction of an archaeological and historical context for the Oliver Phase occupation of the region which could in turn be used to evaluate the preliminary conclusions drawn from the author’s 1990-91 survey of the region described above. Detailed descriptions of each of these projects are provided in the series of technical reports cited above and will not be repeated here. Instead, the remainder of this chapter will summarize the most significant results of these efforts in order to present a current interpretation of Oliver Phase lifeways in south central Indiana.

Investigations of two rock shelters, Cedar Bluff (12Mn72) and Warren (12Mn33), provided important evidence as to the nature of the Oliver Phase occupations of this special class of site. In the 1991 survey report, the author classified the Cedar Bluff rockshelter (12Mn72) as a small habitation site of the Oliver Phase. This conclusion was based on earlier reports of the discovery of abundant cultural materials from stratified deposits within the shelter (Adams 1946:206-210). A reexamination of artifact collections curated at the Glenn A. Black Laboratory of Archaeology as part of a 1992 reconnaissance survey of the site indicated that, in fact, the primary occupation (as represented by the dense subsurface deposits) was most likely affiliated with Middle to early Late Woodland occupants of the valley rather than the Oliver Phase (Redmond and McCullough 1993:12-13). It now appears that the Oliver Phase occupation of the rockshelter is represented by only a few diagnostic rim sherds and triangular points. These data point to a short-term, perhaps seasonal use of the site as a camp during hunting or collecting expeditions.

An unsuspected outcome of the reconnaissance survey of the Cedar Bluff rockshelter was the discovery of three anthropomorphic pictographs and several petroglyphs on rock walls of the shelter (Redmond and Koehler 1996). The three pictographs represent the only recorded examples of painted rock art in Indiana, and the petroglyphs are only the third occurrence in the state. The exact age and cultural affiliation of the rock art has not been adequately demonstrated; however, due to the excellent state of preservation of the pictographs, it is likely that they were executed during the latest prehistoric occupation of the rockshelter which would place their origin sometime during the Oliver Phase.

Test excavations of the Warren rockshelter in 1992 revealed stratified, but severely disturbed, cultural deposits that contained artifacts dating to the Early Archaic, Late Archaic, and Early Woodland periods (Figure 9.5). As with the remains from the Cedar Bluff site, the archaeological traces of the Oliver Phase at Warren proved to be meager, consisting of only a few grit-tempered pot sherds from excavation and the base of a triangular point found during an earlier survey (Redmond and McCullough 1993:54-62). These data suggest that during the late prehistoric period Oliver Phase use of rock shelters was confined to short encampments of a seasonal nature where only minimal food preparation and tool maintenance activities were carried out.

In July and August of 1992, test excavations were undertaken at the Abner site (12Lr431) in Lawrence County (Redmond and McCullough 1993:62-76). The site is situated on a sandy terrace that overlooks an expansive segment of the East Fork White River floodplain. The site was originally recorded by the author during the 1990-91 survey project (Redmond 1991:20) and, based on a nearly 1.5 hectares expanse of surface debris, the site was classified as a large habitation site or village. Furthermore, in early 1992, plowing turned up 20 organic stains along the crests of two sand ridges along the terrace. These anomalies were interpreted as disturbed pit features associated with the Oliver Phase occupation of the site. Test excavations consisted of both hand excavation and mechanical stripping of a total area of 96 square meters or approximately 0.64% of the estimated site area (Figure 9.6). Of the fifteen features identified during the course of the investigation, ten small pits and one post mold cluster were interpreted to be the remains of the Oliver Phase occupation of the site. Most of the pits consisted of shallow basins that contained low densities of cultural material (i.e., average of 1.0 grams of cultural material per liter of fill). In contrast to the other pits, Feature 3 was a relatively deep, straight-sided form that most closely resembled typical Oliver Phase storage pits identified at village sites (see below). This pit contained two fragments of charred maize but low densities of other kinds of cultural debris as well (total of 0.7 grams per liter of fill). Maize remains were recovered from three other pits (Features 5, 6, and 9). Two pits (Feature 9 and 12) contained relatively large amounts of charred hickory and walnut fragments, but botanical remains of any kind were relatively scarce.

The small quantity of cultural material from the Abner site suggests that the occupation was short-term and involved a small population. Despite the expansive area of surface material—which led to the initial determination that the site was a village—excavations revealed only a low density of pit features, a single example of a storage facility, the absence of midden deposits, and an absence of the kind of planned settlement configuration (concentric habitation ring) that was exhibited at known village sites like Bowen and Clampitt (see below). A single post mold concentration may provide evidence for the existence of at least one structure on the site, which would indicate an occupation of more permanent duration than an extractive campsite; however, one of much lower intensity than a large habitation site. The relative abundance of nutshell in the archaeological remains hints at the use of this location as a fall season base camp. On the other hand, the proximity of the Abner site to a large expanse of fertile floodplain soils (ca. 400 ha. Within a two kilometer radius) makes the use of the site as a farmstead occupied during the growing season an equally attractive explanation. Thus, the Abner site is unlikely to represent a large, nucleated habitation site as originally proposed, and, even though its true nature remains uncertain, the site should instead be interpreted as a lowland example of the small habitation class of Oliver Phase sites.

Another small habitation, the Pless site (12Lr370), underwent test excavation in 1992. Unlike the Abner site, Pless was initially recognized as an Oliver Phase small habitation site on the basis of a controlled surface collection carried out by William Meadows in 1989 (Redmond and McCullough 1993:47-45). The surface collection revealed an artifact scatter measuring about 1,000 square meters and included 150 grit-tempered Oliver Phase sherds, as well as projectile points affiliated with the Early Archaic through Early Woodland time periods. A variety of historic period material (ca. AD 1860-1910) was recovered from the remains of a 19th century cabin which formerly existed on the northeastern part of the small, sandy, floodplain knoll on which the site is situated.

Hand excavation of the Pless site exposed a total area of 16.5 square meters (1.6% of the total site area). Revealed here were the remains of two prehistoric pit features and three historic features, one of which (Feature 3) was determined to be an ash dump associated with the historic cabin site (Figure 9.7). The prehistoric features (Features 1 and 2) were poorly preserved examples of shallow pits that contained small amounts of chert debitage, fire-cracked rock, and charred nutshell. The lack of ceramics or any diagnostic artifacts in the fill of these features prohibited determination of their cultural affiliation. A single triangular point was recovered from plow zone context during excavation, but no diagnostic Oliver Phase ceramics were recovered from subsurface contexts.

The investigation of the Pless site detected no intact cultural deposits that could be affiliated with the Oliver Phase occupation of the site. The low frequency of Oliver Phase materials in general is reminiscent of the Abner site (see above); however, the apparent lack of pit features and post molds at Pless would seem to suggest that the latter site was used less intensively than the former. The physical setting of the Pless site—on a small lowland sand knoll backed by steep upland bluffs—would have effectively isolated its inhabitants from large expanses of arable floodplain soils and subjected them to severe seasonal flooding. As such, the site looks less like a seasonal base camp or small habitation site, and more like a convenient stopping-off point for river travelers or a staging point for groups moving between the upland to the south and the river valley. Taken together, the archaeological and physiographic contexts indicate that the Oliver Phase occupation of the Pless site was necessarily of short duration and limited purpose.

VILLAGE EXCAVATIONS

The most intensive archaeological investigations of the Oliver Phase occupation of the East Fork White River Valley to date comprised extensive excavations of two large, nucleated habitations or village settlements: the Clampitt site (12Lr329) in Lawrence County, and the Cox's Woods site (12Or1) in Orange County, Indiana. Both sites were initially recommended for testing as a result of preliminary reconnaissance surveys carried out as part of the 1990-91 survey (Redmond 1991:31-32). The Clampitt site excavations took place in conjunction with the 1991 and 1992 Indiana University summer field schools in archaeology and were directed by the author (Redmond 1994b). The Cox's Woods project was initiated as part of the 1992 intensive survey and testing project in Martin, Lawrence, and Orange counties (Redmond and McCullough 1993:76-104), but the bulk of excavations took place during the 1993 and 1994 Indiana University summer field schools which were co-directed by the author and Robert McCullough (Redmond and McCullough 1996). Over the course of the 1991 and 1992 field seasons at the Clampitt site, a total of 782 square meters or 3.3% of the estimated site area were excavated by hand. Field excavations at the Cox's Woods site made use of similar techniques to expose a total of 186.5 square meters of surface area or 2.1% of the estimated site area. Each of these projects produced an abundance of information related to the settlement, subsistence, technological, and chronological aspects of Oliver Phase culture in south central Indiana. These village excavations, furthermore, provided an ideal opportunity to investigate late prehistoric settled village life in a location far removed from the (supposed) central Indiana "core" area of Oliver Phase settlement. The most significant aspects of these two village excavations are summarized below.

Natural Settings

The Clampitt site is situated on a sandy terrace along the eastern bank of the East Fork White River near the mouth of Guthrie Creek (Figure 9.2). The site overlooks an expansive floodplain to the west and is bordered by Guthrie Creek on the north. Elevations across the site range from 500 to 512 feet above sea level, and the terrace landform is marked by low, north-south trending ridges and gentle swales. The site area has been under intensive cultivation for at least a century. The Cox's Woods site is situated on a small alluvial floodplain of Lick Creek, a small tributary of the Lost River which joins the East Fork White River in southern Martin County (Figure 9.2). Unlike the Clampitt site, most of the Cox's Woods site is covered by a closed canopy, secondary growth forest which has regenerated since the termination of cultivation at least thirty years ago. The unplowed eastern fringe of the site is covered with mature woods consisting of large beech and maple trees. It is within this relatively undisturbed strip of forest that the remains of two earthen embankments of the former village site are preserved.

Preliminary Site Surveys

One of the primary goals of excavations at both the Clampitt and Cox's Woods sites was the delineation of the spatial extent and internal configurations of these supposed village settlements. To this end, preliminary investigations involved geophysical survey and controlled surface collection or systematic shovel testing of each site area. Geophysical (magnetic) survey of each site was carried out early in the investigations in an attempt to identify subsurface cultural features. These surveys were conducted by Stephen Ball of the Glenn A. Black Laboratory of Archaeology with the aid of a Geoscan FM36 fluxgate gradiometer. Survey of a 20 meter by 160 meter transect at the Clampitt site revealed a number of high intensity anomalies, each measuring between 0.5 and 1.0 meter in diameter, that were quickly recognized as possible prehistoric pits (Figure 9.8). Several of these anomalies were later excavated and proved to be Oliver Phase pit features containing pottery and fire-cracked rock (Ball 1993a, 1993b). When the same geophysical technique was applied to the Cox's Woods site, however, the results were somewhat disappointing due to magnetic interference from buried portions of wire fences and other recent metal objects located on the eastern side of the site. Other magnetic anomalies on the southwestern fringe of the site were found to represent small pits and several segments of the stockade ditches that surrounded the site (Figure 9.9).

Following the magnetic survey and prior to the start of excavation, a controlled collection of the plowed surface of the Clampitt site was carried out by students in the 1991 Field School. A regular grid consisting of five meter by five meter-sized collection squares was laid out across an area of approximately 11,800 square meters. All exposed cultural material larger than one square centimeter was collected from each square, and the recorded weights of material were used to construct artifact density maps showing the surface distributions of pottery, bone, chert, fire-cracked rock, limestone, and historic material. In the end, the distributions of both pottery and bone turned out to be the most useful for isolating the areal extent of the Oliver Phase village settlement (Figures 9.10a and 9.10b). These distributions appeared as corresponding semicircular rings of cultural debris located in the northeast corner of the site. Each ring measured about 80 meters in diameter and was truncated at its northern edge by a farm road and the uncultivated (i.e., uncollected) area beyond.

The delineation of the village area at the Cox's Woods site was initiated with the excavation of fifty, 50 cm by 50 cm test units along two north-south and three east-west transects (Figure 9.11). These transects were located to the west of the earthen walls in an attempt to identify the southern, western, and northern limits of the settlement. Each test unit was excavated to either culturally-sterile subsoil or to a maximum depth of 50 cm below the surface. All soils from each excavation unit were passed through one-quarter inch mesh screen, and the materials that were recovered were sorted into four artifact classes: chert, limestone, fire-cracked rock, and pottery.

These materials were counted and recorded in the field, and the resulting tabulations were used to construct maps showing the spatial distributions of subsurface cultural material across the site. The maps of artifact distributions identified the southern and western edges of the settlement as an annular pattern of cultural debris (i.e. pits, midden deposits and stockade fill) measuring approximately 100 meters in diameter and covering an area of 0.87 hectares (Figure 9.11). The center of the site contained little cultural material and was identified as a central plaza or public area. The annular pattern of artifact debris exhibited at both Clampitt and Cox's Woods closely resemble the "midden ring" pattern of contemporary Fort Ancient Tradition village sites in the Ohio Valley (Essenpreis 1982; Graybill 1981; Henderson 1992).

RESULTS

Stockade Defenses

The most distinctive feature turned up by excavation at the Clampitt site was the stockade trench. This feature consisted of a narrow trench that encircled the village and was used in the construction of a wooden post stockade. The trench appeared just below the plow zone as a dark linear stain which varied between 50 and 90 cm in width. A total of 50 meters of the trench feature were exposed through excavation. The complete stockade is estimated to have been 225 meters long and to have enclosed and area of 3,612 square meters (Figure 9.12). In transverse profile, the stockade trench appeared as a flat-bottomed basin that ranged in depth from 50 to 85 cm below the surface. The fill of the trench consisted of dark, organic soil and contained typical village "trash" such as pot sherds, chert debitage, fire-cracked rock, limestone fragments, charcoal and other burned botanical remains, and animal bone. Excavation of several segments of this feature invariably revealed either a single or, more rarely, a double line of post molds (Figure 9.13). Individual stockade posts ranged from 10 to 30 cm in diameter and penetrated from 35 to 100 cm into the subsoil beneath the trench. The posts were spaced between 4.5 and 23.2 cm apart and occurred at a frequency of about five posts per meter of trench length which would suggest that the completed stockade wall incorporated a total of about 1,125 posts. In trench segments where double rows of posts were defined, the lines were roughly parallel and varied between 10 and 35 cm apart.

Evidence of a stockade ditch (as opposed to a "trench") was discovered in the form of a shallow, basin-shaped feature located along the southern periphery of the village (Figure 9.12). This feature measured between 100 and 125 cm in width and extended to 90 cm below the surface. Although originally interpreted as an unusually wide version of the stockade trench described above, this feature is now thought to have functioned as part of a complex of defensive walls and ditches of the kind reported at other late prehistoric village sites such as the Strawtown site (12H3) (McCullough 1991:53-54), the Valeene site (12Or190), and the Cox's Woods site (Redmond and McCullough 1993). One or two possible openings or gateways were recognized in the inner stockade wall: one at the southeast margin and another on the northern side of the settlement (Figure 9.12).

Excavations at the eastern, southwestern and western perimeter of the Cox's Woods site revealed segments of stockade trenches that closely resembled those found at the Clampitt site (Figure 9.14). An eleven meter long excavation transect on the western side of the village indicated that at least one line of stockade trench was situated interior to a five meter wide, 50 cm deep swale that most likely represents the eroded and midden-filled remains of a stockade ditch. Comparison of these remains with excavation data from the preserved earthen walls and ditches on the east side of the settlement strongly suggest that the western stockade trench was either buried beneath or proximal to an earthen embankment consisting of soil removed from the adjacent swale/ditch feature. Subsequent to the construction of the stockade, the ditch feature was filled with large amounts of village refuse that included high densities of pottery, chert debitage, fire-cracked rock, and limestone fragments. Evidence of a deeply buried (90 cm below surface) midden lens, like the one found in the western ditch feature just described, was uncovered on the northern perimeter of the site. This feature contained abundant cultural debris and appeared to slope away from the occupation and toward the bank of Lick Creek. Excavations at this location, however, did not extend far enough northward to expose the entirety of this lens. Thus, it remains uncertain if this feature represented a northern section of an enclosure wall (i.e., embankment and ditch), or rather was a slope midden resulting from the depositing of village refuse at the bank of the creek. The former explanation, if accurate, would indicate that the settlement was at one time completely enclosed by stockade defenses, an interpretation that contradicts historical observations of a "U-shaped" earthwork construction that opened along the bank of Lick Creek (Goodspeed 1884).

Domestic Features

Thirty-nine prehistoric pit features were excavated at the Clampitt site, and all but two of these were located within the defined village boundaries. Pits exhibited a number of forms that most often included round basins, flat-bottom basins, and cylinders (Figure 9.15). These pits contained a variety of cultural material at relatively low densities (i.e., average of 4.0 grams per liter of fill) which reflect their ultimate functions as receptacle for generalized village trash. The generally low densities of cultural material from these features may, in part, be the result of the extremely poor preservation of items of bone or shell which was due to the heavily leached nature and low pH of the sandy loam soil matrix of the site. Several examples of pit features were of sufficient size and shape to have functioned originally as storage pits. Four pits had capacities well over the mean of 337.2 liters and exhibited the straight-sided and flat-bottomed form typical of storage pits documented for numerous other nucleated village sites of the late prehistoric period in eastern North America. Such pits have most often been interpreted as large underground "silos" for the storage of maize and other crops, and these facilities have been cited as evidence of settlement nucleation, communal subsistence strategies, food surpluses, and seasonal abandonment of villages (DeBoer 1988). The cylindrical pits from the Clampitt site are most similar to medium- to large-sized storage pits recorded at numerous Fort Ancient Tradition village sites in the Middle Ohio Valley (Essenpreis 1982; Cowan 1987).

Only thirteen pit features were revealed after two seasons of excavation at the Cox's Woods site. In range of form, dimensions, and contents, these pits closely resembled the relatively shallow, round to flat-bottomed basin described for the Clampitt site (see above). No deep, cylindrical storage pits were identified during excavations at Cox's Woods. In terms of the overall areal density of pit features within excavated areas; however, both villages proved nearly identical with figures of 0.5 pits per square meter for Clampitt and 0.7 pits per square meter for Cox's Woods.

The majority of identifiable post molds at the Clampitt site were associated with the stockade trenches described above. The remaining post molds were scattered within areas devoid of pit features. In the southeastern and southwestern sections of the village, concentrations of post molds were encountered between the inner stockade and feature clusters in a zone that measured between ten and twenty meters in width (Figure 9.12). Several clusters of post molds were identified during excavation, but no recognizable structural patterns were discerned within any one cluster. Nevertheless, the occurrence of these clusters in relatively "featureless" areas located just inside the stockade line is believed to document habitation zones within which houses were constructed. In much the same fashion, it appears that the heaviest occupation of the Cox's Woods site occurred within a ca. 20 to 30 meter wide ring that was situated between the encircling fortifications and the central plaza. It was within this "domestic zone" that most of the archaeological evidence of habitation, in the form of post molds, storage pits, rock concentrations, and hearth features, was found. Also within this zone, the first documented example of an Oliver Phase dwelling was uncovered.

During the course of a large block area excavation in the northwest quadrant of the Cox's Woods site, a portion of a wall trench house structure was identified at approximately 10 meters inside the stockade wall (Figures 9.14 and 9.16). On the northeast side of the structure, a cluster of features, including a large hearth, were identified. Lines of post molds roughly paralleling the southwest and southeast walls of the structure were also identified. The preserved portion of the structure extended approximately 5.5 meters northwest-southeast, and at least 3.0 meters northeast-southwest as measured from the outside of the wall trenches. The overall morphology of the house structure was most likely sub-rectangular; however, much of the northeastern side wall of the structure was not identified due to heavy root disturbance. The edges of the preserved wall trenches were irregular in both plan and profile. They varied from a straight, parallel-sided feature between 50 cm to 75 cm wide along the southeastern wall of the structure to one that exhibited irregular boundaries on the northeastern side.

Post molds were placed sporadically along the wall trenches with large posts (30 cm in diameter) identified at the northwest and southeast corners. Due to additional tree root disturbance, the southwest corner was not fully exposed in plan and not excavated below the base of the plow zone. The small sample of fill recovered from the wall trench contained a very sparse amount of cultural materials which included small pieces of pottery, chert debitage and fire-cracked rock. Features identified within the structure consist of a pit feature, three charcoal-filled posts, and a possible interior screen or hearth remnant. The incomplete nature of the structure found at Cox's Woods prohibits in-depth comparisons with contemporary dwellings in the region; however, the apparent use of wide and deep trenches as the foundation for walls is a construction method unlike any identified at either Fort Ancient Tradition sites in the middle Ohio Valley or Middle Mississippian settlements farther down river.

Material Remains

Nearly 99,000 pieces of cultural material were recovered during the two summers of excavation at the Clampitt site, and almost 104,500 objects were derived from two seasons at Cox's Woods. These large assemblages of material remains from controlled contexts represent the largest sampling of Oliver Phase material culture in the East Fork White River Valley to date. In general, these assemblages exhibit obvious morphological and stylistic similarities with Late Prehistoric period village debris from habitation sites across much of the Midwest.

Lithics

The chipped stone artifacts consist of common utilitarian implement forms such as unifacial end- and side-scrapers, retouched flake knives, "perforators," and gravers that, as a functional assemblage, reflect an expedient flake technology. The dominant chipped stone tool is the Madison triangular point with straight lateral edges and straight to convex basal margins (Figure 9.17). The majority of these points were manufactured from regionally available cherts (i.e., distance <35 kilometers). Less common bifacially flaked tools include humpbacked knives and expanded-base drills. Many of the latter appear to have been made from triangular point □unctuat. The groundstone tool-kit also appears to have originated on an "as-needed" basis as indicated by the production of simple pitted anvilstones, grooved abraders, and fragments of mortar and pestle grinding stones (Figure 9.18). Ground and polished celts may have been one of the few curated tools of these village inhabitants, since this well-known tool type is conspicuous by its general absence from the typical trash deposits of the Oliver Phase villages.

The metric attributes of the triangular point collections show a remarkable consistency in form and size. As shown in Table 9.1, mean basal widths and mean lengths for the Clampitt and Cox's Woods assemblage vary by only 1.1 mm and 5.04 mm respectively. In a similar fashion, mean thickness measurements for each collection vary by only 0.5 mm. The classification of basal forms of triangular points has been used as a means to seriate triangular projectile points from Fort Ancient sites in Kentucky (Railey 1992), Ohio (Litfin et al. 1993), and West Virginia (Graybill 1981). These studies appear to support the interpretation that the modal basal shape of Fort Ancient Tradition points changed over time from convex, through straight, to concave in form. The frequency distribution of basal shapes for triangular points from the Cox's Woods and Clampitt sites reveals the popularity of convex based points and points with straight bases to be roughly equivalent, and both far outnumber the concave forms (Table 9.1). If these results are compared with existing seriations of Fort Ancient points, then the parity of convex to straight based forms in the village sample appear to place both site occupations roughly contemporary with Middle Fort Ancient components (ca. AD 1200-1400) in the central Ohio River Valley.

Flora and Fauna

As noted above, the combination of excessive drainage and low pH of the loamy sand matrix of the Clampitt site resulted in extremely poor preservation of bone and shell remains. Equally detrimental soil conditions prevailed in the silt loam soils at Cox's Woods where bone recovery was also minimal. Most of the faunal remains at both sites were recovered from pit features and consisted of small, unidentifiable fragments. Bone tools were limited to small numbers of deer bone beamers (Figure 9.19), awls, and a single bone bead. Despite the paucity of faunal remains, a number of animal species were identified from the better-preserved elements found in excavated context (Redmond 1994b:27; Garniewicz 1996:142-145 and this volume). These are listed in Table 9.2.

As noted by Garniewicz (1998:22-23), the absence of □unctua remains from the Clampitt and Cox's Woods assemblages appears to be the most obvious "victim" of poor preservation conditions since this species is normally common, along with turkey and deer, at other Late Prehistoric period sites like Bowen. The same explanation can be applied to the lack of diversity in the remains of fish, reptiles, and birds.

Much better preserved (i.e., carbonized) seed and nut remains were recovered from flotation samples taken from feature fill at both village sites (Bush 1994:108-121, 1996:108-117). Among these remains are a wide range of wild and domesticated species that were utilized by the village inhabitants. Maize dominates the seed remains and occurs in over 70% of the pit features excavated at the Clampitt site in 1991. Beans are present in reduced numbers but are relatively widespread at Clampitt. No beans were recovered from Cox's Woods. In contrast, native starchy seeded annuals like goosefoot were recovered in very low numbers at Clampitt, but other varieties like little barley and maygrass are significantly represented at Cox's Woods. Carbonized nutshell from hickory and black walnut are, after maize and charcoal, the next most common category of botanical remains found at either site.

As was the case with much of the artifact assemblage, the faunal and floral remains from the Clampitt site excavations compares favorably with other later prehistoric assemblages in the region. The dominance of tropical cultigens like maize and beans at the expense of native seed crops as seen at Clampitt has been reported for Fort Ancient occupations in the Ohio River Valley as well (Rossen and Edging 1987; Wagner 1987). In fact, a comparison of the Clampitt site plant remains with those of the Anderson Phase Incinerator site (a.k.a. Sunwatch Prehistoric Village) showed a strong correlation in the types and numbers of seed plants utilized (Bush 1993, 1994).

Ceramics

Only through the ceramic artifact class do the Oliver Phase material remains stand out in contrast to other regional assemblage of the late prehistoric period. The assignment of the Clampitt and Cox's Woods village occupations to the Oliver Phase was based on the distinctive stylistic (i.e., decorative) attributes of the ceramics. The most common decorative motif is an incised curvilinear guilloche design executed on the necks of vessels (Figure 9.20a,b). Many of these vessels exhibit narrow rim bands with cord-impressed, incised, or stamped motifs and occasionally thick strap handles (Figure 9.21a,b). This combination of attributes occurs frequently on Oliver Phase pottery found across much of central Indiana (Householder 1941, 1945; Helmen 1950; Dorwin 1971; McCullough 1991, this volume); however, this decorative suite (minus cord-impressions) is best known from Anderson Phase Fort Ancient Tradition assemblages in southwestern Ohio (Griffin 1966; Essenpreis 1982).

As described above, Helmen (1950) grouped the incised vessels into the type Oliver Cordmarked Incised that was based on the type Anderson Cordmarked and Incised defined by Griffin (1966) for Fort Ancient ceramics from southwestern Ohio. In the upper West Fork drainage of central Indiana, the Oliver Cordmarked Incised ceramics are invariably found alongside so-called Late Woodland style pottery bearing cord-impressed designs, collars, and castellations (McCullough this volume). Dorwin (1971) classified the latter into several varieties of the types Bowen Cordmarked and Bowen Collared. In one aspect or another, these materials superficially resemble Late Woodland ceramics that have been recovered from locations across the Great Lakes. Despite such analogous similarities, very few Oliver Phase vessels are typologically identical to specific Great Lakes forms. The mixture of Fort Ancient and Late Woodland ceramic forms has become one of the most definitive characteristics of Oliver Phase material culture in Indiana (Dorwin 1971). The ceramic inventories from the Cox's Woods and Clampitt sites closely resemble each other and also share general similarities with more northerly Oliver Phase assemblages in terms of vessel form, temper, and decorative motifs and techniques. Because the Clampitt site material has undergone the closest examination to date, the results of that analysis were used as the basis for the following discussion.

The pottery assemblage from the Clampitt site includes specimens of all but one of the ceramic types used by Dorwin (1971). A sample of seventy rim sherds from excavated features was used to classify the Clampitt ceramics according to Dorwin's typology. Each rim sherd in the sample was assumed to represent an individual vessel. This classification exercise produced the type frequencies listed in Table 9.3.

This distribution revealed a ceramic sample that was "weighted" toward the Fort Ancient-like Oliver Cordmarked types (total 58.4%). The Bowen Cord-marked and Bowen Collared vessels (total 32.7%) made up the bulk of the Late Woodland varieties in the assemblage. The co-occurrence of these distinctive ceramic styles in numerous features at the Clampitt site is consistent with the Oliver Phase designation of the village component. An attribute analysis of the same rim sherd sample was carried out in order to isolate some of the more significant stylistic and morphological attributes of the ceramic assemblage. The attributes selected for study and their corresponding frequencies are listed in Table 9.4. The following observations are based on these results.

In general, the Clampitt site pottery consists of grit-tempered (i.e., crushed igneous rock, crushed geodes, or coarse sand), globular-shaped vessels with distinct, rounded shoulders and cord-marked bodies. The rim and neck areas of these vessels are about evenly divided between cord-marked and smooth surface treatments. Nearly all lips are smoothed and range in form from rounded to flat; lip thicknesses range from 2.0 to 11.0 mm, with a mode of 5.0 mm and a mean of 5.4 mm. Lip surfaces are most commonly plain, but when decoration does occur, it most often takes the form of oblique, transverse, or single horizontal (i.e., parallel to the lip edge) lines executed with either a plain or cord-wrapped tool. Most rims are thickened with a rim band which consists of either a narrow fold or a wide collar. The height or vertical width of the rim band ranges from 6.0 mm to 46.0 mm, and this attribute was somewhat useful for separating folds from collars. The frequency distribution of rim band heights shows a multi-modal pattern with most collared rims (e.g., Bowen Collared type) measuring over 24.0 mm (Figure 9.22). Rims were predominately excurvate in profile; however, the distinctive cambered or recurved profile is a feature of three sherds (Figure 9.23). Four complete, but detached, strap handles were recovered during excavations at the Clampitt site. Three of these are thick forms that contract gradually in width from the lip to the neck; the fourth specimen is narrow and bifurcated at the lip juncture. One of the wide strap handles is cordmarked, another exhibits punctuates, and the third is decorated with vertical incised lines which give this appendage the appearance of a hickory nut.

Two zones or areas for the application of decoration were defined for purposes of analysis. These are the rim zone, located just below the lip, and the neck zone, which extends from the base of the rim zone to the shoulder. Rim zone decoration is always confined to the rim band, and no non-thickened rims are decorated in this zone. The rim areas of most of the Clampitt site vessels are plain. Rim decoration consists most commonly of various oblique line motifs which are executed with a cord-wrapped tool. Circular punctuates, alone or in combination with oblique cord-impressions, occur in low frequencies. As with the rims, the neck surfaces of most vessels are plain. The most common decorative motif is a widely-incised or trailed guilloche design. It should be noted that many rim sherds are broken just below the rim band and, thus, exhibit very little surface area of the neck, which prohibits the identification of additional specimens with neck decorations.

Cross tabulations of attribute pairs reveals something about the stylistic or decorative “rules” that governed the manufacture of Clampitt site vessels (Figure 9.24). For example, rim decoration most often takes the form of oblique lines alone or paired as chevrons, which are commonly executed with a cord-wrapped dowel. The most common neck design is a widely incised or trailed guilloche motif. A cross-tabulation of rim motif and neck motif indicates that undecorated rims are most often accompanied by undecorated necks (n=38, 54%) (Figure 9.24); however, the co-occurrence of rim and neck decoration is rare (n=14, 20%). Decorated rims almost never occur alone (n=5, 7.1%), even though decorated necks are observed at slightly higher frequencies with plain rims (Figure 9.24).

The non-vessel, ceramic remains from both Clampitt site and Cox’s Woods contain smoking pipes; however, all specimens are highly fragmented. One plain obtuse-angle elbow pipe was recovered from the surface of the Clampitt site by a private collector. None of the pipe fragments from excavated contexts exhibit decoration, and all appear to be untempered. Twenty-four pottery discs made from plain and cord-marked body sherds were found during the 1993 and 1994 excavations at the Cox’s Woods site. One of these disks is tempered with crushed shell and the rest have varying amounts of grit temper. Two of the specimens are perforated or drilled in the center and one exhibits a small depression on the interior surface which may represent an aborted attempt at perforation. Pottery disks of similar form have been recovered from at least one other Oliver Phase site, the Heaton Farm site in Greene County, Indiana (Tomak 1984; Redmond and McCullough 1996). These artifacts are common in some middle to late Fort Ancient Tradition assemblages from Ohio (Griffin 1966) and Kentucky (Turnbow 1992). Surprisingly—and inexplicably—no pottery disks were recovered from excavations at the Clampitt site.

Temporal Placement

As discussed above, the stylistic attributes of pottery remains and triangular projectile points recovered from the Clampitt and Cox's Woods sites indicate that these occupations were roughly contemporary with Middle Fort Ancient period settlement in the central Ohio Valley (ca. A.D. 1200-1400) (Henderson 1992; Drooker 1997). Furthermore, the shared stylistic homogeneity in ceramic decoration, vessel form, and triangular point morphology support an argument that each site hosted continuous (i.e. single component) occupations during the late prehistoric period. In order to arrive at a more precise temporal placement for the Oliver Phase village occupations, wood charcoal samples from controlled contexts at each site were submitted for radiocarbon assay. The resulting radiocarbon determinations are listed in Table 9.5.

Four wood charcoal samples (Beta 47538-47541) were selected from four pit features, and a fifth sample (Beta 47542) was derived from a segment of the inner stockade trench at the Clampitt site. The radiocarbon results were calibrated according to the method of Stuiver and Pearson (1993) and reveal a combined intercept date range of A.D. 1298 to A.D. 1421. With the addition of all (one sigma) standard errors, this range is only slightly expanded to A.D. 1283 to 1439. Three wood charcoal samples from the Cox's Woods site were also submitted for radiocarbon assay. One sample (Beta 62263) came from the base of one remnant embankment on the eastern side of the village, another sample (Beta 62262) was recovered from a midden lens, and a third sample (Beta 98652) was derived from a segment of stockade trench located on the western side of the site. Upon calibration (Stuiver and Pearson 1993), the radiocarbon results produced an intercept date range of A.D. 1367 to A.D. 1431 with a one sigma error range of A.D. 1279 to 1444. When the radiocarbon results from the Clampitt and Cox's Woods sites are compared, it is apparent that all but one date from each group comfortably overlap at the one sigma error range (Figure 9.25). Such an outcome strongly indicates that the two settlements were roughly "contemporary" within a 103 to 131 year long time segment as indicated by the temporal spread of their respective (one sigma) radiocarbon date ranges.

SUMMARY AND CONCLUSIONS

The series of survey and test excavation projects carried out in the East Fork White River Valley between 1990 and 1994 documented an extensive and intensive occupation by Late Prehistoric period societies affiliated with the Oliver Phase of central Indiana. This occupation consisted of a settlement-subsistence system centered on fortified large habitation or village sites located on sandy terrace landforms and at least one upland creek drainage. Archaeological remains at village sites reveal an annular pattern of storage/refuse pits, post mold configurations (including at least one wall-trench structure), and burials that surrounded open centers. Subsistence remains point to a mixed economy of maize horticulture and the spring through fall exploitation of local terrestrial and aquatic plants and animals. The remains of stockade embankment-ditch complexes at both the Cox's Woods and Clampitt sites testify to the prevalence of warfare and the corresponding need for formidable defensive constructions.

Smaller, seasonal habitation sites were located on floodplains and low terraces overlooking large floodplain segments. The specific functions of these sites remains uncertain, but their relatively small size as well as the absence of midden deposits, deep storage pits, substantial house constructions, or stockade defenses suggest that these sites were occupied by small subsets of village populations for relatively short periods of time. In all likelihood, some small habitation sites served as base camps for the collection of riverine resources such as fish and mollusk, and others may represent remote farming stations used to monitor and tend agricultural fields that were somewhat removed from village locations. This latter settlement type may have resembled the rural “cabin” sites used by the Huron and other Iroquoian-speaking groups in the lower Great Lakes and described in seventeenth century ethnohistorical accounts (Trigger 1969:28-29). The remains of numerous small, temporary campsites are scattered in both lowland and upland situations within the study area and these sites most likely served as hunting and collecting camps. Upland rockshelter sites are the most visible example of this settlement type; however, surface scatters of lithic artifacts indicate that open-air campsites were utilized as well.

The one sigma range of calibrated radiocarbon dates derived from Oliver Phase components in the East Fork Valley provide for a temporally limited occupation sometime between ca. A.D. 1250 and 1450. It is possible that the lack of clear evidence for a cultural progenitor to the Oliver Phase in the East Fork Valley may simply be due to our currently unrefined database for prehistoric occupations prior to A.D. 1250. And yet, the absence of a closely related Late Woodland or even an early (ca. A.D. 1000 to 1250) Oliver occupation of the study region may, instead, indicate the non-indigenous nature of the Oliver Phase societies that came to occupy this valley after A.D. 1250.

The place of origin for such an intrusive population may have been the upper West Fork Valley of central Indiana where sites like Bowen and Oliver Farm have produced a few, seemingly early (i.e., twelfth century A.D.) radiocarbon determination. And yet, the prominent Fort Ancient-like attributes of Oliver ceramic material, the annular village plans, triangular point forms, and even the horticultural subsistence profile revealed by the botanical remains together strongly suggests that southwest Ohio was the most likely point of origin for the Oliver Phase societies of the White River Valley. Such a proposed settlement expansion of early Fort Ancient societies could have easily spread into Indiana via the Whitewater River Valley, the headwaters of which interdigitate with source steams for both the West Fort and East Fork valleys. Likewise, the well-documented settlement contraction (i.e, toward the Ohio River) that took place in the central Ohio Valley after A.D. 1400 (Drooker 1997:70) may provide an explanatory mechanism for the 15th Century abandonment of the East Fork Valley. Of course, all of this is no more than educated speculation at this point in time. Only additional research will help unlock the answers to this intriguing episode in Indiana prehistory.

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Table 9.1. Summary of Triangular Point Data.

	Clampitt (n=45)	Cox's Woods (n=60)
mean basal width	14.7 mm	15.8 mm
mean length*	30.3 mm	25.3 mm
mean thickness	4.5 mm	4.0 mm

	Clampitt (n=45)		Cox's Woods (n=60)	
	f	%	f	%
Concave base	1	2.2	4	6.7
Straight base	23	51.1	25	41.7
Convex base	20	44.4	28	46.6
Indeterminate	1	2.2	3	5.0

*complete points only

Table 9.2. **Identified Faunal Remains from Clampitt and Cox's Woods sites (adapted from Garniewicz 1991: Table 1).**

Common Name	Clampitt	Cox's Woods
White-tailed Deer	present	present
Turkey	present	present
Elk	not identified	present
Eastern Cottontail	not identified	present
Eastern Fox Squirrel	present	not identified
Grey Squirrel	not identified	present
Grey Fox	present	not identified
Woodchuck	present	not identified
Beaver	present	not identified
Muskrat	present	not identified
Crane	not identified	present
Duck	present	not identified
Freshwater Drum	present	present
Redhorse	present	not identified
Turtle	present	present

Table 9.3 **Type frequencies of Clampitt site ceramics.**

Type: variety	f	%
Oliver Cord-marked:Incised	10	14.2
Oliver Cordmarked:Plain	31	44.2
Bowen Cord-marked: Cord-Impressed	8	11.4
Bowen Cord-marked: Plain	7	10.0
Bowen Cord-marked: Punched	2	2.8
Bowen Collared: Cambered	1	1.4
Bowen Collared :Straight	5	7.1
Bowen Fabric-marked	2	2.8
Bowen Sharply Everted Rim	0	0.0
Indeterminate type:variety	4	5.7

Table 9.4. Clampitt Site Ceramic Attributes and Frequencies.

ATTRIBUTE 1. variables	f	%
TEMPER		
1. grit	64	91.4%
2. shell	1	1.4%
3. Limestone	2	2.9%
4. grit and shell	3	4.3%
5. sand	0	0.0%
SURFACE TREATMENT-BODY		
1. smoothed	3	4.3%
2. cord-marked	12	17.1%
3. smoothed cord-marked	2	2.9%
4. fabric-marked	0	0.0%
99. indeterminate	53	75.7%
SURFACE TREATMENT LIP		
1. smoothed	59	84.3%
2. cord-marked	0	0.0%
Smooth cord-marked	10	14.3%
4. fabric-marked	0	0.0%
99. indeterminate	1	1.4%
RIM FORM		
1. thickened	58	82.9%
2. unthickened	11	15.7%
3. rolled	1	1.4%
99. indeterminate	0	0.0%
RIM PROFILE		
1. straight	7	10.0%
2. cambered (recurved)	3	4.3%
3. excurvate (flared)	54	77.1%
4. incurvate (constricted orifice)	6	8.6%
99. indeterminate	0	0.0%

ATTRIBUTE 1. variables	f	%
RIM BAND HEIGHT (mm)		

1. 0 (non-thickened)	11	15.7%
2. 1-5	0	0.0%
3. 6-10	13	18.6%
4. 11-15	21	30.0%
5. 16-20	12	17.1%
6. 21-25	5	7.1%
7. 26-30	5	7.1%
8. 31-35	2	2.9%
9. 36-40	0	0.0%
10. 41-45	0	0.0%
11. 46-50	1	1.4%
LIP FORM		
1. flat	42	60.0%
2. round	14	20.0%
3. round and narrow	7	10.0%
4. beveled	7	10.0%
99. indeterminate	0	0.0%
LIP THICKNESS (mm)		
1. 2.0	4	5.7%
2. 3.0	4	5.7%
3. 4.0	13	18.6%
4. 5.0	18	25.7%
5. 6.0	11	15.7%
6. 7.0	11	15.7%
7. 8.0	4	5.7%
8. 9.0	3	4.3%
9. 10.0	0	0.0%
10. 11.0	1	1.4%
99. indeterminate	1	1.4%
NECK THICKNESS (at 2.0 cm below lip or below rim band in mm)		
2. 3.0	4	5.7%
3. 4.0	23	32.9%
4. 5.0	13	18.6%
5. 6.0	17	24.3%
6. 7.0	5	7.1%
7. 8.0	3	4.3%
99. indeterminate	5	7.1%
LIP MOTIF		
1. plain	49	70.0%
2. oblique	4	5.7%
3. transverse	2	2.9%

4. chevron (alt. obliques)	5	7.1%
5. horizontal (channeled)	8	11.4%
99. indeterminate	2	2.9%

LIP TECHNIQUE

1. none	48	68.6%
2. cord-wrapped dowel impressed	10	14.3%
3. tool-impressed	4	5.7%
4. plain dowel impressed	3	4.3%
5. punctuate (ovoid)	4	5.7%
6. punctuate (circular)	0	0.0%
99. indeterminate	1	1.4%

RIM MOTIF

1. plain	50	71.4%
2. obliques	5	7.1%
3. chevrons (alt. obliques)	3	4.3%
4. parallel, alt. obliques	5	5.7%
5. verticals	1	1.4%
6. circles (punctuates)	4	5.7%
7. horizontal lines	1	1.4%
8. combination horz. Lines and parallel alt. obliques	1	1.4%
99. indeterminate	1	1.4%

RIM TECHNIQUE

1. none	52	74.3%
2. cord-wrapped dowel impressed	12	17.1%
3. incised (<2.0 mm wide)	1	1.4%
4. punctates	5	7.1%
99. indeterminate	0	0.0%

NECK MOTIF

1. plain	42	60.0%
2. curvilinear guilloche	6	8.6%
3. rectilinear guilloche	1	1.4%
4. indeterminate guilloche	3	4.3%
5. obliques	1	1.4%
99. indeterminate	17	24.3%

NECK TECHNIQUE

1. none	41	58.6%
2. cord-wrapped dowel impressed	1	1.4%
3. incised (<2.0 mm wide)	1	1.4%
4. trailed (>2.0 mm wide)	9	12.9%
99. indeterminate	18	25.7%

Table 9.5. Oliver Phase Radiocarbon Dates
(calibrations: Stuiver and Pearson 1993)

Site Name	Site No.	Lab. No.	C14 Age(BP)	1 sigma(A.D.) cal. Age ranges	2 sigma(A.D.) cal. Age ranges
Clampitt[1]	Lr-329	Beta-47539	680+/-60	1283 (1298) 1391	1247 (1298) 1406**
Clampitt	Lr-329	Beta-47542	670+/-50	1288 (1300) 1391	1275 (1300) 1403**
Clampitt	Lr-329	Beta-47541	610+/-60	1300 (1340) 1408	1285 (1340) 1434**
Clampitt	Lr-329	Beta-47538	620+/-50	1300 (1347) 1403	1287 (1347) 1422**
Clampitt	Lr-329	Beta-47540	520+/-50	1402 (1421) 1439	1314 (1421) 1455
Cox's Woods[2]	Or-1	Beta-62263	650+/-110*	1279 (1367)1410	1191 (1367) 1449***
Cox's Woods	Or-1	Beta-62262	570+/-70*	1307 (1403) 1431	1290 (1403) 1449***
Cox's Woods[3]	Or-1	Beta-98652	500+/-50*	1407 (1431) 1444	1326 (1431) 1474#

* corrected for isotope fractionation.
** Redmond 1994:28.
*** Redmond and McCullough 1993:102-103.
\# McCullough and Wright 1997b.

[1]Redmond 1994:28.
[2]Redmond and McCullough 1993:102-103.
[3]McCullough and Wright 1997b.

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Figure 9.1 Distribution of Oliver Phase components in Indiana.

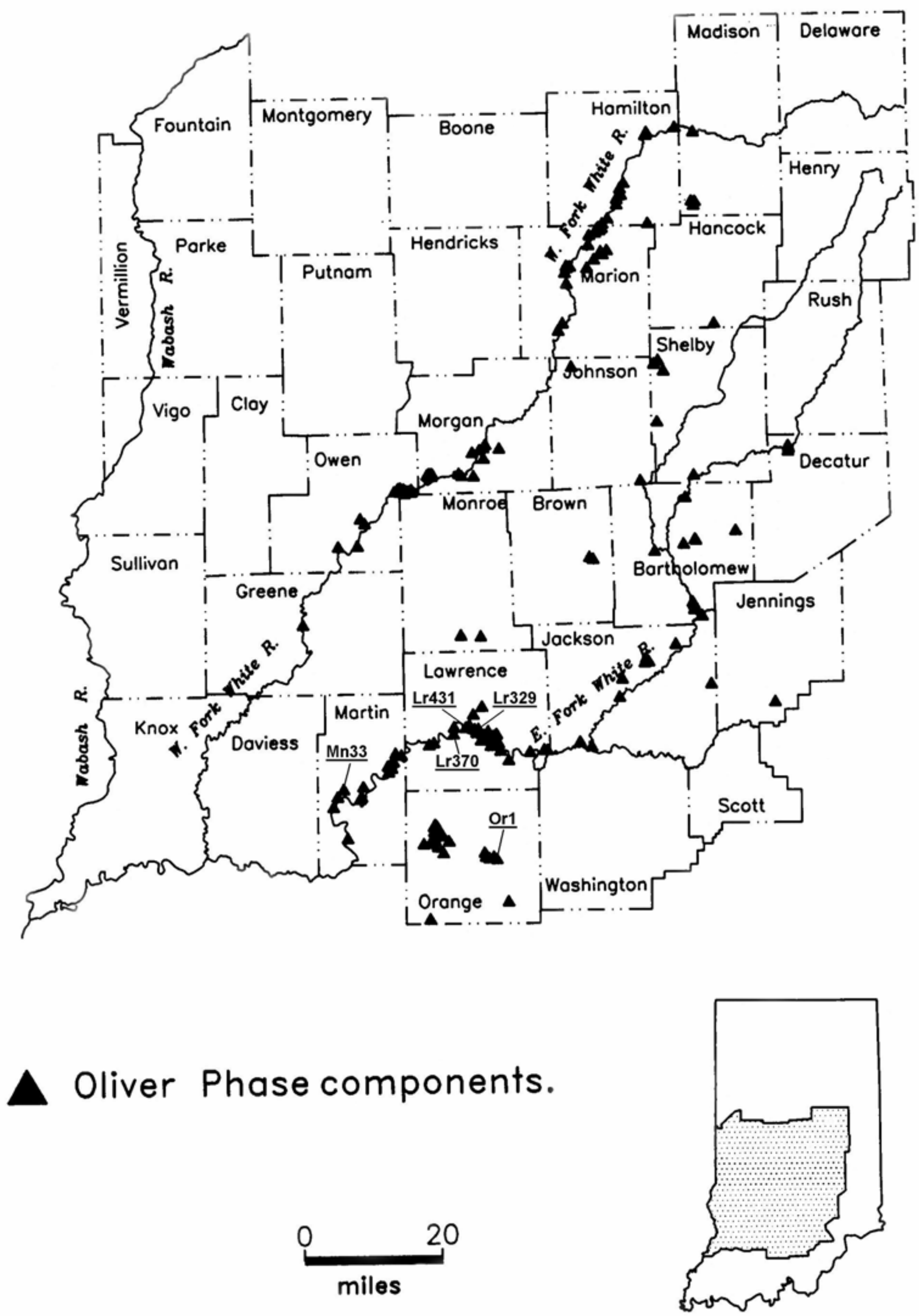

Figure 9.2 Distribution of Oliver Phase components in the East Fork White River Valley.

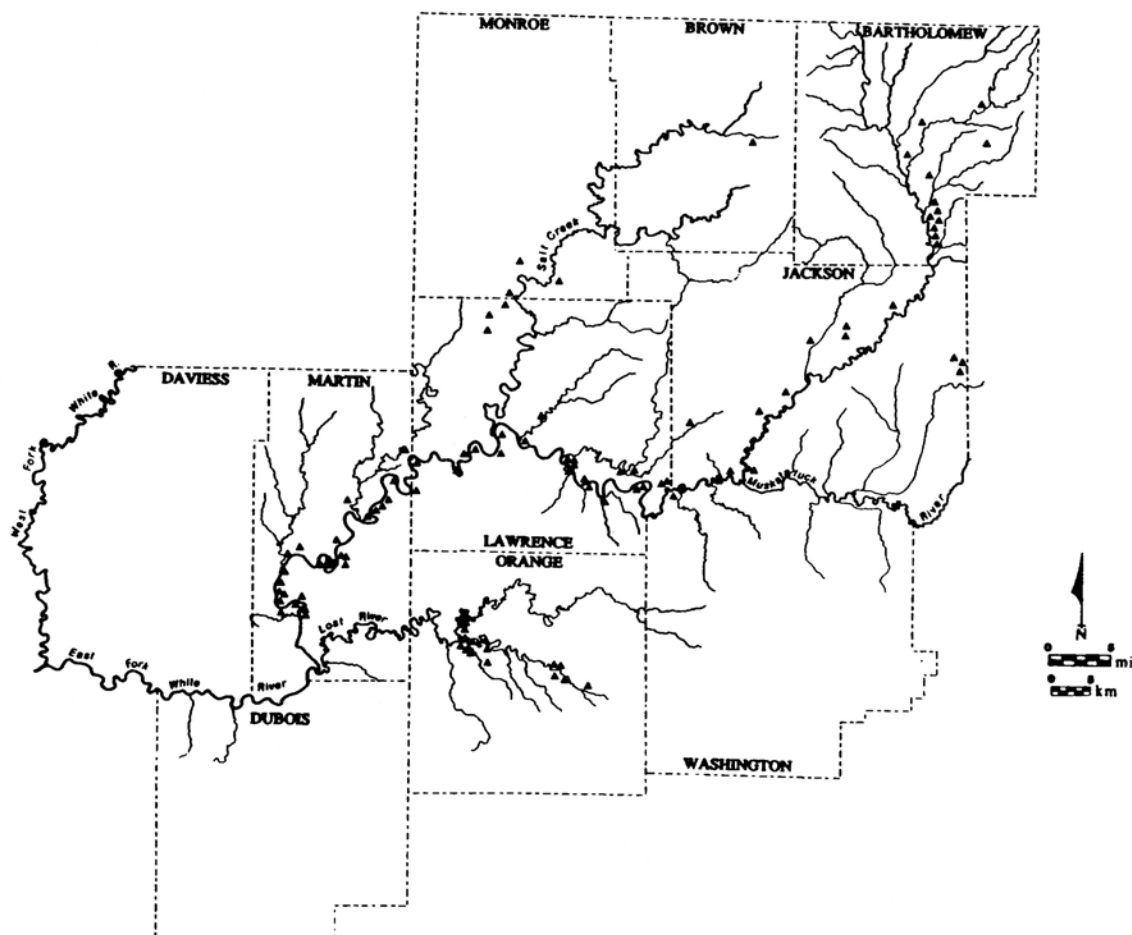

Figure 9.3 **Frequency distribution of Oliver Phase site types by landform (from Redmond 1991: Figure 8).**

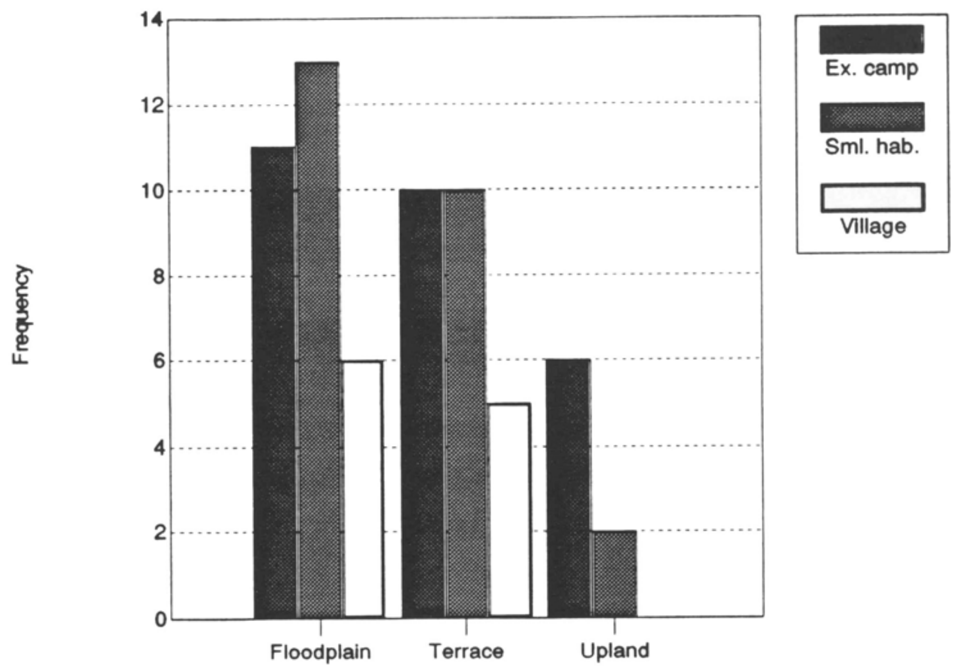

Figure 9.4 **Scattergram showing distances to water by site type (from Redmond 1991:Figure 13).**

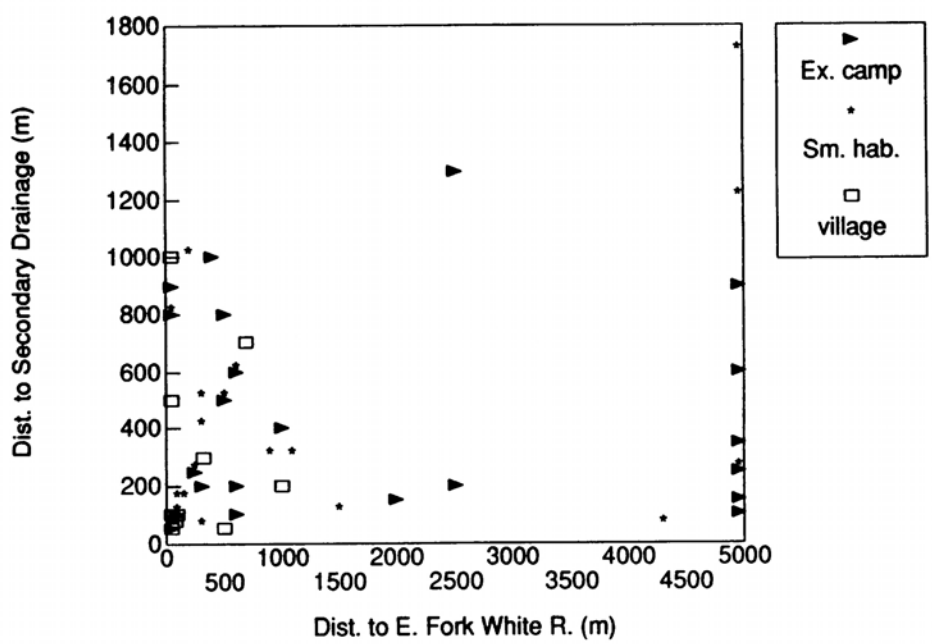

Figure 9.5 Excavation plan of Warren Rockshelter (from Redmond and McCullough 1993: Figure 26).

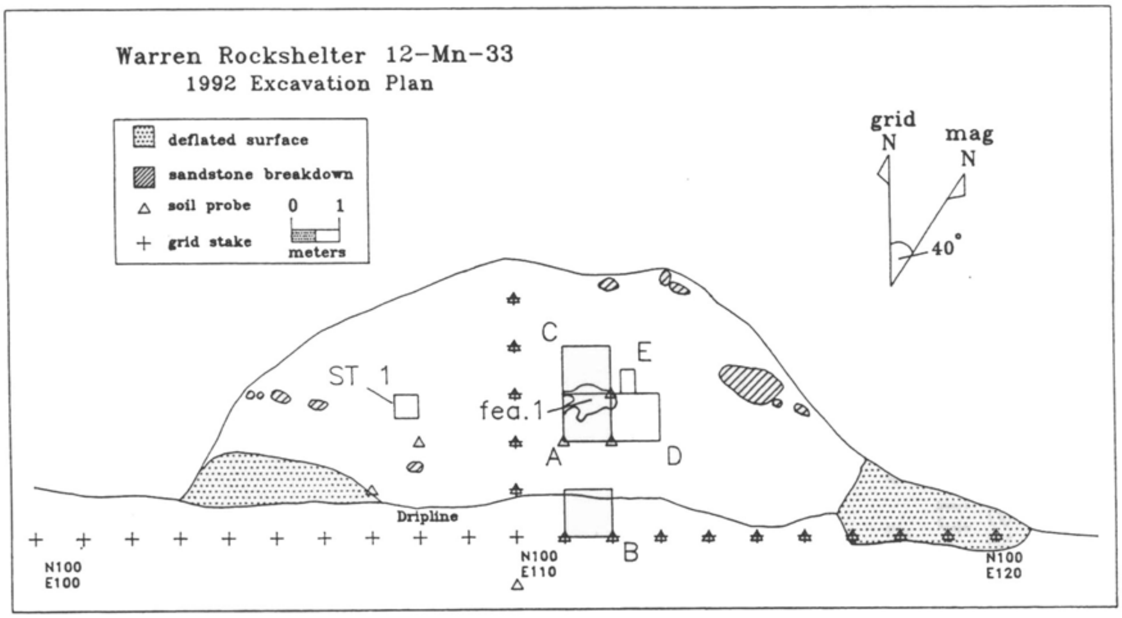

Figure 9.6 Excavation plan of the Abner site (from Redmond and McCullough 1993: Figure 31).

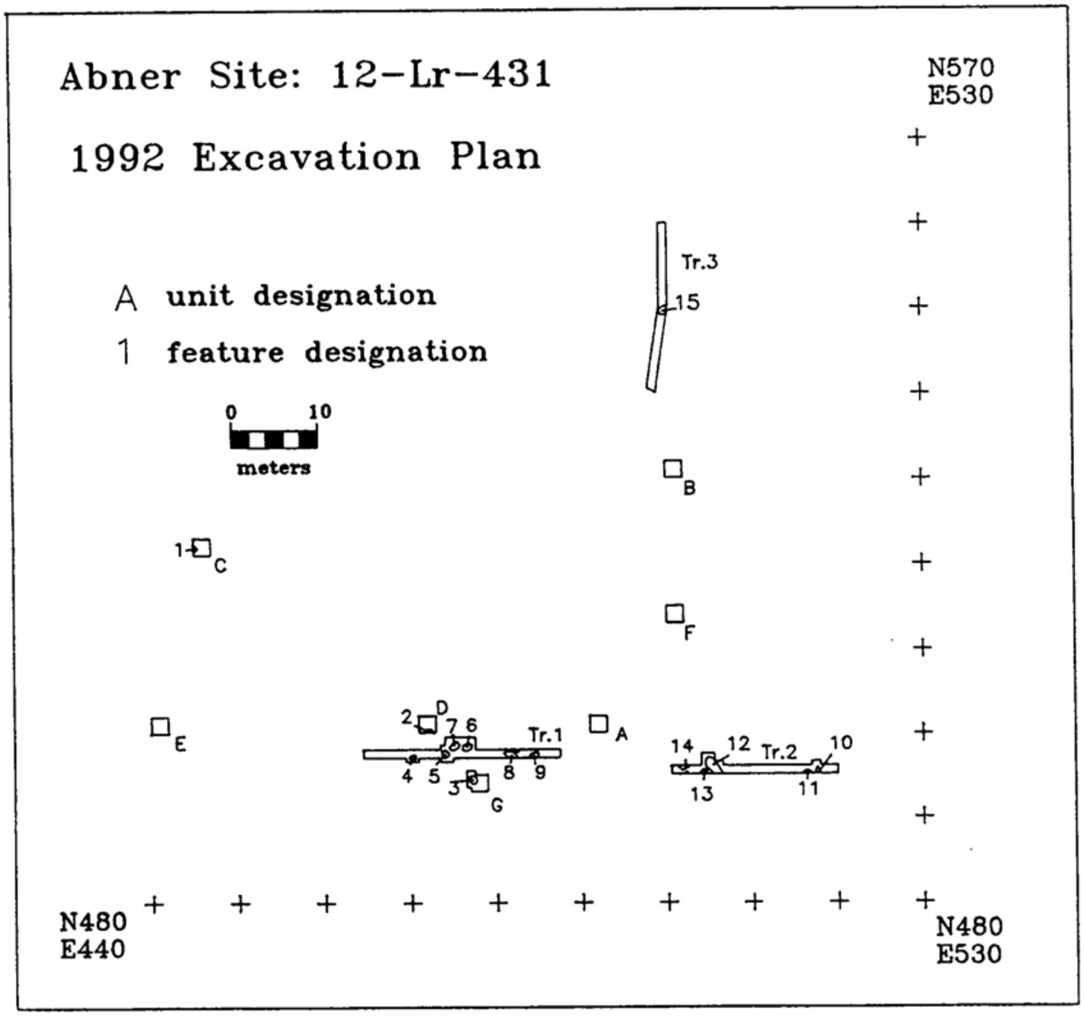

Figure 9.7 Excavation plan of the Pless site (from Redmond and McCullough 1993: Figure 23).

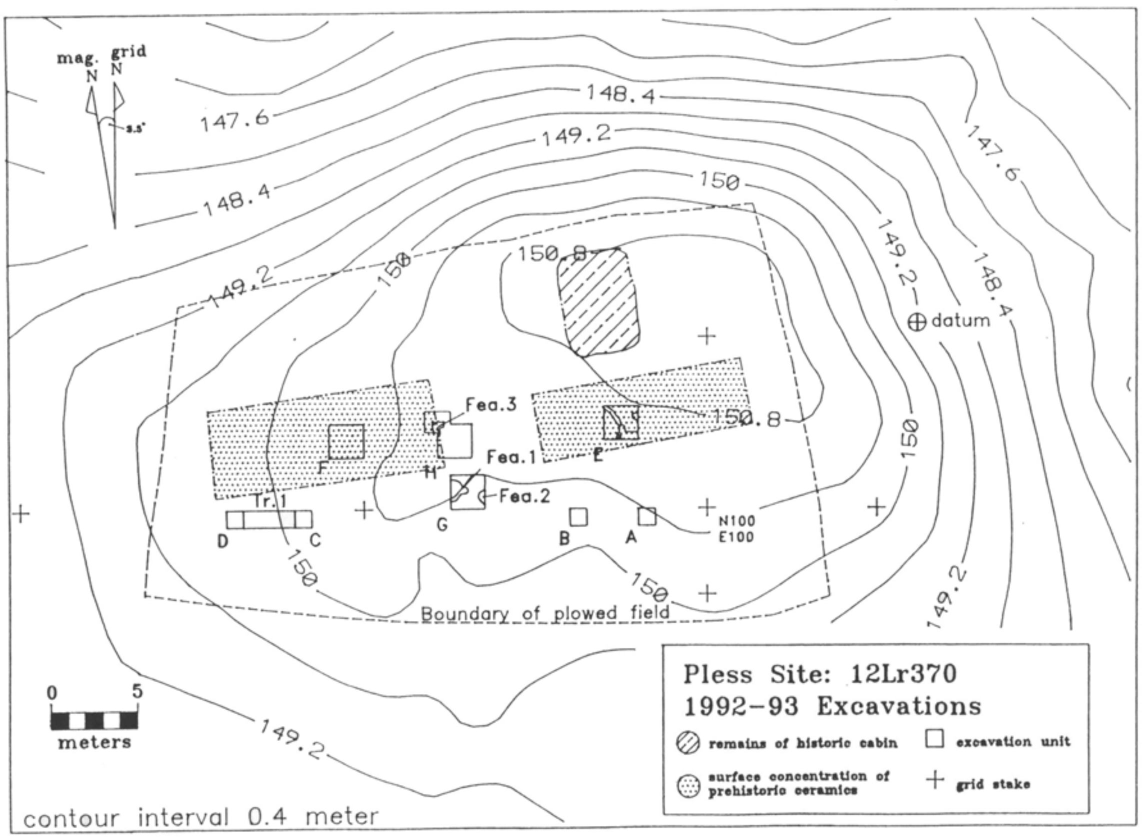

Figure 9.8 Map of magnetic survey grid (Grids 1-8) and anomalies in relation to excavation units and cultural features at the Clampitt site (adapted from Redmond 1994b: Figure 13).

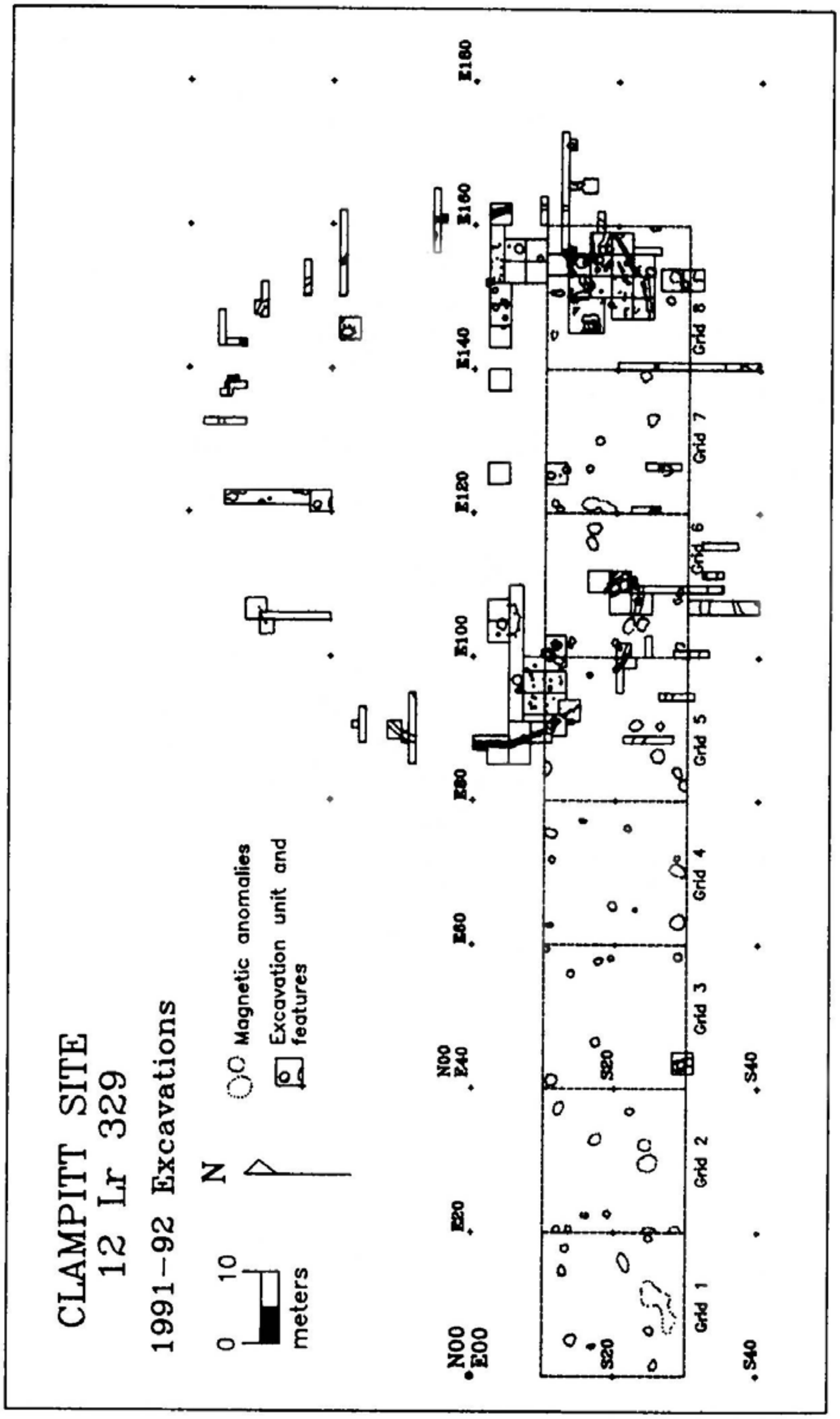

Figure 9.9. The DHPA has removed this image from the public version of this electronic document because it contains sensitive site location information. If you need access to this information for professional research purposes, please contact the DHPA.

Figure 9.10a. The DHPA has removed this image from the public version of this electronic document because it contains sensitive site location information. If you need access to this information for professional research purposes, please contact the DHPA.

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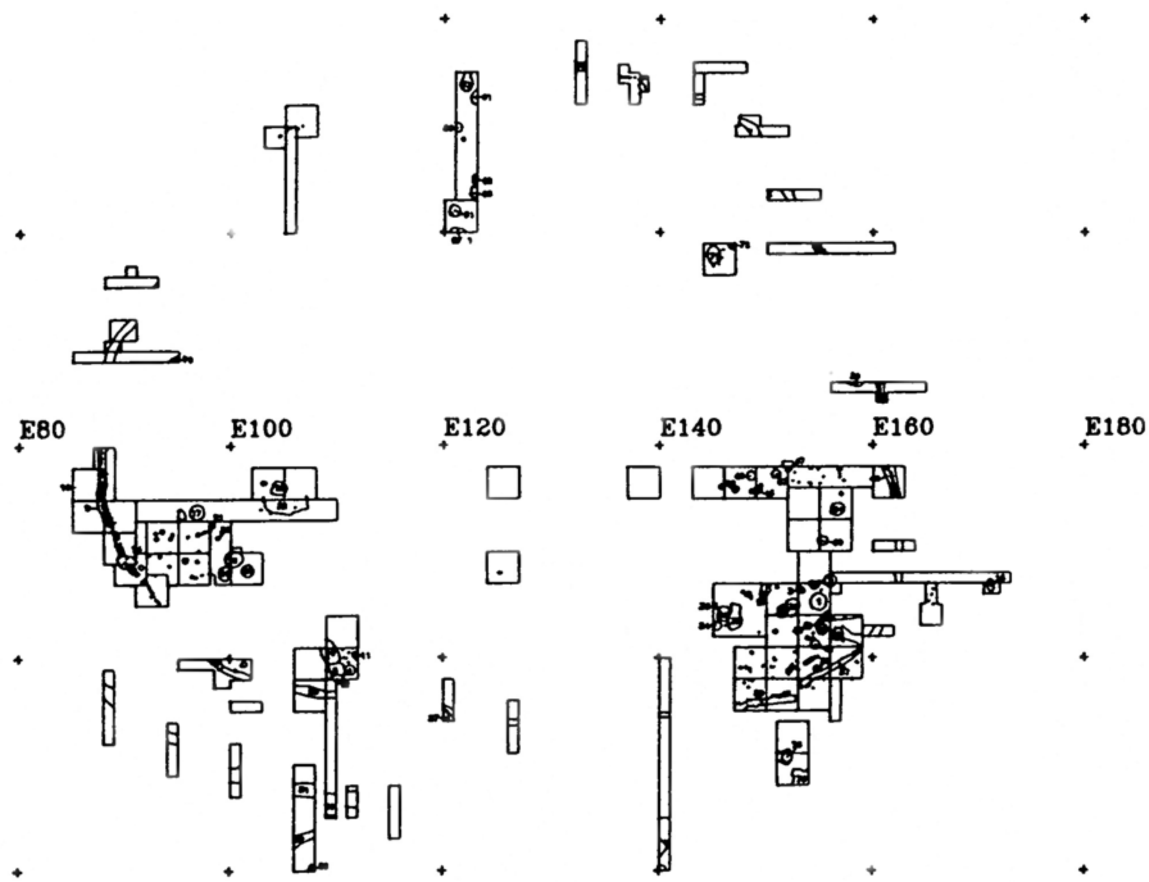
Figure 9.12 Excavation plan of the Clampitt site showing distribution of pits, stockade trenches and post molds.



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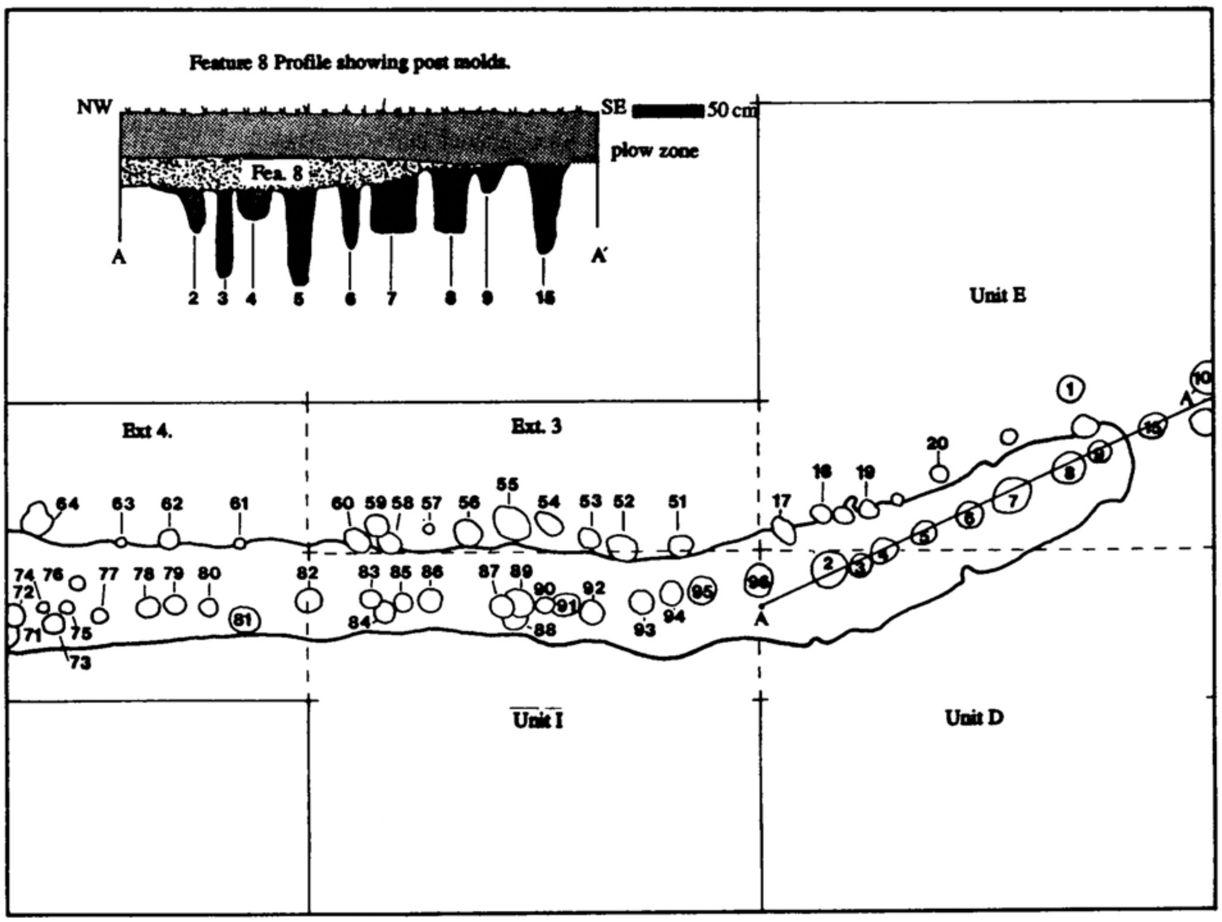

Figure 9.14. The DHPA has removed this image from the public version of this electronic document because it contains sensitive site location information. If you need access to this information for professional research purposes, please contact the DHPA.

Figure 9.15. Profiles of selected pit features at the Clampitt site (from Redmond 1994b: Figure 16).

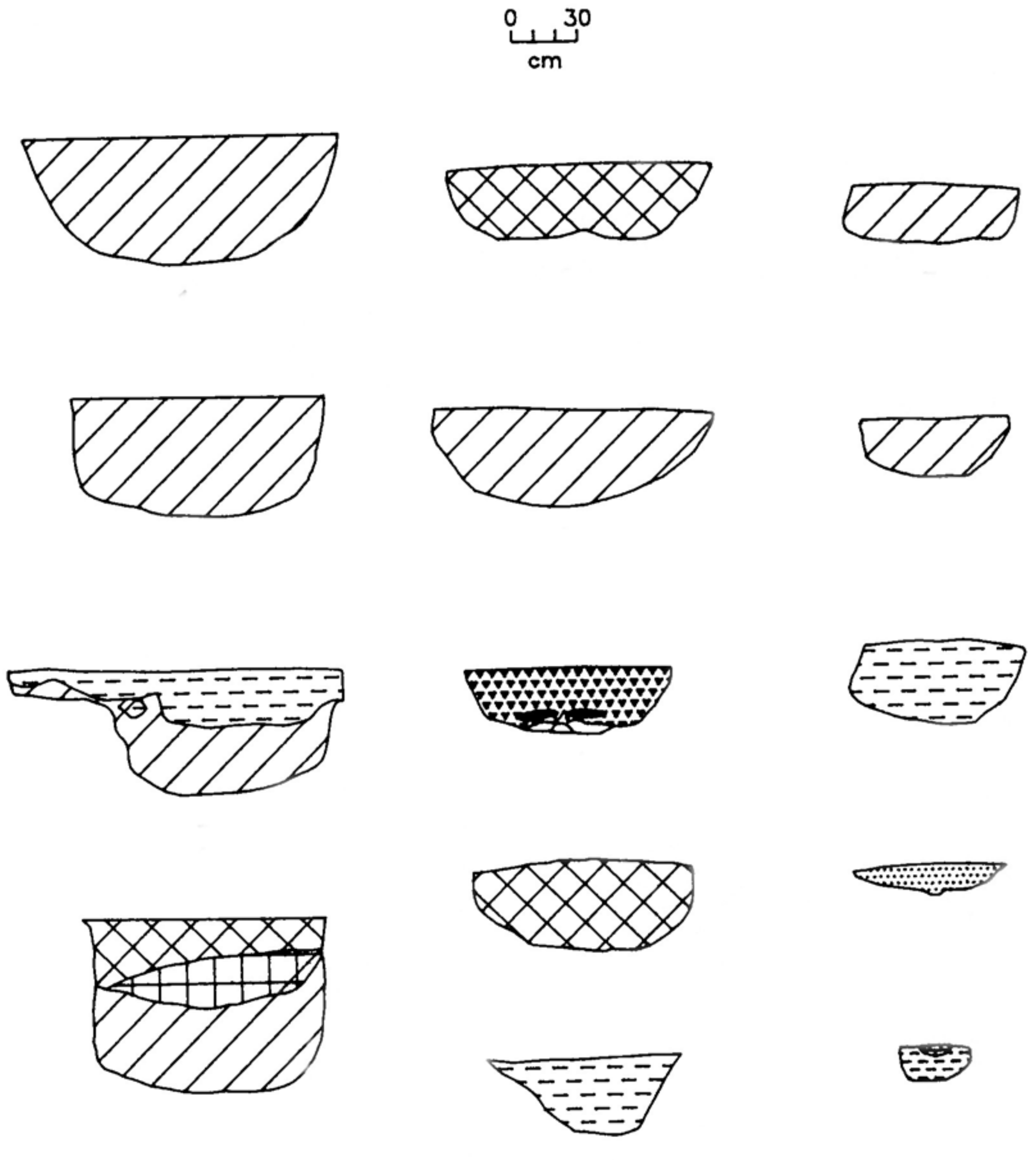

Figure 9.16. Excavation plan of wall trench structure at the Cox's Woods site (from Redmond and McCullough 1996: Figure 21).

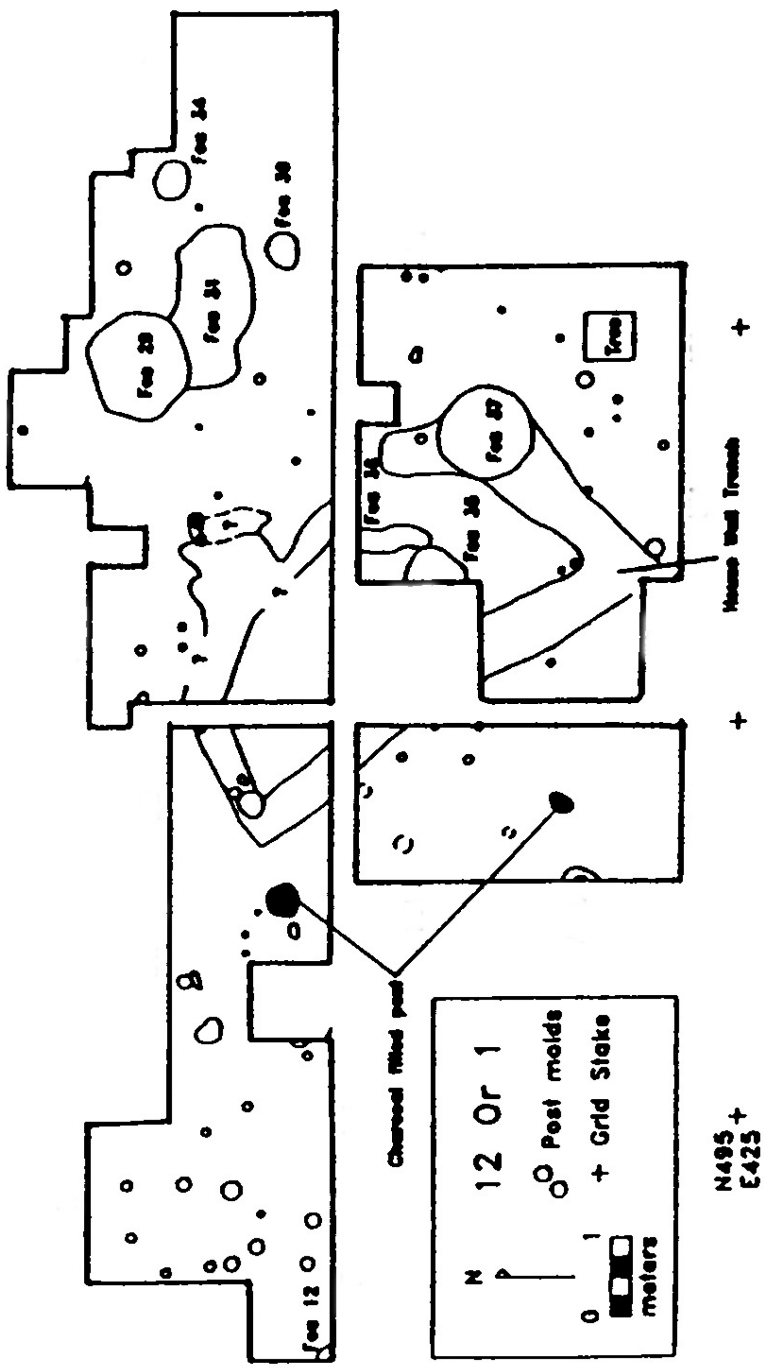

Figure 9.17. Selected triangular points from the Clampitt site.

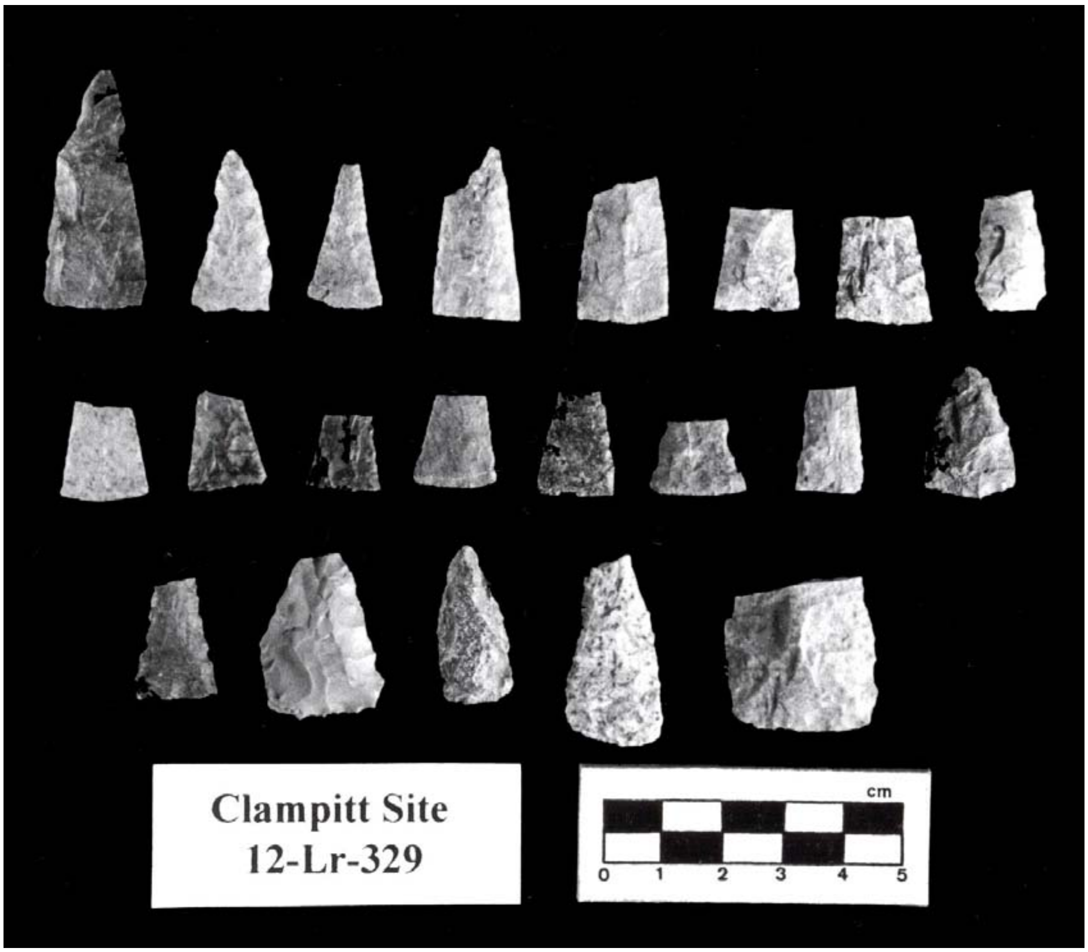

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Figure 9.19. Deer bone beamer (top) and ceramic pipe bow fragments (bottom) from the Clampitt site.

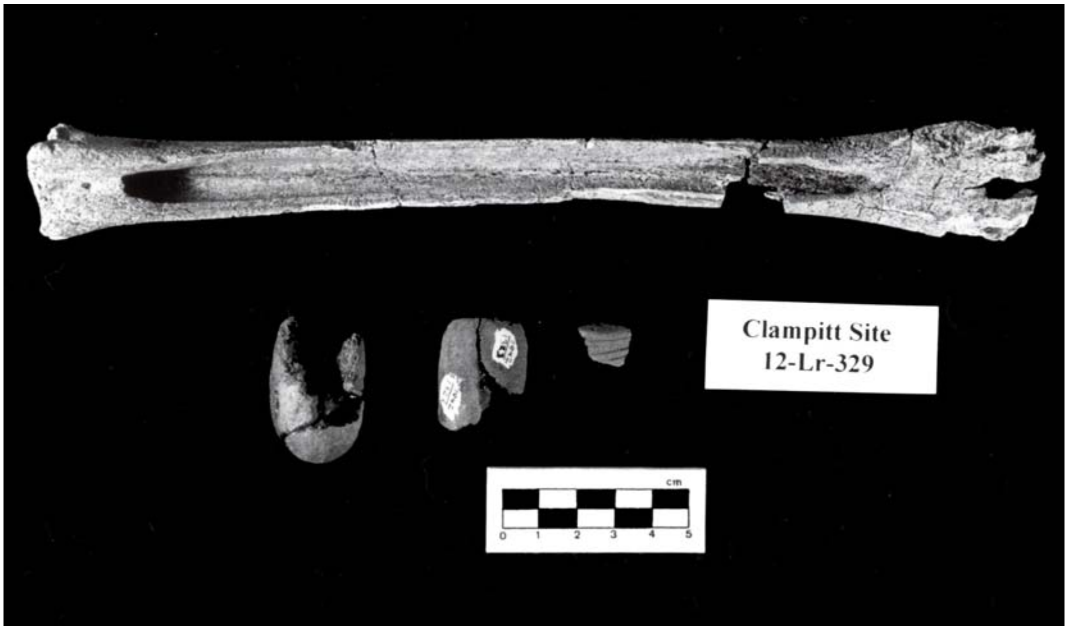
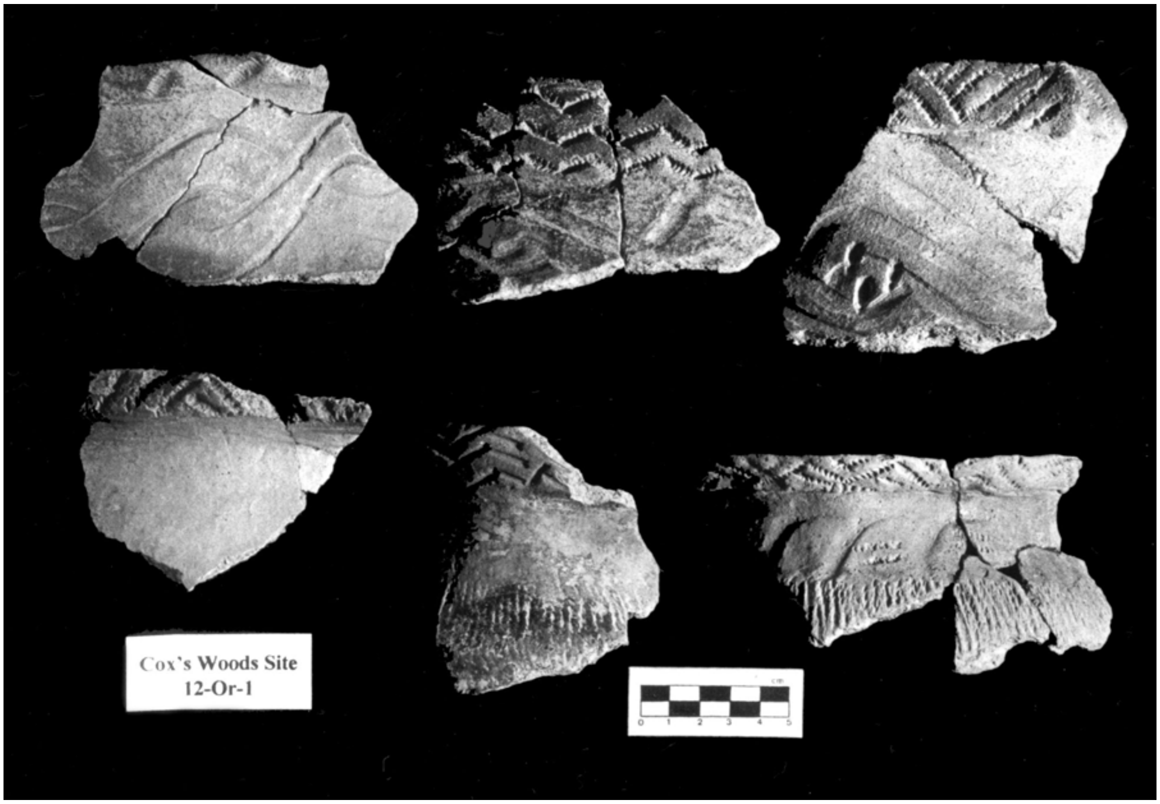


Figure 9.20.a Rim sherds from the Clampitt site exhibiting curvilinear and rectilinear guilloche motifs.

Figure 9.20b Rim sherd from the Cox's Woods site showing rectilinear trailed guilloche design.

Figure 9.21a. Selected rim sherds from the Clampitt site with cord-impressed, incised, stamped, and cordmarked rim folds; two decorated strap handles are shown at the lower right.

Figure 9.21b. Selected rim sherds from the Cox's Woods site showing cord-impressed and incised (bottom row center only) decoration on rim bands and trailed guilloche designs on neck surfaces.



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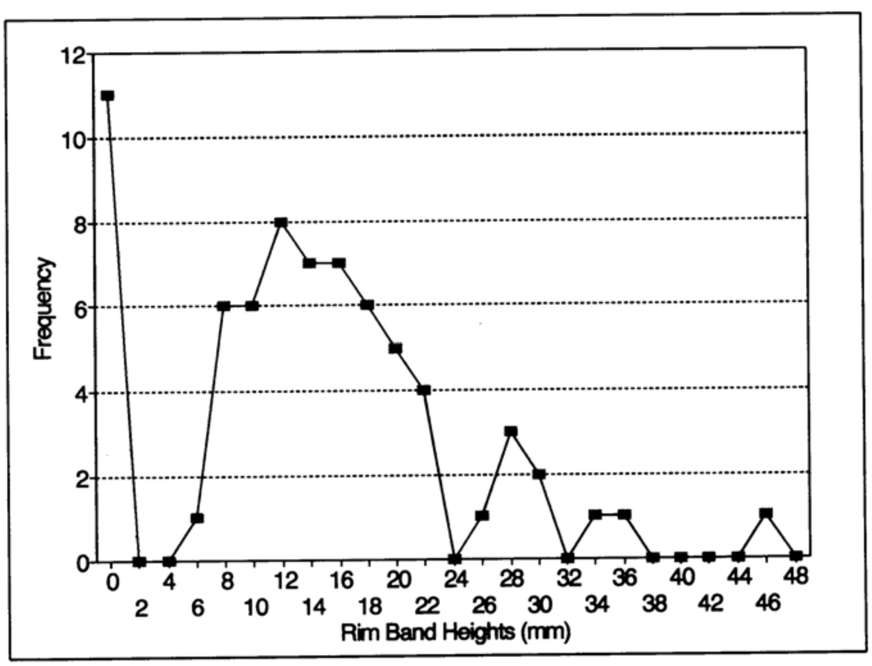


Figure 9.23. Profile drawings of selected rim sherds from the Clampitt site (from Redmond 1994b: Figure 32).

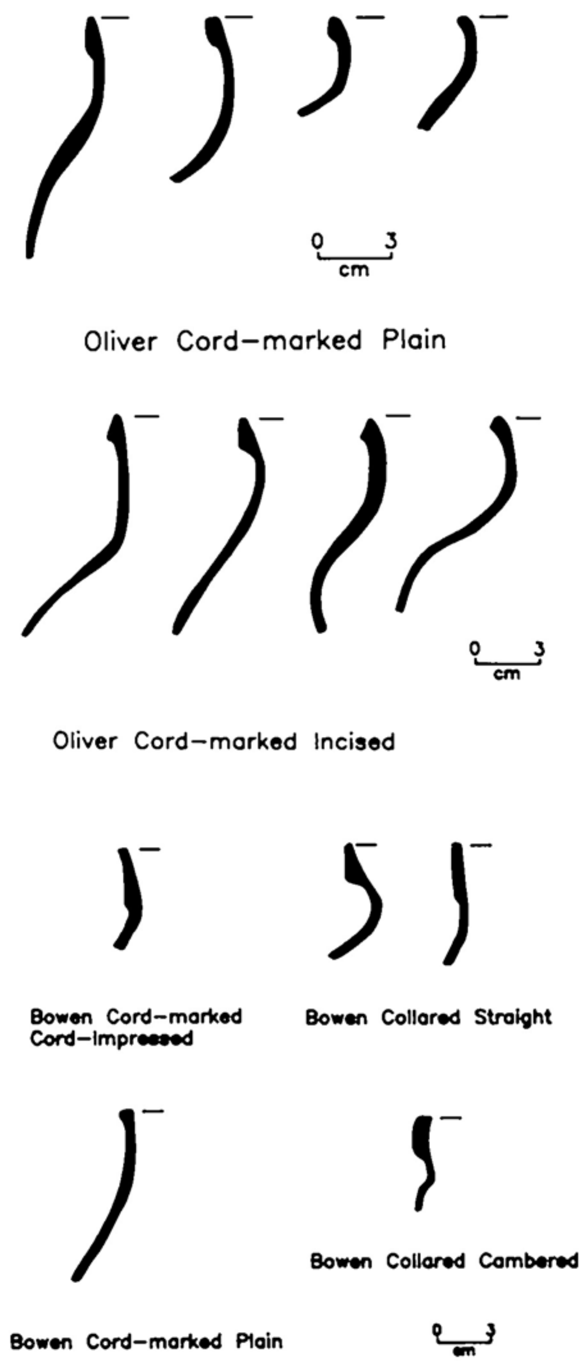


Figure 9.24. Cross-tabulation of ceramic motif and technique frequencies of rim sherds from the Clampitt site (from Redmond 1994b:Figure 33).

Rim Motif

	1	2	3	4	5	6	7	99
	plain	///////	/\/\	//\\	||||||	••••••	≡	?
Rim Techng.								
1. none	50	0	0	0	0	0	0	1
2. CW dowel	0	5	3	3	0	0	0	0
3. incised	0	0	0	0	0	0	1	0
4. punctate.	0	0	0	1	1	4	0	0

Neck Motif

	1	2	3	4	5	99
	plain				/////	?
Neck Techng.						
1. none	42	0	0	0	0	0
2. CW dowel	0	0	0	0	1	0
3. incised	0	1	0	1	0	0
4. trailed	0	5	1	2	0	0
99. indeter.	1	0	0	0	0	17

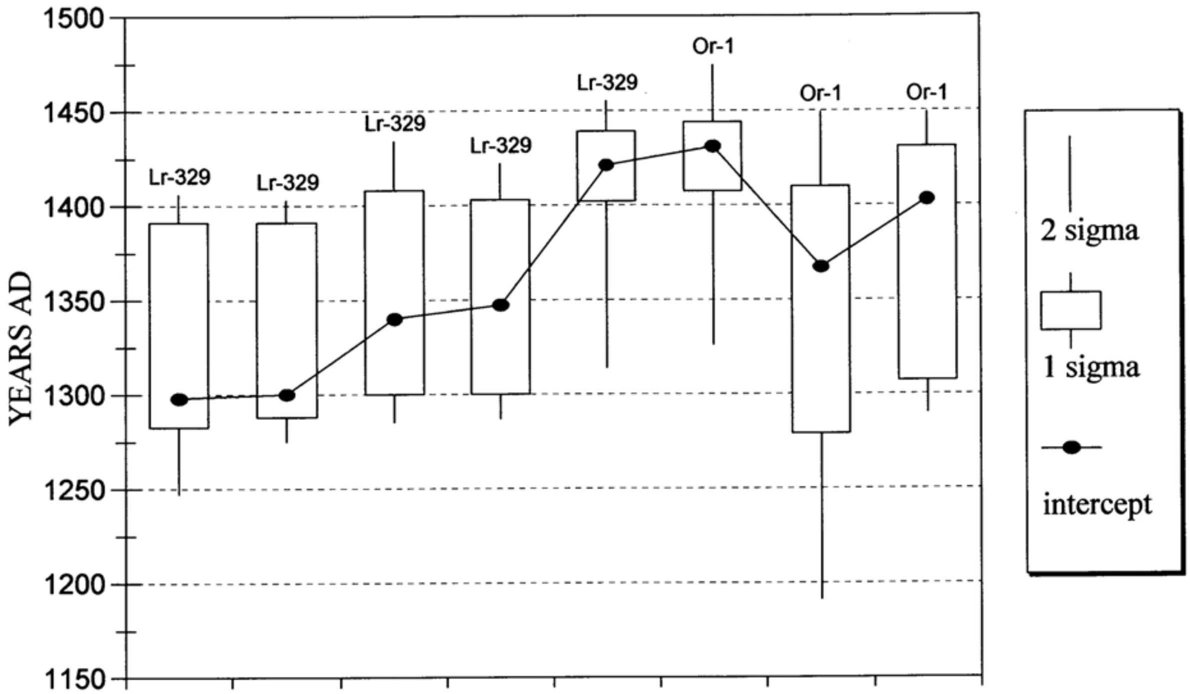
Rim Motif

	1	2	3	4	5	6	7	99
	plain	////////	/\/\	//\\//\\	||||||	•••••••	≡	?
Neck Motif								
1. plain	38	1	1	1	0	0	1	1
2.	3	0	0	1	0	2	0	0
3.	1	0	0	0	0	0	0	0
4.	1	1	1	0	0	0	0	0
5.	0	1	0	0	0	0	0	0
99. indeter.	8	2	1	3	1	1	0	0

Rim Treatment

	Plain	Decorated
Neck treatment		
Plain	38(54.2%)	5(7.1%)
Decorated	13(18.5%)	14(20.0%)

Figure 9.25. Chart of Calibrated Radiocarbon Dates from the Clampitt and Cox's Woods sites.



*(Stuiver and Pearson 1993)

CHAPTER TEN

THE ANGEL TO CABORN-WELBORN TRANSITION IN SOUTHWESTERN INDIANA, NORTHWESTERN KENTUCKY, AND SOUTHEASTERN ILLINOIS

David Pollack and Cheryl Ann Munson

INTRODUCTION

Regional Mississippian chiefdoms throughout the lower Ohio, Green, lower and middle Cumberland, lower Tennessee, and central Mississippi valleys, collapsed in the late fourteenth and early fifteenth centuries (Bareis and Porter 1984; Lewis 1986; McNutt 1996; Morse and Morse 1983; Muller 1986). Prior to the dissolution of these chiefdoms (A.D. 1000 to 1400), this region had a high density of Mississippian societies (Lewis 1986; Muller 1986; Williams 1990), which were characterized by large regional centers with supporting villages, hamlets, and farmsteads. By the early fifteenth century all of these centers had been abandoned. The collapse of these chiefdoms is marked by a decline in population density, inter-societal interaction, and sociopolitical complexity (cf, Tainter 1988). This broad regional pattern has been termed the "Vacant Quarter" (Figure 10. 1) by Williams (1990).

Near the northeastern edge of the Vacant Quarter, in the vicinity of the mouths of the Wabash and Green rivers, the typical pattern of chiefdom collapse (Anderson 1990, 1994; Eisenstadt 1995; Tainter 1988) is not evident. Here, the transition from the Angel Phase (A.D. 1000-1400) to the Caborn Welborn Phase (A.D. 1400-1700) did not lead to the dispersal of the regional population or to the abandonment of the region. The restructuring of social, political, and economic relationships that followed the abandonment of Angel Phase settlements also was not associated with a decline in inter-societal interaction or with diminished access to non-local goods (Green and Munson 1978). In fact, just the opposite occurred.

The transition from the Angel Phase to the Caborn-Welborn Phase also is marked by a slight downstream movement of the local population (Figure 10.2). Angel Phase settlements tend to cluster near the mouth of the Green River and Caborn-Welborn settlements are found in the vicinity of the mouth of the Wabash River. The core area of Caborn-Welborn settlements was located about 50 km downriver from the town and mound center known as the Angel site. While the exact timing of this population shift is not known, the resulting distribution of Caborn-Welborn settlements points to a reorganization of people on the natural landscape.

In this chapter, we review the salient aspects of the Angel Phase and relate the collapse of the Angel chiefdom to the disruption of the Mississippian prestige goods economy, which deprived the Angel elite of the goods and information they needed to validate their positions within Angel society. Next the salient aspects of the Caborn-Welborn Phase are presented. Similarities and differences in Angel and Caborn-Welborn material culture, and settlement and subsistence patterns are then summarized. This is followed by an examination of Caborn-Welborn inter-societal relationships, and it is suggested that Caborn-Welborn sociopolitical organization was that of a small riverine confederacy.

The research presented here draws heavily on earlier research. Important Angel Phase sites include Angel (Black 1967; Hilgeman 1992; Schurr 1992), Southwind (Munson 1983, 1994), and Ellerbusch (Green 1977). Important Caborn-Welborn Phase sites include Hovey Lake (Munson 1997, 1998), Slack Farm (Pollack and Munson 1996, 1998; Pollack 1998), Murphy (Moorehead 1906; Munson 1997, 1998), Bone Bank (Cox 1879; Munson 1997) and Caborn (Munson et al. 1987, 1989; Munson and Jones 1991). Regional survey data and settlement characteristics are described by Green (1977), Green and Munson (1978), Munson (1983, 1995, 1997, 1998), and Pollack (1998).

THE ANGEL CHIEFDOM

Located near the mouth of the Green River in southwestern Indiana and northwestern Kentucky, the Angel chiefdom arose sometime after about A.D. 1000 and lasted until the late fourteenth/early fifteenth century. Sites assigned to the Angel Phase (Black 1967) are located on floodplain ridges, terraces, and bluff margins adjacent to the Ohio River (Green 1977). They are found from the mouth of the Anderson River in Indiana to the mouth of the Wabash River, a distance of about 110 km (Green and Munson 1978; Munson 1983). Calibrated radiocarbon dates from Angel Phase sites have midpoints that range from the mid-twelfth to the early-fifteenth century (Table 10.1).

At the top of the Angel Phase settlement hierarchy was the Angel site. This large regional center is located on the north bank of the Ohio River slightly downstream from the mouth of the Green River. It covered more than 40 ha and consisted of 13 mounds, extensive residential areas, multiple cemeteries, and a sequence of stockade walls (Black 1967). Occupied for most, if not all, of the Angel Phase, the Angel site was the focus of social, economic, and political life for the Angel chiefdom. The bulk of the Angel population appears to have lived at or in close proximity to the Angel site, with the remainder living in more distant farmsteads, hamlets, and small villages (Green and Munson 1978). The presence at Angel of stone box grave cemeteries and a large number of burials, coupled with the absence of burials or cemeteries at smaller Angel Phase settlements, such as Southwind (Munson 1994), suggests that most members of Angel society were interred at the Angel site.

The Angel site also was the focal point for extra-regional interaction and exchange. Residents of the central town had greater access to non-local goods than households living at subsidiary settlements, as reflected by the highly skewed distributions of non-local goods for ornaments or ritual use (copper, shell, fluorite, galena). Important utilitarian items (hoe blades or preforms of Mill Creek, Kaolin, and Dover cherts from Illinois and Tennessee) also are more common at the Angel site than at Angel small villages, hamlets, and farmsteads (Munson 1983, 1994).

The Angel polity can be characterized as a nucleated, simple chiefdom (Hilgeman 1992; Schurr 1992). In general, simple or two-tier chiefdoms have only one level of political hierarchy above the local community, a system of graduated ranking, and a population in the low thousands (Blitz 1993; Earle 1991; Johnson and Earle 1987; Steponaitis 1978, 1991; Wright 1984). Simple Mississippian chiefdoms, such as Angel, were hierarchically organized societies with an elite that could mobilize labor for the construction of large earthen mounds and stockades and that performed the necessary ceremonies and rituals for maintaining group identity, which concomitantly reaffirmed their elite status. These societies are represented archaeologically by a regional center with one or more platform mounds, and associated farmsteads, hamlets, and villages. Nucleated simple chiefdoms are characterized by a concentration of population at a regional center (Blitz 1993), with the remainder living at smaller nearby settlements.

Angel sociopolitical organization also can be characterized as a group-oriented chiefdom (Feinman 1995:264; Renfrew 1974:74-79). At the Angel site, there is little evidence of differential access to personal wealth, but monumental public architecture is very evident in the form of platform mounds and stockades (Black 1967). Within Angel society, greater importance appears to have been placed on the elites' ability to organize communal activities and group rituals that served to link the polity's various settlements than on elite individual displays of wealth. Grave goods, which were found with slightly less than ten percent of the Angel site burials, primarily consisted of chipped stone tools, bone awls, generally undecorated pottery vessels, shell and pottery ear ornaments, and bone hairpins. Objects manufactured from non-local materials interred with the dead consisted of a conch shell columella, a sheet-copper crescent, two marine shell beads, and galena cubes (Kellar 1967; Schurr 1992:307).

COLLAPSE OF THE ANGEL CHIEFDOM

Because only a few Angel Phase sites (Angel [Black 1967; Hilgeman 1992], Southwind [Munson 1994], and Ellerbush [Green 1977]) have been intensively or extensively investigated, it is difficult to identify the specific factors and processes that led to collapse of the Angel chiefdom and the abandonment of Angel Phase communities. However, researchers working in the lower Ohio and in the central Mississippi valleys have identified several factors that may have contributed to the collapse of Angel as well as other regional Mississippian polities throughout the "Vacant Quarter." For the most part, these explanations focus on economic factors. One line of thought is that changes in climatic patterns (Little Ice Age), environmental degradation, drought, and/or soil exhaustion led to a reduction in agricultural yields, which undermined household faith in the ability of the elite to govern (Green and Munson 1978; Muller 1986; Rindos and Johannessen 1991; Williams 1990). Others (Hall 1991; Muller 1986) have suggested that the introduction of new varieties of corn and beans may have actually improved yields and reduced subsistence risk, which allowed greater household autonomy and also undermined the power of the elite. Natural resource depletion, such as wood for the construction of houses and for firewood, also may have been a factor in the abandonment of Mississippian communities.

The primary problem with economic explanations of Mississippian chiefdom collapse is that they link the demise (as well as the development) of an elite class to agricultural production and management of subsistence risks. While management of such risks may have been an important role of Mississippian elites, it would not have been their only function. It also would not have been a role that was unique to Mississippian leaders. The same subsistence risks that confronted

Mississippian elites were also faced by contemporary, less complex, agricultural societies in the middle Ohio Valley, and their leaders must have held management roles. However, these societies did not experience notable rises or declines in political authority (Pollack and Henderson 1992).

Although it may be appropriate to cite changes in environmental conditions, and declines in agricultural yields as factors contributing to the demise of a particular chiefdom, such explanations do little to explain the processes involved in the widespread and contemporary collapse of regional Mississippian polities throughout the Vacant Quarter (Williams 1990). In attempting to explain the collapse of the Vacant Quarter chiefdoms, a factor that warrants greater consideration is the extent to which changes in external relationships may have affected regional elites. One of the few explanations that does focus on external relationships cites disruption of the Mississippian prestige goods economy (Mississippian interaction sphere) as a causal factor in the collapse of regional Mississippian chiefdoms (Steponaitis 1991; Welch 1991). Participation in the Mississippian prestige goods economy may have played an important role in the development of regional elites, and also their maintenance (Brown et al.1990; Steponaitis 1991; Welch 1991). The Mississippian prestige goods economy would have provided elites not only with access to non-local goods, but also with information about the world that they could use to validate their positions within their own society (Hall 1991; Knight 1986; Welch 1991). Within such an economy, the elite would have controlled and regulated access to non-local goods obtained through exchange relationships (Brown et al. 1990; Frankenstein and Rowlands 1978; Peregrine 1992; Smith 1986; Steponaitis 1986; Welch 1991).

At first glance, disruption of the prestige goods economy may be an appropriate explanation for only a few Mississippian polities, such as Moundville (Welch 1991) or Cahokia (Kelly 1991). In many regions large quantities of nonlocal goods have not been found in association with regional Mississippian centers. For instance, at the Angel site only 63 shell beads, pendants, and gorgets; 104 copper artifacts; 230 fluorite artifacts; and 43 galena items are present in the excavated collection of more than one million artifacts (Kellar 1967:462-463; Munson 1994). Thus, based solely on the quantity of nonlocal goods found, one could suggest that the Angel elite were not active participants in the Mississippian prestige goods economy. However, the rarity of nonlocal goods would, in and of itself, have made these items prestigious within Angel society. It also would have enhanced the mystery surrounding them (Schortman and Urban 1995).

Angel and other Mississippian chiefdoms did not develop or exist in isolation from their neighbors. That they developed over a very broad area at about the same time points to some level of extra-regional interaction among them (Smith 1990). Participation in the Mississippian prestige goods economy would have provided the Angel elite with more than just non-local goods. It would have given them access to information and esoteric knowledge that they could use to validate their positions within Angel society through inter-societal interaction with other Mississippian elites (Helms 1979; Schortman and Urban 1995).

Some of the best evidence of the Angel elites' involvement in the wider Mississippian prestige goods economy comes from ceramic vessels: Angel Negative Painted vessels with Southeastern Ceremonial Complex motifs (Waring and Holder 1945; Hilgeman 1991, 1992) such as sun circles, cross-in-circles, bilobed arrows, and bird (woodpecker) heads (Hilgeman 1992:232; Kellar 1967:474, Figure 540); Ramey Incised-like jars (Pauketat and Emerson 1991); Parkin Punctate jars; and Walls Engraved vessels (Black 1967; Hilgeman 1992). While these ceramic types were probably produced locally, the designs depicted on some of them are similar to those found at Mississippian sites in other regions. The presence of these types and the Southeastern Ceremonial Complex motifs at Angel reflect the Angel elites' participation in Mississippian religion and cosmology through the exchange of information and esoteric knowledge.

By ca. A.D. 1400, the Angel site and its associated settlements had been abandoned and the Angel chiefdom no longer appears to have been a viable political entity. Disruption of the Angel elites' access to nonlocal goods and symbols would have deprived them of the materials and emblems they needed to validate their positions within Angel society. If this occurred in conjunction with environmental conditions that led to a reduction in agricultural yields, it also may have undermined household confidence in the ability of the elite to lead.

CABORN-WELBORN

The Caborn-Welborn Phase (A.D. 1400-1700) was initially defined by Munson and Green (1973; see also Green and Munson 1978). It is a late Mississippian cultural manifestation centered around the confluence of the Wabash and Ohio rivers. This society lasted to at least A.D. 1700, based on the occurrence at several sites of small numbers of European trade goods such as copper and brass ornaments, glass beads, and occasional gun flints. Caborn-Welborn sites are found within a 60 km long area that extends as far east as Cypress Bend near Geneva, Kentucky, and as far west as the mouth of the Saline River in southern Illinois (Figure 10.2).

To date, more than 80 Caborn-Welborn sites have been recorded (Figure 10.3). They range from small farmsteads encompassing less than a quarter of a hectare to large villages that cover more than 14 ha. Caborn-Welborn sites tend to cluster within three distinct sub-areas: eastern, central, and western (Figure 10.3). Each sub-area has villages and associated hamlets and/or farmsteads (Pollack 1998). But the Caborn-Welborn settlement system lacks a regional mound center. As with earlier Angel Phase sites, Caborn-Welborn settlements (Green 1977; Green and Munson 1978) are located on floodplain ridges, terraces, and bluff margins adjacent to the Ohio River.

Intra-community Caborn-Welborn cemeteries are common in the central and eastern sub-areas, but are not as common in the western sub-area. In the western sub-area the dead were usually interred in blufftop cemeteries. These cemeteries are situated near Slack Farm and on the bluffs overlooking villages and farmsteads in the western sub-area. This type of cemetery, which is associated with early Mississippian sites further down the Ohio River (Brown 1981; Muller 1986) and its tributaries, is not associated with earlier Angel Phase settlements (Green and Munson 1978).

Calibrated radiocarbon dates from Caborn-Welborn Phase sites tend to cluster in the late fourteenth and fifteenth centuries (Table 10.1). In general, they are later than Angel Phase dates, but there is some overlap in the radiocarbon date ranges for both phases. Such overlap is to be expected, since the Caborn-Welborn Phase is derived from the earlier Angel Phase. Population continuity from the Angel Phase is reflected in Caborn-Welborn material culture as well as settlement and subsistence patterns (Green 1977; Green and Munson 1978). Along with continuities, differences also can be identified in the archaeological record of the Angel and Caborn-Welborn Phases. Some of the differences reflect stylistic temporal trends, while others point to changes in inter-societal relationships and social and political organization.

ANGEL TO CABORN-WELBORN SIMILARITIES AND DIFFERENCES

Material Culture

Similarities in late Angel and early Caborn-Welborn material culture are most evident in site ceramic collections (Hilgeman 1992; Munson 1994; Pollack 1998; Pollack and Munson 1996). During both phases, Mississippi and Bell Plain jars, bowls and bottles, and Kimmswick Fabric Impressed and Kimmswick Plain pans dominate site ceramic collections. Strap handles are also similar, as are other types of appendages applied to jars and bowls (i.e., bifurcated lugs and applied notched rim strips). Similar types of nonvessel ceramic objects, such as pestles, disks, ear plugs, and owl effigy pendants, also have been recovered from both Angel and Caborn-Welborn sites. Decorated ceramic types that reflect continuity are Old Town Red and, to a lesser extent, Parkin Punctate and Walls Engraved. Other decorated types, such as Manly Punctate, Beckwith Incised, Matthews Incised, and O'Byam Incised/Engraved, show continuity not only with the preceding Angel Phase, but with the lower Ohio Valley in general (Pollack 1998). Ceramic trends initiated during the Angel Phase that continued after A.D. 1400 include the widening and thinning of jar handles, an increase in the number of hemispherical bowls with horizontal notched or beaded applied rim strips, and an increase in the number of shallow bowls with outslanting walls (deep rim plates) (Pollack and Munson 1996).

Continuity from the earlier Angel Phase also is reflected in the designs placed on Caborn-Welborn jars. The most common design associated with Angel Negative Painted ceramics consists of opposing descending and rising triangles on the rim surrounding the center of a plate (Hilgeman 1992) (Figures 10.4 and 10.5). Layout lines were used to create the triangular areas, which were then usually filled with sets of parallel lines, nested chevrons, or ticked horizontal lines (Hilgeman 1992: Table 5.1). Hilgeman (1992) and Curry (1950) have interpreted this type of plate decoration as representing a sun symbol, with the center of the sun in the well of the plate and its rays formed by an encircling band of projecting triangular areas around the rim.

Based on the similarity in design layout exhibited by Angel Negative Painted plates and Caborn-Welborn Decorated jars, it is quite likely that the rising and descending triangular areas found on Caborn-Welborn Decorated vessels also depict rays of a sun, with the center of the sun corresponding to the orifice of the jar. Rather than being painted around the inner rim of a plate, however, the Caborn-Welborn potter placed the sun's center at a jar's orifice and its rays on a jar's outer shoulder. This similarity extends to how the sun's rays were decorated as well: with parallel lines or lines and punctations, and sometimes nested chevrons. Thus, while the type of vessel (plate vs. jar) and the techniques used to depict the sun (painted lines vs. incised/trailed lines and/or punctates) may have changed, similar messages could have been conveyed to Angel and Caborn-Welborn societies by the designs placed on these vessels (Pollack and Munson 1996, 1998). Within Caborn-Welborn site collections, Southeastern Ceremonial Complex symbols are also found on Walls Engraved ceramics.

The lithic collections from Angel and Caborn-Welborn sites are strikingly similar: chipped triangular arrow points, hoes, simple unipointed drills, and sidescrapers; ground and polished gouges and celts; and sandstone grinding slabs and abraders. In addition to ceramics, Southeastern Ceremonial Complex symbols are also found on engraved stones and are present in the form of catlinite maces and monolithic axes. These catlinite artifacts are truly diminutive forms, one-tenth or less of the size of the maces and monolithic axes found at Mississippian sites to the south, and probably were used as pendants.

Perhaps the most striking difference between Angel and Caborn-Welborn ceramics is a shift from negative painted designs on the interior of plates and the exterior of bottles to a preference for trailed, incised, and/or punctated designs on jar shoulders. There also are aspects of Caborn-Welborn chipped stone tool assemblages that serve to distinguish them from earlier Angel collections. In particular, Caborn-Welborn sites are marked by triangular endscrapers, a common multifunctional tool not found at Angel Phase sites. Bipointed drills and Nodena points are other chipped stone tools associated with Caborn-Welborn Phase sites that are not present at Angel Phase sites.

Settlement and Subsistence Patterns

During both the Angel and Caborn-Welborn phases, settlements, regardless of size, tended to be associated with floodplain ridges and terraces situated near the Ohio River. Thus, throughout the Mississippian sequence in this region similar economic strategies were pursued. Geographically, this orientation was towards the rich alluvial soils that border the Ohio Valley and its tributaries, and the aquatic resources of the riverine and near-river zone (Green 1977; Green and Munson 1978; Muller 1978, 1986; Muller and Stephens 1991; Munson 1995; Smith 1975). The floodplain ridges and low terraces would have been cultivated, while wild plants, fish, reptiles, and other animals would have been procured in the backwater lakes and sloughs situated nearby. Migratory waterfowl and large mammals also would have been exploited in the riverine zone (Smith 1975). Additionally, the rivers, lakes, and sloughs would have provided the main transportation routes for travel by canoe. It is worth noting that backwater lakes and sloughs are far more common near the mouth of the Wabash than at the mouth of the Green River, which suggests the possibility that the Caborn-Welborn population may have had direct access to more aquatic resources than the Angel population.

Both Angel and Caborn-Welborn families grew corn, squash, sunflower, and marshelder, and possibly chenopod (Crites 1994; Kellar 1967; Rossen 1994, 1995). Wild plant foods collected and consumed include nuts of hickory, pecan, black walnut and butternut, and fruits of persimmon, pawpaw, wild grape, wild cherry and plum. The primary difference was the addition of beans to the Caborn-Welborn diet (the few beans noted for the Angel site were misidentified [Crites, personal communication 1986, as cited in Munson 1994]).

Corn was a staple of both the Angel and Caborn-Welborn diet. However, carbon isotope data indicate that Caborn-Welborn families may have consumed somewhat less maize than their ancestors (Powell et al. 1996; Schurr 1992, 1994). The Slack Farm population yielded a mean carbon isotope value of -10.9 ‰, which is somewhat lower than the mean value of -9.1 ‰ obtained from the Angel site sample. The Slack Farm mean value is also lower than other pre-A.D. 1400 Mississippian regional centers in the lower Ohio Valley, such as Wickliffe (mean=-9.6 ‰) and Tinsley Hill (mean=-8.7 ‰). While the isotope data indicate that the Caborn-Welborn population at Slack Farm consumed somewhat less corn than the earlier Angel population, the C12/C13 ratios and the paleobotanical remains (Rossen 1994, 1995) indicate that corn continued to make up a significant part of their diet.

Although the Angel to Caborn-Welborn transition appears to be associated with a slight reduction in corn consumption and the addition of beans to the diet, there seems to have been almost no change in animal subsistence patterns or in the amount of meat consumed by Mississippian households. Nitrogen values obtained from Angel (mean=8.9 ‰) and Caborn-Welborn (mean=9.1 ‰) skeletal remains indicate that both populations consumed similar amounts of aquatic foods, animal protein, and legumes (Powell et al. 1996).

Not surprisingly, faunal remains from Angel and Caborn-Welborn sites also are quite similar, at least in terms of the range of species exploited. As was the case for most Mississippian populations in the lower Ohio and central Mississippi valleys (Smith 1975), deer was a primary source of meat for the residents of Angel and Caborn-Welborn communities (Adams 1949; Brewer 1994; Kellar 1967; Neumann 1962; Munson 1994; Terry Martin, personnel communication 1997). Elk and bear also were occasionally hunted as were small mammals, such as raccoons, beaver, squirrels, rabbits, and foxes (Brewer 1994; Kellar 1967). Turtles dominate the reptile group (Munson 1994) and birds (turkey, ducks, and geese) and fish (gar, catfish, buffalo, bass, and drum) may not have been as important to the diet of Angel and Caborn-Welborn people (Terry Martin, personal communication 1997) as they were to Mississippian groups living in the central Mississippi River Valley (Smith 1975). The presence of bison bones at several Caborn-Welborn Phase sites (Munson 1998) and their absence from earlier Angel Phase sites indicates that by the fifteenth century these animals had moved close enough to the mouth of the Wabash River to have become a resource for Caborn-Welborn hunters.

Inter-societal Relationships

Though continuity can be documented for the region in terms of settlement and subsistence patterns and material culture, the Angel to Caborn-Welborn transition is marked by the reorientation of inter-societal interaction spheres and increased access to non-local goods. Catlinite pipes and pendants, copper beads, marine shell beads, pendants and gorgets, and fluorite ornaments have been recovered from both mortuary and domestic Caborn-Welborn contexts. The presence of these non-local materials indicates that some members of Caborn-Welborn society participated in the Oneota interaction sphere (Hall 1991) as well as the Mississippian prestige goods economy (Brown et al. 1990; Welch 1991) (Figure 10. 6). Additionally, the occurrence of ornaments made from non-local materials at Caborn-Welborn villages and hamlets suggests that imported goods may have been more common after A.D. 1400 and also were more accessible to a wider spectrum of the population (Munson 1983, 1994).

Similarly, nonlocal Mill Creek and Dover cherts are widely represented at Caborn-Welborn villages and hamlets, in comparison with Angel Phase sites (Munson 1983).

In addition to nonlocal goods, the presence of ceramic types and decorative attributes derived from the central Mississippi Valley (Figure 10. 7) also reflects some level of social interaction between individuals living in the vicinity of the mouth of the Wabash River and those living in other regions. Central Mississippi Valley types found at Caborn-Welborn Phase sites include Campbell Applique, Campbell Punctate, Walls Engraved, Kent Incised, and Fortune Noded. Ceramic attributes also reflect interaction with this region. They include the “Memphis Rim Mode,” (House 1991), jars with a large number of (arcaded) handles (Mainfort 1996), and “head pots” (cf., Hathcock 1983: Figure 20B for the Bone Bank site).

Interaction with more northerly societies is reflected by the presence of Oneota-like ceramics in Caborn-Welborn collections (Figure 10. 8) (Pollack and Munson 1996, 1998; Pollack 1998). Unlike Caborn-Welborn Decorated or Mississippi Plain jars, which tend to have a rounded rim/neck juncture and lack interior lip modifications, Oneota-like jars found on Caborn-Welborn Phase sites tend to have a sharply angled rim/neck juncture. The latter are also distinguished from Caborn-Welborn Decorated jars by the presence of interior lip modification in the form of notches, dashes and trailed chevrons, and notched loop or intermediate loop/strap handles (Figure 10. 8). In contrast to the Oneota-like jars, Caborn-Welborn Decorated jars lack interior lip decoration and are primarily associated with wide, thin straps. Many are also embellished with a variety of lugs, nodes, and applied horizontal strips (Figure 10. 9). Catlinite pipes and ornaments, native copper artifacts, and the introduction of triangular endscrapers (Figure 10. 10) also reflect interaction with more northerly societies (Pollack and Munson 1998).

The geographic location of the Angel/Caborn-Welborn homeland might have been a factor in the maintenance and reorientation of inter-societal exchange relationships. Control or regulation of the long-distance movement of goods and information would have been instrumental in developing and sustaining new local leaders. Since Caborn-Welborn communities were situated along the periphery of both the Mississippian and Oneota interaction spheres (Hall 1991), some members of Caborn-Welborn society may have functioned as "middlemen" in the long-distance movement of goods between Mississippian chiefdoms to the south and Oneota tribal groups to the north.

CABORN-WELBORN SOCIOPOLITICAL ORGANIZATION

How the descendants of Angel reconstructed social and political relationships during the subsequent Caborn-Welborn Phase is not easy to discern. The absence of a clearly identifiable regional center with monumental architecture, elite residential or mortuary areas, and subsistence differences that might indicate differential access to resources argues against Caborn-Welborn society being organized as a chiefdom. However, variation in the size and internal organization of settlements reflects the presence of a settlement hierarchy that included large villages, small villages, hamlets, and farmsteads. The association of plazas with villages shows the importance of group ceremonialism and rituals within Caborn-Welborn society. The presence of larger quantities of shallow bowls with out-slanting walls, pans, hemispherical bowls with lugs, and long necked bottles at villages than at smaller settlements (Pollack 1998), suggests the preparation, serving, and consumption of food in ritual contexts took place more frequently at larger communities than at hamlets or farmsteads.

The continuation of a settlement hierarchy and a concentration of settlements within a relatively restricted area points to the presence of leaders who had some degree of power and influence beyond their own village. These leaders may have been responsible for mediating disputes both within and between communities, scheduling religious ceremonies, coordinating agricultural tasks, and negotiating alliances and exchange relationships with external groups. But the absence of a regional mound center suggests that the roles of Caborn-Welborn leaders were less formalized, or less centralized, than those of the Angel elite.

After A.D. 1400, it is possible that many of the activities previously carried out at a regional center were conducted at Slack Farm, and perhaps at the nearby Murphy site as well, especially during the earliest portion of the Caborn-Welborn Phase. These two sites, which are situated on opposite sides of the Ohio River, are the largest Caborn-Welborn villages. Of the two, only Slack Farm appears to have been a large village throughout the entire Caborn-Welborn Phase. Situated at the confluence of the Ohio and Wabash rivers, the leaders of Slack Farm and Murphy would have been in an ideal position to participate in inter-societal as well as intraregional Caborn-Welborn relationships. As such, Slack Farm, and perhaps to a somewhat lesser extent Murphy, may have been the focal point of Caborn-Welborn economic and political activities. The leaders of these two villages may have competed with each other during the early portion of the Caborn-Welborn sequence for power and prestige within the Caborn-Welborn society.

Vernon Knight (1990) has suggested that the system of exogamous ranked clans that typified many historic Southeastern tribes provided a hierarchical framework that permitted societies to move from a tribal to a chiefdom level of sociopolitical organization and back again without requiring a major restructuring of social relationships. If this was the case, then the Angel to Caborn-Welborn transition may not have resulted in a major reconfiguration of social relationships, but rather changes in the power and prestige of the members of the highest ranked clan(s). Although they would no longer have been treated as an elite class, members of the highest ranked Caborn-Welborn clans would have had more power and influence than members of lower ranked clans.

Although Caborn-Welborn sociopolitical organization was not as complex as that of simple Mississippian chiefdoms, it appears to have been more complex than contemporary tribal societies, such as Fort Ancient groups to the east (see Henderson 1992) and Oneota groups to the north (see Green 1995), that lacked settlement hierarchies and population concentrations. If Caborn-Welborn sociopolitical organization was less complex than a simple chiefdom but more complex than a tribal group, it may have been similar to that of the Southeastern Indian confederacies of the Contact period, such as the Creek and the Choctaw (Galloway 1994; Knight 1994; Swanton 1911, 1946), though organized on a much smaller scale. These societies consisted of segments of earlier Mississippian chiefdoms that banded together to achieve common political and economic goals. For instance, Knight (1994:389; see also Galloway 1994) has described the Creek Confederacy as having a scaled hierarchy of potentially impermanent aggregations that developed on a contingent basis in response to crises of greater or lesser importance.

Perhaps after A.D. 1400 the Mississippian population living near the mouth of the Wabash River reconstituted itself as a small riverine confederacy. This concept makes some of the intraregional spatial patterns documented in this region easier to interpret. Among the patterns identified are differences in the use of lines and fill on Caborn-Welborn Decorated jar shoulders and the ceramic types interred with the dead. The observed patterns may represent social or cultural differences that served to distinguish families living in the eastern sub-area from those living in the western sub-area.

As previously noted, the primary design placed on Caborn-Welborn Decorated jars consists of a series of descending and rising triangles, with the descending triangle being filled with lines or punctations. In the eastern sub-area, there is a marked preference for the use of punctations to fill these triangular areas. This pattern stands in sharp contrast to a preference for the use of lines as fill in the western sub-area. The greatest variation in the use of lines and punctations as fill was observed in the central sub-area, although this sub-area does exhibit a slight preference for the use of lines as fill.

In addition to variation in Caborn-Welborn shoulder decoration, intraregional differences have been identified in the types of decorated jars interred with the dead. Caborn-Welborn Decorated vessels are well represented in several private and museum collections from sites in the eastern sub-area (Pollack 1998). However, this ceramic type rarely shows up in mortuary collections from the central and western sub-areas (Pollack 1998) (Figure 10.3). The primary exception to this pattern is the central sub-area Bone Bank site (James H. Kellar, personal communication; Munson 1997), where Caborn-Welborn Decorated jars are relatively common. A preference for Caborn-Welborn Decorated mortuary jars in the eastern sub-area coincides with the high percentages of this type in site surface collections (Pollack 1998).

In contrast to the eastern sub-area, and with the exception of Bone Bank, central Mississippi Valley ceramic types (e.g., Campbell Punctate, Campbell Applique, Parkin Punctate, and Kent Incised) are the primary decorated jars interred with the dead in the central and western sub-areas (Pollack 1998). This pattern corresponds to the slightly higher frequencies of these types in surface collections from sites located in these two sub-areas.

Not only are there intraregional differences in the types of decorated vessels found in villages and graves, but cemetery location with respect to villages varies between the eastern and western sub-areas. In the eastern and central sub-areas, there is a marked preference for cemeteries to be located within a community. Within community cemeteries have been documented at Slack Farm, Murphy, Hovey Lake, Bone Bank, Ritz, Ashworth, Caborn, Big Oeth, Mulligan, Ries-Hasting, and Bauer (Auerbach 1998; Moorehead 1906; Munson 1983, 1995, 1997, 1998; Pollack 1998). Large villages, such as Slack Farm, Hovey Lake, and Murphy contain multiple cemeteries, while farmsteads, such as Bauer, contain only one (Auerbach 1998).

In contrast, surveys in the western sub-area suggest that most individuals were interred in cemeteries located on blufftops above the villages. Blufftop cemeteries are located directly above Slack Farm ("The Rock" Mound) and above Blackburn and Moore to the west (Grundy Hill and 15Un40), but are not known upstream from Slack Farm. Regardless of whether Caborn-

Welborn interments were located within communities or in blufftop cemeteries, ceramic vessels were frequently placed with the dead.

Together, the observed spatial distributions of Caborn-Welborn shoulder decoration, the types of decorated jars interred with the dead, and the locations of cemeteries are suggestive of cultural and perhaps religious differences between the eastern and western sub-areas. The higher frequency of central Mississippi Valley types in the western sub-area suggests that the residents of this sub-area had more social and economic interaction with areas downstream from the mouth of the Wabash River than did those who lived in the eastern sub-area. Placement of cemeteries on the bluffs overlooking villages in the western sub-area is consistent with earlier Mississippian burial practices in the lower Ohio Valley (Clay 1963, 1997; Lane 1993; Muller 1986). The presence of Caborn-Welborn blufftop cemeteries thus suggests a continuation of the practice of placing cemeteries apart from communities (Muller 1986). It also suggests the possibility that some families from the lower Ohio Valley may have relocated to the western sub-area following the collapse of other Mississippian societies. The greater use of lines as fill in the western sub-area may have served to distinguish residents living downstream from the mouth of the Wabash from those living upstream.

Fewer families from other regions may have lived in the villages and hamlets of the eastern sub-area. Within this sub-area, the location of cemeteries within Caborn-Welborn communities represents a continuation of the earlier Angel practice of burying the dead within residential areas. It is also possible that the placement of Caborn-Welborn Decorated jars in burials could reflect a continuity in beliefs. As noted previously, the design most commonly found on these jars consists of filled triangular areas that are similar to the designs on Angel Negative Painted plates.

The central sub-area shows a mixed pattern that is intermediate between the eastern and western sub-areas and reflect this sub-area's geographic position within the Caborn-Welborn region. As such, an overlap in the distribution of stylistic elements and mortuary practices would be expected in this area. For instance, the presence of blufftop cemeteries at Slack Farm and the practice at Slack Farm and Murphy of rarely placing Caborn-Welborn Decorated jars in graves are comparable to mortuary practices documented in the western sub-area. On the other hand, the association of cemeteries with residential areas at Slack Farm, Murphy, Hovey Lake, and Bone Bank compares best with the eastern sub-area.

Organized as a small riverine confederacy, Caborn-Welborn families living in all three sub-areas would have shared a common body of ideological and social beliefs at one level, but at another level, those living in the western sub-area would have maintained an identity that distinguished them from those living in the eastern sub-area. Caborn-Welborn leaders may have competed and cooperated with each other in attempts to gain control of the various groups, factions, or divisions that comprised this confederacy. When the reaction of the larger society required a coordinated response, some individuals may have attained positions of power that transcended the entire Caborn-Welborn region. In essence, at times they may have tried to re-create an Angel-like chiefdom.

However, based on the absence of a regional center, none of the Caborn-Welborn leaders appear to have been able to hold onto this power for an extended period of time. The expansion of inter-societal exchange relationships and the absence of nearby competing polities may have undermined attempts by aspiring elites to keep political centralization under their leadership for an extended period of time. While the Angel elite had been able to overcome, to some extent, the leveling mechanisms inherent in small-scale societies, the same cannot be said for Caborn-Welborn leaders.

CONCLUSION

Examination of the Angel to Caborn-Welborn transition has shown that the collapse of a Mississippian chiefdom did not always lead to a dispersal of the local population, a decrease in population density, and a reduction in inter-societal relationships. That Mississippian society at the mouth of the Wabash River exhibits less political centralization after A.D. 1400 should not be taken to mean that aspiring leaders were uninterested in or incapable of acquiring the prestige and power of earlier elites. Instead, it may mean that they could no longer rely on the lower Ohio Valley Mississippian exchange system that had helped sustain earlier elites. Furthermore, aspiring Caborn-Welborn elites may have been able to maintain links with the broader Mississippian religious system through their inter-societal relationships with Mississippian groups located to the south of the lower Ohio Valley, but a wide segment of the Caborn-Welborn population also was able to acquire non-local goods. Thus, Caborn-Welborn leaders seem to have neither controlled access to non-local goods nor to have derived the power and prestige from inter-societal linkages to the degree that the earlier Angel elites had achieved.

As the Caborn-Welborn population reconfigured the social boundaries that served to distinguish the elite from the rest of society, household resistance to elite authority and the leveling tendencies of small-scale societies may have reasserted themselves. It is also possible that as they reconstructed social, political, and economic relationships, they developed social mechanisms (Bender 1990; Upham 1990; Spencer 1993, 1994; Trigger 1990) that discouraged or prevented aspiring elites from acquiring the same level of power and prestige as their predecessors.

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LIST OF TABLES

Table 10.1. Radiocarbon dates from Angel and Caborn-Welborn Phase Sites.

Site/Sample No.	Age BP	Calibrated date	Material
Angel Phase			
Angel			
Beta-39235	950±80*	970(1041,1150)1270	Wood
Beta-39232	840±80*	1020(1222)1300	Wood
M-7	760±100	1040(1280)1405	Wood
Beta-39234	750±80	1160(1282)1400	Wood
DIC-2357	680±50	1270(1298)1400	Wood
Beta-44768	660±60	1270(1302)1410	Wood
Beta-44769	640±60	1280(1307,1360,1379)1420	Wood
DIC-2358	630±45	1290(1310,1353,1385)1410	Wood
Beta-39233	590±60	1290(1398)1440	Wood
M-5	580+/100	1270(1400)1483	Wood
Beta-44771	570±50	1300(1403)1440	Wood
Beta-44770	530±50	1310(1415)1450	Wood
M-4	530±100	1280(1415)1630	Wood
DIC-1024	510±50/40	1320(1426)1470	Wood
Ellerbusch			
DIC-238	900±50/60	1020(1165)1280	Wood
Southwind			
UGa-4715	890±135*	890(1168)1390	Corn
Stephan-Steinkamp			
Beta-22087	670±90	1220(1300)1430	Wood
Beta-22088	640±100	1220(1307,1360,1379)1450	Wood
Caborn-Welborn Phase			
Slack Farm			
ISGS-2849	640±70*	1270(1307,1360,1379)1430	Corn
Beta-62688	630±60*	1280(1310,1353,1385)1430	Wood
Beta-62695	600±50*	1290(1328,1333,1395)1430	Wood
ISGS-2851	570±70*	1290(1403)1450	Corn
Beta-62689	570±50*	1300(1403)1440	Corn
Beta-62690	550±50*	1300(1408)1440	Corn
ISGS-2850	470±70*	1320(1438)1630	Corn
Beta-62694	420±50*	1420(1454)1640	Corn
ISGS-2853	390±70*	1410(1478)1650	Corn
Hovey Lake			
ISGS-2852	560±70*	1290(1405)1460	Corn
Beta 102580	540±50*	1310(1410)1450	Wood
Beta-119392	550±40*	1310(1408)1440	Soot on pot
DIC-2360	250±60	1490(1657)1950	Wood
Caborn			
Beta-39278	580±40*	1300(1400)1430	Nut
Beta-38381	570±50*	1300(1403)1440	Wood
ISGS-2851	400±70*	1410(1473)1650	Grass
Beta-38382	380±50*	1440(1483)1650	Wood
Murphy			
Beta-119390	730±50*	1230(1286)1390	Nutshell
Beta-119795	650±40*	1290(1305,1367,1373)1400	Corn
Beta-119796	640±40*	1290(1307,1360,1379)1410	Corn
Beta-119391	470±40*	1410(1438)1480	Corn
Beta-119794	340±40*	1450(1520,1569,1627) 1650	Soot on pot
Leonard			
RL-82	460±125	1290(1441)1950	Wood?
RL-83	345±190	1287(1518,1580,1624)1955	Wood?

* Corrected for isotopic fractionation C-12/C-13.
Calibrated for 2 Sigma from CALIB computer program following Stuiver and Pearson 1993. Angel Phase dates taken from Hilgeman 1992 and Munson 1994 (only acceptable dates presented).

LIST OF FIGURES

Figure 10.1. Vacant Quarter modified from Williams (1990:174).

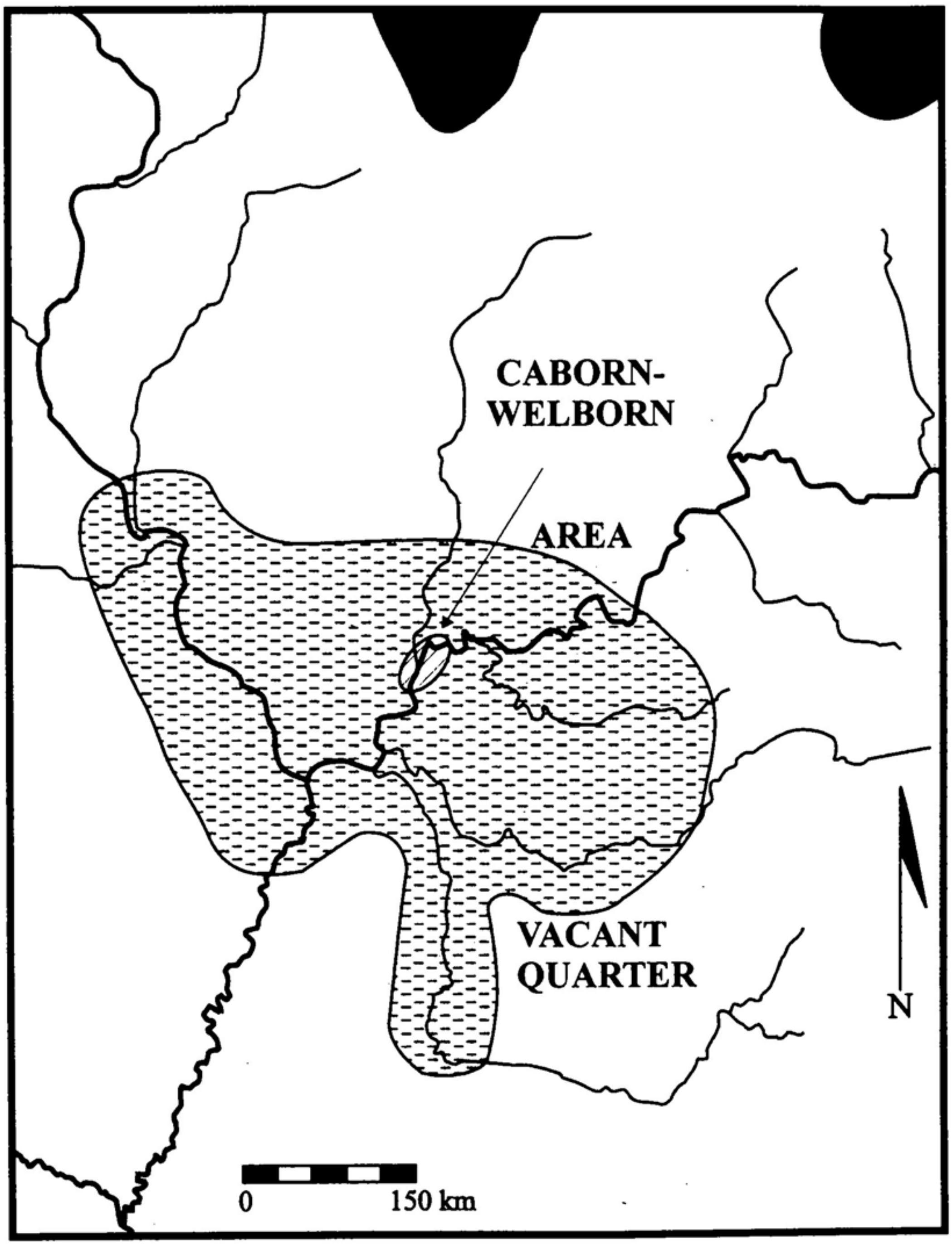


Figure 10.2. Angel and Caborn-Welborn phases.

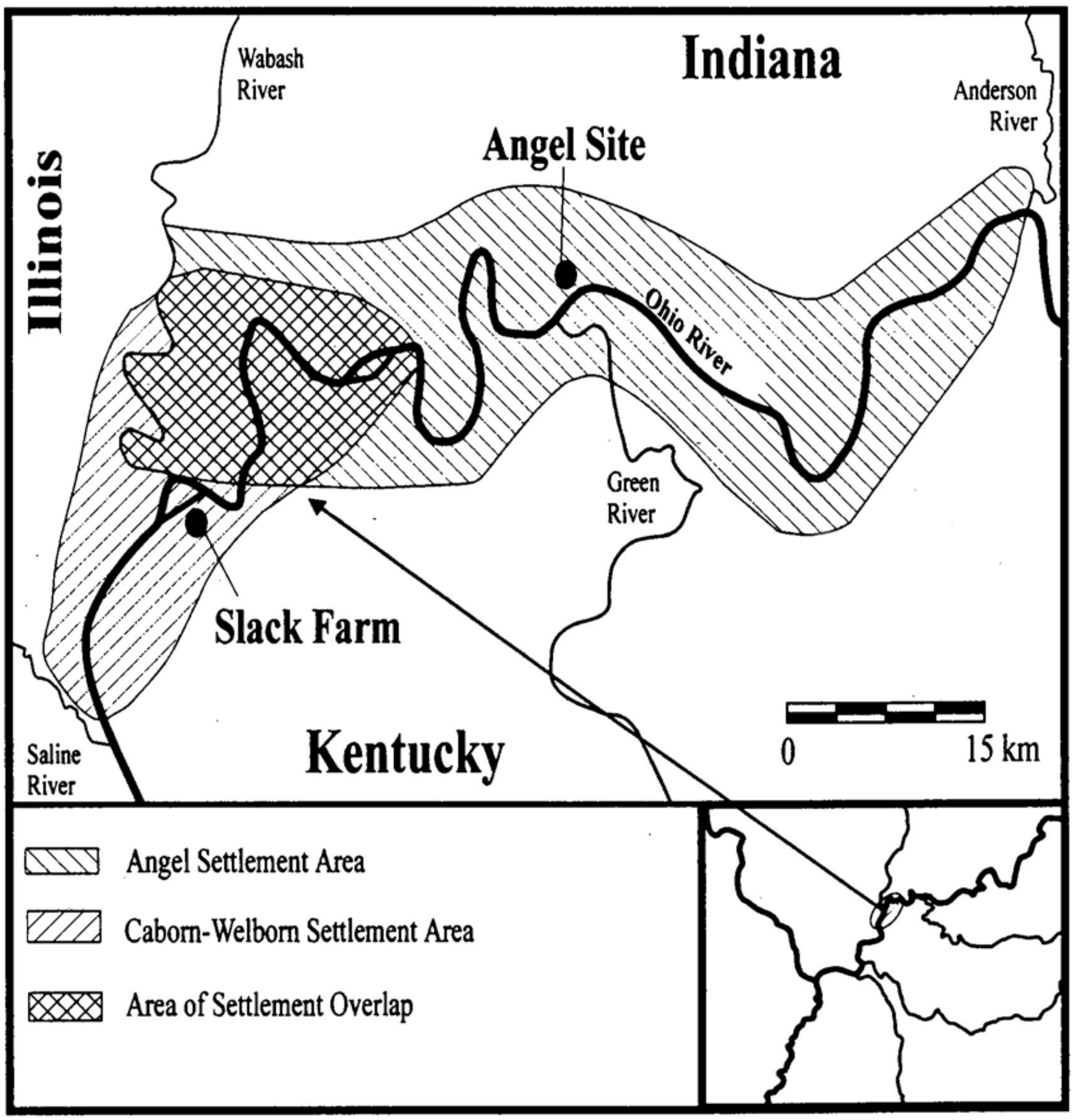


Figure 10.3. Distribution of Caborn-Welborn Phase Sites showing sub-areas and sites discussed in text.

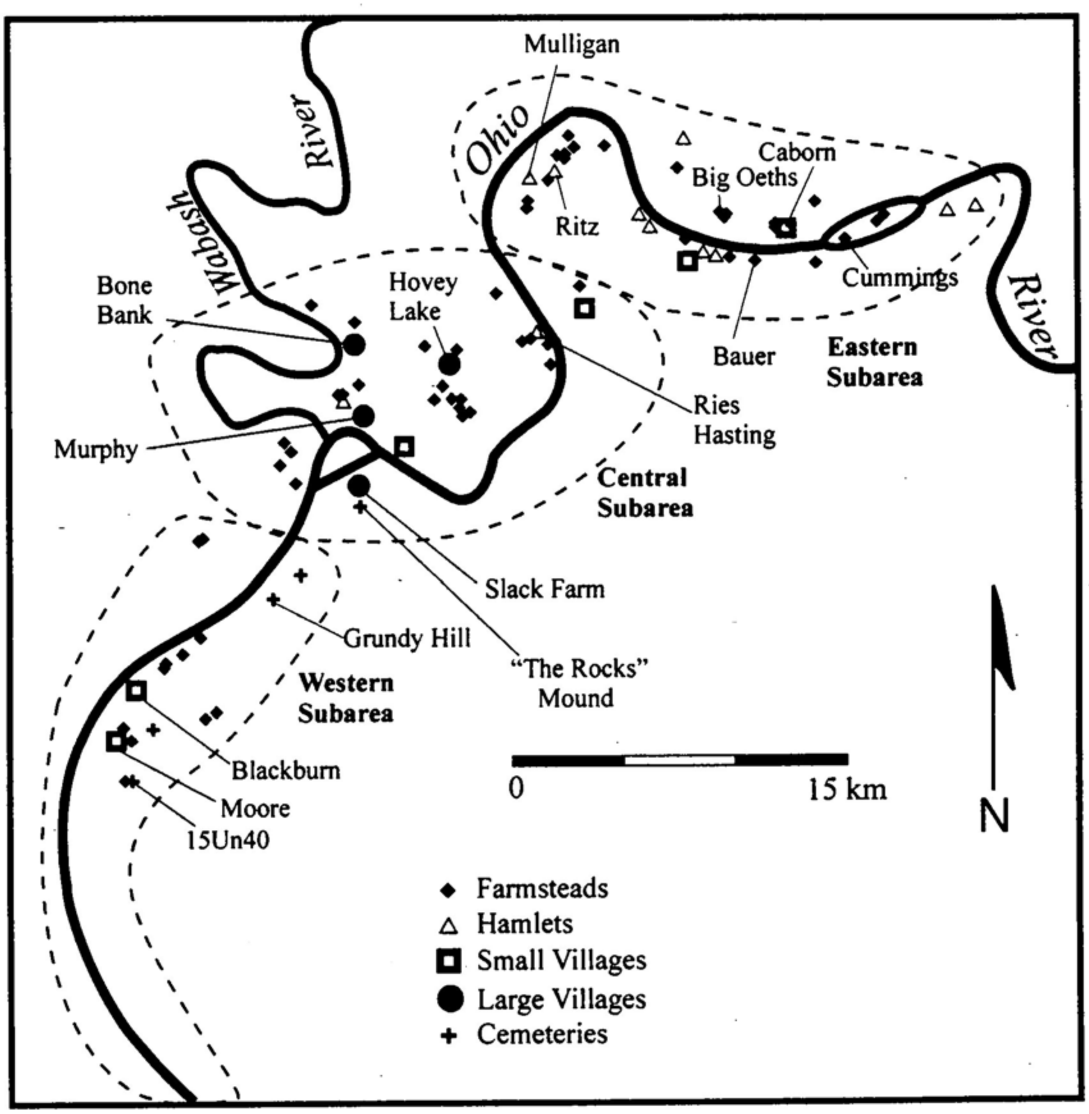
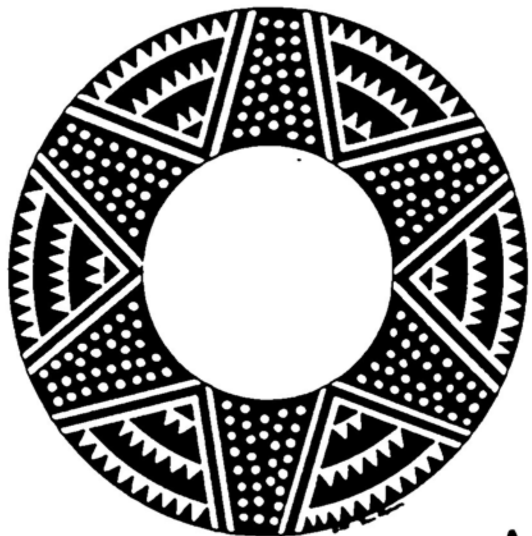
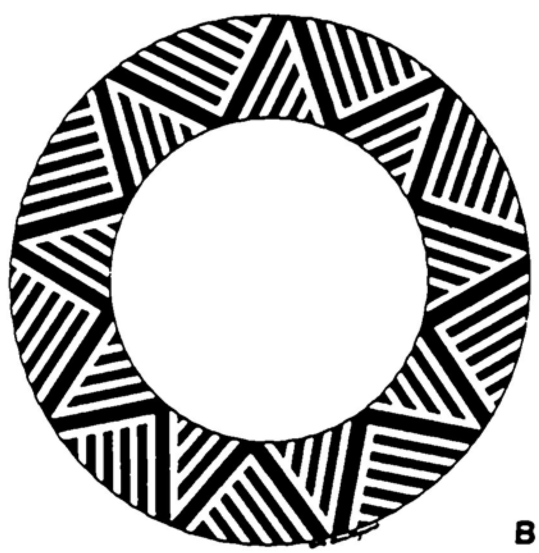


Figure 10.4. Angel Negative Painted plates (adapted from Hilgeman 1991:Figure 10B and 12A).



A



B

Figure 10. 5. Caborn-Welborn Decorated jars.

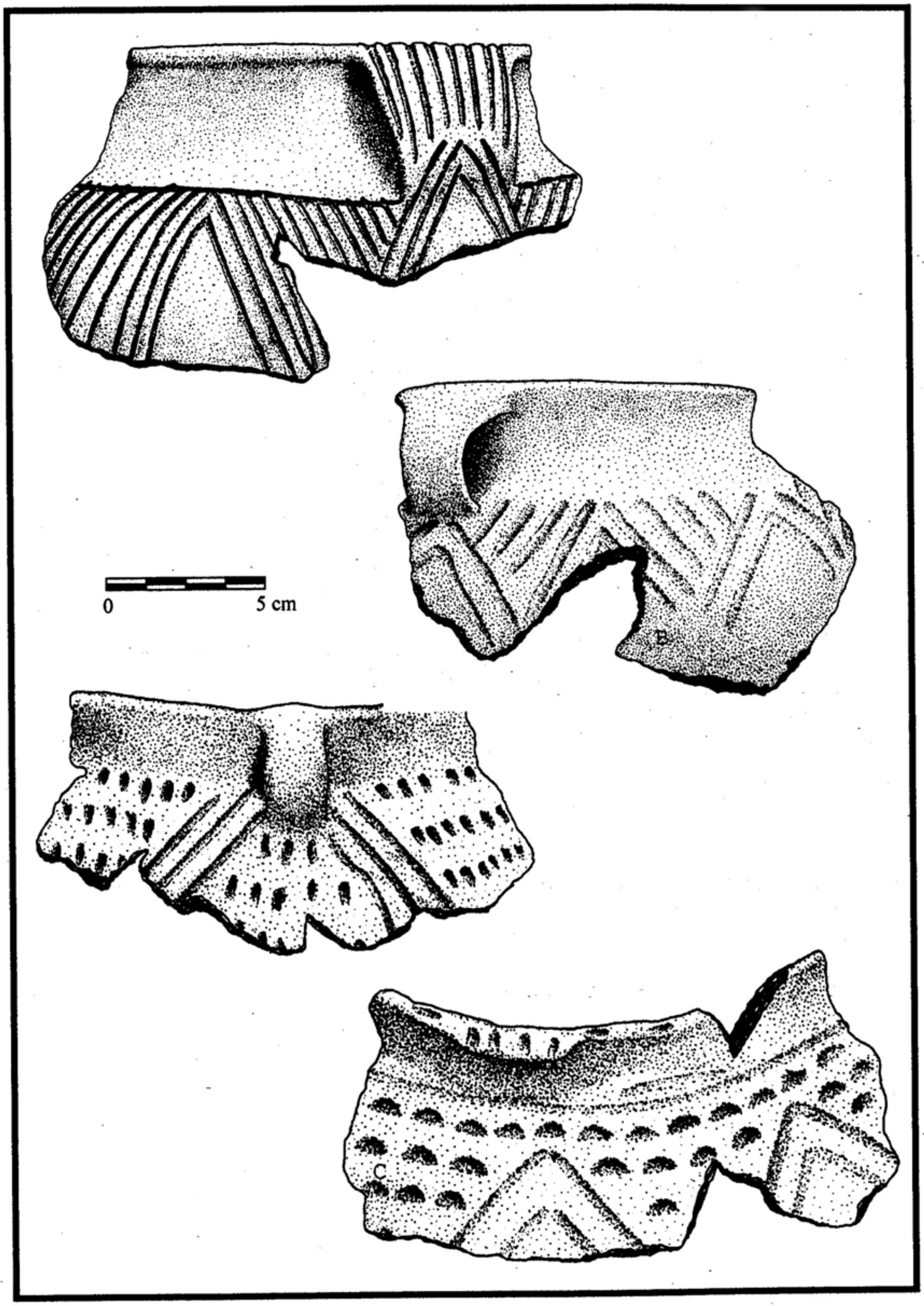


Figure 10. 6. Caborn-Welborn and Contemporaries ca. A.D. 1500.

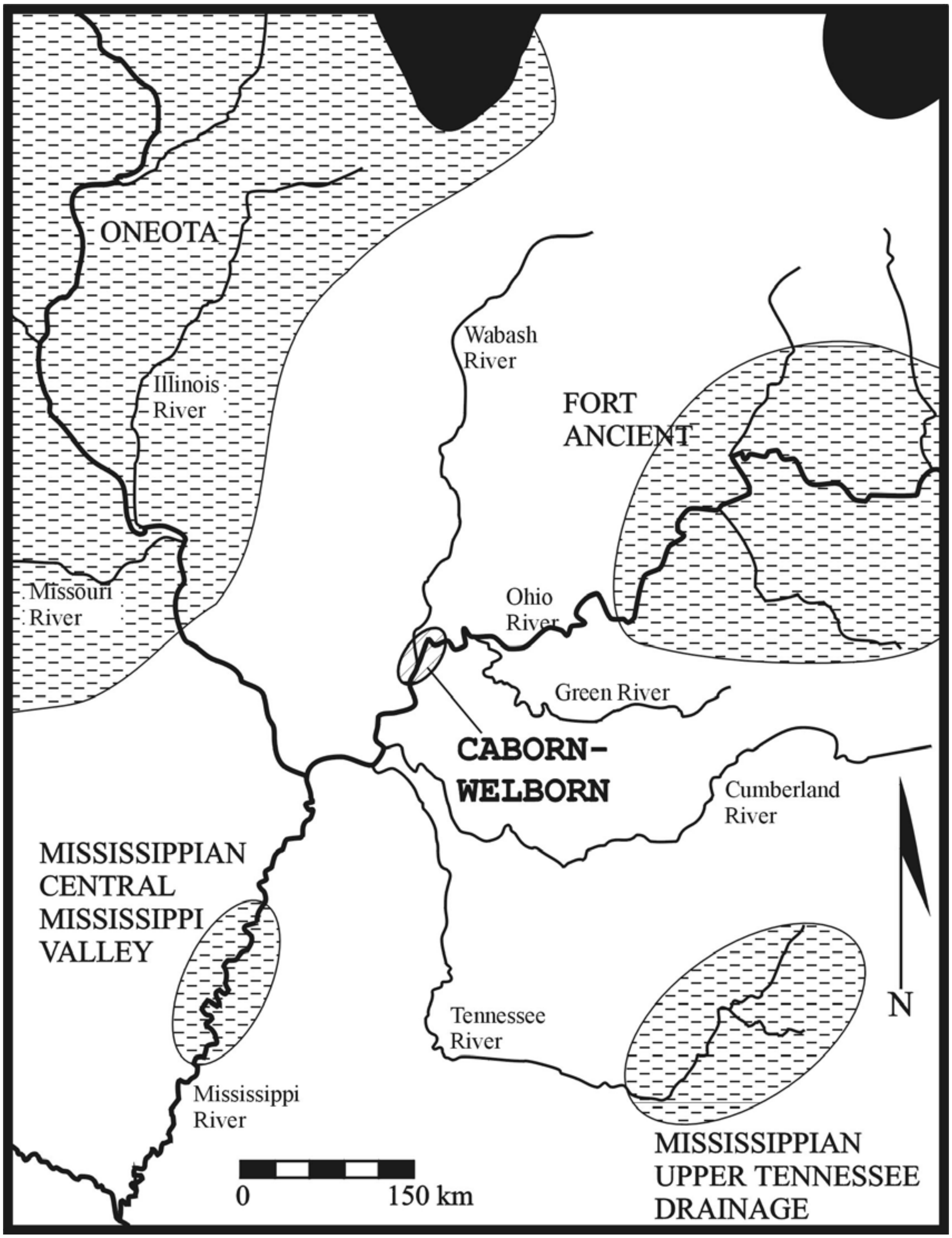


Figure 10. 7. Central Mississippi Valley Types.

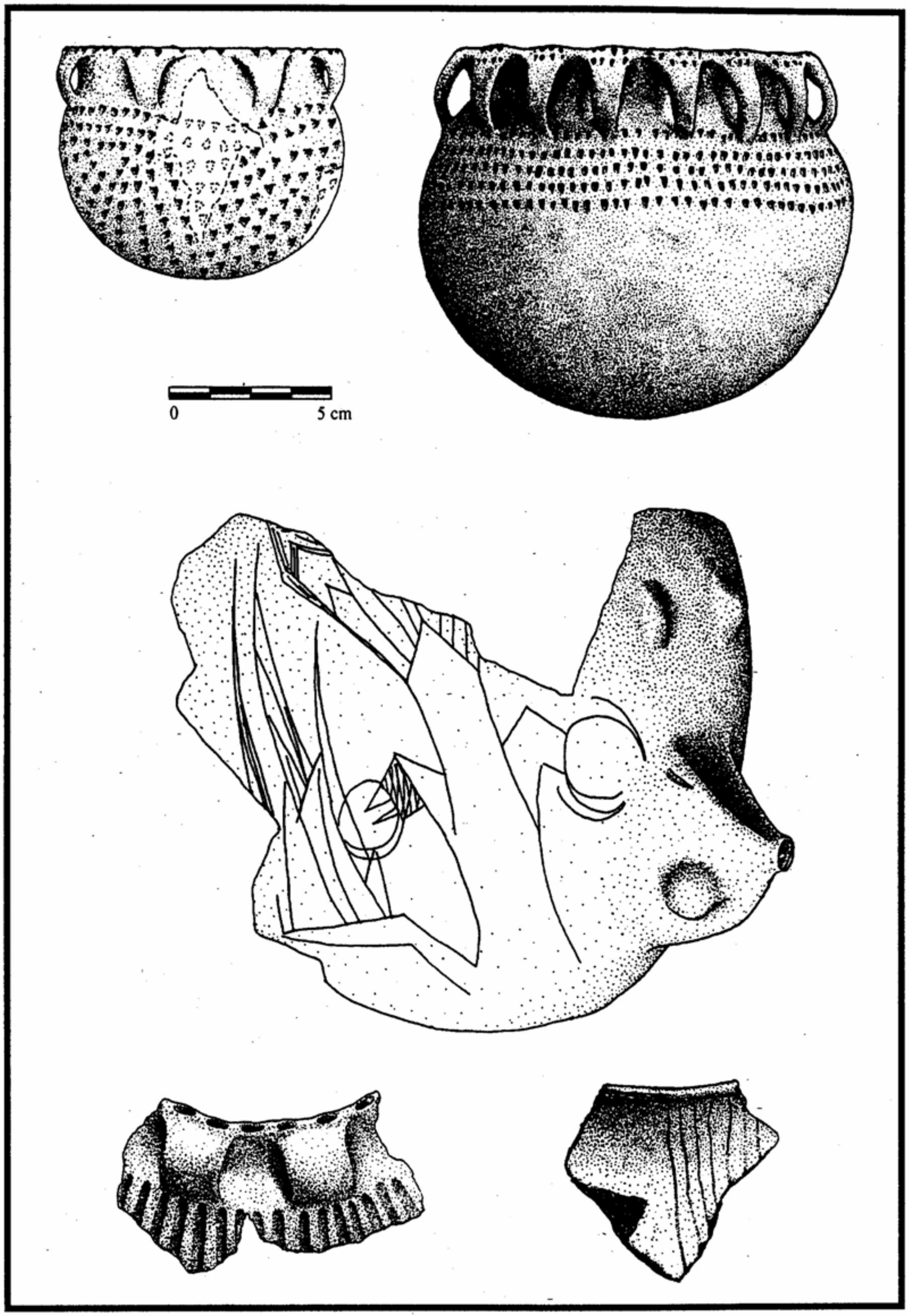


Figure 10. 8. Oneota-like jars.

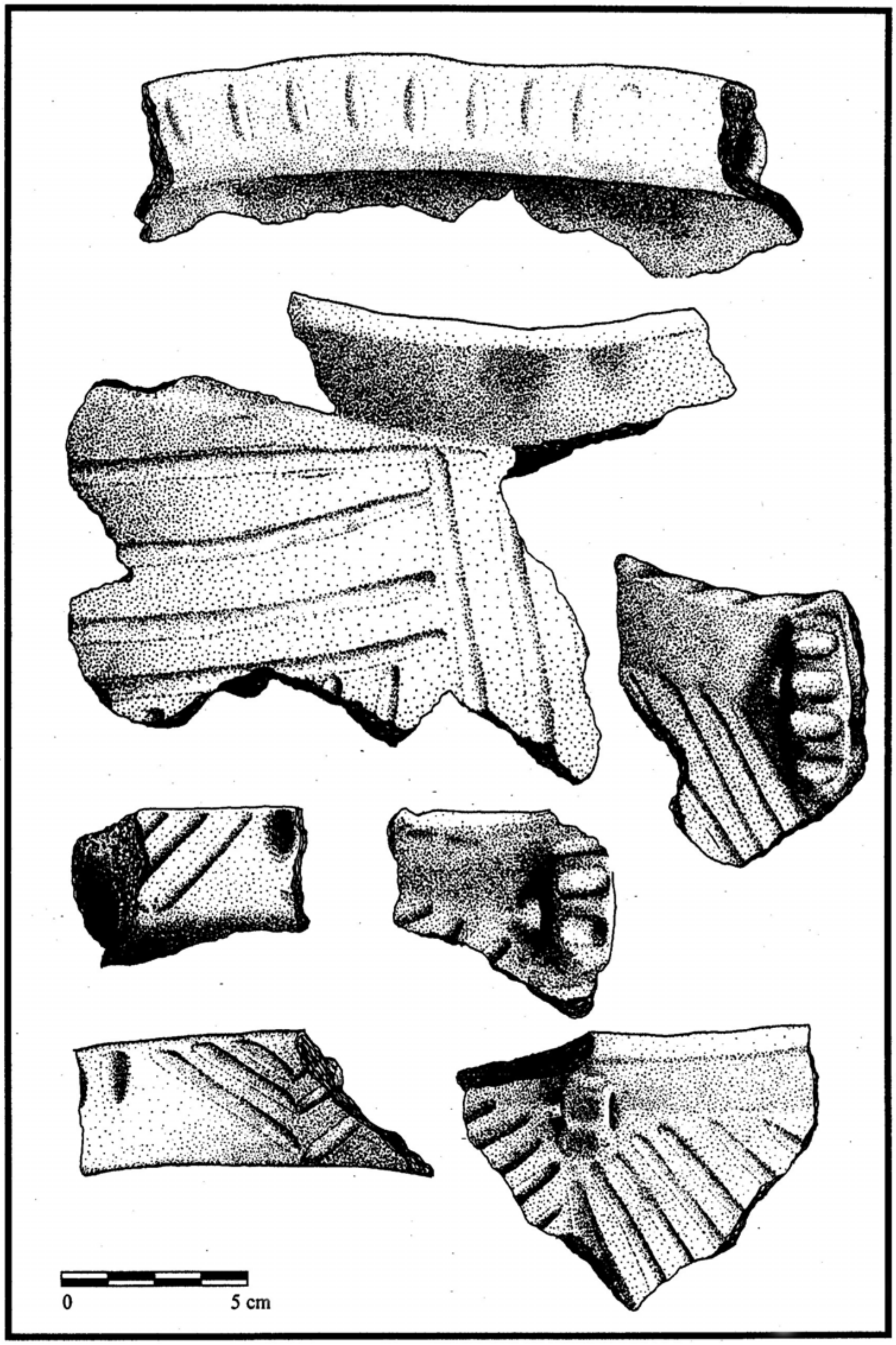


Figure 10. 9. Caborn-Welborn Lugs, Nodes, and Applied Clay Strips.

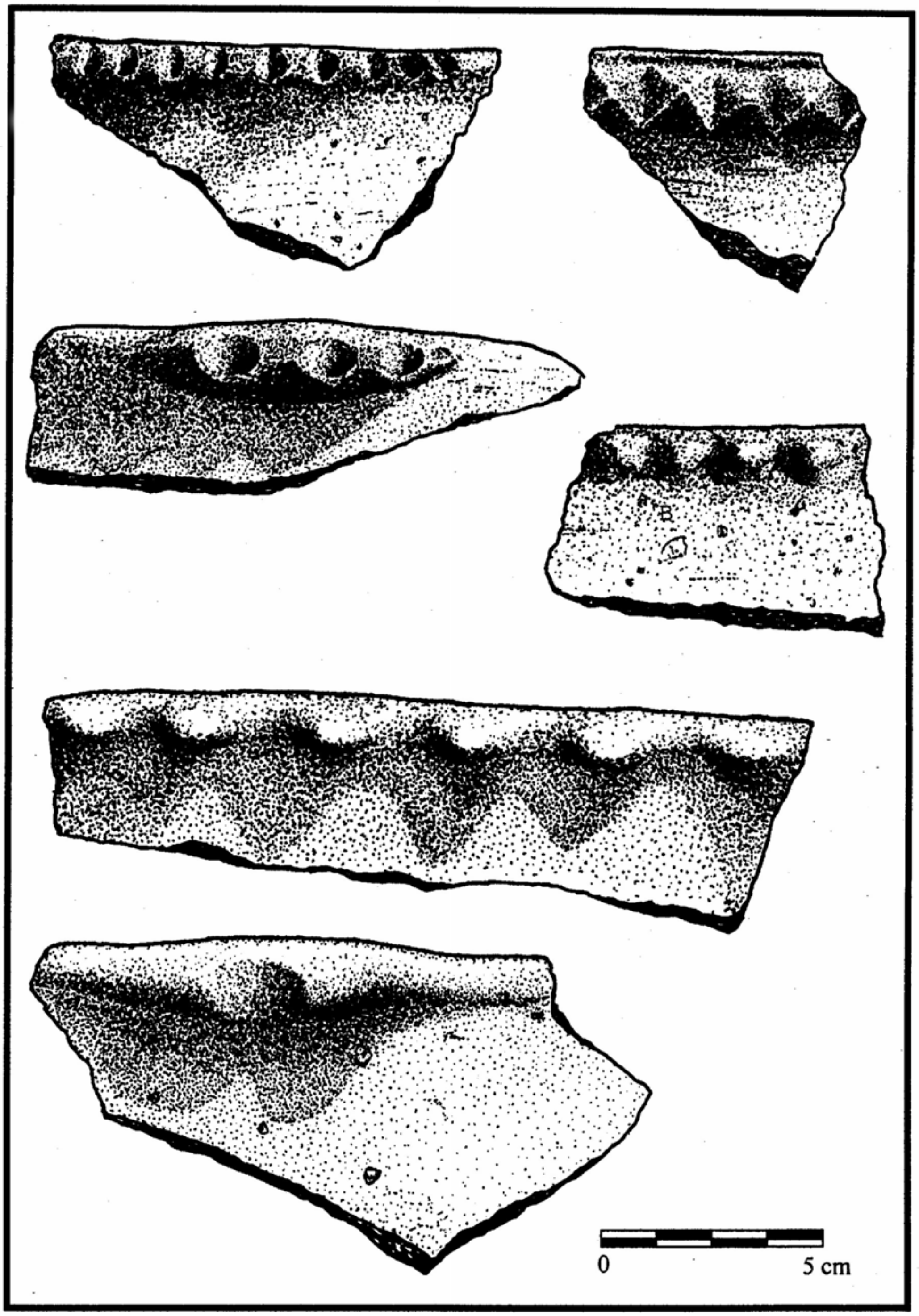
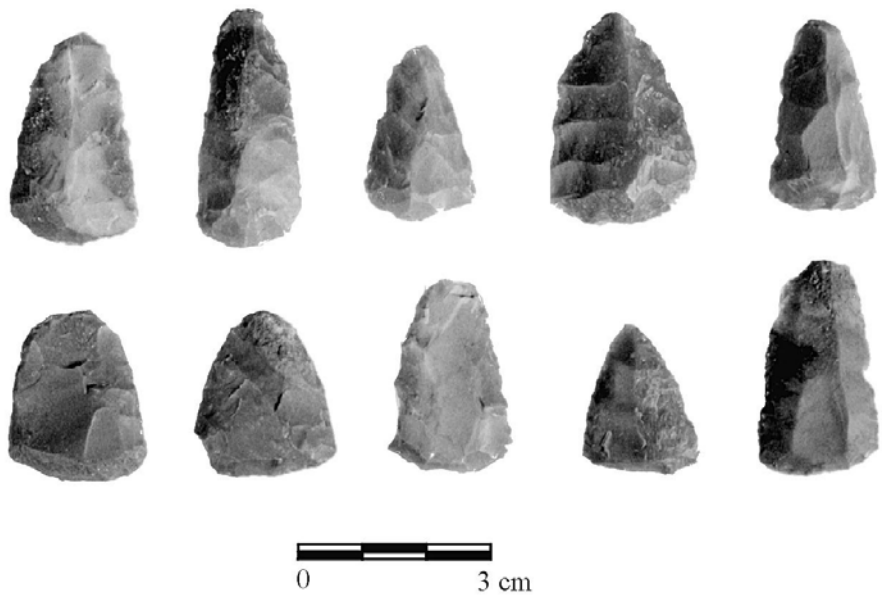


Figure 10. 10. Triangular endscrapers.



AFTERWORD

James R. Jones III

The question of what cultural groups arose or continued out of the late prehistoric occupations in Indiana naturally arises from a volume of this sort. Dr. Mark Schurr, in Chapter 1 discusses some of the problems relating to connecting late prehistoric groups with those in protohistoric or early historic times. The following briefly follows up on questions of prehistoric-historic connections in Indiana

PROTOHISTORIC CULTURES AND THE PROBLEM OF LATE PREHISTORIC-EARLY HISTORIC CONNECTIONS IN INDIANA

Historical Occupations

The major groups of Native Americans in Indiana from the late 1600s to the early to mid-19th century include Miamis, Weas, Piankashaws, Potawatomis, Kickapoos, Mascoutens, Delawares, and Shawnees. To a lesser extent, brief Winnebago and Wyandot occupations are also documented.

Accounts of Native American groups in the historical record in the area that was to become the state of Indiana appear in the late 17th century. Unfortunately, it appears that many groups historically associated with Indiana were apparently displaced during the Iroquois Wars and many groups are documented as returning to the Indiana area in the late 1600s and in the 18th century. Miamis and Weas are mentioned in conjunction with the Wabash River in the 1690s (e.g., Margry 1876-1886[4]:661; Deliette 1934:392-4). In an account from 1679-1681, La Salle noted that the Miamis' former homelands were on the west side of Lake Michigan (Margry 1876-1886[1]:545). The Miamis originally consisted of six groups or bands, four of which were recorded in Indiana: the Crane (which became known as the Miamis), the Weas, Piankashaws, and the Pepikokea—the latter disappearing from documents in the 1640s and probably merging with the Weas (Callender 1978:681; Rowland and Sanders 1932[2]:534; Anonymous 1902:376; Bacqueville de la Potherie 1911-1912[2]:621). Generally speaking, the Miamis ocupied the upper Wabash drainage, the Weas the central portion, and the Piankashaws the lower portion (see, e.g. Tanner 1987: various maps).

In the 1600s, Potawatomis are recorded along the St. Joseph River (Clifton 1978:726), which drains out of the southeastern end of Lake Michigan and along the southern border of Indiana and Michigan. Tanner records two Potawatomi villages along what was to become the Indiana-Michigan border in the late 1600s (1987:32). Most Potawatomi settlements documented in Indiana occur in the latter third of the 18th century and into the 19th century (Tanner 1987:59, 80, 88, 98-99,106-7,133, 140,152,164-5). Potawatomi settlements are restricted generally to the Indiana-Michigan border area, later south to the Kankakee River, and later to the north side of the Wabash River (see, e.g., Tanner 1987: various maps).

The Kickapoos and Mascoutens are closely related during their documented history in Indiana. These two groups appear to be associated with the extension of prairie lands into northwestern Indiana, south of the Kankakee River and to the Iroquois and Vermilion rivers and along portions of the Wabash River east to the Tippecanoe River (Tanner 1987:58). The Mascoutens may have extended farther into northern and northwestern Indiana in the late 17th and early 18th centuries, but were reduced in territory in 1735-1765 (Goddard 1978:669) to an area in Indiana similar the the Kickapoos.

The Delawares moved into the White River drainage in Central Indiana during the Revolutionary War period (Goddard 1978:222-3). Although many Delaware settlements were still present in Indiana in 1810, most were gone in the next two decades (Tanner 1987:9809,106-7,154).

Like the Delawares, Shawnees predominantly entered Indiana during the Revolutionary War times (Callender 1978:622), with the exception of two settlements to ca. 1670 in extreme southeastern Indiana, near the border of Indiana and Ohio, in the vicinity of the mouth of the Great Miami River (Tanner 1987:332-3). Shawnee settlements were in southeastern and southern Indiana along drainages emptying into the Ohio River, and again had predominantly passed through the state by the early decades of the 19th century (Tanner 1987:98-9,106-7).

Late Prehistoric and Protohistoric Occupations

General descriptions of Indiana prehistory, including late prehistoric phases and cultures are found in, for example, Kellar (1993) and Jones and Johnson (1999). In Indiana, two professionally investigated phases which may be termed “transitional” or “emerging” Mississippian manifest some Late Woodland and Mississippian characteristics: the Yankeetown and Oliver phases (see McCullough 1991; McCullough and Wright 1996, 1997); Redmond and McCullough 1993; Redmond 1986). Yankeetown occurs in extreme southwestern Indiana, identified, among other things, by the presence of primarily grog-tempered “distinctive incised, bar stamped, filleted, plain and cordmarked sherds” (Redmond 1986:5). The Oliver Phase (with calibrated intercept dates ranging from A.D. 1260-1470; see McCullough and Wright 1997:Appendix 3:8) consists of nucleated villages found in central and south-central Indiana, with some pottery displaying Fort Ancient characteristics and other sherds resembling Springwells-like decoration (McCullough 1991; McCullough and Wright 1996, 1997; Redmond and McCullough 1993). Research has not demonstrated a link with these and later prehistoric or protohistoric cultures. In northeastern Indiana late prehistoric sequences are not well known, although there is the possibility of Springwells influence or occupations (McCullough 1991).

Mississippian occupations in the state include Upper and Middle Mississippian. Middle Mississippian manifests traits sometimes generally described as “classic” Mississipian, while the representations of Upper Mississippian are described as less elaborate. Middle Mississippian occupations in Indiana include the Angel, Vincennes, and Caborn-Welborn phases. Upper Mississippian phenomena include Fisher and Huber, and Fort Ancient.

The Angel Phase (ca. A.D. 1050-1400) is restricted to southwestern Indiana, and is characterized by a flat-topped mound complex with plaza and palisades surrounded by villages and hamlets (see Black 1967). The Caborn-Welborn Phase (ca. A.D. 1400-1700) is also restricted to southwestern Indiana and nearby portions of adjacent states, and is distinguished by a dispersed pattern of hamlets and smaller villages (Munson 1995, 1997). Some copper and trade beads have been found at Caborn-Welborn sites, evidencing some indirect historic contact, although there are no historic records or archaeological evidence linking the phase with any historical groups (Munson 1995, 1997). The Vincennes culture (Winters 1967), in the Wabash Valley in southwestern Indiana and adjacent Illinois, is a Middle Mississipian expression in the state which is not yet fully understood. Dates for this manifestation may range from ca. A.D. 1085 +/- 85 to A.D. 1430 +/- 70 (McCullough and Wright 1997:10; Barth 1982:65 cited in McCullough and Wright 1997:10).

The Prather complex is a poorly understood Mississippian phenomenon, possibly with characteristics of both Angel and Fort Ancient influences, documented roughly between the Fort Ancient and Angel Phase occupations on the Ohio River (Janzen n.d.).

Upper Mississippian expressions in Indiana are described as:

> generally found in the northern, central, and southeastern parts of the state and demonstrate less "classic" characteristics of Mississippian clutures. Upper Mississippian cultural groups in Indiana include Fisher and Huber in northwestern Indiana, and Fort Ancient in southeastern Indiana. Fisher and Huber groups exploited wetlands and marsh edges in prairie environments, hunted bison, were hunters-gatherers, and lived in nucleated villages (Faulkner 1972).

In the southeast portion of the state, Fort Ancient occupations occurred. The classic work by James B. Griffin on Fort Ancient describes Fort Ancient peoples as living in nucleated villages circular in shape, surrounded by wooden post stockade walls, along major drainages, with large expanses of cultivable floodplain [Jones and Johnson 1999:18].

Huber is part of the Oneota tradition (e.g., Faulkner 1972; Fowler and Hall 1978:566; Brown and Asch 1990; Jeske 1998).

Prehistoric Antecedents

As noted above, the Caborn-Welborn Phase can be described as a protohistoric occupation with the presence of some trade items. Unfortunately, as mentioned previously, no know historical group or groups documented have been shown to be associated with them.

Other phases or complexes in Indiana proffered as protohistoric and ancestral to historical groups include Huber, in northwestern Indiana, and Fort Ancient, in the southeastern corner of the state.

Sites in northwestern Indiana yielding Huber Phase ceramics include the Griesmer and Fifield sites (Faulkner 1972), sites in the vicinity of the Granville Focus area (Faulkner 1972:164), and possibly the Davidson site (Jeske 1998). A feature containing only Huber sherds from the Griesmer site yielded a radiocarbon date of A.D. 1520 +/- 130 (Faulkner 1972:53). The

Davidson site, which Jeske describes as a "Huber/Berrien Phase Upper Mississippian Site" (see below) yielded a radiocarbon date of 360 +/- 70 B.P. (1998:121,130).

There have been suggestions of Huber occupations as antecedent to Miamis. For example, Faulkner stated:

> Considering both the archaeological and ethnohistorical evidence, it appears that the Huber complex is most likely the archaeological remains of one of the Miami bands. The next most logical correlation would be with an Iliniwek group. Unfortunately, a positive identification with one of these two ethnic groups rests on important data that have not been collected and/or published [Faulkner 1972; 178].

After additional comparison of subsistence and settlement patterns from historical records of the area and the archaeological records of Fisher and Huber sites he investigated, Faulkner (1972:178-180) concluded:

> Present archaeological and ethnohistorical data suggest that both Fisher and Huber are the archaeological expressions of Central Algonkian tribes who inhabited the upper Illinois Valley from A.D. 1200-1700, most likely the Miami or Iliniwek [1972:181].

Brown (1990:155-159) evaluates evidence for Huber-Miami connections, and finds the evidence incomplete or questionable. Berrian has been also suggested as ancestral to the Wea (see Stothers and Schneider, this volume), although this appears tenuous.

Cremin dates the Berrien Phase to A.D. 1400-1600 and calls the phase "a local manifestation of the geographically Oneota tradition" (1996:383). He adds that new dates "and a piece of European trade brass obtained from pit features . . . argue strongly for extension of this phase well into the seventeenth century" (1996:383). The ceramic vessels from Huber and Berrien are described as "nearly identical in shape, surface treatment, and decoration," but that there are differences (1996:385-387). Cremin places the southernmost site related to Berrien in Starke County, Indiana, at the Brems site (1996:384,387). He notes a Miami-Mascouten-Wea site near the St. Joseph and Kankakee portage in 1679 and other Miami villages in southwestern Michigan from the 1690s to 1749 (1996:395-396). His statement regarding the Berrien Phase is worth quoting at length, arguing:

> For the Berrien Phase being fully contemporaneous witht the Huber Phase (ca. 1425-1625). If this is indeed the case, it is most doubtful that both can be associated with the Miami, given their respective geographical distributions and differences I their ceramic assemblages. If the Miami are indeed associated with Huber, we must look elsewhere to establish the ethnic identity of the Berrien Phase people. I propose that we look no further than the Potawatomi [1996:408].

The protohistoric Madisonville Focus of Fort Ancient, which has yielded trade goods at some sites, is present "in the lower Miami drainages, southeastern Indiana, and adjacent northern

Kentucky" (Drooker 1996:154,360-370). Drooker has provided a recent summary of proposed ethnic affiliations for Fort Ancient (1996:175-178). Although she notes that Central Algonquian Shawnees have most often been suggested as affiliated with Fort Ancient, she writes that "no evidence has been advanced that conclusively ties the Fort Ancient archeological culture area to a known historical group or groups" (1996:175).

Cheryl Ann Munson, David Pollack, and A. Gwynn Henderson have contributed substantial data on Caborn-Welborn occupations in Indiana. Dating from ca. A.D. 1400 to 1650 or later, they occupied extreme southwestern Indiana and adjacent areas of Kentucky and Illinois (Munson 2000; Munson and Pollack, this volume). European-made objects, such as tinkling cones, gunflints, glass beads, and "other European metal objects" are found, leading the researchers to characterize the phase as protohistoric (Munson 2000). Pollack et al. (1996:24) state: "the Caborn-Welborn people never traded directly with Europeans. Metal objects of European origin reached their homeland through trade with groups living close to French or English outposts." Currently there is no known evidence relating Caborn-Welborn with any historically known tribes.

Regarding the problem of relating prehistoric to historic Native American cultures in Indiana, Kellar has stated:

> To relate prehistory to history requires that American Indian ethnic groups be identified through unique house styles, pottery, tools, or other material objects accessible to archaeologists. However, in Indiana, no such body of data exists, or is likely to be recovered, since the historically documented groups were late migrants into the region. And by the time they had entered the state the native material culture had been all but replaced by items of European manufacture. The archaeologist/historian is faced with an impossible task in the quest for ethnic identifications in Indiana [Kellar 1993:61-62].

Although the identification of protohistoric sites in Indiana with historically recorded groups is, to say the least, challenging, ethnic identifications of sites in Indiana are not impossible. There has been much recent research into Miami, Wea, Caborn-Welborn, Delaware, and Potawatomi sites, to name only some. Although there is little evidence of the smoking gun to which Mark Schurr refers, "artifact signatures" or "ethnic signatures" determined from frequencies (reflecting cultural choices) of material culture at sites in Indiana, whether prehistoric, protohistoric, or items of predominantly European or American manufacture should be evident. It appears, for example, that sites of predominantly Native American, mixed European/Native American, or predominantly Euroamerican background can be determined through archaeological and ethnohistorical research and analysis (e.g., Jones 1985, 1987, 1989, 1992). Patterns and frequencies of artifacts, floral and faunal remains, features, site structure, etc. should be determinable from archaeological investigations. Currently there are two projects to locate historical Native American sites in the state: Mark Schurr, conducting investigations of Potawatomi sites in northern Indiana and Ball State University searching for Delaware sites. Other recent studies have investigated a Miami village site (Mann 1996), and a métis site (Schurr 1997).

Relating protohistoric sites to historically recorded groups in Indiana has not been accomplished, but if artifacts of European manufacture are recorded in Ohio Fort Ancient sites, why not in Fort Ancient sites in Indiana? Given that Berrien Phase, Huber Phase, and Western Basin Tradition studies have moved, or are moving towards toward ethnic identifications with historical tribes, similar sites in Indiana may someday yield evidence of ethnic affiliation.

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