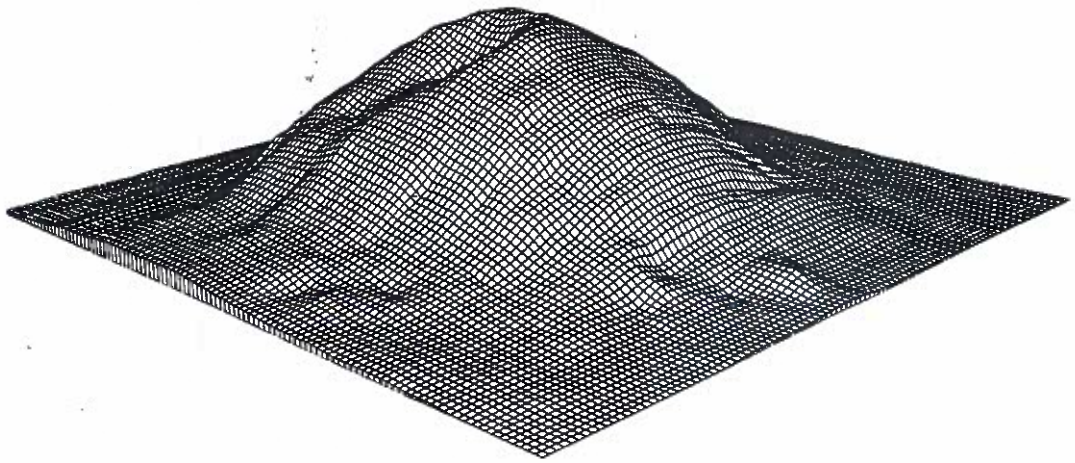
CURRENT ARCHAEOLOGICAL RESEARCH IN KENTUCKY:

VOLUME ONE



Edited By David Pollack

Kentucky Heritage Council

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VOLUME ONE

Edited

By

David Pollack

- 1987 -

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Kentucky Heritage Council

PREFACE

The Fourth Annual Kentucky Heritage Council Archaeology Conference was held at Murray State University, Murray, Kentucky on February 28 to March 1, 1987. The conference, which was cosponsored with Murray State University, was a great success and 20 papers were presented on a wide range of subjects. Of the formal presentations, 12 papers were selected for publication in this volume. Unlike past conferences, which focused on a particular cultural period (i.e., Archaic and Paleoindian, Woodland, and Late Prehistoric), this conference was open to papers dealing with any aspect of Kentucky prehistory.

During the conference, the Kentucky Archaeological Registry was initiated, with Wickliffe Mounds being the first site registered. As part of a brief ceremony, a plaque and certificate were awarded to Murray State University, the owner of this important archaeological resource. Since the conference, over 15 archaeological sites have been added to the Registry. The Registry program seeks to actively involve property owners in the long-term preservation and management of significant archaeological sites on their land. The program also educates the owners of archaeological sites about stronger preservation options that are available to them, such as easements, management leases, and fee simple donation of the property to a preservation organization or the state.

Figure 1 illustrates the locations of sites discussed in this volume. As with the previous conference volumes, much of the research reported herein was supported by a state grant or a federal survey and planning grant awarded by the Kentucky Heritage Council. Projects supported by the Heritage Council include Charles B. Stout's research at the Adams Site, Paul P. Kreisa's work in the Big Bottoms of Fulton County, Richard W. Jefferies' research at the Wright Mound Site, George R. Milner and Richard W. Jefferies' reevaluation of the Robbins Mound, Heidi Fassler's investigation of the Guilfoil Site, and A. Gwynn Henderson and Christopher A. Turnbow's work at Fort Ancient sites in northeastern Kentucky.

Federal undertakings requiring data recovery programs have generated important information on prehistoric adaptations in Kentucky. Research papers included in this volume that resulted from such studies include Steven R. Ahler's paper on the Hansen Site, and William E. Sharp and Christopher A. Turnbow's investigation of the Muir Site.

The remaining four papers resulted from ongoing research of individuals and institutions. These include Lynne Mackin Wolforth's paper on Jonathan Creek, Jack Rossen and Richard B. Edging's discussion of Late Prehistoric subsistence patterns, Pamela A. Schenian's analysis of the Crick Site cache, and David Pollack, Mary Lucas Powell, and Audry Atkin's paper on the mortuary patterns identified at the Larkin Site.

A. Gwynn Henderson reviewed and commented on each of the papers included in this volume and her assistance is greatly appreciated.

David L. Morgan, Director
Kentucky Heritage Council

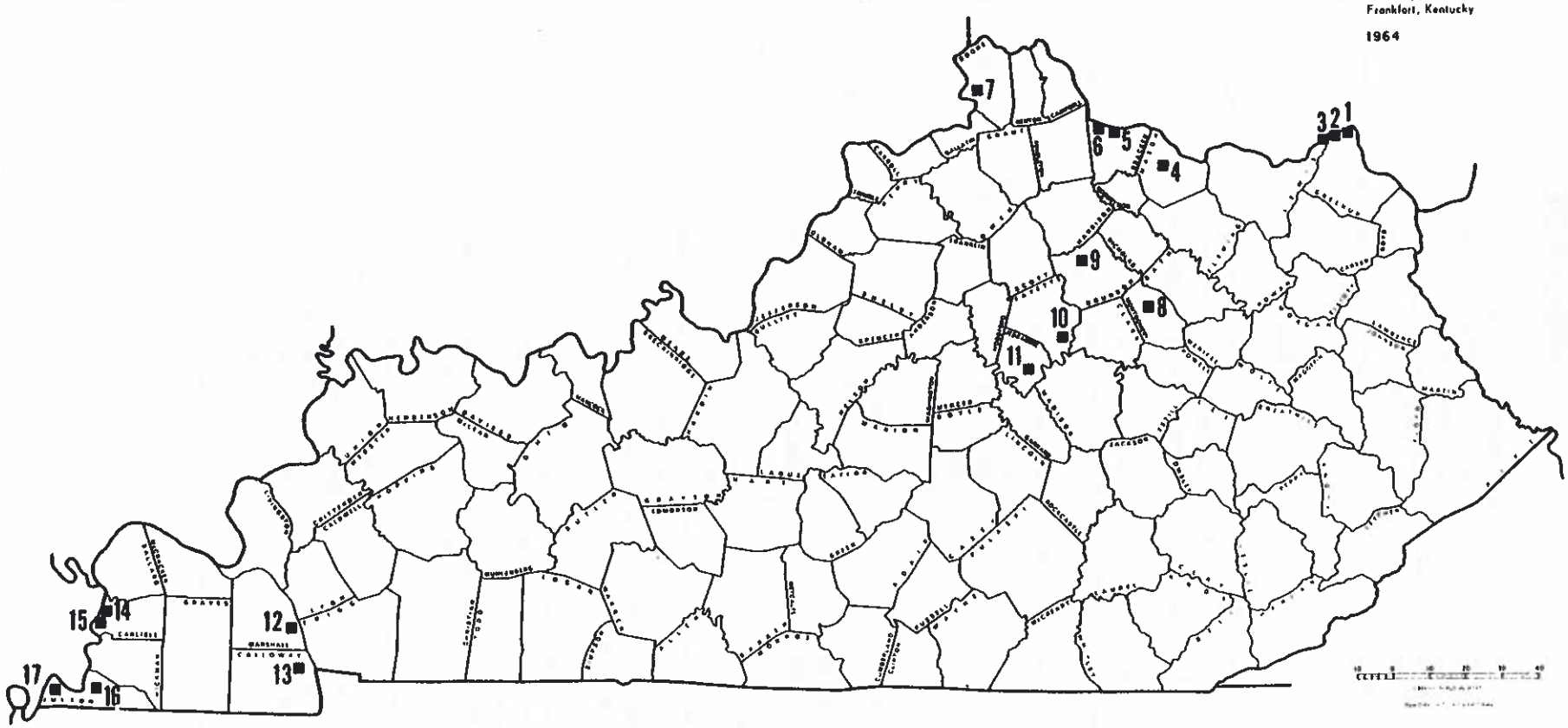

Figure 1. Sites discussed in text: 1, Hansen; 2, Thompson; 3, Laughlin; 4, Fox Farm; 5, Augusta; 6, Snag Creek; 7, Robbins Mound; 8, Greene Mound; 9, Larkin; 10, Guilfoil; 11, Muir; 12, Jonathan Creek; 13, Crick; 14, Marshall; 15, Turk; 16, Adams; 17, Sassafras Ridge.

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THE CRICK CACHE (SITE 15CW96)

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ABSTRACT

Archeological investigations at the Crick Site (15Cw96) in Calloway County, Kentucky, uncovered a large (minimum n=81) cache of Turkey-tail blades in association with a sparse scatter of chert debitage and fire-cracked rock. In this paper, morphological characteristics of the Crick Site cache are summarized, and the patterns and variations of attributes among the cache blades are outlined. The archeological context of the cache and its location in relation to possible chert sources and to other reported regional Turkey-tail caches are discussed.

INTRODUCTION

In late April, 1984, David Crick came to the Murray State University Archaeology Laboratory with a bushel basket containing 44 Turkey-tail blades and blade fragments. During plowing of the potato field that morning, the plow had cut slightly deeper than in previous years, and brought up the blades. All of the blades were found in an approximately one meter square area. Mr. Crick, realizing that this was not a common occurrence, contacted Murray State University. Kenneth Carstens visited the site and took initial measurements and slides of the blades recovered by Mr. Crick. Arrangements were then made with Mr. Crick for Murray State archaeologists and students to conduct field studies on his property to determine if additional blades existed, and to assess the context of the artifacts. Permission was also obtained from Mr. Crick to submit some of the blade fragments for thin-sectioning and microscopic examination to identify, if possible, the source or sources of the raw material used in their manufacture.

This paper summarizes the field methodologies used thus far to investigate the site, and describes the archeological context and the environmental setting of the Crick Site. Metric and morphological characteristics of the cache blades are presented and topics for future study of the Crick Site cache in particular, and of caching behavior and prehistoric long-distance exchange networks in general, are also discussed.

FIELD METHODOLOGIES

Prior to excavation of the area where Mr. Crick recovered the blades, a surface collection was made of an 80 m (east-west) by 8 m (north-south) adjoining area. The dimensions of the surface collected area were determined by field conditions. Since the area to the north of the cache was wooded and the area to the south was in crops, the area collected does not represent the full extent of the site. All materials collected were piece-plotted in reference to arbitrary datums established at the edge of the field.

A surface collection of the site and excavation of four adjoining 1 x 1 m units were carried out primarily by Murray State University undergraduates William Lawrence and Kathy Lyons, under the direction of Kenneth Carstens. Subsequent excavations at the site were conducted by the author, assisted by a number of Murray State students.

In the initial excavation, a 1 x 2 m grid was laid out and a 1 x 1 m unit opened. As it became apparent that portions of the cache remained intact below the plowzone, and that the cache extended beyond the limits of the initial 1 x 1 and demarcated 1 x 2, the excavation block was expanded to a 2 x 2 m unit. Each 1 x 1 m sub-unit was excavated in 10 cm levels. All fill from the excavations was screened through 6.25 mm (1/4 inch) mesh, except for the soil immediately surrounding the cache and a sample of all other unit-level fill which was retained for flotation. To date, processing of the flotation samples has not been completed.

As the cache was exposed, it was pedestalled, with each blade labeled in situ, and three-dimensionally piece-plotted. Following mapping of the cache, each blade was individually bagged and sent to the laboratory (Kenneth Carstens, personal communication 1986).

ENVIRONMENTAL SETTING AND ARCHAEOLOGICAL CONTEXT

The Crick Site is located on what was once a small knoll in the dissected uplands near the Tennessee River. In 1974, a bulldozer was used to remove approximately 30 to 60 cm of soil from the top of this knoll, artificially leveling the area (David Crick, personal communication to Kenneth Carstens). The excavated cache lies at the edge of the cultivated field on this former knoll. The distribution of surface collected materials indicates that the cache is located in the approximate center of the site along its east-west axis, and that the site continues to the north into the woods and to the south into the cultivated field.

Approximately 300 m north of the cache lies a spring, which forms the headwaters of a tributary stream of Jonathan Creek, one of the major tributaries of the Tennessee River. The headwaters of a tributary stream of the Clarks River lies approximately 1 km west of the Crick Site, and the Clarks River itself, another major tributary of the Tennessee, lies less than 3 km to the west. The original channel of the

Tennessee River, now within Kentucky Lake, is approximately 13 km east of the cache.

Adjacent to the spring lies a disturbed meadow. Shovel tests placed in the meadow and adjacent to the spring yielded chert flakes and flecks of charcoal. A habitation area is postulated to exist in this meadow (Kenneth Carstens, personal communication 1986), although further testing of this area will be necessary to determine if it is associated with the cache in any way.

The in situ portions of the Crick Site cache were found immediately below the plowzone. No evidence of a cremation or inhumation was found in association with the cache. A slightly darker stain was identified at the same level as the cache, and was initially thought to be the only extant evidence of a burial (the skeletal remains having decomposed). When the excavation block was re-opened in late fall of 1986 for additional excavation, two small, amorphous, mottled stains were observed at approximately 60 to 70 cm below ground surface, or 20 to 30 cm below the base of the cache. These proved to be root molds, which suggests that the stain observed in association with the cache was not created by an inhumation but rather by a tree.

Chert flakes, fire-cracked rock, natural chert pebbles, and sandstone chunks were found in both surface and subsurface contexts at the site. Chert pebbles and sandstone chunks occur naturally in the soil of this area (Olive 1965). At this time, it has not been determined if the fire-cracked rock is the result of prehistoric activities associated with the cache, or if it is the result of historic forest-clearing activities.

Chert flakes and blocky chert pieces, which can be attributed to prehistoric activities at the site, were recovered from both subsurface and surface contexts. Some of the flakes are of a raw material similar to that of the recovered Turkey-tail blades, while others are definitely not of the same material as the blades. Approximately 16 chert flakes were recovered from the ground surface. An additional 71 flakes or blocky chert pieces exhibiting cultural modification and 25 chert fragments definitely originating from Turkey-tail blades were recovered from subsurface contexts. Some of the 71 flakes or blocky chert pieces may also derive from the blades. It is expected that additional chert flakes and small fragments of blades will be recovered from the flotation samples as they are processed. The chert pebbles, sandstone, and fire-cracked rocks have not been counted as yet, but are estimated to consist of several hundred pieces.

DATING

Although charcoal was recovered in association with the Crick Site cache, a large enough sample for a radiocarbon assay was not found. Few Turkey-tail blade caches have been firmly dated. Available radiocarbon dates from sites other than Crick and associated diagnostics at other sites indicate a temporal range of approximately 1500 to 500 B.C., however. The Turkey-tail caching phenomenon in the Ohio Valley and Upper Great Lakes Region is variously assigned to the Late Archaic (Binford 1963a), Early Woodland (Myers 1981), or transitional Late Archaic-Early Woodland (Bell 1960:90-91; Cambron and Hulse 1964:121; Scully 1951:11) cultural periods.

CACHE METRICS

A minimum of 81 blades are represented in the Crick Site cache. These include 47 complete blades, 14 essentially complete blades re-fit from two or more pieces, 14 blades which have been re-fit from two or more pieces, but from which pieces of a size likely to be recovered by excavation or screening are still missing, and six additional partial blades which do not match any other fragments at this time. Small fragments are missing from some of the "complete" and "essentially complete" blades, but the missing pieces are sufficiently small that it is unlikely that they would have been observed during excavation or recovered during screening using a 6.25 mm (1/4 inch) mesh.

The following measurements were taken, where possible, on each of the complete blades, re-fit blades, and partial blades:

1) Lengths:
   a) Maximum blade length
   b) Tang length
   c) Minimum haft length
   d) Maximum haft length
2) Widths:
   a) Maximum blade width
   b) Barb-to-barb width
   c) Minimum haft width
   d) Maximum tang width
3) Thicknesses:
   a) One centimeter below the tip
   b) At the point of maximum blade width
   c) Maximum tang thickness
   d) Thickness of the barb-to-barb axis
   e) Maximum thickness of the blade (floating location)

Using the SPSSx Frequency and Condescriptive programs (Nie et al. 1975; Norusis 1983), summary statistics were obtained for the ranges and distributions of each of the measurements listed above, and bar graphs and histograms were generated. The number of valid cases per measurement category ranged from 74 to 79 out of a possible 81 cases.

Blade length (n=74) varies from 82 to 169 mm. The mean length of the blades is 119 mm with a standard deviation of 18 mm. Sixty-eight of the blades for which complete length could be measured fall within the range of 97 to 146 mm, with a nearly continuous distribution between these extremes. Maximum tang length (n=78) has a range of 19 to 39 mm with a mean of 26 mm and a standard deviation of 3 mm.

The maximum width (n=75) of the blades varies from 20 to 48 mm with a mean of 40 mm and a standard deviation of 5 mm. Similarly, the width at the barb axis ranges from 18 to 42 mm, with a mean width of 35 mm and a standard deviation of 4 mm.

All of the thickness measurements have ranges of 7 mm or less, and the remaining length and width measurements have ranges of 12 mm or less, with small standard deviations around the means.

The statistics given above differ only slightly from the figures presented in an earlier paper (Schenian 1986) that were based on only 46 of the complete blades. The ranges of some of the variable measurements have increased slightly, but the means and standard deviations generally remained the same. The largest shift was in mean blade length, which was 115 mm based on 46 blades, but 119 mm based on 74 blades.

Although groups of very similar blades, which could be interpreted as the work of a single knapper or community can be visually identified within the cache, these groups could not be verified statistically. All of the blade length, width, and thickness frequency distributions exhibit either an approximation of the normal curve or extremely tight clustering. In addition, plots made of maximum length versus maximum width and of maximum length versus maximum tang length (the variables with the greatest ranges) indicate a slight tendency towards a maintenance of proportionality. In other words, longer blades tend to have greater maximum width and longer tangs, but there is a great deal of variation in the ratio of maximum length to maximum width.

BLADE GEOMETRY

Didier (1967:9,28), citing Binford (1963b, n.d.), defines three Turkey-tail types (Hebron, Harrison, and Fulton). The Hebron type has no defined varieties; the Harrison, two; and the Fulton, eight. One of the Fulton varieties, the Jackson, was not illustrated in Didier (1967:28). It has been suggested by Didier (1967:17) that the six known examples of this variety, all surface finds, may be fakes.

Outlines of Didier's (1967:8) types and varieties are presented in Figure 1. The connecting lines indicate associations within caches as reported in Didier (1967:19-20), that will be discussed in further detail below.

Many of the Crick Site cache blades conform to the Harrison, var. Marshall, and Fulton, var. Ross, types, but the cache also contains blades which do not conform to any of the established categories. For

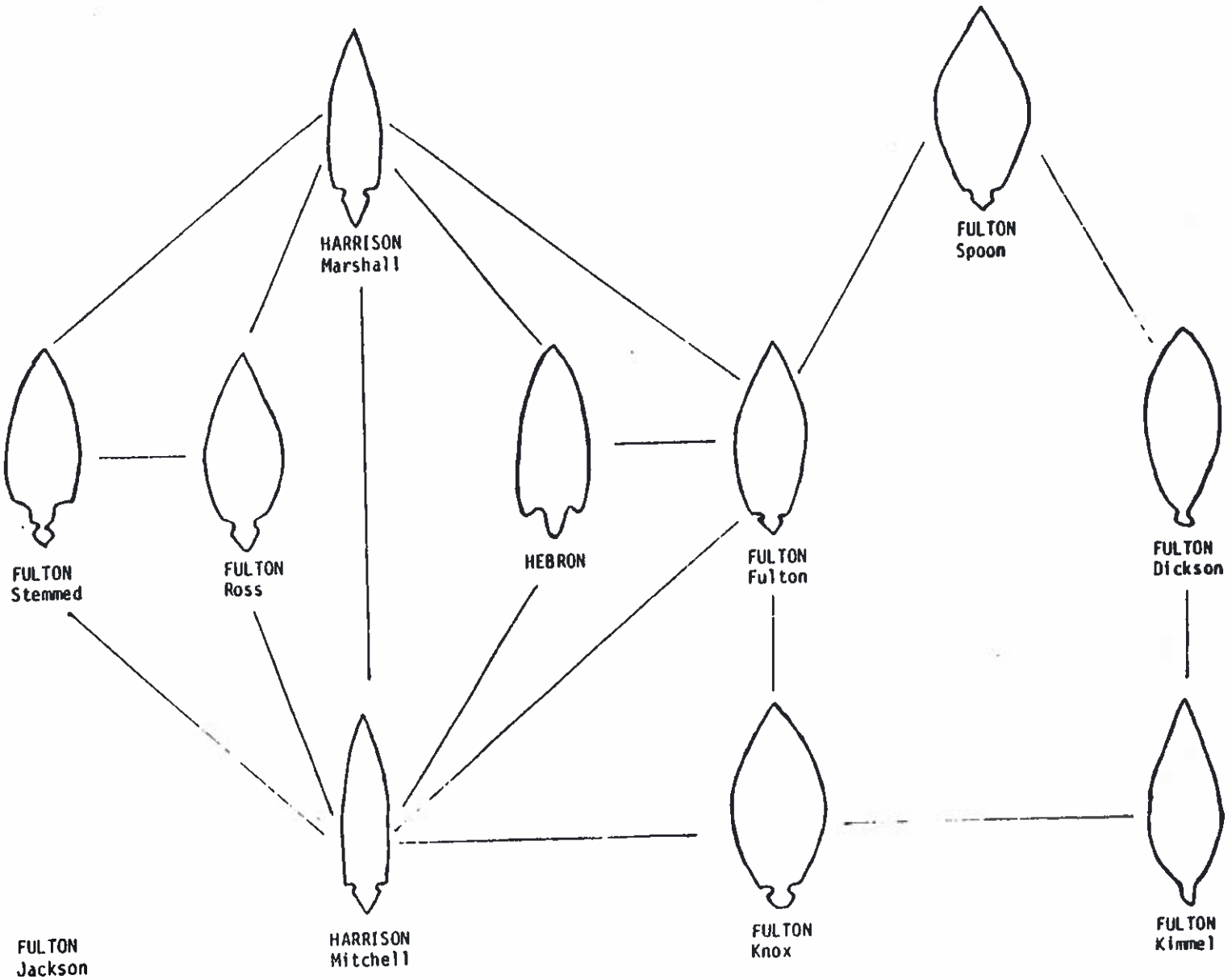

Figure 1. Turkey-tail blade types and variants, traced (and reduced) from Didier (1967:28), with connecting lines indicating associations of type/variants within caches, based on Didier (1967:19-20).

example, there are two blades from the site that are distinctly shorter and proportionally thicker than the other Crick Site blades and that have atypical tang forms. Three other blades or blade fragments were reworked prior to inclusion in the cache. There are also a number of blades in the cache which show less concern with aesthetics than is commonly ascribed to Turkey-tail cache blades (Didier 1967:3), with large areas of cortex remaining on one or both blade faces or with exaggerated concavo-convex longitudinal cross-sections (Binford 1963b:202-203).

RAW MATERIAL

Generally Turkey-tail blades have been assumed to have been manufactured from Wyandotte chert (also known as Harrison County chert or flint, or as Indiana Hornstone) on the basis of gross macroscopic morphology. Wyandotte chert is found in the Upper Ste. Genevieve limestone formation (Myers 1981:25) in Harrison and Crawford counties in Indiana, and Hardin, Meade, and Breckinridge counties in Kentucky (Tankersley 1985:252). The assumption that Wyandotte chert was the primary raw material used in the manufacture of Turkey-tail cache blades found throughout the Midwest has led some researchers to hypothesize that either the raw material, preforms, or finished Turkey-tail blades were being traded out of this limited source area in some form of long-distance trade network (Didier 1967:4; Myers 1981:25,45). Based on diagnostic mineralogical studies of Wyandotte chert, however, Tankersley (1985:253) has stated, "In the case of Wyandotte chert, macroscopic examination is inadequate, because of the chert's similarity in color and texture to other cherts (especially Mississippian cherts from the Ste. Genevieve and St. Louis limestone formations)."

To determine if the cache blades from Crick were indeed manufactured of Wyandotte chert, one of the Turkey-tail fragments from the Crick Cache was submitted for thin sectioning and microscopic examination to Ken Tankersley at the Glenn Black Laboratory at Indiana University. Tankersley concluded that the Crick cache blades

> are not manufactured from Wyandotte chert ... but from an Upper St. Louis chert source area much closer to the site. One area where this chert occurs in abundance is near Burna in Livingston County, Kentucky...This chert is an excellent Wyandotte look-alike, but it is St. Louis and not Ste. Genevieve as in the case of Wyandotte (Tankersley 1986).

REGIONAL CONTEXT

Didier (1967:59,70) reported 13 locations of Turkey-tail blades in Kentucky. According to Didier (1967:59), four of the 13 Turkey-tail find locations occur in counties bordering the Ohio River in north-central Kentucky (Breckinridge, Meade, and Jefferson counties), three occur in counties adjacent to the Green River (Butler, Hart, and McLean), three are located in counties bordering the Tennessee and/or Cumberland Rivers (Marshall and Trigg), and three occur in other western Kentucky counties (Christian and Graves). Only two of the 13 sites were reported to be caches (one in Marshall County and one in Christian County) (Didier 1967:51); the remainder represented surface finds. Only two of the 13 sites had been reported in published sources prior to Didier's study (Brown 1930:101; Journal of the Illinois Archaeological Society 1949:17); the rest were reported to Didier as personal communications, primarily from collectors. None of the sites appear to have been recorded with the Office of State Archeology at the University of Kentucky, however, and little specific information is known about them.

In addition to the sites discussed by Didier, several other caches of Turkey-tail blades have been reported in Kentucky. King (1939:120,125) reported the discovery of a cache of 31 Turkey-tail blades in Marshall County. This site was also never professionally investigated, and little additional information is available about it.

Two possible Turkey-tail caches have been recorded as a result of cultural resource management projects in Kentucky in the past two decades. Mocas (1977:169) reported the discovery of a group of six Turkey-tail blades and a possible isolated Turkey-tail fragment in the plowzone at the Lawrence Site (15Tr33) in Trigg County. Although found in the plowzone, the proximity of the six blades led researchers to hypothesize that they represented a disturbed cache (Philip DiBlasi, personal communication 1987). The other possible cache consists of five Turkey-tail blades from the Gardner Site (15Ml90). As with the Crick Site cache, the blades from the Gardner Site were discovered by the landowner (Mr. Gardner) (Carstens et al. 1979:29-30). The Gardner Site is situated approximately 11 km northeast of the Crick Site in Marshall County, Kentucky.

In summary, six caches, or possible caches, of Turkey-tail blades have been reported in Kentucky. All six are located in extreme western Kentucky, in the general vicinity of the Tennessee and Cumberland rivers and their tributaries. Eleven surface finds of Turkey-tail blades in western Kentucky were also reported in Didier (1967:59), and it is likely that additional Turkey-tail blades have been discovered as isolates since Didier's study. In general, the Turkey-tail blades and caches appear to be concentrated near major riverine systems in western Kentucky.

ISSUES FOR FUTURE CONSIDERATION

Didier (1967:17-18,56) included Kentucky in her Southern Indiana Region, which she defined as the source area of "hornstone". In addition to the Kentucky sites, Didier included a large number of Turkey-tail blade finds in Illinois, Indiana, Missouri, Wisconsin, Michigan, Ohio, and New York in her study. Although Didier (1967:5) mentions that Turkey-tail blades have also been discovered in Tennessee and in Ontario, Canada, no data from these sites were included in her study. King (1939:125) reported on a cache discovered near Camden, Benton County, Tennessee, and since the time of Didier's study, Turkey-tail blades have also been discovered in cache contexts in Mississippi (Brookes 1986). Geological and mineralogical studies have greatly reduced the source area of Wyandotte chert and identified alternate raw material sources from which some Turkey-tail blades were manufactured, both within and outside Didier's Southern Indiana Region. Thus, a redefinition of the distribution of Turkey-tail blades and potential raw material sources is needed, but is beyond the scope of the current paper.

DIDIER'S TYPE-VARIETIES

The presence of atypical blades and blade fragments in the Crick Site cache, and the normal distributions of the metric data, raise questions about the reality of Didier's types. Are these types and variants a result of conscious style variation, in which knappers set out to make a specific type-variant style of Turkey-tail, in which case the associations between types and variants within a cache may reflect geographical connections between knappers and/or traders, as was suggested by Didier (1967), or are the type-variant categories a reflection of idiosyncratic manufacturing styles of individual knappers or of communities of knappers interpreting a single general Turkey-tail type ideal? If the latter alternative is correct a greater range of variation in blade morphology should be able to be documented, similar to that observed in the Crick Site cache. It may also be possible to identify different "sets" or type-variants of blades in small caches, where the continuums of length, width, and thickness measurements and variation in haft and tang morphology seen in the larger Crick Site cache, are lacking.

INTRA-SITE VARIABILITY

Another aspect of caching behavior that needs to be further investigated is intra-site variability in blade forms. Binford (1963a) has suggested for the Pomranky cache, which contained Turkey-tail blades as well as other blade types, that variations between clusters of blades within a cache site may be a result of different groups of people contributing sets of blades to a single cache. Although the Crick Site cache was disturbed by plowing, it may be possible to reconstruct the original cache configuration, through use of the IBM CADCAM program,

which would then allow for the analysis of variation between clusters.

The Turkey-tail blades recovered from cache contexts in Mississippi are always associated with other blade forms, primarily Benton points (Brookes 1986). This association, or lack of association, of Turkey-tail blades with other blade forms also needs to be more fully examined.

RAW MATERIAL SOURCING

Didier (1967:5,10-11,17-18) defined the source area of hornstone or Harrison County chert as her Southern Indiana Region (encompassing southern Illinois, southern Indiana, and western Kentucky), based on the distribution of macroscopically similar cherts. At the time of her study, these were considered to represent a single chert type found throughout that region. Despite the wide distribution of these cherts, researchers (Binford 1963a:190; Myers 1981:13-14) have often emphasized or implied a Harrison County, Indiana, origin for the raw material from which their Turkey-tail cache blades were manufactured.

Harrison County, Indiana, was recently defined as the source of the specific chert type, Wyandotte, which does have a relatively limited area of distribution. Advances in sourcing techniques will make possible more accurate definition of chert types, such as Wyandotte, and of raw material source locations, which will have profound implications for the interpretations of prehistoric exchange patterns.

Since the sample from the Crick Site cache looked like Wyandotte chert on the macroscopic level, but was found to be a more local look-alike on the basis of microscopic examination, the presumed raw material source of earlier reported Turkey-tail caches needs to be re-evaluated. Could these also be manufactured of Wyandotte look-alikes, rather than imported Wyandotte chert? John Nass (personal communication 1986) and William Lovis (1985) have reported the discovery of Michigan Turkey-tail caches in which at least one of the blades is manufactured of a local Michigan chert that macroscopically resembles Wyandotte chert. (They may have been referring to the same site).

The significance of Turkey-tail blades definitely not manufactured of Wyandotte chert, such as the white chert and quartzite blades reported from Wisconsin (Didier 1967:14,31) needs to be reconsidered. If the manufacturing of Turkey-tail cache blades does not necessarily involve the procurement of Wyandotte cherts, either through direct access procurement at the source or through trade with the groups living near the sources of Wyandotte chert in Harrison and Crawford counties in Indiana, and Hardin, Meade, and Breckinridge counties in Kentucky (Tankersley 1985:252), what are alternative explanations for the manufacture, trade, and caching of Turkey-tail blades?

THE ROLE OF TURKEY-TAIL CACHING

Turkey-tail caches have been postulated to be part of the Late Archaic-Early Woodland mortuary complex with or without the presence of inhumations or cremations at a particular cache site (Didier 1967:7), based on the assumption that evidence of the burials was lost through poor preservation or through amateur excavation. Neither the Crick Site cache nor the cache excavated by Lovis (1985) yielded any evidence of being a mortuary site and the cache excavated by Lovis was, in fact, located within a camp site. Thus, alternative hypotheses as to the function of cache sites need to be examined.

The caching of Turkey-tail blades may not have been a mortuary ritual per se, but the expression of a ritual, cementing the alliance of two bands or tribes. Perhaps the caching functioned as a symbolic "burying of the hatchet", which at times coincided with the burial of a band member, and other times did not. Or it may be that cache sites were recognized as "sacred" or at least "restricted" areas, such as the ritual sites of some Australian Aborigine groups (Hamilton 1982:90). The occurrences of inhumations or cremations in these cases would represent individuals who wandered into the area during a restricted ceremony and became grave goods for the cache through their trespass and not vice versa.

Perhaps cache sites had no ceremonial function in their own right, but were storage areas for future trade (Bryan 1950:29; Winters 1984:12). Could it be that Turkey-tails circulated through the Midwest in a kula ring-like system, with no single point of entry (i.e., southern Indiana), but multiple points of entry of look-alike trade goods, with the ritualized trade of ceremonial blades facilitating the trade of other items (copper, subsistence items, women, and so forth) between distant or unrelated groups of people? Thor Conway (1986), in his study of nineteenth and twentieth century trade systems of Canadian Indian groups that operate at a band level of organization, noted that the meeting places for trading partners were at territorial boundaries, readily accessible by major drainages, were named sites, and were used over long periods of time. It has already been noted that Turkey-tail blades tend to be found along major Midwestern riverine systems (Didier 1967). The Kentucky caches seem to be located on or near the ridges dividing drainage system watersheds, (e.g., the Crick Site is located on the ridge dividing the Clarks River and Jonathan Creek drainages, and the Gardner Site is located on the ridge dividing the Jonathan Creek, Ledbetter Creek, and Tennessee River watersheds). A similar distribution pattern has been noted elsewhere in the south for non-Turkey-tail caches (William Radisch, personal communication 1987). The Crick Site cache, and the possible Gardner Site cache, are certainly situated near navigable river systems, and a trading system similar to that described by Conway for the Upper Great Lakes region may have been in operation in this area.

DIACHRONIC CHANGES

It is possible and indeed probable that the nature of the Turkey-tail caching phenomenon changed through time. If possible, more accurate temporal parameters need to be established for the phenomenon and for the sites involved, so that changes in the role of Turkey-tail caching in mortuary behavior and in trade systems may be examined. Walthall (1981:7), for example, has found that the procurement of galena shifted from long-distance trade networks to procurement from local sources in some areas during the Late Archaic through Early Woodland. It may be possible that this also occurred with the procurement of raw material for the manufacture of Turkey-tail blades.

The discovery of Turkey-tail blades in association with Middle Archaic Benton points in caches in Mississippi (Brookes 1986) also emphasizes the need for caution in assuming a Late Archaic or Early Woodland origin for Turkey-tail blades. The relationships, if any, between the Mid-South Middle Archaic caching phenomenon and the Ohio Valley-Great Lakes Late Archaic-Early Woodland caching phenomenon need to be explored.

CONCLUSION

In this paper, the metric and morphological characteristics of the Turkey-tail cache blades recovered from the Crick Site have been summarized and discussed. Recent investigations at this western Kentucky site, as well as at Turkey-tail cache sites in Michigan and Mississippi, have provided new data for the investigation of previous assumptions and hypotheses concerning the Turkey-tail caching phenomenon. Further investigation and analyses of these sites should shed new light on the raw material sources from which cache blades were manufactured, on the routes and mechanisms of prehistoric long-distance exchange, and on the role of caching in Archaic and Woodland period mortuary and ceremonial systems.

ACKNOWLEDGMENTS

I would like to thank, first of all, David Crick for bringing his discovery to the attention of the professional archeological community and for allowing and encouraging Murray State University personnel to investigate the site. Secondly, I would like to thank Kenneth Carstens for the background information on the investigation of Site 15Cw96 prior to my direct involvement with the site. Last, but not least, I would like to thank the Murray State University students who participated in the excavation and processing of the cache, especially William Lawrence and Kathy Lyons for their extensive work at the site and in the laboratory.

THE GREENE MOUND ARCHAEOLOGICAL PROJECT: INVESTIGATIONS OF OFF-MOUND ACTIVITY AT A KENTUCKY ADENA SITE

By
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Lexington, Kentucky

ABSTRACT

The Greene Mound (15Mm8), the only extant member of the Wright Mound complex investigated by Webb in the 1930s, has been the subject of recent study by members of the University of Kentucky Anthropological Research Facility. Initial efforts in 1985 focused on mapping the mound and surrounding area and excavating shovel probes to collect information about the nature and extent of off-mound activities. Excavation of test units in the circum-mound area in 1986 provided a larger, more representative artifact sample and an indication of the site's stratigraphy and depositional history. This paper discusses the results of the University of Kentucky Greene Mound Project and the implications of these findings for future Adena research.

INTRODUCTION

For more than 100 years, Adena research efforts have focused on excavating the numerous earthen mounds scattered throughout the Ohio Valley and analyzing the burials and exotic artifacts which they contain. Because of this past emphasis on investigating mortuary behavior, very little is currently known about Adena settlement and subsistence practices or technology. During the past 20 years, however, increasing emphasis has been placed on identifying and investigating Adena off-mound activity areas (Clay 1985). To date, most of these attempts have met with relatively little success.

Archaeological investigations conducted over the past 50 years in the vicinity of the Wright Mounds (15Mm6 and 15Mm7), located near Mt. Sterling in Montgomery County, Kentucky, indicate that this area has a high potential for contributing new information about Adena off-mound activities. This paper discusses the results of the previous Wright Mound investigations and the findings of recent University of Kentucky fieldwork conducted at the nearby Greene Mound (15Mm8). Suggestions for future efforts designed to locate Adena off-mound features and activity areas are presented.

ADENA RESEARCH IN CENTRAL KENTUCKY

Adena sites, with their large burial mounds, elaborate earthworks, and exotic artifacts, have intrigued archaeologists since the early nineteenth century (Rafinesque 1824; Squier and Davis 1848). The first scientific investigation of an Adena site occurred in 1901, when William C. Mills excavated the Adena Mound at Chillicothe, Ohio (Mills 1902). Since those early days, archaeologists have identified an Adena core area that includes parts of Kentucky, Ohio, Indiana, and West Virginia (Dragoo 1963; Swartz 1971; Webb and Baby 1957; Webb and Snow 1945).

The major research goal during this period was identifying cultural traits, such as mound and tomb construction techniques and artifact attributes, that eventually led to the development of regionally distinct cultural complexes. Since these early studies largely concentrated on burial mounds and ceremonial structures, trait lists generally reflect the mortuary component of Adena culture.

Much of what is known about Adena in central Kentucky stems from mound excavations conducted by William S. Webb and William D. Funkhouser during the Depression era of the 1930s. Most of these projects were conducted as part of federal relief programs designed to put the unemployed back to work. For the first time, the funding and labor was available to conduct large-scale survey and excavation projects using standardized field and laboratory techniques (Milner and Smith 1986). Central Kentucky Adena sites investigated by Webb using federal relief funds and labor include the Ricketts Site (Funkhouser and Webb 1935; Webb and Funkhouser 1940), the Mt. Horeb Earthworks (Webb 1941a), the Drake Mound (Webb 1941a), and the Morgan Stone Mound (Webb 1941b).

One of the largest and longest running of the federally sponsored archaeological projects in central Kentucky involved the excavation of the Wright Mounds, located approximately 4 km west of Mt. Sterling. These investigations, initiated in 1937 under the direction of William S. Webb, used a Works Progress Administration (WPA) crew to completely excavate two mounds (15Mm6 and 15Mm7) located on the Elizabeth Wright farm (Figure 1). Excavation yielded numerous Adena tombs and burials, as well as associated exotic artifacts (Webb 1940). The third member of the mound group (15Mm8), a conical earthen structure located approximately 60 m southeast of the large Wright Mound (15Mm6), was located on the Greene family farm. As a consequence of the Greene Mound being owned by a different family, it was not excavated by Webb and it remains largely intact today.

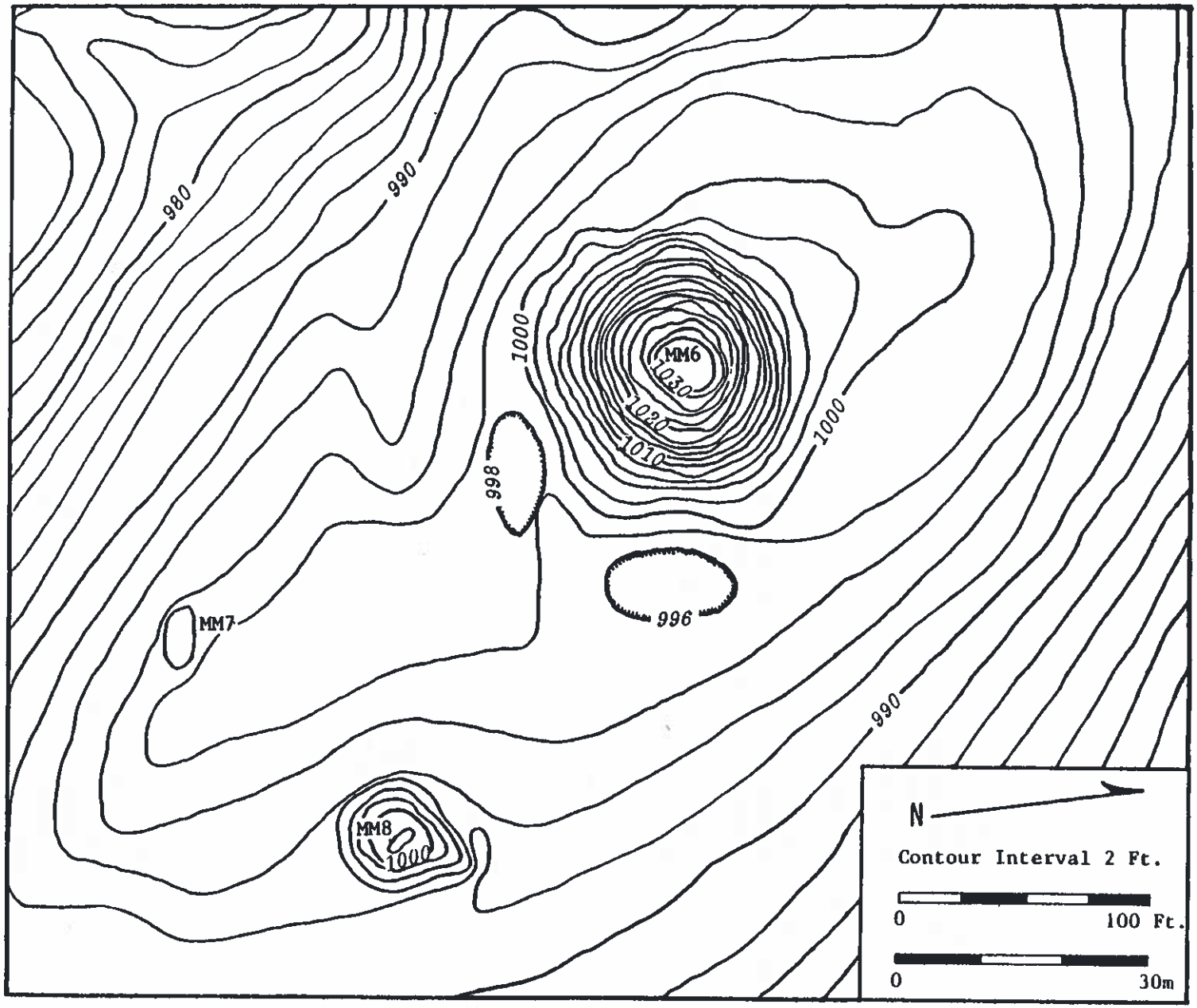

Figure 1. Location of the three mounds comprising the Wright-Greene Mound Complex (adapted from Webb 1940:Figure 1).

WRIGHT MOUND INVESTIGATIONS

Excavation of the large Wright Mound, under the direct supervision of John L. Buckner, extended from October 1937 until April 1939. Webb (1940:7) selected the site for excavation because it was located in a region known for its concentration of mounds and because these particular mounds were considered likely candidates to produce materials representative of the Adena complex. Webb (1940:8) believed that an "ancient village" once occupied the ridge on which the mounds were built, but that its remains had been destroyed by mound building and erosion.

Webb's field investigations focused on the largest of the three mounds (15Mm6). The mound, approximately 10 m high and 60 m in diameter, was excavated from north to south in a series of 1.5 m (5 feet) cuts. Excavation revealed that the mound was built in four construction stages, each containing a number of log tombs and associated burials, accompanied by items made from exotic materials such as copper and mica (Webb 1940).

Excavation of the primary mound exposed a humus or midden layer representing the original premound ground surface. Materials recovered from the submound midden included chert flakes, charcoal, pottery, several tools, and a disturbed burial. Soil and artifacts from the primary mound closely resembled that from the pre-mound humus layer, prompting Webb (1940:48) to conclude that the pre-mound midden was the source of the primary mound fill.

Removal of the submound midden layer disclosed numerous postholes in the underlying clay (Figure 2). Many postholes were aligned, indicating the shapes of several premound structures. The postholes often occurred in pairs, a characteristic now recognized as a common Adena construction trait (Webb and Snow 1945:53-55). Webb (1940:49) identified parts of at least six circular or curved posthole alignments and one rectangular pattern. Estimated diameters of the circular alignments ranged from 11 to 35 m; the lengths of the arcs ranged from 9 to 23 m (Webb 1940:50-52). These dimensions suggest that these structures were substantially larger than most Woodland period domestic structures.

Individual posts averaging 25 cm in diameter extended 46 cm below the submound surface. Postholes within each pair were spaced 18 cm apart, while the pairs were spaced from 1.1 to 1.5 m apart (Webb 1940:52). The distance between pairs of posts suggests that they were not part of a standard domestic structure. Some posts were set vertically, but others were "inclined outward from the center of the pattern" (Webb 1940:52).

The shape and size of the alignments indicated to Webb (1940:50-51) that they may have been parts of circular palisades inside of which smaller structures were built. Unfortunately, he was unable to define smaller alignments within the larger ones. If the patterns were complete circles, they would have extended well beyond the edge of the Wright Mound.

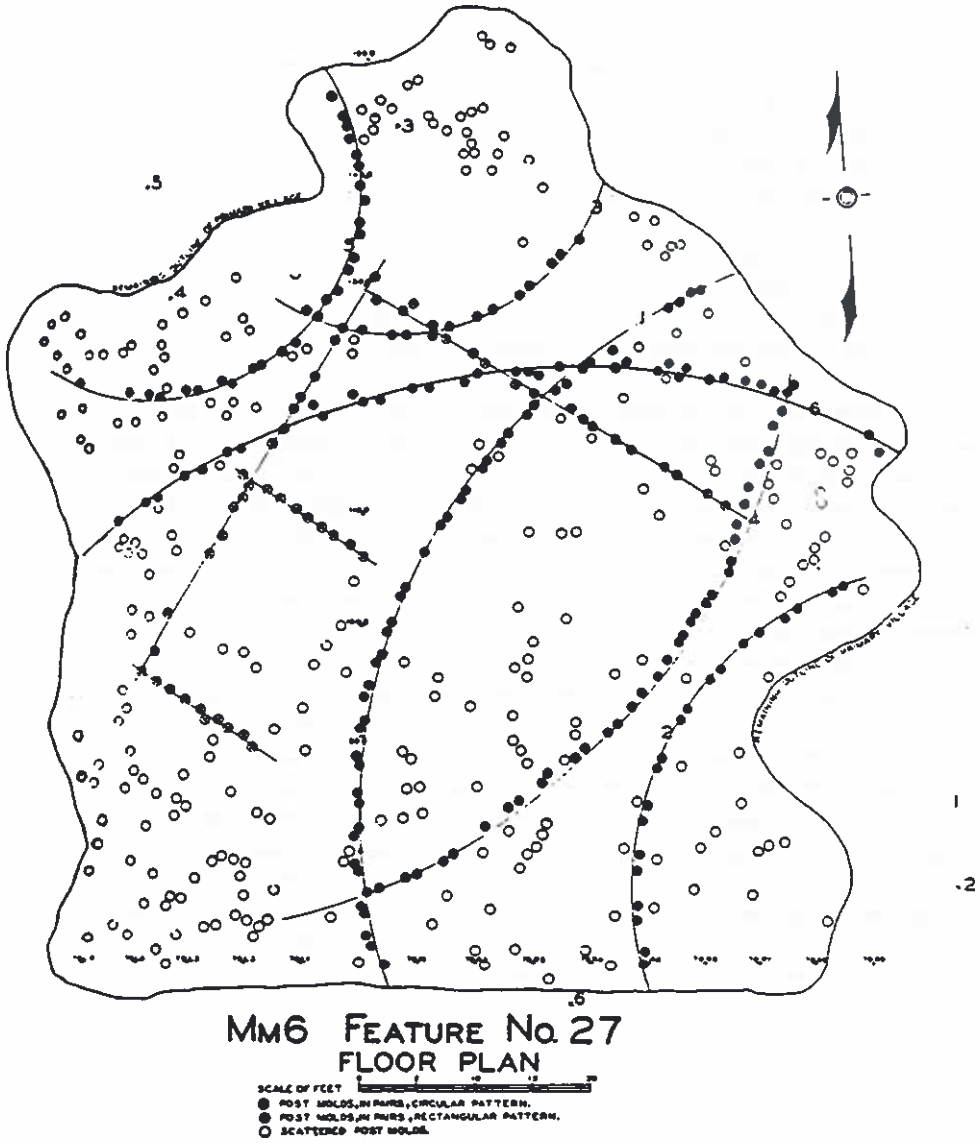

Figure 2. Posthole alignments found in clay hardpan below 15Mm6 (from Webb 1940:Figure 33).

Wood charcoal collected during the WPA excavation and subsequently submitted for radiocarbon dating in the early 1970s yielded determinations of A.D. 210+/-140 and A.D. 50+/-50 (uncorrected). Charcoal producing the earlier date came from charred logs covering the primary mound. The later date was obtained from charcoal collected from Feature 19, a log tomb associated with the secondary mound (Crane and Griffin 1972:160, cited in Turnbow 1981:58).

In 1984, members of the University of Kentucky Anthropological Research Facility designed a multi-disciplinary research project that built on the results of Adena research conducted by Webb and his co-workers. These investigations, supported by a Federal Survey and Planning grant from the Kentucky Heritage Council, are focusing on the re-analysis of existing museum collections and records, coupled with new fieldwork (Jefferies et al. 1985). With the exception of the research conducted by R. Berle Clay (1980, 1983, 1984a, 1984b, 1985, 1986), relatively little is known about the non-mortuary and off-mound aspects of Adena culture. In view of this bias in the archaeological data base, fieldwork being carried out as part of the University of Kentucky's project has concentrated on identifying off-mound Adena activity areas.

The presence of midden and postholes below the Wright Mound, and the apparent extension of posthole alignments beyond the mound's periphery, increases this site's potential for providing information about Adena off-mound activities. Webb (1940:52) suggested that since the midden edge and the ends of the posthole alignments coincided with the periphery of the primary mound, the surrounding midden was used in mound construction, destroying any additional evidence of the "village". If, as Webb reported, the postholes extended well into the soil beneath the mound, then portions of the alignments, or perhaps other kinds of features, may still be preserved in less disturbed parts of the site. Webb's floor plan drawing shows that several posthole alignments could extend a considerable distance to the east in the general direction of the Greene Mound (Figure 2). Since the area surrounding the Greene Mound has not been disturbed by recent activities, other than plowing, evidence of alignments may still be preserved below the shallow plowzone. In view of the results of past archaeological investigations at the Wright Mounds, and the potential of the Greene Mound area to produce new information about Adena off-mound activities, University of Kentucky archaeologists selected this location to pursue their research.

GREENE MOUND INVESTIGATIONS

The Greene Mound is a conical earthen structure measuring approximately 18 m in diameter and 2.5 m high. Investigation of the Greene Mound by University of Kentucky archaeologists started in the summer of 1985 using students from its archaeological field school. The mound was carefully mapped, with elevation readings taken at 1 to 2 m intervals within a 50 x 50 m area surrounding the mound. These data were then used to produce a standard topographic map (Figure 3) and a computer-generated three-dimensional contour map (Figure 4) using the Surface II plotting program (Sampson 1978). The three-dimensional plot not only showed the relief and outline of the mound, but provided an accurate representation of its actual shape.

Following the completion of mapping, a series of systematically-placed shovel probes was excavated around the mound to locate intact midden deposits, features, and artifact concentrations (Figure 5). Shovel probe transects were spaced 5 m apart near the mound; probes were excavated every 5 m along these transects. Transect and probe intervals north and east of the mound were increased to 10 m.

Examination of shovel probe profiles and fill did not reveal any obvious midden or features, but numerous artifacts, consisting of biface fragments, debitage, and sandstone, were recovered. Most of the artifacts occurred in probes placed between the Greene Mound and the former site of the large Wright Mound. Probes placed north, east, and south of the mound had lower artifact densities.

Unfortunately, shovel probes produced no diagnostic flaked stone or ceramic materials, so artifacts could not be assigned a specific temporal or cultural affiliation. Many of the diagnostic artifacts found in the Wright Mound fill are attributed to the Early Woodland Adena occupation(s) that must have been in the immediate vicinity of the mound. Others clearly date to the Archaic period (Webb 1940:Figure 38). The mixed age and cultural affiliation of the mound fill artifacts suggests that both Archaic and Woodland groups inhabited this ridgetop location. Even though earlier materials occur, the Early Woodland midden and posthole patterns below the large Wright Mound, combined with the artifacts collected from recent shovel probes, made further investigation of Adena off-mound activities near the Greene Mound warranted.

Additional investigations were conducted at the Greene Mound by the University of Kentucky during the fall of 1986. This work, funded by a state grant from the Kentucky Heritage Council, involved the hand excavation of six 1 x 2 m test units. Four units were excavated along a north-south line located west of the mound (Figure 3). Shovel probes placed in this part of the site in 1985 indicated that the highest artifact densities occurred here. Two additional units were excavated north and east of the mound. Test unit locations were selected to provide information about the site's depositional history, to obtain data on feature and artifact distributions, and to investigate the nature of Early Woodland activities that occurred around the mound. Each of the six units were excavated in 10 cm thick arbitrary levels. Maximum depth of the units ranged from 25 to 40 cm.

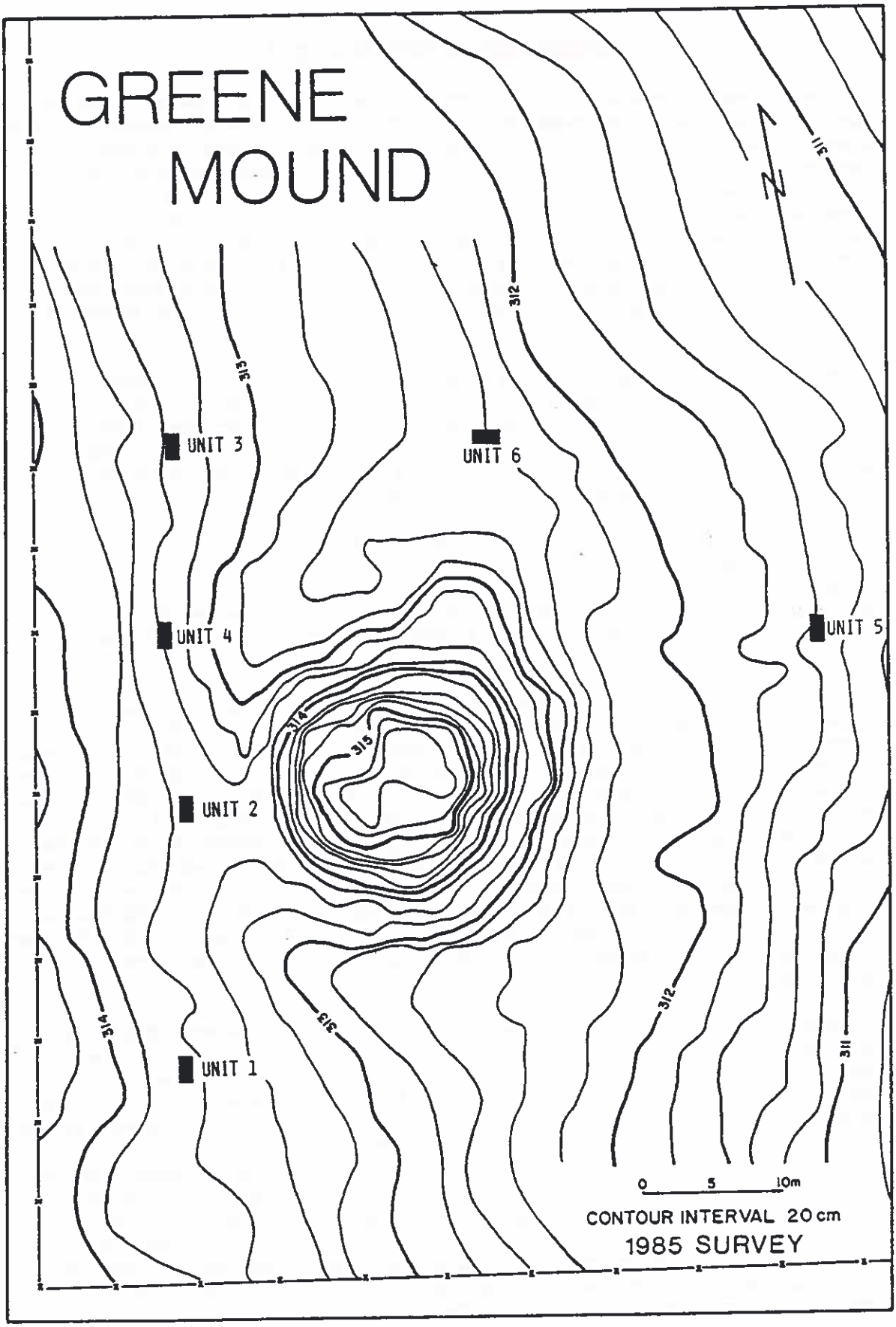

Figure 3. Topographic map of the Greene Mound showing test units.

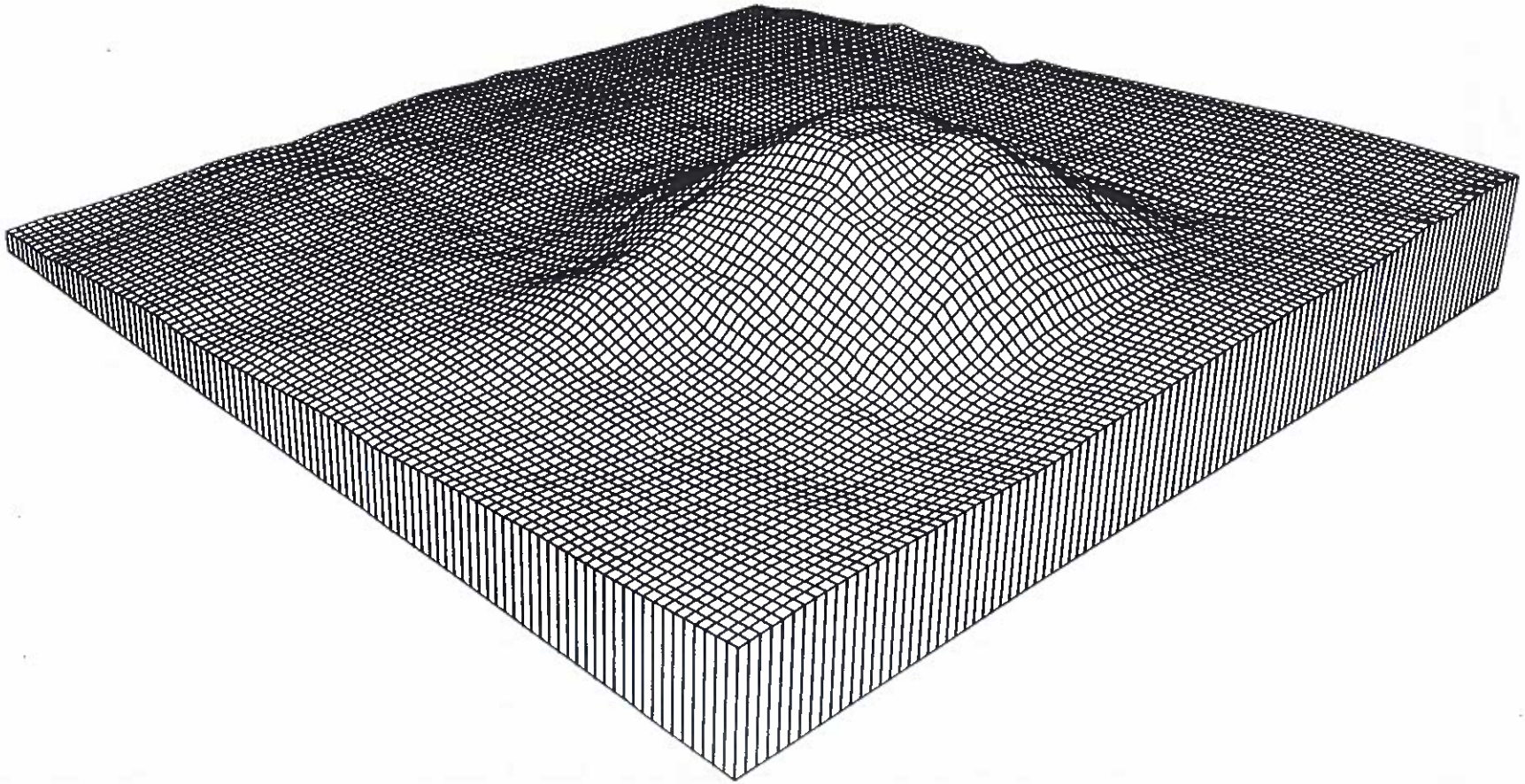

Figure 4. Three-dimensional contour map: southeast view of the Greene Mound.

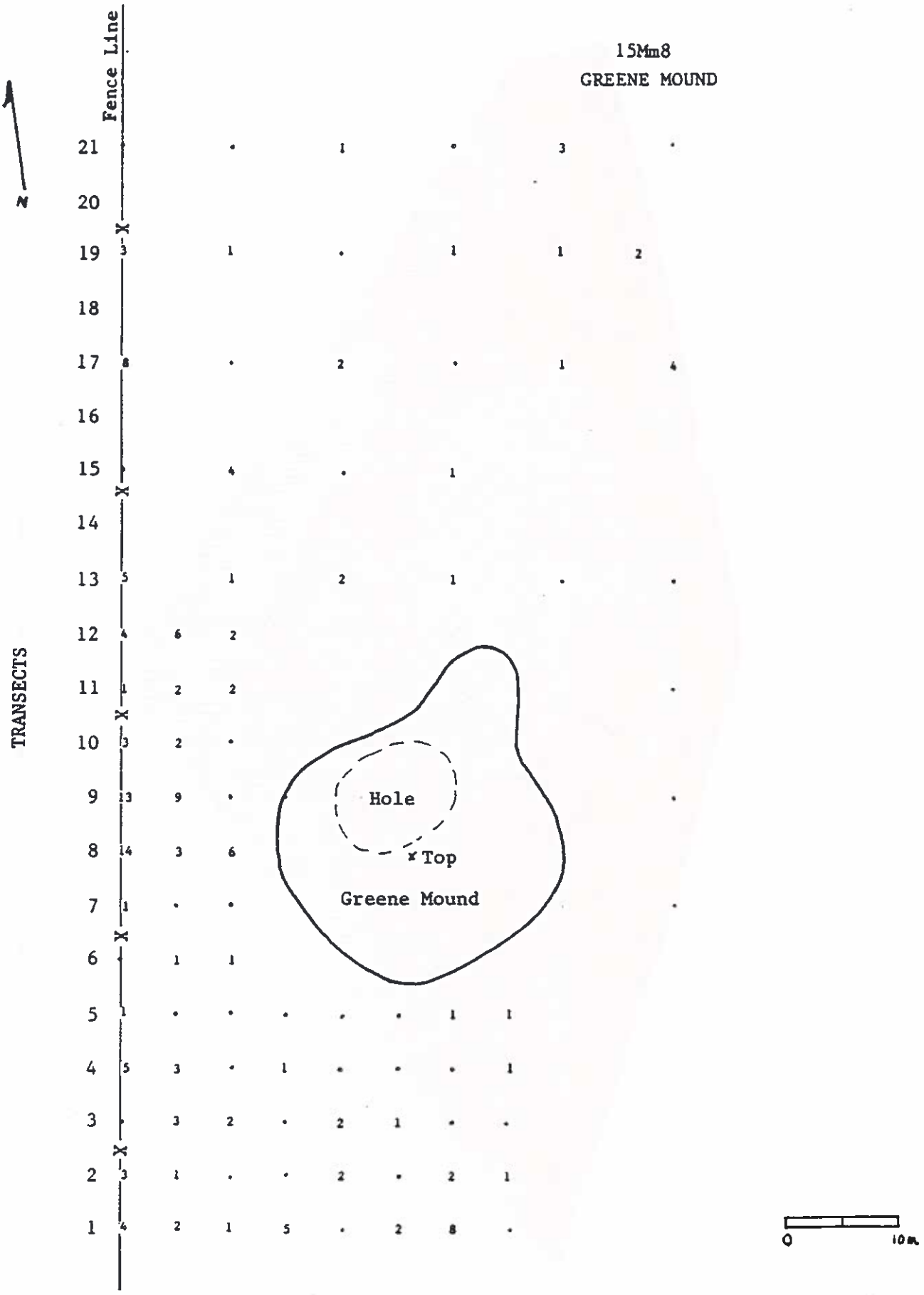

Figure 5. Location of shovel probes showing number of flaked stone artifacts from each probe.

Examination of test unit profiles revealed varied stratigraphy across the site (Figure 6). The portion of the site west of the mound, near Test Unit 2, contained the deepest and most complex stratigraphy. A 20 cm deep plowzone (dark brown silty clay loam) comprised the upper soil zone. A 15 to 20 cm thick transition zone located between the plowzone and the B-horizon soil may represent a lightly stained midden deposit. Artifact densities in the transition zone closely conformed to those of the plowzone. This zone may also be attributable to eroded soil that was carried downslope and re-deposited around the up-hill side of the mound. The B-horizon soil in Test Unit 2 was encountered at approximately 40 cm below surface. Excavation of Test Units 3 and 6, located northwest and north of the mound, respectively, revealed generally similar soil profiles.

Test Units 1 and 4, located west of the mound, and Test Unit 5, situated to the east, exhibited truncated profiles containing a very thin transition zone between the plowzone and the B-horizon soil. The B-horizon was encountered less than 20 cm below surface in Test Unit 4. The reasons for the stratigraphic differences between these three units and the three units discussed above are currently unclear. The truncated profiles may be attributable to aboriginal borrowing activities associated with mound construction, or with modern agricultural practices that caused deflation of the soil profile.

Although no postholes, features, or artifact concentrations were identified in any of the test units, a variety of artifacts including flaked stone, ground stone, and ceramic materials were recovered. Flaked stone items, consisting of various types of chert debitage, biface fragments, and an Adena Stemmed projectile point, comprised the largest artifact category.

In excess of 1,300 pieces of debitage were recovered from the six test units (Table 1). Although the very small size of most flakes precluded the reliable identification of specific chert types, a qualitative assessment indicates that approximately 75% of the debitage is Boyle chert. This chert type, which originates in the Devonian period Boyle dolomite formation, does not outcrop in the immediate vicinity of the Greene Mound. The closest known outcrops are exposed along Slate Creek, some 12 km east of the site (Weir and McDowell 1976). Boyle chert is highly variable in color, occurring as gray, white, blue, pink, red, tan, or any combination of these colors (Boisvert et al. 1979b:70). The remainder of the debitage is comprised of Paoli chert and several unidentified chert types.

Debitage was assigned to five categories (Table 2) commonly associated with the various stages of the biface production trajectory (Jefferies 1982). Angular fragments, associated with the early stage of biface production, are small chunks of chert lacking flake characteristics such as a striking platform or a bulb of percussion. Percussion 1 flakes have a prominent bulb of percussion, the striking platform is generally perpendicular to the bulb of percussion, and cortex is present on the outer surface. Percussion 2 flakes resemble Percussion 1 flakes, but have no cortex. Bifacial thinning flakes generally have flake scars on the exterior surface, a diffuse bulb of

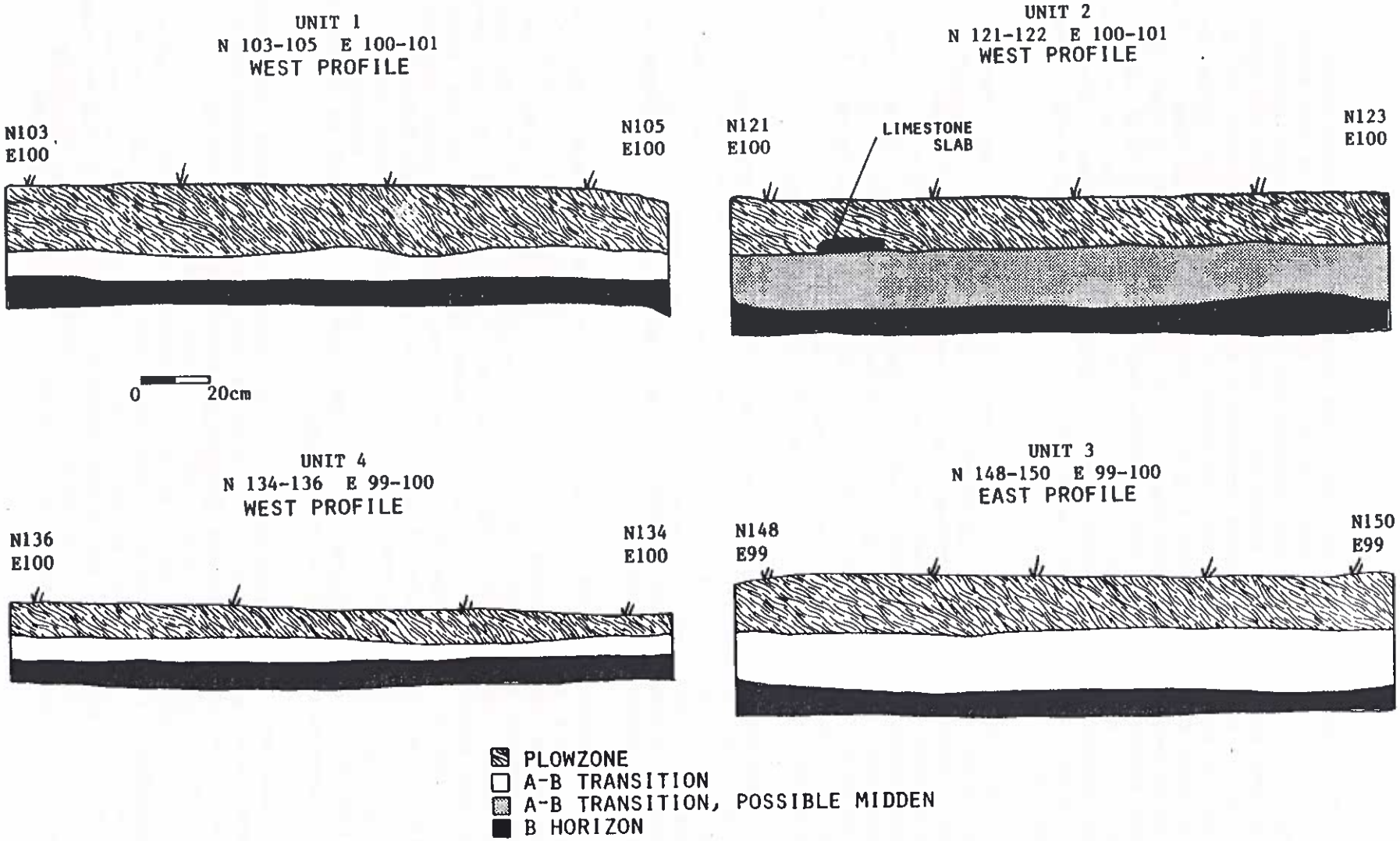

Figure 6. Greene Mound excavation unit profiles.

Table 1. Greene Mound Artifact Distribution.

Test Unit	Volume(m)	Ceramics				Flaked Stone				Other Rock			
		n	wt.(g)	sherds/m³[a]	sherds/m³[b]	n	wt.(g)	flakes/m³[a]	flakes/m³[b]	n	wt.(g)	rocks/m³[a]	rocks/m³[b]
1	.50	9	3.9	18.0	7.8	78	93.2	156.0	186.4	402	343.6	804.0	687.2
2	.80	3	1.0	3.8	1.3	222	147.7	277.5	184.6	910	1020.3	1137.5	1275.4
3	.70	12	7.9	17.1	11.3	731	515.7	1044.3	736.7	950	1132.1	1357.1	1617.3
4	.55	8	2.3	14.5	4.2	108	95.7	196.4	174.0	266	397.8	483.6	723.3
5	.50	3	3.1	6.0	6.2	159	75.9	318.0	151.8	706	320.3	1412.0	640.6
6	.70	8	3.2	11.4	4.6	50	93.6	71.4	133.7	302	497.7	431.4	711.0

a = density by count
b = density by weight

Table 2. Greene Mound Debitage.

Test Unit	Angular Fragment		Percussion 1		Percussion 2		Bifacial Thinning		Shatter		Total	
	n	wt.	n	wt.	n	wt.	n	wt.	n	wt.	n	wt.
1	3	6.4	4	24.7	7	13.1	4	2.0	60	47.0	78	93.2
2	17	16.0	5	21.0	29	21.4	17	12.0	154	77.3	222	147.7
3	46	64.8	32	57.5	71	92.5	74	67.9	508	233.0	731	515.7
4	3	4.2	4	8.7	13	22.4	13	17.2	75	43.2	108	95.7
5	5	8.8	1	0.7	12	20.7	9	8.7	132	37.0	159	75.9
6	6	25.9	5	18.2	4	3.7	5	16.7	30	29.1	50	93.6
TOTAL	80	126.1	51	130.8	136	173.8	122	124.5	959	466.6	1348	1021.8

percussion, and the striking platform forms an acute angle with the bulb of percussion. Thinning flakes are generally associated with intermediate and late stages of biface production. Shatter, broken flakes lacking a bulb of percussion or a striking platform, is generally associated with the final stage of flaked stone tool production and the maintenance of finished tools.

The distribution of debitage among the various categories indicates that all stages of chert reduction occurred at the site. The predominance of thinning flakes and shatter, accounting for more than 80% of the debitage, combined with the small size of all flakes (mean = .75 g), suggests that most flaked stone tool manufacturing activities were associated with the later stages of tool production and maintenance. The character of the Greene Mound debitage is at least partially attributable to the distance from the Boyle chert source area (greater than 12 km). Most early stage reduction activities were probably conducted at the source area to facilitate transport of the raw materials.

Calculation of the density of debitage per cubic meter of excavated soil by both count and weight (grams) clearly indicates that Test Unit 3, with more than 1,000 flakes per cubic meter, contained the highest density (Table 1). Test Unit 3 was located between the Greene Mound and the former location of the large Wright Mound. Densities were much lower in the remaining five test units, ranging from 71 to 318 flakes per cubic meter. Unfortunately, the Greene Mound debitage cannot be assigned a specific cultural affiliation because of the presence of both Archaic and Woodland components at the site.

Other flaked stone artifacts recovered during the 1986 field season consist of two biface fragments, a modified flake and two projectile points (Table 3). Both biface fragments are made of Boyle chert and appear to be parts of blanks or preforms (Figure 7a). The modified flake, also of Boyle chert, is unifacially flaked along one lateral margin and is apparently part of a scraper or a denticulate. A basal portion of a small side notched projectile point was found in Test Unit 5. Cultural affiliation cannot be accurately determined, but it is probably attributable to one of the site's Archaic components.

The only flaked stone artifact from the 1986 testing that can be attributed to the Adena occupation with some degree of certainty is a contracting stemmed projectile point (Figure 7b). The specimen came from plowzone deposits removed from Test Unit 6 (Level 2), located 10 m north of the mound. Points having similar hafting characteristics are commonly found on Adena sites in the Ohio Valley (Dragoo 1963; Webb and Snow 1945). A recent evaluation of flaked stone artifacts from the large Wright Mound identified 37 specimens resembling the Greene Mound point (also see Webb 1940:Figure 38q-r). Dragoo (1963:113) reports that this point type is less distinctive of Adena than ovate-base stemmed variants, and cautions that similar points were manufactured by some Ohio Valley Late Archaic groups.

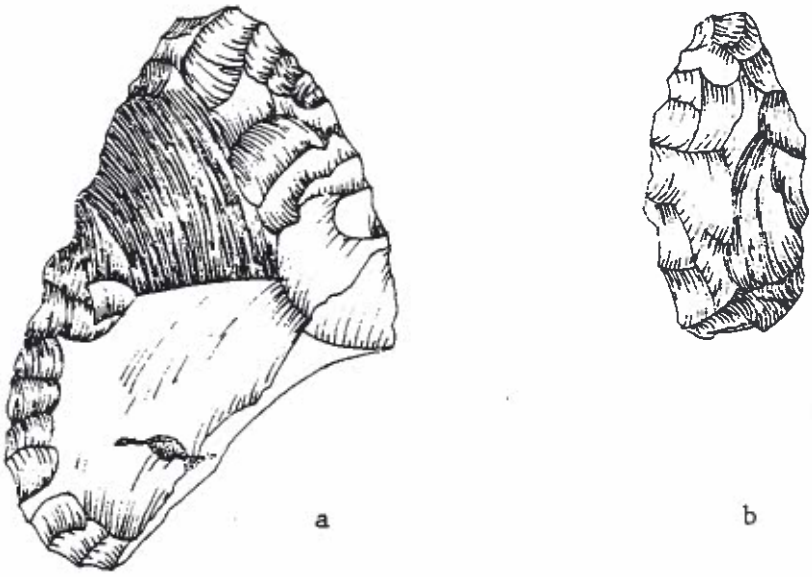

Figure 7. Greene Mound bifaces.

Table 3. Provenience of Flaked Stone Tools.

Provenience	Utilized Flake	Biface/ Biface Fragment	Projectile Point/ Projectile point Fragment	Total
Test Unit 2				
Level 1	1	-	-	1
Test Unit 3				
Level 2	-	1	-	1
Test Unit 5				
Level 2	-	-	1	1
Test Unit 6				
Level 2	-	-	1	1
General Surface				
Collection	-	1	-	1
Total	1	2	2	5

Table 4. Distribution of Green Mound Ceramics by Surface Treatment and Temper Type.

Temper	Surface Treatment			
	Cordmarked	Plain	Unknown	Total
Siltstone	1	1	23	25
Limestone	0	0	1	1
Sand	0	0	3	3
Unknown	0	0	14	14
Total	1	1	41	43

The Greene Mound specimen is made of Boyle chert and has been reworked to the extent that there is little of the blade left to resharpen. Because of the extensive modifications, few useful measurements could be taken. Those metric attributes that were measured are presented below:

Maximum Length	40.6 mm
Maximum Width	19.9 mm
Maximum Thickness	8.9 mm
Haft Length	13.4 mm
Haft Width	18.3 mm

Ceramic material was recovered from all six of the 1986 test units, but individual sherds were very small and highly eroded, as reflected by a mean sherd weight of 0.5 g. The total ceramic collection consisted of only 43 body sherds and sherdlets (Table 4). The small size and poor state of preservation of this material is attributable to its disturbed plowzone context and the effects of weathering on the porous, friable sherds.

Because of the nature of the pottery, weight was considered to be a better indicator of sherd distribution than frequency. The lowest density of sherds per cubic meter of soil occurred in Test Units 2 and 4 located 5 to 8 m west of the mound (Table 1). The highest density was in Test Units 1 and 3, located approximately 20 m southwest and northwest of the mound, respectively. Test units placed north and northeast of the mound (Test Units 5 and 6) exhibited intermediate sherd densities.

The low density of sherds in test units placed next to the mound suggests several possibilities. If this pottery is attributable to the same group that built the Greene Mound, then activities requiring the use of ceramic containers may have been more commonly performed away from the mound than next to it. Also, sherd densities may be lower near the mound because soil containing sherds located in the immediate vicinity was used for mound construction, artificially lowering the amount of pottery in that area. The presence of a shallow ditch around the mound's periphery (Figure 4) suggests that at least some of the soil used for mound construction came from adjacent areas. Obviously, much more research needs to be conducted before these issues can be properly addressed.

Analysis of individual sherds provided some useful technological information about the Greene Mound ceramics. Fifty-eight percent of the sherds are tempered with a soft crushed rock that can easily be scratched with the fingernail (Table 4). The character of the temper particles and the absence of a carbonate reaction to the application of hydrochloric acid suggest that the pottery is siltstone tempered. Irregularly-shaped holes formed where the angular temper particles had eroded. Sherds are very soft and friable, as reflected by the extremely small size of the specimens. An alternative explanation is that the temper material is a highly weathered limestone containing an insufficient amount of calcium carbonate to react to the hydrochloric

acid. For the present analysis, however, this material is considered to be siltstone.

One siltstone tempered sherd has a cordmarked exterior, one is plain, and the remainder are too eroded to determine surface treatment. Sherd thickness ranges from 4.8 to 6.9 mm, with a mean of 5.7 mm.

The remainder of the ceramic collection consists of three sand tempered sherds, one limestone tempered sherd, and 14 sherds for which temper type could not be identified. Surface treatment could not be determined for any of these specimens.

In his analysis of the Wright Mound pottery, Haag (1940:81) described a number of sherds resembling the siltstone tempered ceramics from the Greene Mound area. He noted that they "invariably showed some leaching, and the middle of a sherd showed some remnants of this leached material, which was angular and light colored, but would not give a carbonate reaction" (Haag 1940:81). Although Haag noted only 18 sherds in the Wright Mound collection having these attributes, the friableness of the siltstone tempered sherds, combined with the WPA excavation techniques, undoubtedly worked against their recovery from the mound fill. The presence of similar pottery in the Wright Mound fill suggests that the Greene Mound material is at least contemporary with the construction of the Wright Mound, if not predating it.

In their recent discussion of pottery from the Calloway Site (15Mt8), Niquette and Boedy (1986:74-76) delineated the geographic range of siltstone tempered ceramics in Kentucky. Their survey of the literature revealed that this pottery occurs in small quantities at scattered open sites and rockshelters in eastern Kentucky, including the Tough Tree Shelter (15McY292) in McCreary County (Knudsen et al. 1985), the Carroll Shelter (15Cr57) in Carter County (Ison and Ison 1985) and the Bentley Site (15Gp15) in Greenup County (Henderson and Pollack 1985). Siltstone tempered pottery is more common in West Virginia, however, where it is generally classified as Armstrong ceramics (Niquette and Boedy 1986:78).

Niquette and Boedy's examination of pottery from the C and O Mounds (Haag 1942) identified a considerable number of Johnson Plain siltstone tempered sherds. In an earlier study of this material, Purrington (1972) noted that the siltstone tempered sherds were either plain, cordmarked, cord-wrapped dowel-impressed, or incised (cited in Niquette and Boedy 1986:76).

Siltstone tempered sherds from the Calloway Site, located in Martin County, Kentucky, were used to define a variant of Adena Plain pottery known as Adena Plain, var. Inez (Niquette et al. 1987). Inez Plain is almost identical to Johnson Plain siltstone tempered pottery from the C and O Mounds, except in rim form. Based on a careful evaluation of extant chronometric data and temporally diagnostic artifacts from Calloway and other sites, it appears that Inez Plain pottery dates to between ca. 250 B.C. and A.D. 200 (Niquette et al. 1987).

Paste and temper characteristics of the Greene Mound ceramics are similar to those of Inez Plain (Charles M. Niquette, personal

communication 1987). The mean thickness of the Greene Mound sample (5.7 mm) matches that of Inez Plain body sherds from the Calloway Site sample, but thickness measurements could be taken on only three Greene Mound specimens. Unfortunately, because of the small size and poor state of preservation of the Greene Mound ceramic collection, few other comparisons can be made at this time. If the Greene Mound siltstone tempered pottery is temporally related to Inez Plain pottery from the Calloway Site, then the Greene Mound material would appear to be attributable to an early Middle Woodland occupation. Radiocarbon dates from the Wright Mound (A.D. 50+/-50 and A.D. 210+/-140) closely conform to the time range proposal for Inez Plain pottery.

SUMMARY AND CONCLUSIONS

Until recently, most Adena research in Kentucky has concentrated on excavating burial mounds and analyzing the associated mortuary features and artifacts. Ongoing investigations by the University of Kentucky in the vicinity of the Greene Mound have attempted to determine the character of off-mound activities of the groups responsible for mound construction. Initial efforts toward this goal have met with rather limited success, but this is not surprising, since only 12 m^2 of a very large and complex site have been examined.

The 1986 field season yielded a considerable amount of information about site stratigraphy, providing insights into activities which disturbed normal soil formation processes. The report of erosion of more than 1.2 m (4 feet) of soil from around the Wright Mound since its construction (Haag 1974) does not appear to have occurred in the Greene Mound area. Soil loss attributed by Haag to erosion may actually reflect borrowing activities associated with mound construction.

Excavation of test units produced numerous artifacts, some of which may be attributable to an Adena occupation. The stemmed projectile point is probably Adena, but similar types were manufactured by Kentucky Late Archaic groups. Perhaps the best indication of Adena activity is the siltstone tempered pottery. The small, eroded sherds appear to resemble material found in both the Wright and C and O mounds, and at the Calloway Site.

While this evidence supports the presence of Adena off-mound activities, it is at best circumstantial. Larger areas of the site need to be opened to locate features containing well-preserved materials in good cultural context. Evidence of truncated soil profiles near the mound suggests that some of the soil used in its construction came from nearby, possibly destroying indications of previous activities. Future excavation efforts will focus on areas further from the mound that are less likely to have been impacted by mound construction.

ACKNOWLEDGEMENTS

Much of the work at the Greene Mound was funded by a state grant from the Kentucky Heritage Council. I would like to thank the members of the 1985 Kentucky Archaeological Field School for their help in surveying the Greene Mound vicinity, Richard Edging and Matthew Walters for their efforts during the 1986 excavations, and Mary Lucas Powell and Nancy O'Malley for their comments on the different versions of this paper. The computer generated graphics used in this paper were produced by George R. Milner and Jeff Williams.

A REEVALUATION OF THE WPA EXCAVATION OF THE ROBBINS MOUND IN BOONE COUNTY, KENTUCKY

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ABSTRACT

New Deal era excavation records and collections from the 1939 to 1941 investigations of the large Robbins Mound (15Be3) in Boone County, Kentucky, were reexamined to acquire new information on Adena mound construction methods, mortuary practices, and paleodemography. Computer-generated graphics proved to be a particularly effective means of investigating changes over time in the configuration of the cemetery, specifically the location of the mound's apex and its overall shape. This study of WPA era field notes and University of Kentucky Museum of Anthropology specimens demonstrates the continuing research significance of existing museum collections.

INTRODUCTION

Adena sites have long excited the imagination of professional and amateur archaeologists alike. This interest can, in part, be attributed to the presence of geometric earthworks that some have considered mysterious, calling them "sacred circles;" the existence of many large, structurally complex, conical burial mounds; and an impressive array of exotic materials often associated with graves. A focus on Adena mounds was assured once it was recognized that they were related to other elaborate mortuary manifestations elsewhere in the midcontinent, specifically the Hopewell sites of Ohio.

Work conducted since the definition of Adena in 1932 (Greenman 1932) has resulted in the recognition of a core area centered in the Ohio River Valley and including portions of Kentucky, Ohio, Indiana, and West Virginia. University of Kentucky archaeologists in the 1930s and 1940s, particularly William S. Webb, were instrumental in the early definition of Adena, especially in terms of material culture (Webb and Snow 1945). The extensive survey and excavation program supported largely by Franklin D. Roosevelt's Works Progress Administration (WPA; later the Work Projects Administration) permitted the excavation of many large Adena mounds in Kentucky, particularly in the Bluegrass and along the Ohio River, and the development of extraordinary collections of artifacts and extensive files of frequently detailed field records. Adena mounds represented one of four primary research foci for the New Deal archaeologists, the others being Archaic shell mounds and Fort Ancient and Mississippian habitation sites (Milner and Smith 1986:14-15).

Although considerable attention was devoted to the study of Kentucky Adena sites from the late 1930s through the early 1950s, there have been few recent contributions to this subject with the notable exception of work by R. Berle Clay (1980, 1983, 1984a, 1984b, 1985, 1986). This lack of attention is surprising, given the presumed importance of Adena societies in the evolution of eastern North American cultures, since they represent an early example of elaborate funerary practices.

Additional research is needed in Kentucky and elsewhere to resolve questions pertaining to the development of Adena, the organizational characteristics of this prehistoric culture, and the nature of its settlement and subsistence strategies. These ambitious objectives are best addressed by long-term projects, such as the one initiated by University of Kentucky archaeologists in 1985, that include studies of existing museum collections and new fieldwork. An important aspect of the University of Kentucky's project involved the examination of museum collections to determine if New Deal era field records and museum specimens could be used to address research questions relating to Adena mortuary practices, social organization, and mound construction.

MATERIALS AND METHODS

This paper focuses on the large Robbins Mound (15Be3) situated in the Boone County uplands near the Ohio River. It and a much smaller mound (15Be14), which was located nearby, were excavated by John B. Elliott from 1939 to 1941 as part of the Kentucky state-wide archaeological program conducted under the auspices of the WPA (Figure 1). This site is one of over 20 Boone County Adena mounds, mound complexes, and earthworks that have been reported to the Office of State Archaeology.

The large Robbins Mound was chosen for further study since it met several criteria essential for a successful reanalysis of an archaeological site. First, the excavations were conducted carefully and were well documented. Second, the field notes, skeletal remains, and artifacts were curated over the years and are available for study. Third, a detailed account of the excavations and the supervisor's interpretations was published shortly after fieldwork ended (Webb and Elliott 1942). This particular mound was also of interest since it included a large number of burials and was a complex structure consisting of multiple layers of soil representing separate building episodes.

All available artifacts, human skeletons, and field records from the Robbins Mound excavations were examined during the course of this study. The skeletons were aged and sexed according to standards currently used by physical anthropologists.

Considerable attention was directed toward the reinterpretation of mound stratigraphy. The mound had been excavated in a series of cuts, each 5 feet (1.5 m) wide, resulting in a series of 20 vertical faces extending across the mound in an east-west direction. Measurements in feet and inches were used throughout the reanalysis of the Robbins

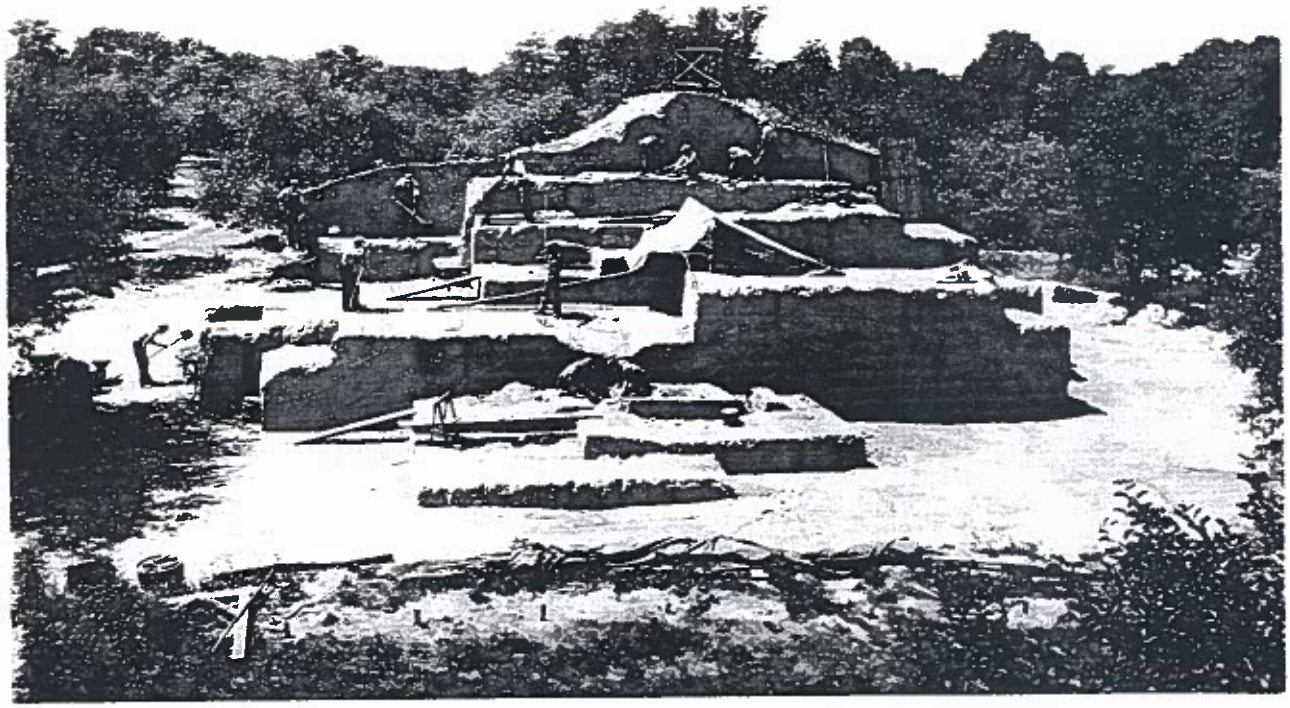

Figure 1. Excavation of the north side of the Robbins Mound (UKMA 4638).

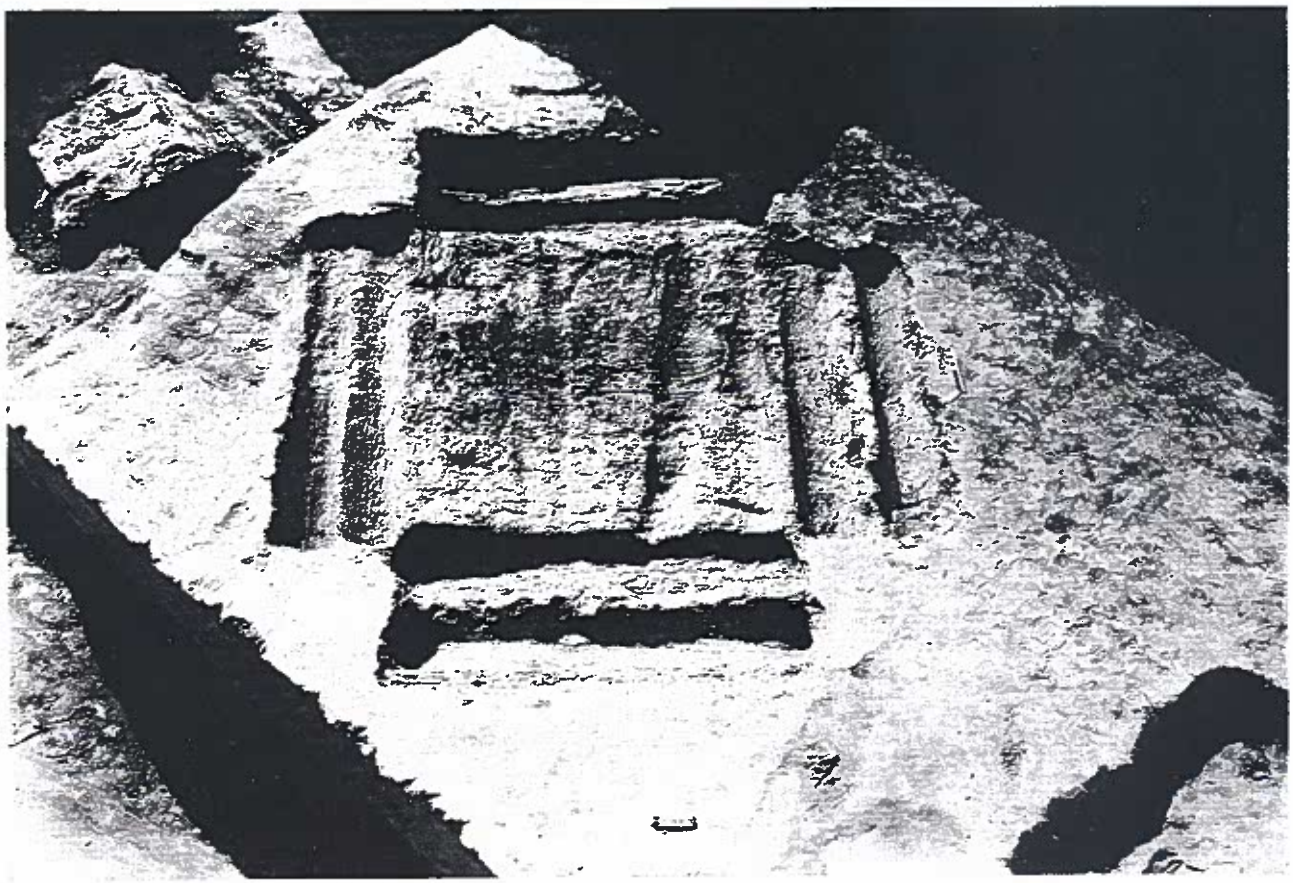

Figure 2. A log-lined tomb, Feature 32, in the large Robbins Mound (UKMA 4719).

Mound, since conversion to the metric system would have unnecessarily complicated data entry and manipulation. In addition, it should be noted that grid north as used here and by the excavators is oriented 35 degrees east of magnetic north. This represents a deviation from standard New Deal era practice, reflecting a field decision that facilitated the excavation of this particular mound (Webb and Elliott 1942:379).

Detailed profile drawings of each vertical face were made at the time of excavation. These drawings made it possible to follow soil layers from one vertical exposure to the next throughout the excavation area and allowed the authors to reconstruct the mound's stratigraphy. Corresponding fill episodes in different vertical faces were identified on the basis of the general shape of major soil zones, the dip of soil lenses, and the soil descriptions. The top elevation of each major fill zone was recorded at 2.5 foot (76 cm) intervals across the mound profiles.

The mound's east and west limits were encompassed by the profiles, but the northern and southern limits were not completely included within the excavated area. The amount of unexcavated fill, however, was minimal. In addition, the northernmost and southernmost dimensions of the mound were identified in two short trenches dug along the mound's midline. Topographic data provided information on ground surface elevation beyond the limits of the excavated area. Elevations of additional points around the mound's perimeter were extrapolated from the closest known profile and topographic data. The resulting data matrix consisted of points arranged in a grid measuring 135 x 135 feet (41 x 41 m).

ORIGINAL FINDINGS

The field supervisor who directed the Robbins Mound excavation was fully aware that the mound had a complex construction history (Webb and Elliott 1942:383-384, 488). The first construction phase consisted of removing upper soil horizons from much of the future mound area and then building a circular structure consisting of outwardly slanting, paired posts (Feature 26). The initial mortuary feature was a deposit of cremated bones within this structure. Soil was later piled inside the structure, forming a small mound (Stage 1). The structure eventually burned and its remnants were covered by a second mound (Stage 2). This sequence of events was followed by the deposition of considerable mound fill (Stages 3 to 8) and the construction of numerous mortuary features, often log-lined tombs (Figure 2). Neither the field notes nor the published site report include an adequate description of the later mound-building episodes, although a general eastward shift in the mound apex was noted (Webb and Elliott 1942:488). This lack of attention to mound building episodes in an otherwise detailed report is undoubtedly attributable to the mound's complex stratigraphy and the lack of readily distinguishable construction stages demarcated by highly distinctive fills or developed soil horizons.

Eighty-nine burial numbers were assigned in the field, and 90 skeletons were recognized as coming from mortuary features (Webb and Elliott 1942:417-420). The remains of several additional individuals were represented by calcined and highly fragmented bones on the submound structure's floor. Charles E. Snow, the physical anthropologist who studied this skeletal collection, concluded on the basis of the remains from mortuary features that young adult males (21-35 years old) dominated the skeletal series. The mound was, thus, interpreted as a cemetery principally for the "male members of the ruling class" (Snow 1942:448).

Artifacts found in association with the burials and tombs included copper bracelets, copper pendants, mica crescents, shell beads, a shell spoon, expanded bar gorgets, a cache of ovate bifaces, and stemmed projectile points. The artifact inventory compares favorably with assemblages from other Ohio River valley Adena mounds (Webb and Snow 1945).

Charcoal collected at the time of excavation and subsequently analyzed yielded a radiocarbon determination of 150 B.C. (2100+/-140 B.P.; M-2242) (Crane and Griffin 1972). This wood charcoal sample, which was obtained from the burned structure (Feature 26) at the base of the mound, dates the initial episode of mortuary activity at the site.

REANALYSIS

The first phase of the Robbins Mound reanalysis focused on the mound's stratigraphy. Although many individual soil layers were recorded in the various mound profiles, only eight major fill zones could be recognized that extended across much or all of the area encompassed by the mound. The eight mound stages, with slight vertical exaggeration, are illustrated in Figure 3. The two stages at the top of the figure are the primary and secondary mounds that were identified in the field. These are the two mounds associated with the submound structure. The illustration in the lower right corner of Figure 3 is the final shape of the mound at the time of excavation, and a large, partially filled relic collectors pit is visible. Five intermediate stages, also shown in the figure, were identified in this reanalysis.

Computer-generated graphics enhanced our ability to identify changes over time in the mound's size, shape, and apex location. The irregular surface contours observed in the computer generated maps must have been a conspicuous feature of the mound throughout much of its history, and most of the topographic highs and lows are directly attributable to the construction of tombs. For example, the ramps associated with a rectangular tomb are clearly seen in Mound Stage 4 (Figure 4). Other irregularities correspond to additional tombs often partially covered by later deposits of soil. In addition, many tomb roofs appear to have collapsed producing depressions.

The nature of mound construction changed dramatically after the building of the two initial mounds associated with the submound

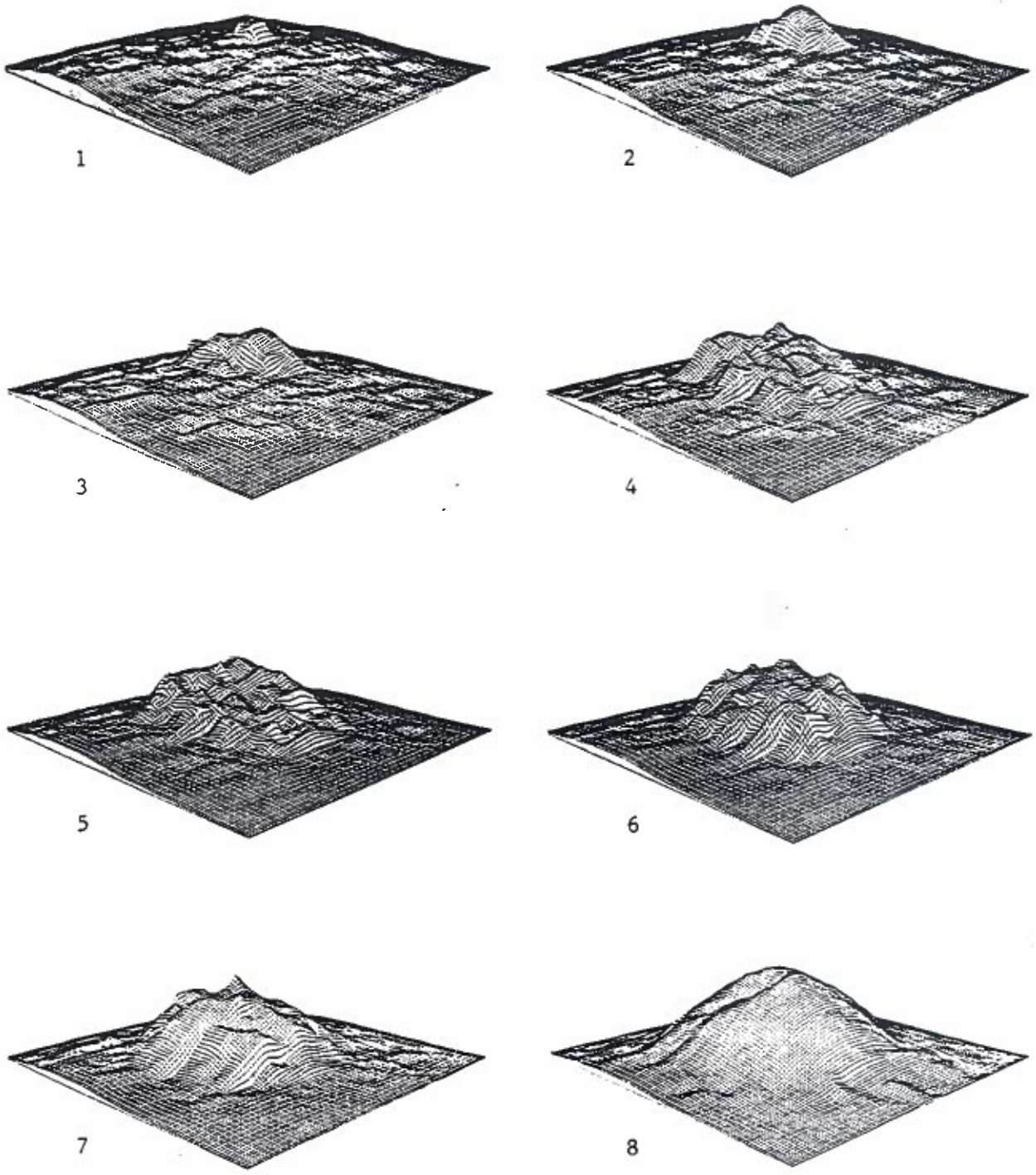

Figure 3. Eight episodes of mound construction, from the earliest (Stage 1) to the latest (Stage 8).

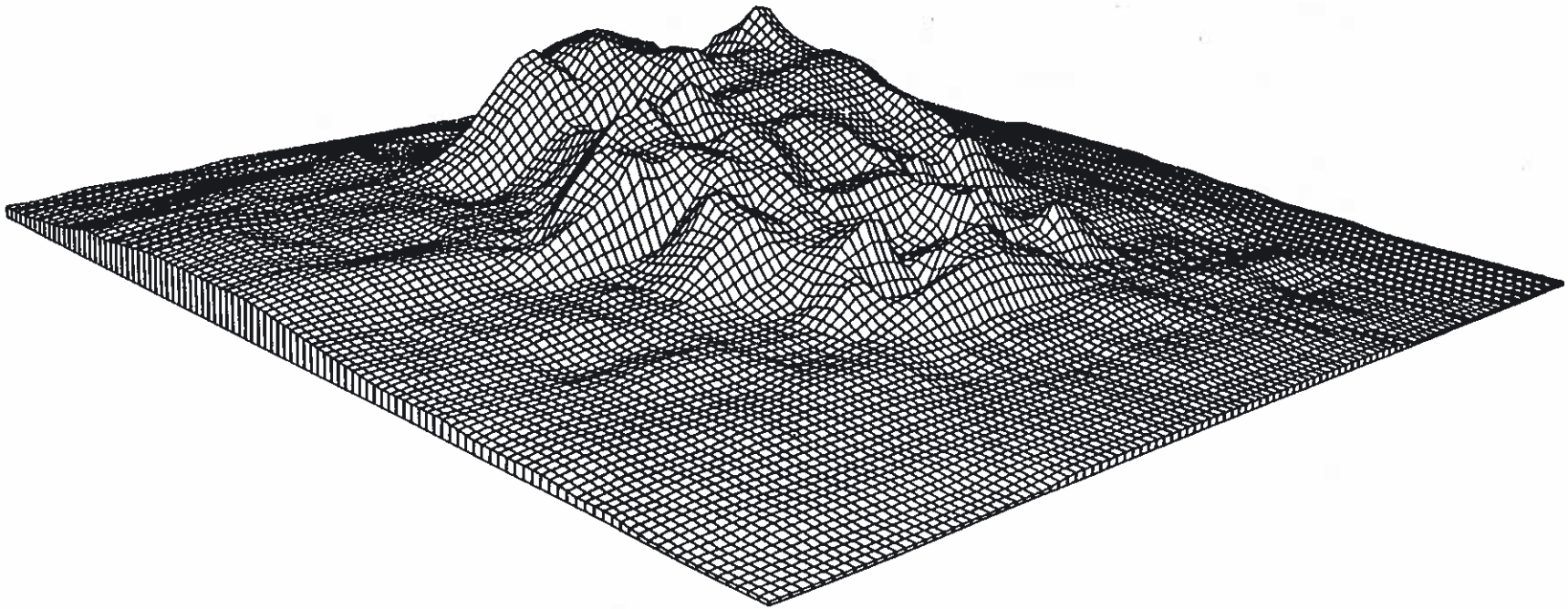

Figure 4. Robbins Mound Stage 4.

structure or its remnants. Later mound construction seems to have focused on the preparation of single tombs. This individualized process of soil deposition was periodically interrupted by the dispersal of fill laterally across much of the existing mound to form new, but still undulating, surfaces. Tombs generally were built along the sides of the mound. They were constructed by piling soil to form a level floor surrounded by higher ramps that joined the mound's flank to form a rectangular cavity, which was usually lined with logs. Thus, the tombs associated with a particular construction episode tended to encircle the mound. Burials other than those in tombs were also found within the mound. Usually these were isolated individuals placed in mound fill, on distinct mound surfaces, or in bark-lined depressions formed by the collapse of roofs belonging to earlier tombs. The terminal construction episode involved the deposition of a layer of soil that covered the entire mound. This cap probably reduced some of the surface irregularities, but many would have remained until the mound was smoothed further through years of erosion (Figure 5).

The age and sex of many of the noncremated skeletal remains from mortuary features could be estimated. The other skeletal remains were too incomplete or poorly preserved to determine age or sex, or the bones were not available for study. Overall, age and sex could be determined for 40 adult skeletons.

The reanalysis of the skeletal remains resulted in a markedly different interpretation of the age and sex structure of the group buried within the Robbins Mound than that proposed by Snow (1942). All discrepancies between the original and revised estimates of sex involved a shift from male to female. While Snow's analysis indicated that 78% of the of the unburned adult skeletons from the Robbins Mound were males, the reanalyzed sample was evenly divided between males (50%) and females (50%). Revisions in age estimates are no less significant in terms of their implications for Snow's original conclusion that the mound contained primarily young adults. In most instances where there was a discrepancy in the estimated age-at-death, the revised age was older than the original assignment.

These discrepancies are not surprising, given a general shift in recent decades in the emphasis placed by physical anthropologists on various skeletal indicators of sex and age. Males seem to be over-represented in many earlier osteological reports (Weiss 1973:58), and this tendency appears in Snow's work. For example, in a study of Mississippian period burials from Moundville, Alabama, Mary Lucas Powell (1985:161) found that when there was a discrepancy between her estimates of skeletal sex and those of Snow, the usual pattern was for a shift from male to female. Eighty-five percent of the Snow:Powell Moundville assessments of sex agreed with one another, whereas 82.5% of the Snow:Milner Robbins Mound assessments corresponded. The upward shift in the ages of many Robbins Mound skeletons is also consistent with other evidence for systematic biases in Snow's assessments of the demographic structure of prehistoric populations. For example, Snow's reexamination of the Archaic Indian Knoll skeletal remains, almost 20 years after they were originally studied (Snow 1948), resulted in an increase in the average age of the adult segment of this large skeletal series (Johnston and Snow 1961).

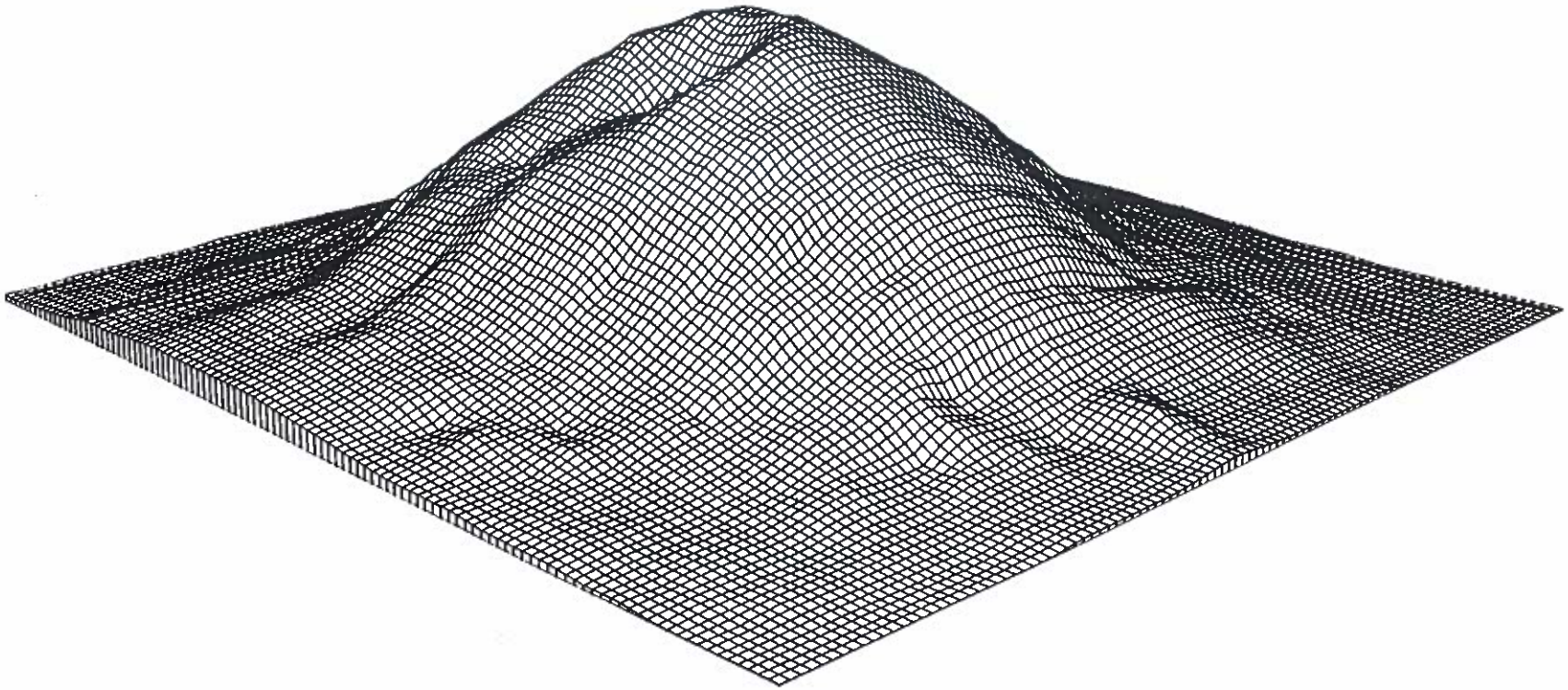

Figure 5. Robbins Mound Stage 8.

In summary, most of the individuals buried in the Robbins Mound were adults, but both young and old adults are well-represented in the collection. In addition, males and females apparently had an equal chance for burial within the mound.

An examination of feature characteristics, grave contents, and skeletal age and sex revealed three unequivocal patterns indicating differential treatment of the dead. First, adults enjoyed preferential access to mound burial. Second, sizable log-lined tombs were not part of the two initial mound building episodes, which were instead associated with a submound structure and other remains. Third, most of the skeletons with burial accompaniments (i.e., 12 of 18) were buried in rectangular tombs with associated ramps.

Part of the difficulty in identifying artifact patterning among burials is a function of small sample size, since few individuals were associated with grave goods. Only four classes of objects were found with four or more individuals. All projectile points were associated with individuals older than 15 years at the time of death, but shell beads, copper bracelets, and ochre were found with both juveniles and adults.

CONCLUSION

These results illustrate the potential for the future study of New Deal era field records and museum collections using new analytical techniques. Reexamination of the Robbins Mound field records coupled with computer-generated views of sequential mound-building episodes resulted in the identification of previously unrecognized mound construction details. These results should help future archaeologists develop excavation strategies for Adena mounds.

Additional information also was obtained on Adena mortuary practices. While it may be true that the people buried in the Robbins Mound were in Snow's (1942:448) terms "selected and honored by such interment," the skeletal series was not dominated by young adult males. Based upon the identified discrepancies between original and revised age and sex identifications, it is recommended that future paleodemographic studies of New Deal era skeletal series include reassessments of skeletal age and sex.

ACKNOWLEDGEMENTS

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MIDDLE-LATE WOODLAND OCCUPATION AT THE HANSEN SITE, GREENUP COUNTY, KENTUCKY

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ABSTRACT

Excavations by the University of Kentucky at the Hansen Site (15Gp14) in 1985 revealed a Newtown phase midden/buried paleosol. Radiocarbon dates from several features and structures suggest the site was occupied from A.D. 300 to 600. However, the low density of cultural material and spatial segregation of structures and features indicate that utilization of this part of the site was not continuous for the entire 300 year period. Intra-site spatial analysis resulted in the identification of discrete clusters of material classes and attributes which suggest the presence of two different Newtown occupational episodes during this period: one dating from A.D. 300-450 and the other A.D. 500-600.

INTRODUCTION

Site 15Gp14, also known as the Hansen Site (and formerly referred to as the Ed Winkle Site), was investigated by the University of Kentucky under contract with the Kentucky Transportation Cabinet from May through mid-September of 1985. Hansen is a multicomponent stratified site, with minor Late Archaic, Early Woodland, and Fort Ancient occupational episodes. The vast majority of the archaeological materials, however, derive from a single stratum which dates to the late Middle Woodland-early Late Woodland period. Diagnostic artifactual remains and radiocarbon dates from this stratum mutually corroborate the assignment of these materials to the Newtown phase. The purpose of this report is to summarize the results of the analysis of the Newtown materials recovered from the site.

PHYSICAL SETTING AND HISTORICAL BACKGROUND

The Hansen Site is located in extreme northeastern Kentucky, on the south bank of the Ohio River near Portsmouth, Ohio. The present channel of the Scioto River joins the Ohio directly north of the site, while an earlier confluence is located about 1.2 km downstream. The narrow floodplain in the vicinity of the site is restricted by the upland bluffs, which border the site to the southeast. The present surface terrain is a series of parallel floodplain ridges, which become more distinct to the west. The Ohio River bank truncates the site on its north side, exposing the site's major stratigraphic units.

The site was first reported in 1979 during a site reconnaissance for a proposed bridge across the Ohio River (Wilson 1979). At that time, shovel probing confirmed the presence of subsurface deposits. Cultural debris was also observed eroding from the Ohio River bank. Additional investigations conducted within the highway right-of-way, a north-south transect located near the eastern margin of the site, included excavation of test units, solid core drilling, and examination of the eroding river bank (Fiegel 1983; Jefferies 1985). Excavation of two test units about 150 m from the bank revealed only plow-disturbed strata. No buried paleosols were observed in either unit. Solid core drilling conducted closer to the river revealed sandstone and charcoal flecks suggestive of possible buried cultural horizons. Of the 20 cores placed in transects parallel to the proposed highway center line, 12 produced possible cultural materials. Inspection of the eroding river bank revealed the presence of intact cultural deposits. As presently defined, the site covers at least 6.0 ha, but only a small portion of the site was directly affected by the bridge construction.

As a result of these investigations the presence of three possible buried cultural horizons was indicated. The uppermost horizon contained the most intensive occupation, and several features were observed to originate within this zone. Materials recovered from the beach and from eroded features were diagnostic of the Woodland period. A second occupation horizon was located about a meter below the upper horizon, but no diagnostic cultural materials were observed. Finally, four of the cores produced charcoal flecks between 4.5 and 5.0 m below surface. As a result of these investigations the floodplain within 100 m of the Ohio River bank was determined to have the highest potential for containing stratigraphically separated cultural deposits. The research strategy for the University of Kentucky's investigation of Hansen was designed to capitalize on the site's stratigraphic potential.

Archaeological investigations conducted by the University of Kentucky were performed in five stages (Figure 1). The first stage consisted of mapping the site and recording bank profiles. The bank profiles clearly showed that the Woodland occupation was contained within Stratum 4. Stage two entailed the excavation of five backhoe trenches to examine the upper two cultural horizons identified in the bank profiles. Initially, Strata 1-3 were removed to expose a portion of stratum 4. Each trench floor was mapped, and then a narrow interior trench was excavated to expose Strata 5-7. All trench profiles were mapped. In stage three, two 10 x 20 m blocks were stripped of Strata 1-3

15GP14
GENERAL EXCAVATION PLANS

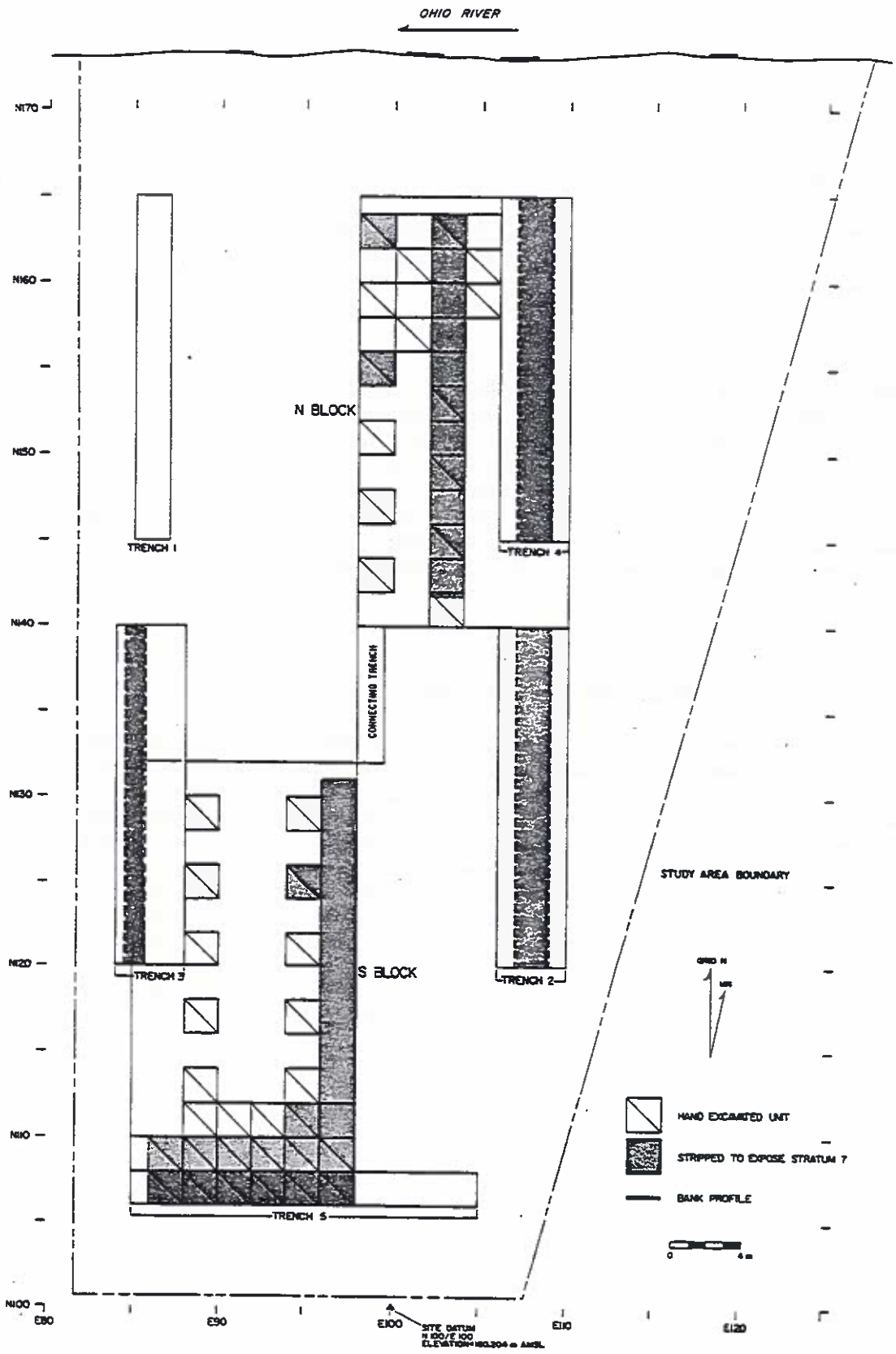

Figure 1. General excavation plan.

overburden. Within these blocks, 41 (2 x 2 m) units and all exposed features were excavated. Stage four entailed mechanical removal of the remainder of Stratum 4 from the excavation blocks. The exposed areas were mapped and all features and posts were excavated. The last stage involved limited exploration of the lower cultural horizons (Strata 5-7) through a combination of hand and mechanical excavation.

As a result of these activities, approximately 15 m^3 of sediment were excavated by hand from the 2 x 2 m units. In addition, 114 features, three structures, and 172 postholes were excavated within Stratum 4. All of the excavated sediments were waterscreened through 6.35 mm (1/4 inch) or nested 6.35 mm and 1.59 mm (1/4 and 1/16 inch) mesh. Flotation (8 liter) and soil/sediment (1/4 liter) samples were taken from each feature and excavation unit/level, but only a limited number of these were fully analyzed.

Investigation of the site and analysis of the materials recovered indicated that most of the cultural material contained in the uppermost horizon could be assigned to the Newtown phase, an early Late Woodland manifestation previously dated to A.D. 400-800 at other sites in northern Kentucky and southern Ohio (Cowan 1979a, 1979b; Griffin 1952; Henderson and Pollack 1982, 1985; Oehler 1973; Railey 1984, 1987a; Riggs 1986; Seeman 1980). The middle cultural horizon was attributed to the Late Archaic period, while the deepest materials were of non-cultural origin.

RESEARCH ORIENTATION

Four major analytical research objectives were defined to guide the investigation of the Hansen Site materials. First, contributions could be made toward refining local chronological sequences, especially within the Newtown phase. Second, a more adequate picture of Late Woodland subsistence patterns might be obtained, given adequate preservation and recovery of botanical and faunal remains. Third, changes in technological aspects of material culture, specifically changes in ceramic technology and lithic procurement and utilization, might be identified. Finally, the site might reveal important aspects of Middle to Late Woodland cultural dynamics, promoting a better understanding of both cultural change and continuity during this time span. Tempering all of these objectives is the fact that only a small portion of a very large and complex site was examined.

EXCAVATION RESULTS

The site stratigraphy, radiocarbon dates, features, and structures are discussed below. Summaries of lithic, ceramic, and botanical analyses performed on material recovered from Stratum 4 are also presented.

STRATIGRAPHY

Nine major stratigraphic units were observed within the Project Area. All strata became thicker and deeper toward the river (Figure 2). Stratum 1 is the present plowzone and developing A Horizon. Stratum 2 consists of a series of super-imposed sandy loam plowzones. The high sand content is probably attributable to increased sediment loads resulting from historic land clearing. Stratum 3 is the earliest plowzone, consisting of disturbed Stratum 4 deposits.

Stratum 4 is a moderately to poorly developed A Horizon from 10 to 30 cm thick containing moderate amounts of prehistoric cultural debris. Numerous features and postholes originate in this stratum, and this stratum contains all of the in situ Newtown materials.

Strata 5 and 6 are the AB and B Horizons of the buried paleosol. Cultural debris was extremely sparse and only three features were observed to originate in Stratum 5. Stratum 6 is apparently culturally sterile. Stratum 7 is a thick deposit of unaltered alluvial sediments. Several features originate near the Stratum 6/7 interface, and these constitute a Late Archaic occupation of limited duration and range of activities.

Strata 8 and 9 were observed only in deep bank profiles and in the profile of the excavation for bridge Pier A located about 50 m south of the Project Area. Both strata exhibit minor stratigraphic subdivisions representing discrete depositional episodes. Although small pieces of charcoal are included in these sediments, no definite cultural materials were recovered.

Observations by the project geomorphologist indicate that the landform upon which the site is located is an expansion bar created by the widening of the floodplain downstream from the restrictive bluffs (Shepherd 1987). After its initial formation, the expansion bar was apparently not subjected to severe or frequent inundation, and the resulting surface was suitable for at least ephemeral occupation for the last 4,000 years. Average sedimentation rates are low (0.23 mm/year) for the past four millennia, and the weakly developed paleosol represented by Strata 4-6 suggests an even lower rate of deposition for the last 2,000 years.

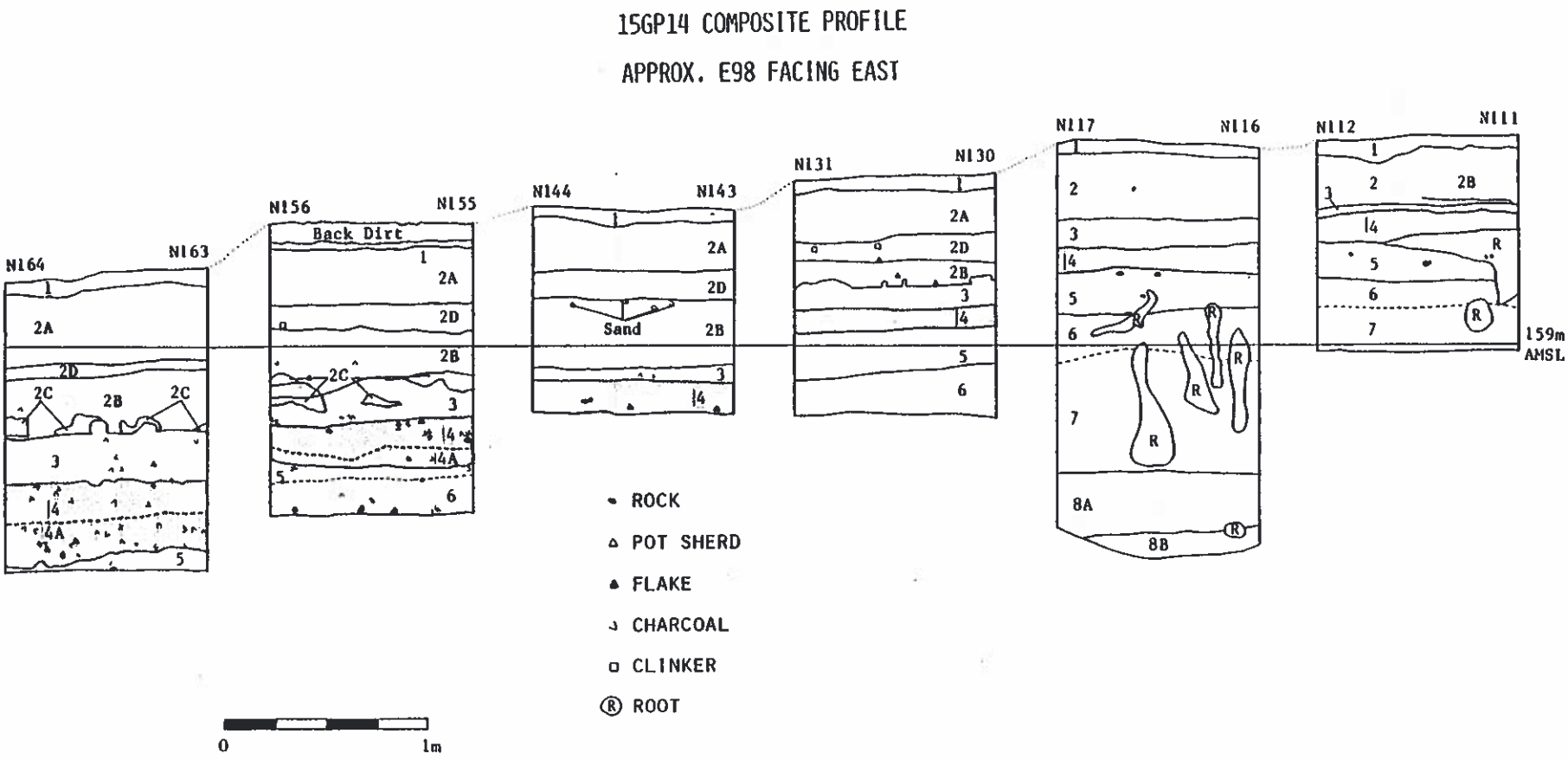

Figure 2. Stratigraphic north-south profile through the Hansen Site. The buried A Horizon paleosol/midden is shaded.

RADIOCARBON DATES

Fifteen radiocarbon assays were performed on samples from the Hansen Site, providing chronological control for Strata 4, 5, 6/7, and 9. Table 1 lists the results of these assays and provides contextual information. The determination for the sample from Stratum 9L (16,340+/-430 B.C.) provides a temporal context for the initial formation of the expansion bar. Based on this assay, the deepest charcoal recovered from the core drill samples, at elevations comparable to Stratum 9L, is probably non-cultural in origin. The Strata 6/7 features (1930+/-90 B.C. and 2060+/-90 B.C.) date to the Late Archaic period, and limited artifactual evidence confirms this assignment. The date from Stratum 5 (510+/-70 B.C.) indicates continued ephemeral occupation of the site during the Early Woodland period.

Of the 11 assays on Stratum 4 features, three are unacceptable in light of the fact that their determinations disagree radically with the associated artifactual debris. Dates of 800+/-70 B.C. and 760+/-70 B.C. from Features 111 and 102, respectively, were derived from samples contaminated with coal. A second assay on nutshell from Feature 102 produced an acceptable date of A.D. 550+/-70. A sample from Feature 109 yielded a modern date. Since this feature was exposed to the weather for a few weeks during fieldwork, modern contaminants may have been introduced. All of these features produced only Newtown diagnostic materials.

The A.D. 180+/-90 date from Feature 53 would normally be considered too early for Newtown, but the feature produced two Newtown Cordmarked rims. The remainder of the assays indicate that the investigated portion of the site was occupied from about A.D. 300 to 600. This spans the traditional boundary between the Middle and Late Woodland periods. While some of the dates from Hansen may appear to be too early for Newtown, the artifactual assemblage is perfectly congruent with other reported Newtown assemblages. The fourth-century dates from Hansen join a growing number of Newtown dates [Leonard Haag, A.D. 280 (Reidhead and Limp 1974); Lichliter, A.D. 350 (Seeman 1980); Pyles, A.D. 360 (Railey 1984)] that indicate this archaeological phase bridges two temporal and cultural periods, traditionally considered as separate entities.

Given the suite of dates presented in Table 1, at least two interpretations can be made regarding the nature and duration of the occupation of Stratum 4. One interpretation entails that the dates be viewed with emphasis on their statistical overlap, which is most evident if the centroids are averaged. This results in a date of A.D. 450+/-225, which would infer that all of the dates were derived from a single radiocarbon population. This method of treatment would indicate that all of the Woodland materials recovered from Stratum 4 could be derived from a single component. The wide range of radiocarbon centroids would simply reflect statistical error.

The alternative interpretation, and the one preferred here, is that the dates do not represent a single radiocarbon population, but instead are derived from at least two separate occupational episodes. This interpretation requires that the assays be viewed more individually,

Table 1. Radiocarbon Determinations from the Hansen Site.

Ages refer to the radiocarbon years before present as determined by Beta Analytic, Inc.; the date is an uncorrected AD/BC conversion from the RCYBP based on 1950 as the base date. Assays marked with an asterisk (*) denote dates which are not in agreement with stratigraphic or artifactual evidence. No corrections have been applied to the assays.

Lab number	Provenience	Elev. of sample	Stratum	Age (RCYBP)	Date
Beta-15081	Pier A	156.47	9L	18290+430	16,340 BC
Beta-14574	F77	158.90-158.77	7	4010+90	2060 BC
Beta-15083	F82	159.11-158.80	6/7	3880+90	1930 BC
Beta-15085	F115	157.85-157.58	5	2460+70	510 BC
Beta-14577	F111	158.58-158.24	4	2750+70	*800 BC
Beta-15511	F53	159.07-158.90	4	1770+90	180 AD
Beta-15082	F19	158.16-157.60	4A	1630+90	320 AD
Beta-15510	F21	159.20-159.01	4	1630+100	320 AD
Beta-14573	F36	159.59-159.36	4	1520+60	430 AD
Beta-15084	PM120	158.80-158.63	4	1510+70	440 AD
Beta-15509	F45	157.97-157.89	4A	1410+80	540 AD
Beta-14576	F102	158.88-158.84	4	2710+60	*760 BC
Beta-15512	F102	159.43-158.72	4	1400+70	550 AD
Beta-14575	F98	158.34-157.99	4	1360+70	590 AD
Beta-15513	F109	159.26-159.00	4	Modern	*Modern

with emphasis on the differences between the centroids. In support of this interpretation, it can be shown that the three earliest acceptable dates were derived from statistically different populations than the three latest dates (see Thomas 1976). The two fifth century dates can be included in either group if viewed on a statistical basis alone. Evidence from the feature and structure distributions (see below) suggest that the fifth century dates should be included in the earlier group.

If Hansen contains two distinct Newtown occupational episodes, then it may be possible to associate structures, features, and cultural materials with specific occupational episodes. The initial Newtown occupational episode may be distinguished from the later occupation by the presence of temporally sensitive attributes that can be affiliated with the late Middle Woodland period. The later episode may exhibit a different suite of diagnostic attributes.

FEATURES, STRUCTURES, AND POSTHOLES

Recognition of features at Hansen was difficult due to the effects of bioturbation on feature boundaries and the fact that many features contained low densities of cultural refuse. The lack of refuse in features is consistent with the generally low densities of materials recovered from the A Horizon/paleosol. The generally low density of cultural materials indicates that occupational activities were probably neither continuous nor intense during the entire time range. However, variation in feature size and shape (and implied functional differences), coupled with the presence of recognizable structure areas, indicate that when occupation did occur within the Project Area, a full range of domestic activities were performed.

Several different morphological feature types were recognized at Hansen. The most common type was a small shallow basin, often lacking dense cultural refuse. Large basins, medium-sized cylindrical pits, and deep, partially collapsed cylindrical pits often contained large amounts of secondary refuse. A few features were deep cylindrical pits with heavily oxidized perimeters. These may have functioned as "earth ovens", but the amount of subsistence remains recovered from them was very low. Several types of surface features were also recognized, including oxidized areas, rock concentrations, and charcoal scatters. The features encountered in the Stratum 4 block excavations are shown in Figure 3. Features and postholes are not uniformly distributed within the excavation blocks, with both being more common in the southern half of the South Block. This pattern is consistent with the overall distribution of cultural materials in the two blocks.

Three complete structures were defined in the field. Structure 1 is an oval, single-post structure, measuring 5.5 by 4.5 m, and is located at the south end of the South Block. It may have been rebuilt once, with a slight shift in location toward the northeast. Feature 36, an apparent cooking facility associated with Structure 1, contained large quantities of nutshell and bone fragments. Other features which may be

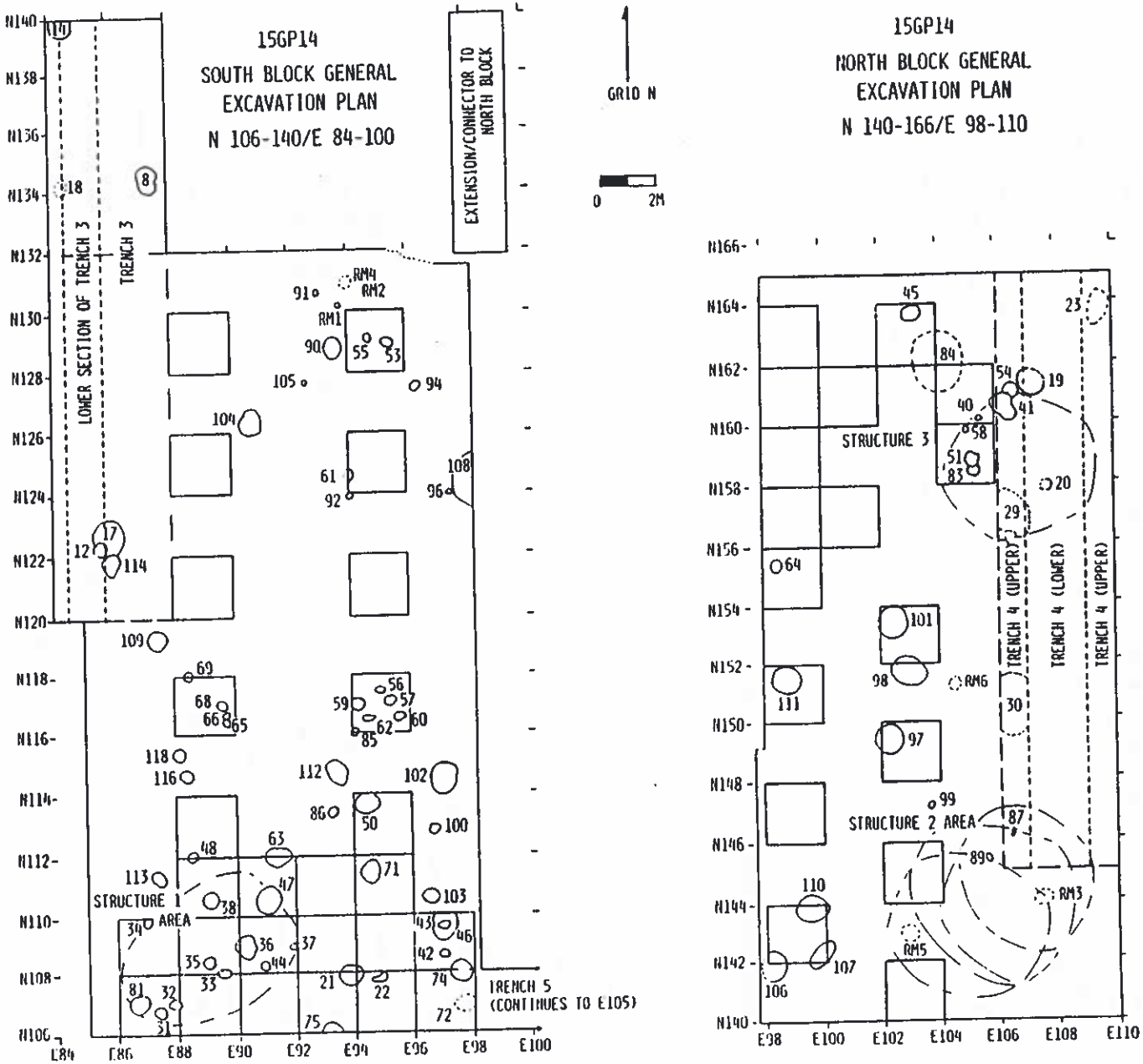

Figure 3. Distribution of features and structures within the major excavation blocks at Hansen.

related to the occupation of Structure 1 include Features 21 and 47, both of which are large, partially collapsed pits.

Structure 2 is located in the southern part of the North Block and exhibits at least three partially overlapping construction episodes comprised of roughly oval, single-post structures. Since only one instance of post super-positioning was observed, the temporal relationship of the different construction episodes could not be determined. At least one of the structures burned, as indicated by large oxidized areas. No interior cooking or heating facilities were observed.

Structure 3 is a roughly circular, single-post structure measuring about 4.2 by 4.2 m. It is located at the northern end of the North Block. Immediately external to the structure is Feature 19, a deep, partially collapsed cylindrical pit. Features 51 and 83, interior to Structure 3, may have served as cooking or heating facilities; fired sediments were abundant in these features, but subsistence remains were virtually absent.

At least three of the deep, partially collapsed cylindrical features (19, 21, and 47) occur immediately adjacent to structures. The shape and location of these features suggest that their primary function may have been for storage. Their secondary function was for refuse disposal, as indicated by discrete internal fill zones with high densities of rock, charcoal, and lithic and ceramic debris. Large basins and small, shallow, basin-shaped features are also quite common in structure areas, but their function is problematical.

The similarities in the construction methods of the structures and the wide spacing between them suggest that all of the structures may have been occupied at the same time. Other indications of structure contemporaneity are the presence of similar suites of features in close proximity to structures, including medium-sized deep cylindrical pits, large basins, and small shallow basins. Finally, all of the radiocarbon dates from structures or from features directly associated with structures fall between A.D. 320 and 440. This suggests that the earlier Newtown occupational episode proposed previously may have included the majority of the domestic occupation present within the Project Area.

Features included in the later occupational episode appear to be limited to a few very large, deep cylindrical pits which are isolated from the known structure areas. All of the radiocarbon dates derived from these types of features date to the sixth century. A possible change in intra-site organization through time may be documented from the feature data. The proposed early Newtown occupational episode seems to be characterized by functionally similar structure/feature clusters, while the proposed later episode may have been more specialized or more communally oriented, with the very large facilities indicating the presence of multiple households interacting on a communal or cooperative level.

A similar pattern of very large cylindrical features spatially isolated from identified structures was found at the Bentley Site, immediately down river from Hansen. A radiocarbon date of A.D. 560+/-70 was recovered from one such feature at Bentley (Henderson and Pollack 1985), and the ceramic and lithic assemblages are almost indistinguishable from the Hansen materials. Though the spatial and temporal similarities between the Bentley Newtown component and the proposed sixth century Newtown component at Hansen are not completely identical, they cannot be ignored.

MODIFIED CHIPPED STONE

Modified lithic items recovered from Stratum 4 compare favorably with those described for other Newtown assemblages (see Henderson and Pollack 1985; Oehler 1973; Railey 1984). Chipped and ground stone items from Stratum 4 are listed in Table 2. The wide variety of tool forms indicate a generalized suite of domestic activities. This is consistent with the feature and structure data.

The most common type of modified item is the utilized flake, followed by biface fragments. Formally shaped unifacial implements are very rare, and systematic reduction of chipped stone is limited to biface production.

Production stage analysis (see Callahan 1979; Collins 1975) of bifacially worked items indicates that most lithic production activities involved late-stage reduction. Initial exploration and reduction stages were probably performed at nearby chert source areas. Large numbers of late-stage biface fragments were recovered from the northwest section of the North Block, in an area west of Structure 3. A large concentration of debitage in the same area suggests that this portion of the site may have served as a flaked stone tool production and use area. Because this lithic production and use area does not appear to be directly associated with Structure 3, it may be affiliated with the proposed later Newtown occupational episode.

Examination of projectile point variability indicates some variety in point styles within Stratum 4. Corner notched or expanding stem points that are similar to Steuben, Chesser, or Lowe types (Morse 1963; Prufer 1967; Winters 1968) are the most prevalent (Figure 4). This point style is commonly associated with Newtown components in the central Ohio River Valley. Differential distribution of these point types with respect to structures and non-structure areas was not observed. Chipping patterns and haft element attributes suggest that manufacturing techniques for these point types closely resemble those used in the late Middle Woodland period (see Montet-White 1968). The recovery of Adena-like contracting stem points suggests the presence of limited episodes of Early to Middle Woodland occupation at the site. It is possible, however, that these points are associated with the initial Newtown occupation of the Project Area. Spatially, concentrations of Adena-like points occur immediately to the east of Structure 1 and between structures 2 and 3. If the Adena-like points are associated with the

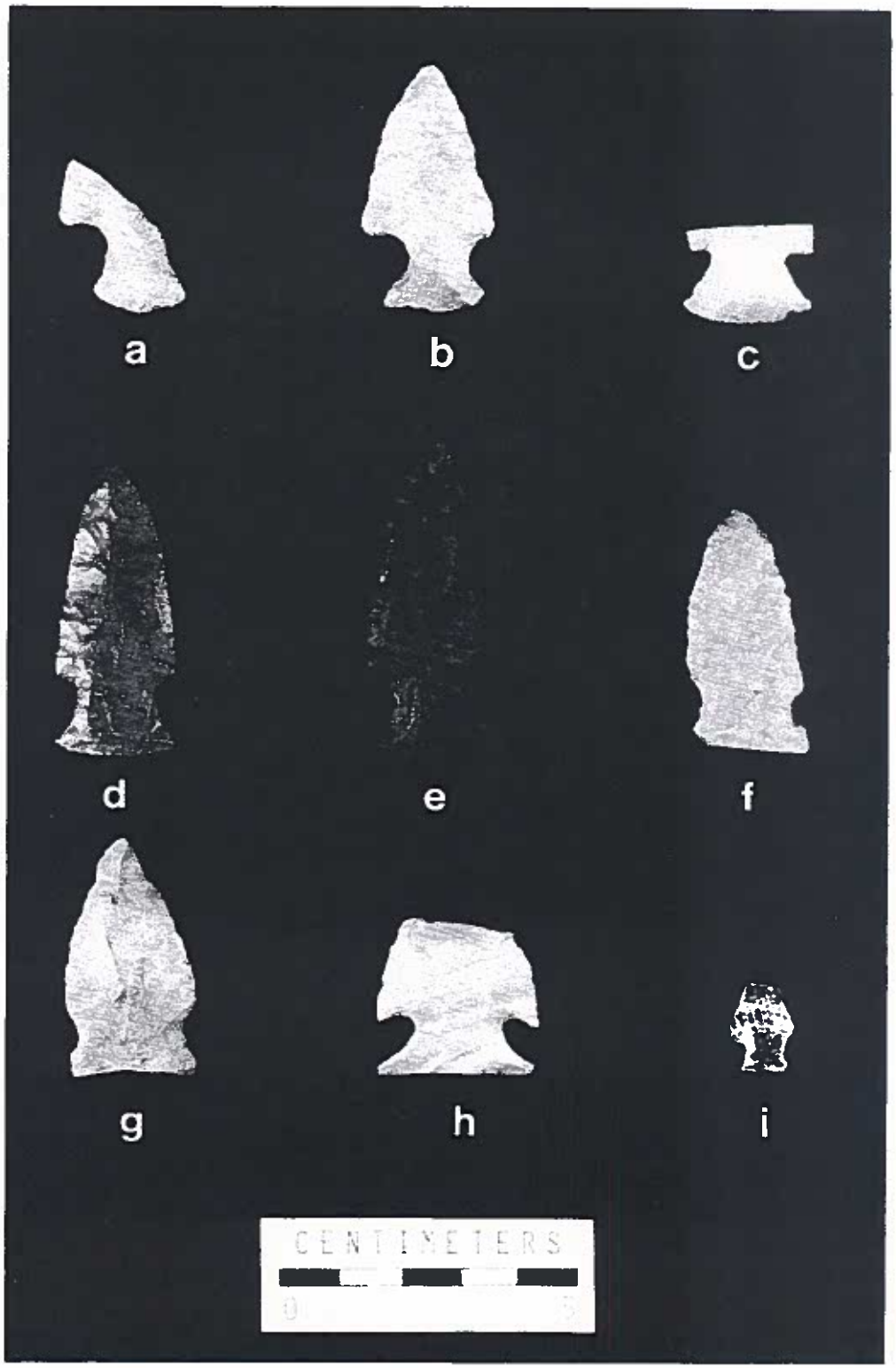

Figure 4. Projectile points: a-b, corner notched; c-h, Steuben/Lowe/Chesser; i, quartz crystal.

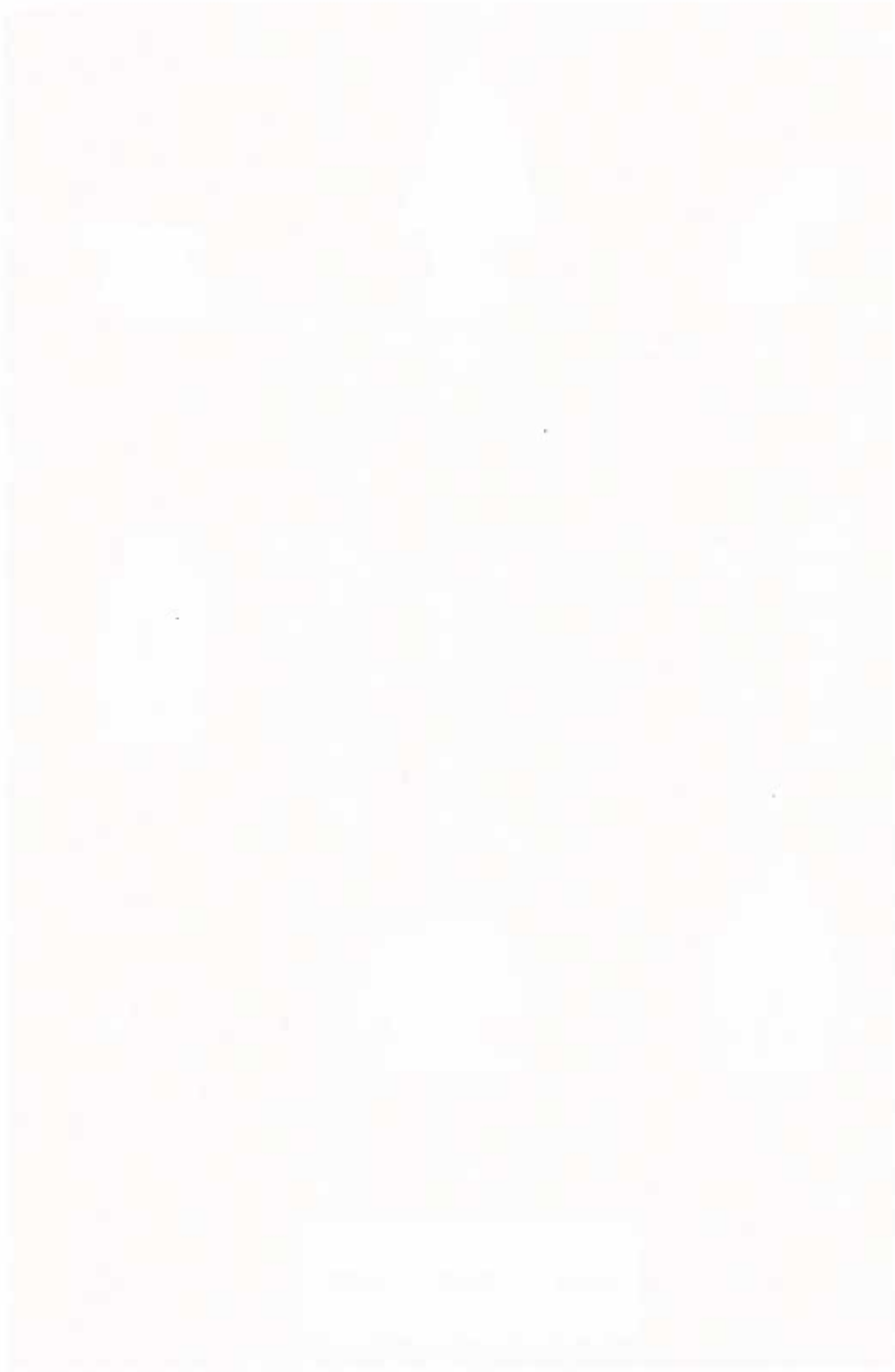

Table 2. Distribution of Chipped and Ground Stone Items Within Major Provenience Groups at the Hansen Site.

Tool Type	General Site	North Block Units	South Block Units	Features	Other Strata	Total
Unifaces						
Utilized flakes	73	82	37	48	2	242
Scrapers	8	3	5	6	2	24
Deeply notched item	2		1	2		5
Perforator	1	6	1	1		9
Backed uniface	2	2		1	1	6
Burin			1			1
Resharpening flakes		2	1	1		4
Other uniface	3	1		3		7
Total	89	96	46	62	5	298
Bifaces						
Scrapers	2	3	1	4		10
Perforators	3	1	1	4		9
Backed biface	1			1		2
Pieces esquillees	1	3	6	2		12
Rough bifaces	6	4	3	8		21
Thick biface/fragments	23	33	15	17	1	89
Thin biface/fragments	44	62	28	48	4	186
Projectile points						
Corner-notched	4	18	9	6		37
Side-notched			3	1		4
Expanding stem	2	3	3	2	3	13
Contracting stem	2			1	1	4
Large triangles	3	4	2	6	1	16
Small triangles	4		2			6
Pentagonal				2		2
Rejuvenated points		1	1	4		6
Indeterminate	1	1	1	2		5
Miscellaneous biface	1	4	3	3		11
Total	97	137	78	111	10	433
Cores						
Amorphous	43	30	47	75		195
Bipolar	16	14	10	12		52
Prepared	1		2	4		7
Core tools	3			1		4
Fragments	3					3
Total	66	44	59	92	0	261
Ground Stone						
Crushed/battered items	14	19	22	22	1	78
Abraded items	1	7	1	8	1	18
Combination	3	1	2	2		8
Celt	1		5			6
Axe fragment			1			1
Gorget				2		2
Miscellaneous items	3	11	6	4		24
Total	22	38	37	38	2	137

early Newtown occupation, then their proximity to the structures lends support to the interpretation that the structures are also affiliated with the proposed initial Newtown occupational episode.

Pentagonal points (n=2), Jack's Reef corner notched points (n=7), and large triangular points (n=16) are probably associated with the proposed later Newtown occupation. Pentagonal points and large triangular points were recovered from features (45, 98, and 102), which yielded radiocarbon determinations dating to the sixth century. In addition, all of the Jack's Reef points were recovered from the general vicinity of the late-stage biface production and use area described above.

A possible post-Newtown occupation of Stratum 4 is represented by a few scattered small triangular and flake points. Only two examples of triangular points were recovered from Stratum 4 contexts; most were recovered from general site proveniences or from the plow-disturbed Stratum 3.

DEBITAGE

Two aspects of the debitage were examined: flake type and material type. Specific flake types may be either signatures for different manufacturing techniques, or may be assigned to specific stages of a bifacial reduction manufacturing trajectory (Collins 1975; Raspet 1979; Stahle and Dunn 1984). The formal chipped stone items indicated that almost all of the lithic debitage was a by-product of biface manufacturing. Four flake types were used to define a bifacial reduction trajectory. These flake types represent progressive decortication, shaping, and thinning of bifacial items. Debitage produced by bipolar flaking and blade production was also observed. Two other flake types, broken flakes and angular fragments, were common, but could not be assigned to a specific flaking technique or reduction stage. Table 3 shows the distribution of flake types with respect to gross provenience categories.

When densities of debitage per liter of excavated sediment are plotted, concentrations can be identified (Figure 5). Higher density values tend to be associated with non-structure areas, with the highest concentrations present in the northwestern quadrant of each excavation block. The North Block concentration consists mainly of bifacial thinning and broken flakes, indicating late-stage bifacial reduction in this area. The South Block concentration exhibits high proportions of bipolar flakes, in addition to flakes from bifacial reduction. Large numbers of tested alluvial gravel cores also occur in this area. The low debitage densities near structures may suggest that lithic reduction was primarily an outdoor activity. The large concentrations of debitage in non-structure areas may be affiliated with the proposed later Newtown occupation and reflect changes in lithic reduction activities through time.

Though true blades (Montet-White 1968; Pi-Sunyer 1965) were rare at the site, 14 were recovered from North Block contexts. Since true

Table 3. Distribution of Flake Types.

Numbers in parentheses indicate percentages within provenience groups.

Flake Type	General Site	Units	Stratum 4 Features	Other	Total
Secondary	535 (15.7)	2055 (12.9)	643 (18.9)	134 (22.1)	3367
Tertiary	448 (13.1)	1431 (9.0)	344 (10.1)	69 (11.4)	2292
Late-stage	269 (7.9)	1494 (9.3)	275 (8.1)	52 (8.6)	2090
Bifacial thinning	553 (16.2)	2212 (13.8)	427 (12.5)	671 (11.1)	3259
Broken	1366 (40.1)	6632 (41.5)	1185 (34.8)	197 (32.5)	9380
Angular Fragment	131 (3.8)	1063 (6.7)	251 (7.4)	29 (4.8)	1474
Bipolar	102 (3.0)	1078 (6.7)	278 (8.2)	58 (9.6)	1516
Blade	3 (0.1)	14 (0.1)	0	0	17
Total	3407 (99.9)	15979 (100.0)	3403 (100.0)	606 (100.1)	23395

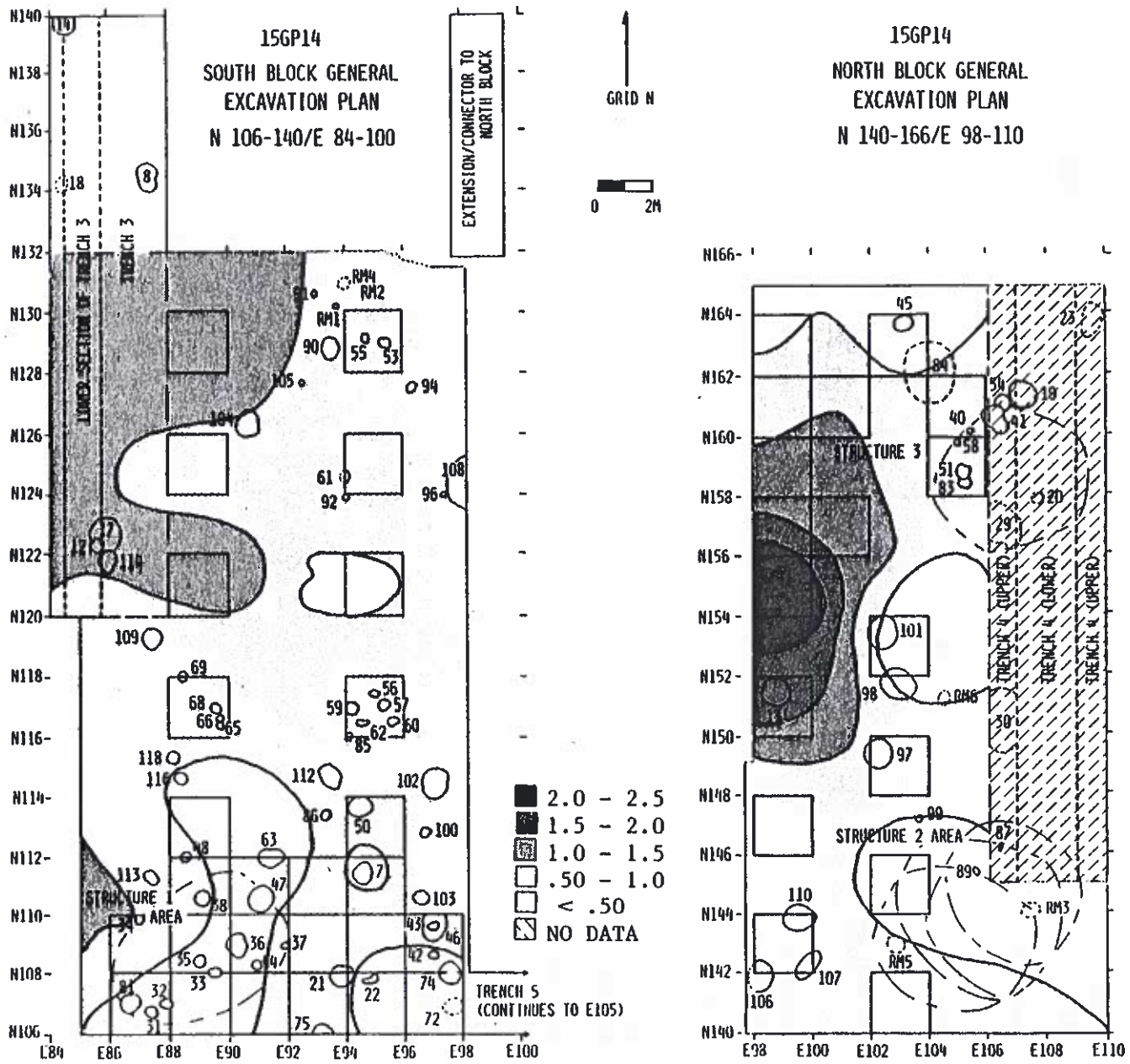

Figure 5. Debitage densities: per liter of sediment from general excavation units.

blades are more common during the Middle Woodland period than the Late Woodland period, the specimens recovered from Hansen may be associated with the proposed early Newtown occupation. Unfortunately, they could not be spatially associated with any of the structures but were instead scattered throughout the North Block.

The second aspect of the debitage analysis entailed examination of raw material types. Five material groups were differentiated, based on published descriptions by Boisvert et al. (1979a) and Stout and Schoenlaub (1945). Group A consists of combined Haney, Paoli, and St. Louis cherts that outcrop locally in the Mississippian Newman limestone formation. Group C is composed of Upper Mercer, Breathitt, and Kanawha cherts from locally outcropping Pennsylvanian formations. Upper Mercer chert is the most common type in this group. Group F is composed of non-local Ohio Flint Ridge (Vanport formation) chert, non-local Boyle chert, and a variety of minor identified chert types which are mainly non-local in origin. Another group (H/L) is composed of two major varieties of water-worn pebbles derived from gravel bars in the Ohio River. Group K consists of unidentified materials, many of which are burned.

Table 4 shows the distribution of material type groups across major provenience divisions. Group A is the most common, but significant quantities of Groups C and H/L are also present. Figure 6 shows the distribution of selected chert groups represented as proportions of the total number of debitage items. Only materials recovered from 6.35 mm (1/4 inch) screening of excavation units is included.

Newman formation chert is almost uniformly distributed within the excavation blocks, but other types show distinct clusters. The Upper Mercer/Group C chert occurs in significant proportions only in the North Block. Its occurrence in a non-structure area suggests that exploitation of this chert type may have been temporally restricted to the proposed later Newtown occupational episode.

Ohio Flint Ridge chert occurs in high concentrations only in one small cluster in the North Block. This is a material type which was extensively traded during the Middle Woodland period, and its discrete distribution at Hansen may indicate a specific locus of early Newtown activities or features. This concentration spatially overlaps the Adena-like points discussed above, but does not overlap with the Group C concentration. Another small concentration of Ohio Flint Ridge chert is found just to the east of Structure 1 in the South Block. This pattern of discrete clusters of non-local cherts near structures suggests that non-local chert use may have been more common during the proposed initial Newtown occupational episode.

Groups H and L were combined on the assumption that all local river pebble cherts would be exploited in a similar manner. Their highest proportions occur in areas which also have large numbers of bipolar flakes and tested cores. These material types were probably exploited only on an expedient or exploratory basis. The presence of concentrations of river pebbles near Structure 1 as well as non-structure areas suggests that use of these raw materials cannot be assigned to a specific Newtown occupational episode.

Table 4. Distribution of Raw Material Groups.

Numbers in parentheses are percentages within the provenience group.

Material Type	General Site	Units	Stratum 4 Features	Other	Total
A	1755 (51.5)	6645 (41.6)	1193 (35.1)	222 (36.6)	9815
C	737 (21.6)	2639 (16.5)	233 (6.8)	34 (5.6)	3643
F	40 (1.2)	377 (2.4)	105 (3.1)	8 (1.3)	530
G	20 (0.6)	97 (0.6)	14 (0.4)	6 (1.0)	137
H	212 (6.2)	1867 (11.7)	514 (15.1)	93 (15.3)	2686
I	38 (1.1)	288 (1.8)	40 (1.2)	8 (1.3)	374
K	263 (7.7)	2473 (15.5)	684 (20.1)	94 (15.5)	3514
L	342 (10.0)	1593 (10.0)	620 (18.2)	141 (23.3)	2696
TOTAL	3407 (99.9)	15979 (100.1)	3403 (100.0)	606 (99.9)	23395

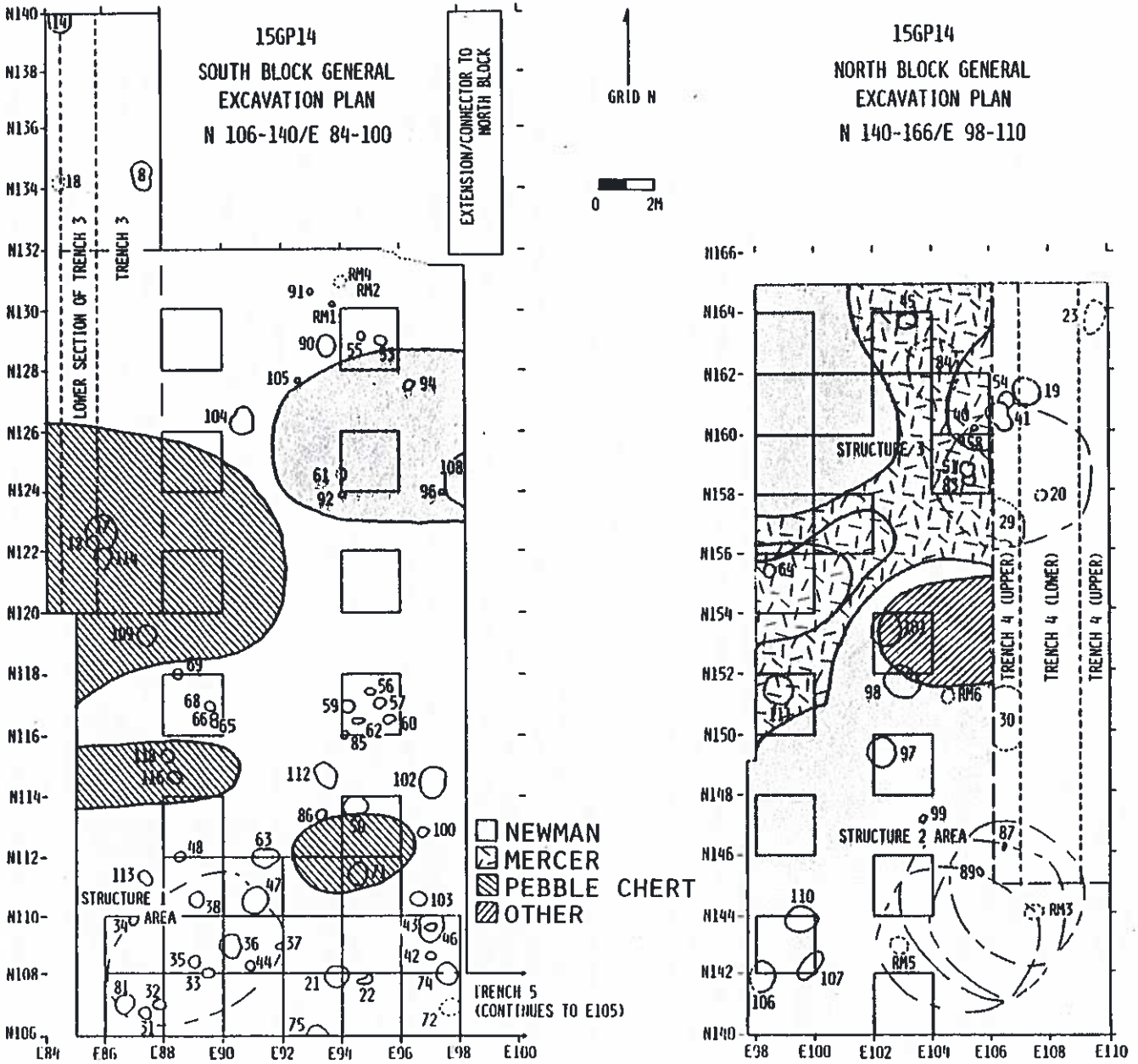

Figure 6. Areas of high concentrations of selected raw material groups measured as a proportion of material recovered from each general excavation unit: Newman > 40%; Upper Mercer > 20%; Pebble chert > 30%; Other (non-local) chert > 5%.

Examination of the distributions of flake and material types suggests two patterns of raw material exploitation within the Project Area. One pattern, that of small concentrations of specific raw materials near structure areas, suggests these concentrations may represent household-use of certain chert materials and may be associated with the proposed early Newtown component. The other pattern, that of high densities of selected chert groups (C and A) in non-structure areas, suggests that chert reduction and use may not have been tied to specific households, but may reflect instead a more communal organization of activities. As with the sixth century large deep cylindrical pits that are also interpreted as having been associated with communal activities, chert groups C and A may be associated with the proposed later Newtown episode.

CERAMICS

Of the 21,658 sherds recovered from Hansen, only 1,678 were subjected to detailed analysis. The remainder were either undecorated body sherds less than 4 cm^2 or were split sherds. Of the analyzed sherds, 270 have only general site provenience and are not discussed in this paper (Table 5). Unlike the lithic debitage, most of the analyzed ceramics came from features. This reflects both the generally poor preservation environment of the Stratum 4 A Horizon paleosol compared to undisturbed features and also the general scarcity of midden refuse at Hansen. The low densities of refuse material may be a function of repeated short-term utilization of the Project Area and/or a result of refuse disposal in overbank areas or other uninvestigated portions of the site.

The majority of ceramics can be assigned to the types Newtown Cordmarked and Newtown Plain (McMichael 1984). A distinct angular shoulder (Figures 7g-i,8j-o) is probably the most distinguishing attribute of Newtown ceramics, but not all vessels exhibit this trait. Both Newtown types exhibit mainly vertical to slightly inslanting rims (Figures 7a-f,8a-i). Jars are the predominant vessel form and bowls are rare. Though Newtown ceramics from Hansen are tempered with a variety of crushed rock alone or in combination, including limestone, mudstone, and chert as well as quartz/feldspar grit and fired clay, most sherds are tempered with limestone.

Other ceramic types are also present in low quantities in the assemblage. Several rims compare favorably to McGraw Cordmarked (Figure 8p), a Middle Woodland utilitarian ware (Prufer 1965). A few sherds can be assigned to Connestee series (Middle Woodland) types (Keel 1976), indicating some degree of interaction with the Appalachian region. Minor amounts of checked-, simple-, dentate-, and complicated stamped sherds were also recovered. Check stamping was observed in combination with angular shoulders and cordmarking. Check stamped sherds were also present in Newtown assemblages from Pyles (Railey 1984) and from Bentley (Henderson and Pollack 1985), and they appear to constitute a minor type in Newtown ceramic assemblages. The inclusion of stamped decorations in Newtown assemblages again points out the temporal overlap of the early part of the Newtown phase with the late Middle Woodland period.

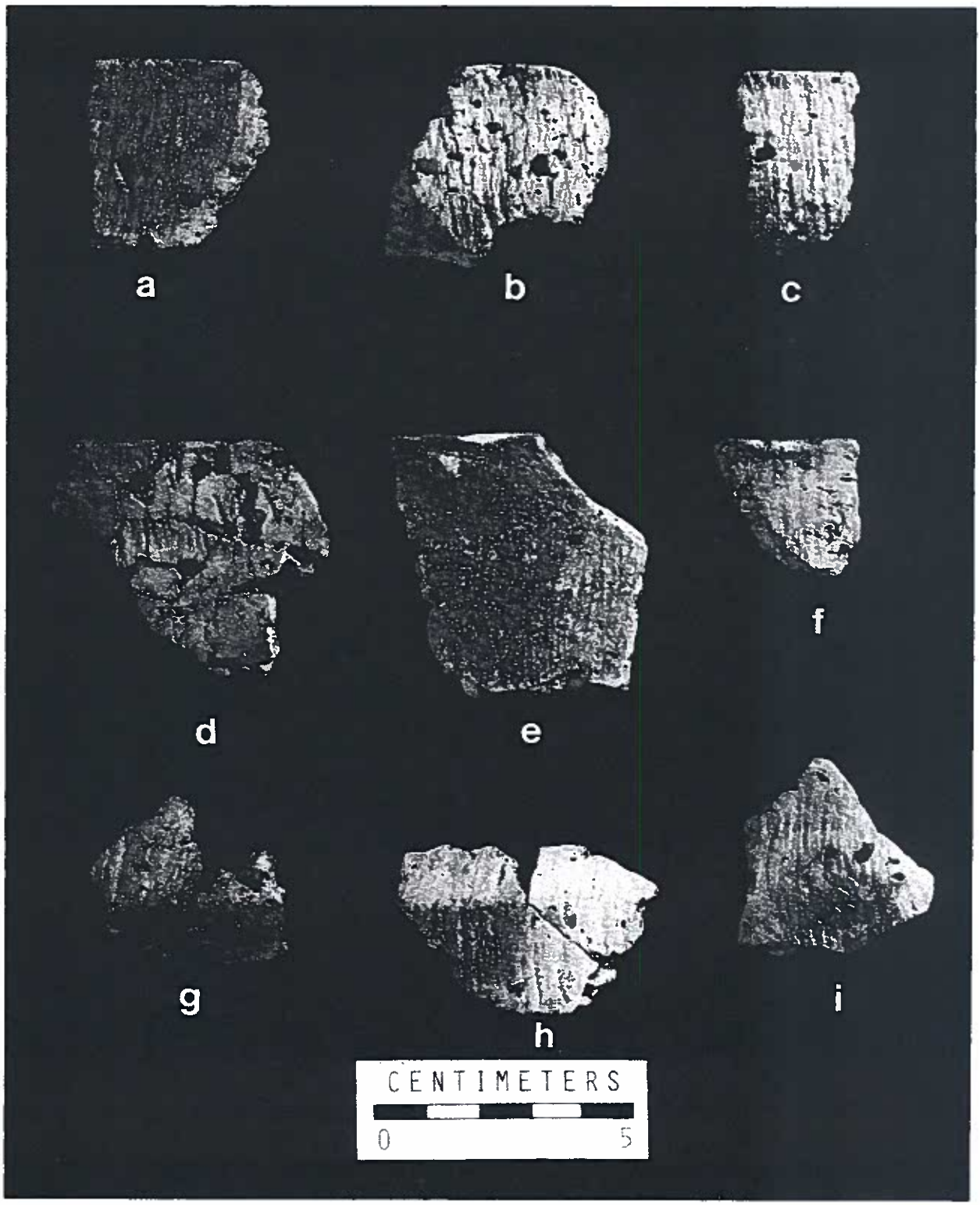

Figure 7. Newtown Cordmarked ceramics: a-f, rims; g-i, angular shoulders.

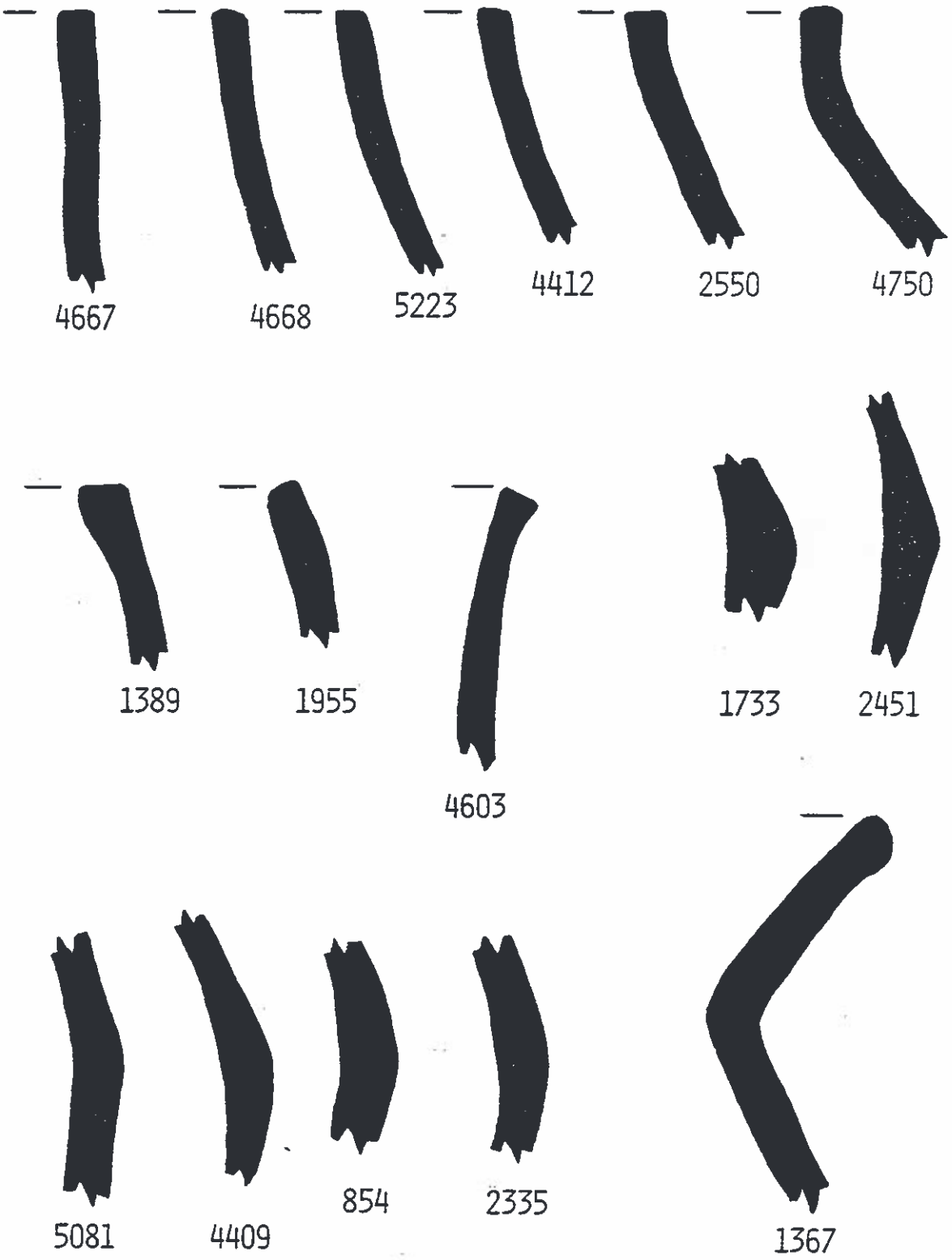

Figure 8. Ceramic profiles: a-i, Newtown Cordmarked rims; j-o, Newtown Cordmarked angular shoulders; p, McGraw Cordmarked rim.

Table 5. Ceramic Type Frequencies.

Numbers in parentheses are percentages within the provenience group.

	General Site		Stratum 4/4A		Strata 5-7		Total	
Newtown								
Cordmarked	101	(65.2)	922	(81.1)	5	(100.0)	1028	(79.3)
Plain	15	(9.7)	80	(7.0)	0		95	(7.3)
Check Stamped	6	(3.9)	43	(3.8)	0		49	(3.8)
Unidentifiable Surface Treatment	2	(1.3)	41	(3.6)	0		43	(3.3)
McGraw								
Cordmarked	14	(9.0)	31	(2.7)	0		45	(3.5)
Plain	1	(0.6)	4	(0.4)	0		5	(0.4)
Unidentifiable Surface Treatment	0		2	(0.2)	0		2	(0.1)
Turner Simple Stamped	1	(0.6)	1	(0.0)	0		2	(0.1)
Pickwick/Mann								
Complicated Stamped	0		1	(0.0)	0		1	(0.1)
Connestee								
Brushed	0		4	(0.4)	0		4	(0.3)
Checked Stamped	1	(0.6)	2	(0.2)	0		3	(0.2)
Plain	1	(0.6)	0		0		1	(0.1)
Untyped "Hopewellian"								
Dentate Stamped	7	(4.5)	3	(0.3)	0		10	(0.8)
Untyped "Southeastern"								
Complicated Stamped	1	(0.6)	1	(0.0)	0		2	(0.1)
Untyped "Southeastern"								
Cordmarked/Simple Stamped	0		1	(0.0)	0		1	(0.1)
Fort Ancient Types	5	(3.2)	1	(0.0)	0		6	(0.5)
Total	155	(99.8)	1137	(99.7)	5	(100.0)	1297	(100.0)
Untyped (Cordmarked, Plain, Scraped, Net-impressed, Cordwrapped Dowel-impressed, and unidentifiable surfaces)	115		266		0		381	
Unanalyzed (less than 4 square cm)	902		18,987		91		19980	
Total	1172		20390		96		21658	

Other researchers have noted that temper is not reliable as a temporally sensitive attribute for Late Woodland ceramic types in the middle Ohio valley (Henderson and Pollack 1982, 1985; Seeman 1980). Sherds which are clearly assignable to Newtown types in the Hansen assemblage exhibit a wide variety of tempers. Though tempering is not a reliable temporal indicator on a regional basis, it may be temporally sensitive at the local or intra-site level. Even if temper is not temporally sensitive at the intra-site level of analysis, examination of temper distributions may suggest activity areas within the Project Area or maybe used to delineate subassemblages at the household level of resolution. For these reasons, temper distributions at Hansen were subjected to additional examination.

Since the Hansen Site's radiocarbon dates suggest two Newtown occupations occurred in the Project Area, one in the late Middle Woodland period and the other in the early Late Woodland period, it was suspected that distributions of temper types within the Project Area might be used to temporally differentiate these occupational episodes. Figures 9 and 10 show the distribution of the proportions of limestone tempered and grit tempered analyzed ceramics from hand-excavated units. In these figures, sherds which are either exclusively or primarily limestone tempered are included in the limestone temper group. Sherds whose primary temper is grit are included in the grit group. Grit temper is proportionally more common in the North Block units, but is not exclusive to that portion of the site. If higher proportions of grit temper represents a slightly earlier occupation, the temper distributions suggest that an earlier occupation is at least present in the North Block. If limestone temper is more prevalent in the later Newtown occupation at Hansen, the distribution of limestone tempered sherds partially corroborates the interpretations of the lithics and feature/structure data. High proportions of limestone tempered ceramics are generally found in the non-structure areas of the site.

Specific ceramic attributes may also reflect temporal differences. Figure 11 shows the distribution of angular shoulders. They are present in both the North and South Blocks and are associated with all of the structures. Their nearly ubiquitous distribution confirms that angular shoulders are a recognizable signature of Newtown ceramics but are apparently not temporally sensitive within the Newtown time span. Figure 12 shows the distribution of selected surface decorations which are assumed to be temporally sensitive. Check stamped sherds are present in both blocks and like angular shoulders, may not be sufficiently temporally sensitive to differentiate between the two Newtown occupations proposed for Hansen. Connestee series sherds and dentate stamped and complicated stamped sherds are much more common in the North Block, near structures 2 and 3 and may be associated with the proposed early Newtown occupation.

The major implication of the ceramic attribute distributions is that there may be temporally sensitive attributes (i.e., temper and surface treatment) which occur in minor amounts in Newtown assemblages (see also Henderson and Pollack 1982, 1985; Prufer 1965). While angular shoulders remain a distinctive attribute of Newtown phase ceramics in general,

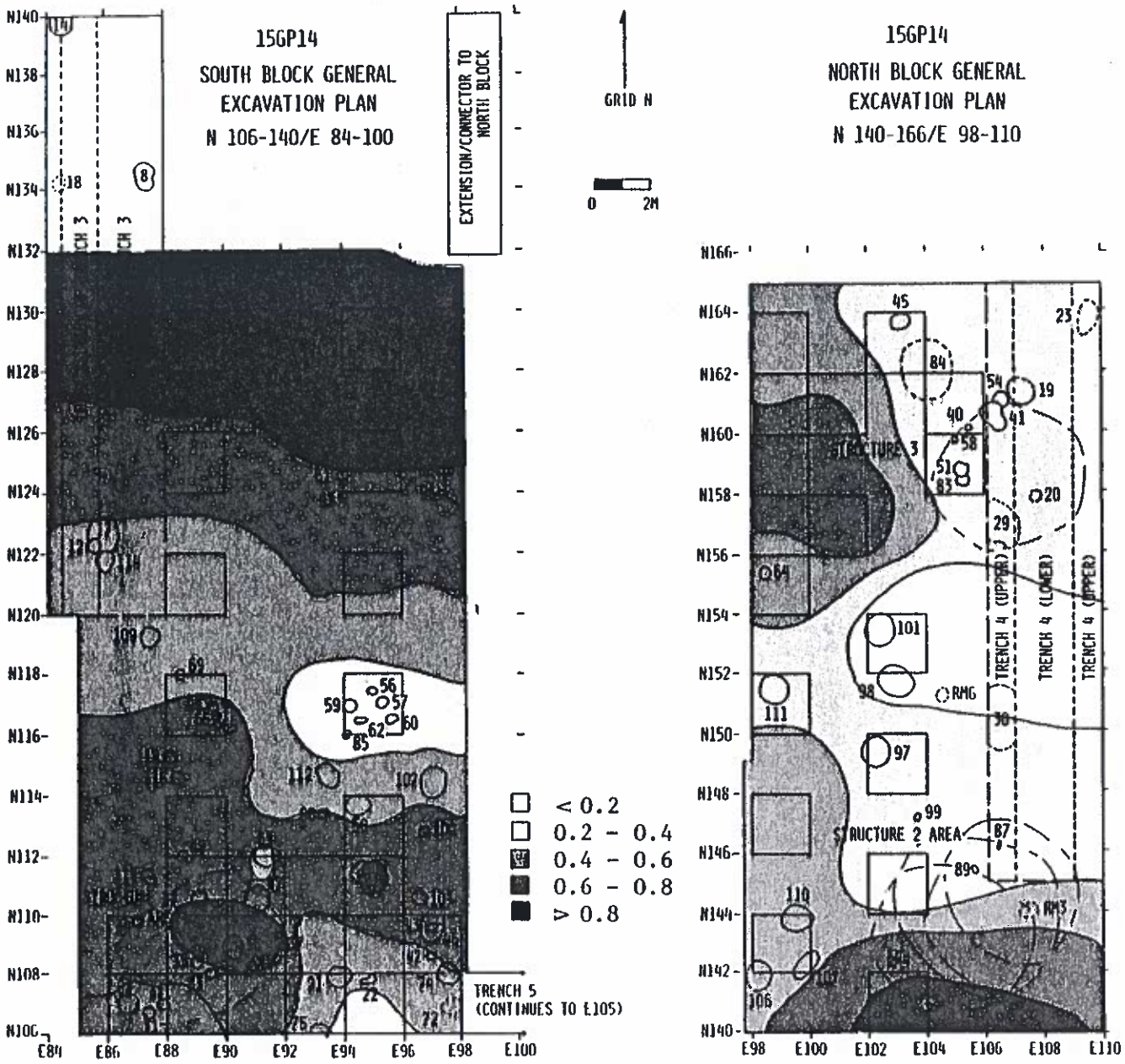

Figure 9. Distribution of proportions of limestone tempered ceramics from general excavation units.

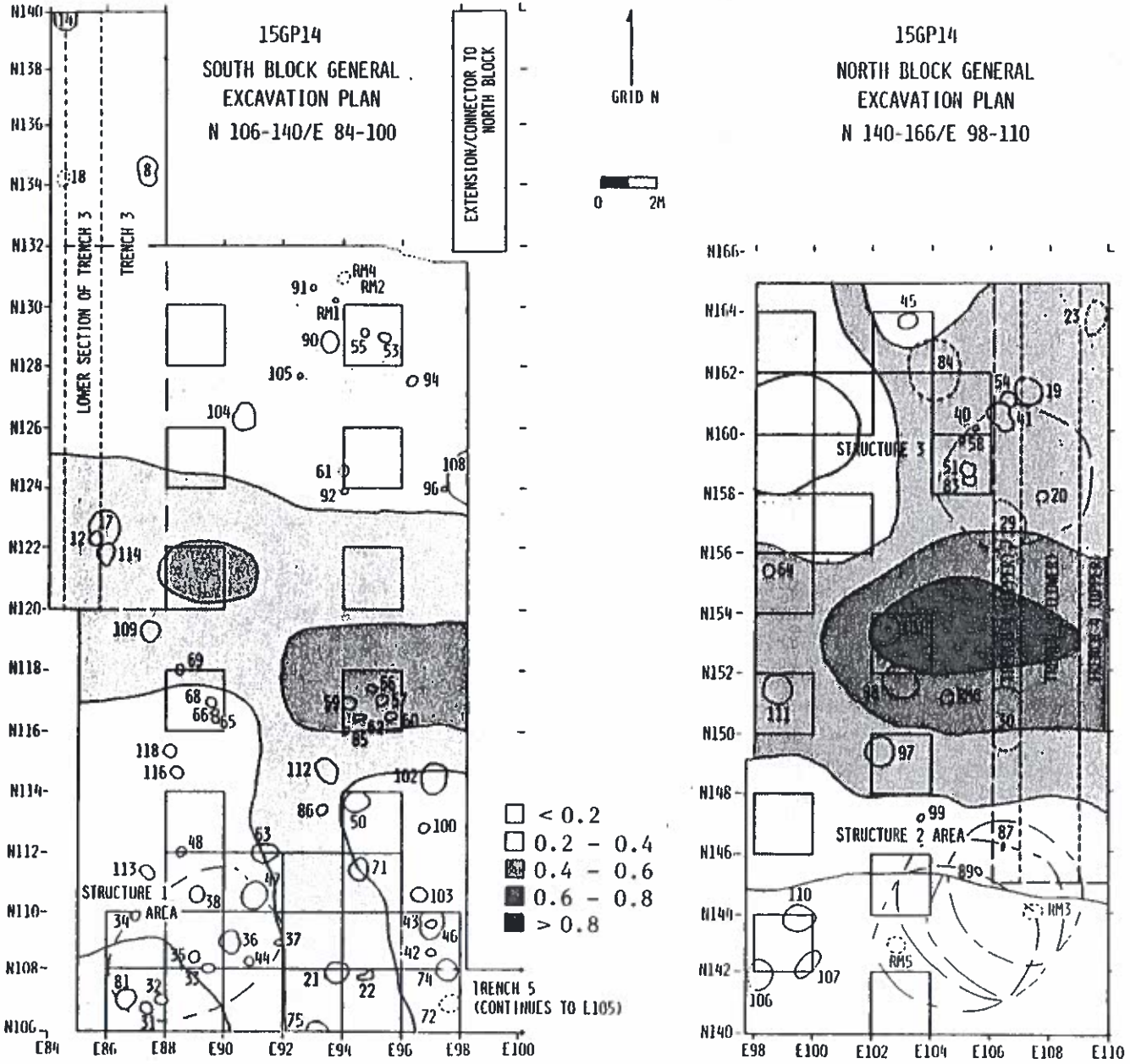

Figure 10. Distribution of proportions of grit tempered ceramics from general excavation units.

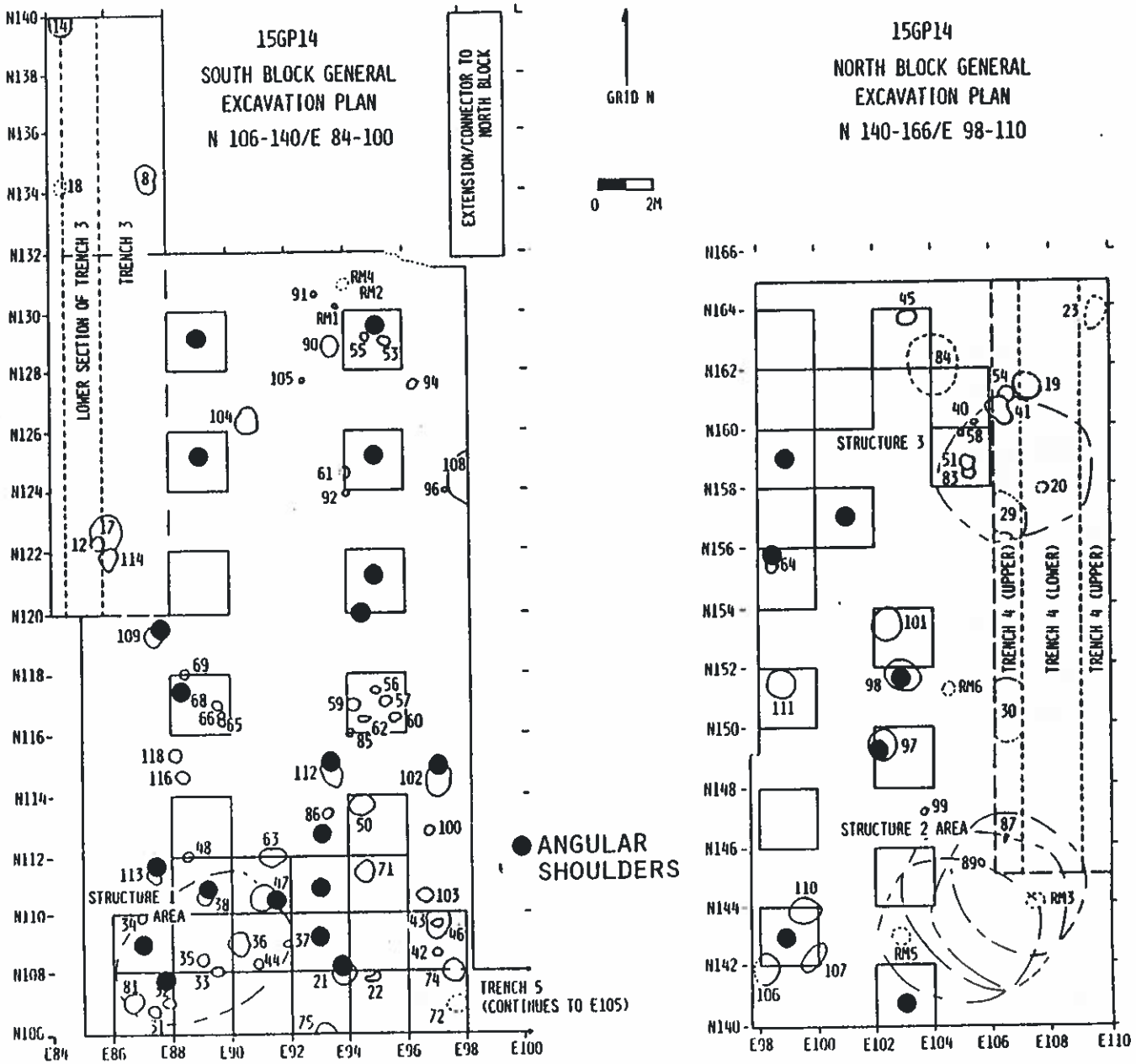

Figure 11. Distribution of angular shoulders.

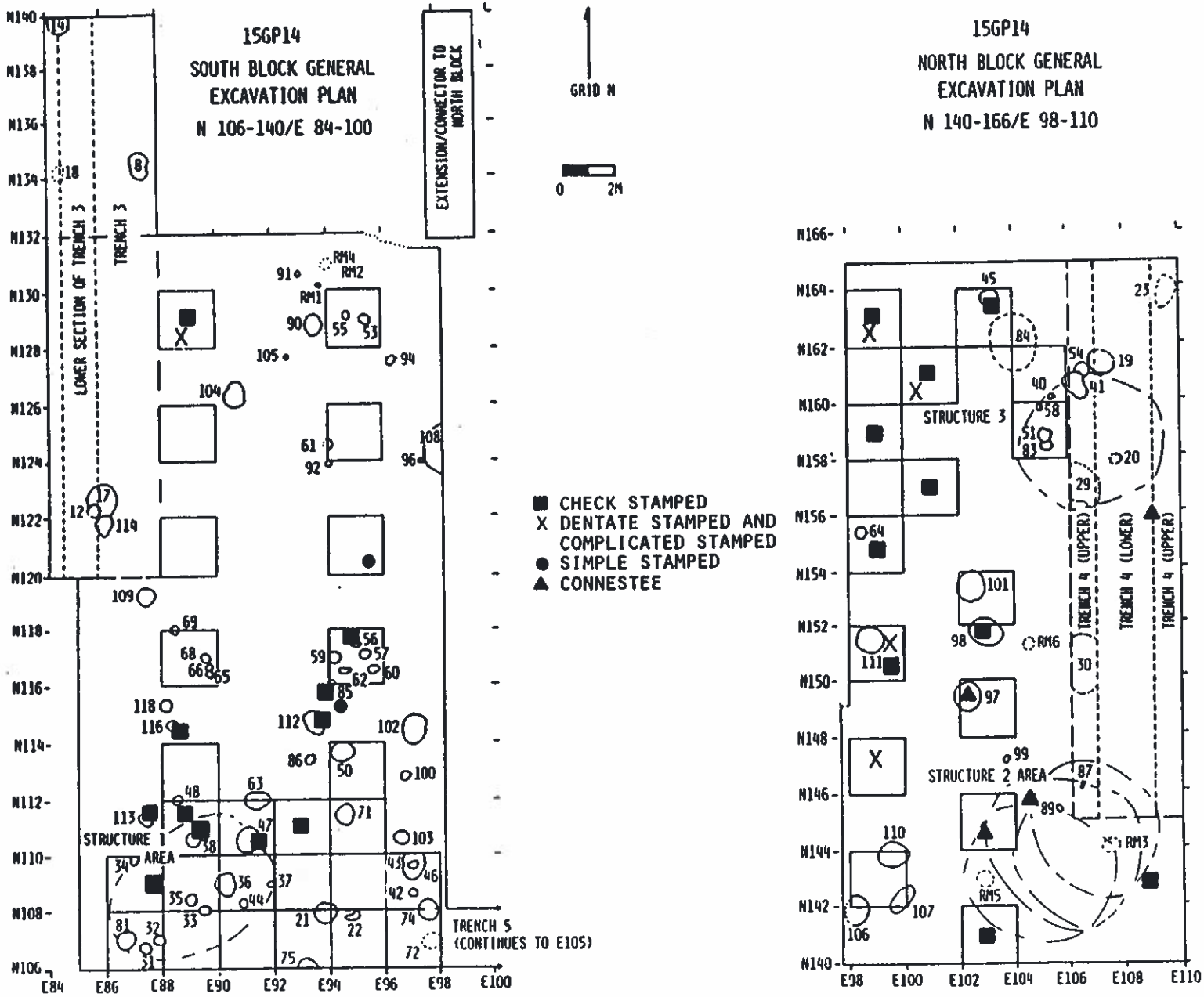

Figure 12. Distribution of selected ceramic decorative attributes.

other decorative and tempering attributes may be useful for identifying early Newtown manifestations. These attributes are most informative when viewed on a relative or proportional scale in context with the remainder of the ceramic assemblage. Even if these attributes prove to have little or no temporal significance, their differential distribution at Hansen indicates that there are recognizable activity or disposal areas which can be identified at the site and which warrant detailed examination.

BOTANICAL ASSEMBLAGE

No corn or bean remains were recovered from the Hansen Site, and the assemblage as a whole represents a generalized hunting/gathering/horticultural subsistence base common to Woodland assemblages in the region (Table 6). Examination of the distribution of botanical remains may provide information on possible changes in subsistence systems through time.

Table 6. Distribution of Botanical Remains Recovered from Flotation Samples.

Numbers in parentheses are gram weights.

	Excavation Units		Features	
	N Block	S Block	N Block	S Block
Wood charcoal	173 (1.37)	290 (2.43)	10311 (134.62)	8403 (95.67)
Nut shell				
Carya spp.	35 (0.64)	642 (16.79)	156 (2.68)	3666 (185.04)
Juglans spp.	87 (1.28)	129 (2.86)	334 (6.67)	597 (13.14)
Juglandaceae	103 (0.75)	711 (6.55)	516 (4.57)	3995 (37.44)
Other	3 (0.03)	2 (0.01)	1 (trace)	26 (0.44)
Other charcoal	5 (0.02)	27 (0.24)	155 (1.46)	363 (3.53)
Seeds	19 ----	51 -----	95 ------	243 ------
Unidentified	3 (0.04)	5 (0.08)	28 (0.31)	107 (0.99)
Total	428 (4.13)	1857 (28.96)	11596 (150.31)	17400 (335.35)

Table 6 shows that quantitative differences exist between the blocks, with the South Block numerically superior. This reflects the higher intensity of occupational activity in general in the southern portions of the Project Area. A comparison of North and South block botanical assemblages in terms of diversity shows very little difference. Both blocks produced a variety of wild plant remains, with hickory and walnut remains being the most prolific categories of subsistence remains. A variety of native domesticates is also present, including squash, marsh elder, goosefoot, knotweed, and maygrass. These remains were recovered from features in both blocks, and from features which are associated with both the proposed initial and later Newtown occupational episodes at Hansen (Figure 13). While there are clear quantitative differences between the blocks and between the various features, qualitatively they represent nearly identical botanical assemblages. The only major difference between excavation blocks is the higher proportion of walnut in the North Block. This difference may be related to exploitation of a more disturbed or variable habitat during one of the occupational episodes. It is not possible from this botanical evidence alone to assign the walnut remains to either of the proposed Newtown occupational episodes. Overall, there is little evidence for change in subsistence systems through time which would parallel the proposed temporal differences in the lithic and ceramic assemblages and site organization discussed previously.

SUMMARY

Limited excavations at the Hansen Site revealed a buried A horizon paleosol with sparse amounts of cultural materials. Radiocarbon dates place the occupation of the Project Area between A.D. 300 and 600, spanning the late Middle Woodland and early Late Woodland periods. Diagnostic artifact assemblages compare favorably to previously defined Newtown materials. The presence of at least three structures and numerous features indicate a generalized domestic utilization of the Project Area, but the lack of superimposed features and the low overall density of cultural materials suggest that the occupation was not continuous during the entire 300 year time span. Botanical remains, lithic debitage, rough rock, and features all exhibit increasing densities toward the more elevated southern portions of the site. Distributions of major material classes show a tendency for lithic debitage to be concentrated more heavily in non-structure areas, and at least two probable lithic reduction areas were identified.

On the basis of the time span indicated by the radiocarbon dates and some systematic differences identified in feature sizes and structure/feature clusters, two separate occupational episodes were proposed for the Project Area. Various material classes were examined for distributional evidence that would support this interpretation of the radiocarbon and feature/structure data. Items diagnostic of the Newtown phase such as Lowe/Steuben/Chesser points and angular shouldered ceramics show generally ubiquitous distribution within the Project Area. Botanical remains are similarly distributed, suggesting that major changes in adaptive strategies did not occur during the span of time represented here.

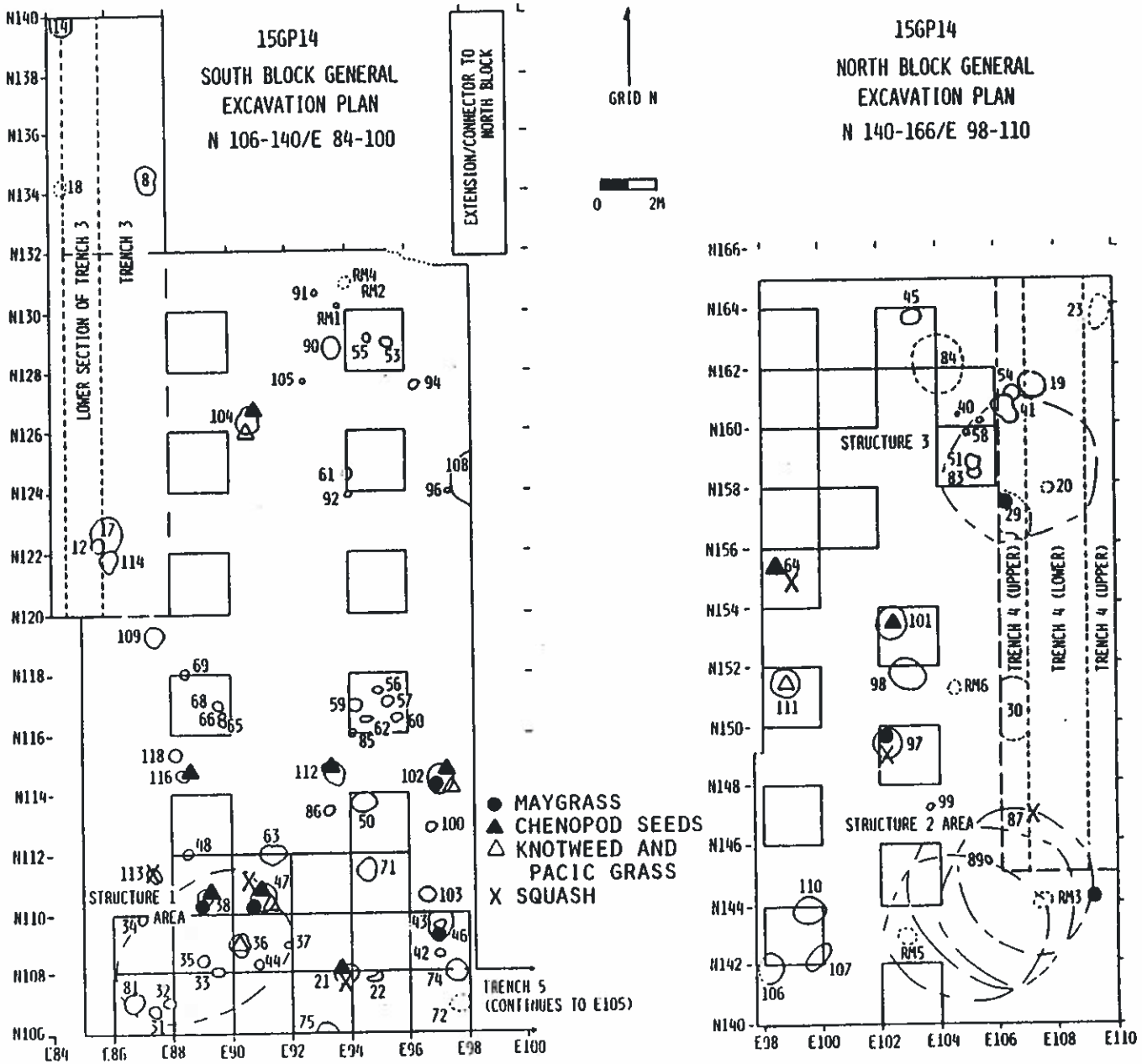

Figure 13. Distribution of starchy seeds and squash remains.

The distribution of specific ceramic attributes and chipped stone raw material types and flake types suggest the presence of two different spatial patterns which may be related to the proposed sequential occupational episodes of the Project Area. Higher proportions of Ohio Flint Ridge chert, true blades, and ceramics with diagnostic minor surface treatments found in close proximity to structures suggest that an early Newtown occupational episode would include all of the domestic structures and associated features. This earlier component probably dates to near the end of the Middle Woodland period, possibly between A.D. 300 and 450.

A later episode of occupation is represented by high concentrations of debitage in non-structure areas and an almost exclusive use of outcrop-derived Upper Mercer or Breathitt chert in late-stage biface production and use activities. Also spatially associated with this episode are pentagonal, Jack's Reef, and large triangular points. Finally, very large cylindrical pit features, which are apparently not directly associated with domestic structures, also seem to be affiliated with the later use of the site. Radiocarbon assays and diagnostic lithic tools indicate that this occupation probably took place in the early part of the Late Woodland period, between A.D. 500 and 600.

If these data are interpreted correctly, two Newtown episodes of occupation are represented within this 300 year interval of time. An alternative interpretation of the data would be that the differential spatial patterning represents activity areas that resulted from a single extended Newtown occupational episode. The statistical differences between the earliest and latest radiocarbon dates makes the latter interpretation unlikely, but not impossible.

At the risk of extrapolating on the basis of this single case, more general interpretations may be inferred from this analysis. Since the Newtown phase apparently spans the traditional boundary between the Middle and Late Woodland periods, earlier manifestations of the phase should include minor amounts of Middle Woodland diagnostic materials, but the majority of diagnostic items should be classified as Newtown. Later manifestations of this phase should either lack the Middle Woodland attributes, or they should occur in much lower proportions than in early Newtown phase assemblages. Henderson and Pollack (1982, 1985) have also remarked on the tendency for Newtown assemblages to include minor amounts of materials that would otherwise be considered Middle Woodland. For instance, check stamped ceramics and small numbers of non-local ceramics were recovered from the nearby Bentley Site.

It must be restated that the interpretations presented in this paper are tentative at this time, since they are based on minor differences in spatial distributions and on subtle differences in temporally sensitive attributes. Testing these interpretations using other Newtown assemblages will be a difficult but potentially rewarding task. Identification of Newtown components depends on both accurate radiocarbon dating and examination of relatively large assemblages.

Analysis of coeval components from other sites in the middle Ohio valley should provide welcome comparative data that can be used to

assess the interpretations presented in this paper. The Bentley Site (Henderson and Pollack 1985) may provide a good test case for these propositions, since the excavations covered a broad contiguous area, and the Newtown material assemblage is virtually identical to the Hansen assemblage. Other sites that should provide stratigraphic control for testing these propositions are represented by the Newtown type sites in southwestern Ohio: Turpin and Sand Ridge. Reevaluation of these sites is currently under way (Riggs 1980, 1982, 1986).

The results of the Hansen Site investigations indicate that while radical changes in some aspects of cultural systems, especially social integration and mortuary behavior, occurred between the late Middle Woodland and early Late Woodland periods, other aspects of the cultural system remained stable. Utilitarian ceramic and lithic assemblages remain almost uniform and there is little change in the subsistence system during this time span. Traditional archaeological interpretations of the Middle to Late Woodland transition imply changes in almost all aspects of cultural systems at the end of the Middle Woodland period. The data from Hansen indicate that changes in cultural systems are complex and are not uniformly expressed in all aspects of the system at the same time.

LATE PREHISTORIC SETTLEMENT PATTERNS IN THE BIG BOTTOMS OF FULTON COUNTY, KENTUCKY

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ABSTRACT

Recent fieldwork in the Big Bottoms of Fulton County has yielded a large sample of sites dating between A.D. 700-1700. In this paper, an analysis of selected site attributes (artifact types, site size, and site location) is employed to identify settlement pattern differences between Late Woodland and Mississippi period occupations in the area. Little change is noted between the Late Woodland and early Mississippi period phases, but during the Medley and Jackson phases (A.D. 1300-1700), settlements shift and become increasingly nucleated. This process is interpreted as being associated with the rise of Sassafras Ridge (15Fu3) as a major mound center.

INTRODUCTION

Since its inception, two major goals of the Western Kentucky Project have been to refine the local Mississippi period chronology and to understand the role of major mound centers in the regional Mississippian settlement system. Recent research in the Mississippi River counties of western Kentucky has resulted in an improved Late Woodland and Mississippi period chronology for this portion of Kentucky (cf. Lewis 1982, 1986; Lewis and Mackin 1984; Sussenbach and Lewis 1987; Sussenbach et al. 1986). With the refined chronological sequence in place, research can now begin to focus on local Late Woodland and Mississippi period settlement patterns and their development through time.

To examine prehistoric settlement patterns in the Mississippi River counties of western Kentucky, a site survey of the Big Bottoms region of Fulton County was undertaken in 1986. Since a number of mound sites, large villages, and hamlets had previously been identified in the vicinity of Running Slough, it was felt that an intensive survey of this area, when combined with the previously reported sites, would yield a fairly complete view of the Late Prehistoric occupation of the study area.

This paper examines Late Woodland and Mississippi period settlement patterns identified as a result of the 1986 survey project (Figure 1). The temporal framework used in this paper is based on previous work in the region by R. Barry Lewis (1982, 1983) and research conducted by other Western Kentucky Project personnel (Edging 1985; Sussenbach and Lewis 1987). These investigations have resulted in the definition of

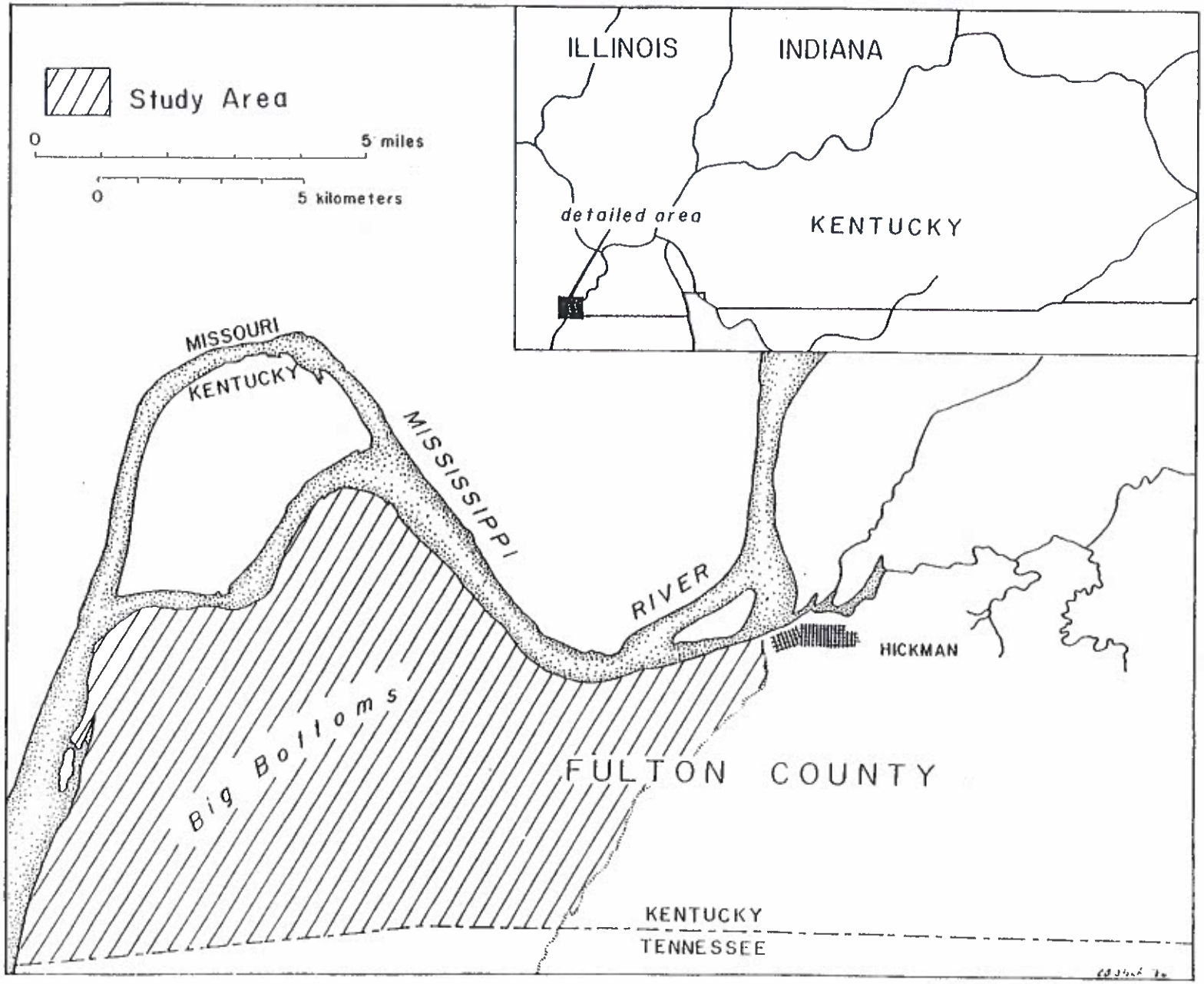

Figure 1. Big Bottoms, Fulton County, Kentucky.

two Late Woodland and four Mississippi period phases (Figure 2). For the purposes of this paper, the settlement patterns in the Bottoms will be discussed in segments of two phases each: Late Woodland (Berkley and Cane Hills), early Mississippi (James Bayou and Dorena), and late Mississippi (Medley and Jackson). This is not to suggest that the grouping of these phases has any cultural reality or significance. Such an approach, while not ideal, is necessary due to the preliminary nature of this study and the difficulty encountered in assigning individual sites to a phase based on surface collected ceramics alone. As additional research is undertaken in western Kentucky, it is anticipated that it will become possible to assign sites with more confidence to specific phases based on surface collected data alone.

It should also be pointed out that it is often difficult to differentiate between Late Woodland and early Mississippi period sites in the western Kentucky region when using surface collected materials. Baytown Plain and Mulberry Creek Cordmarked, characteristic Woodland ceramic types, were present in the region by at least A.D. 400, and continued to be used well into the James Bayou phase (A.D. 900-1100). This represents a time span of at least 700 years, during which Baytown Plain and Mulberry Creek Cordmarked dominated the regional ceramic assemblage. At present, the Western Kentucky Project is just beginning to understand the chronology of technological changes associated with these types. At present, it appears that after approximately A.D. 800, both types were made with increasingly finer pastes and smaller tempering particles, resulting in thinner-walled vessels. This trend is used in this paper to distinguish early Baytown and Mulberry Creek varieties from those made between A.D. 800 and 1100.

The organization of this paper is as follows: 1) the project is briefly described and the environmental parameters of the study area are reviewed; 2) the material culture associated with the Late Woodland, early Mississippi, and late Mississippi phase groups are reviewed, differences in material culture between the Big Bottoms and the rest of western Kentucky are noted, and the settlement pattern associated with each phase group in the study area is described; and 3) Late Woodland and Mississippi period settlement pattern trends in the Big Bottoms are summarized and avenues are presented for future research in the study area.

1986 BIG BOTTOMS SURVEY

The Running Slough survey area is roughly 3,100 ha in size (Figure 1). Of this, about 865 ha, or 28% of the area, was surveyed. Standard pedestrian survey techniques were employed, with investigators walking transects spaced 5 to 15 m apart. Though most fields were in crop, surface visibility throughout the majority of the study area was good to excellent. As a result of this survey, over 25 new sites were located and reported to the Office of State Archaeology at the University of Kentucky. Most of these sites are multi-component in nature and contain at least one Late Woodland or Mississippi period component. When these sites are combined with those already on file with the Office of State

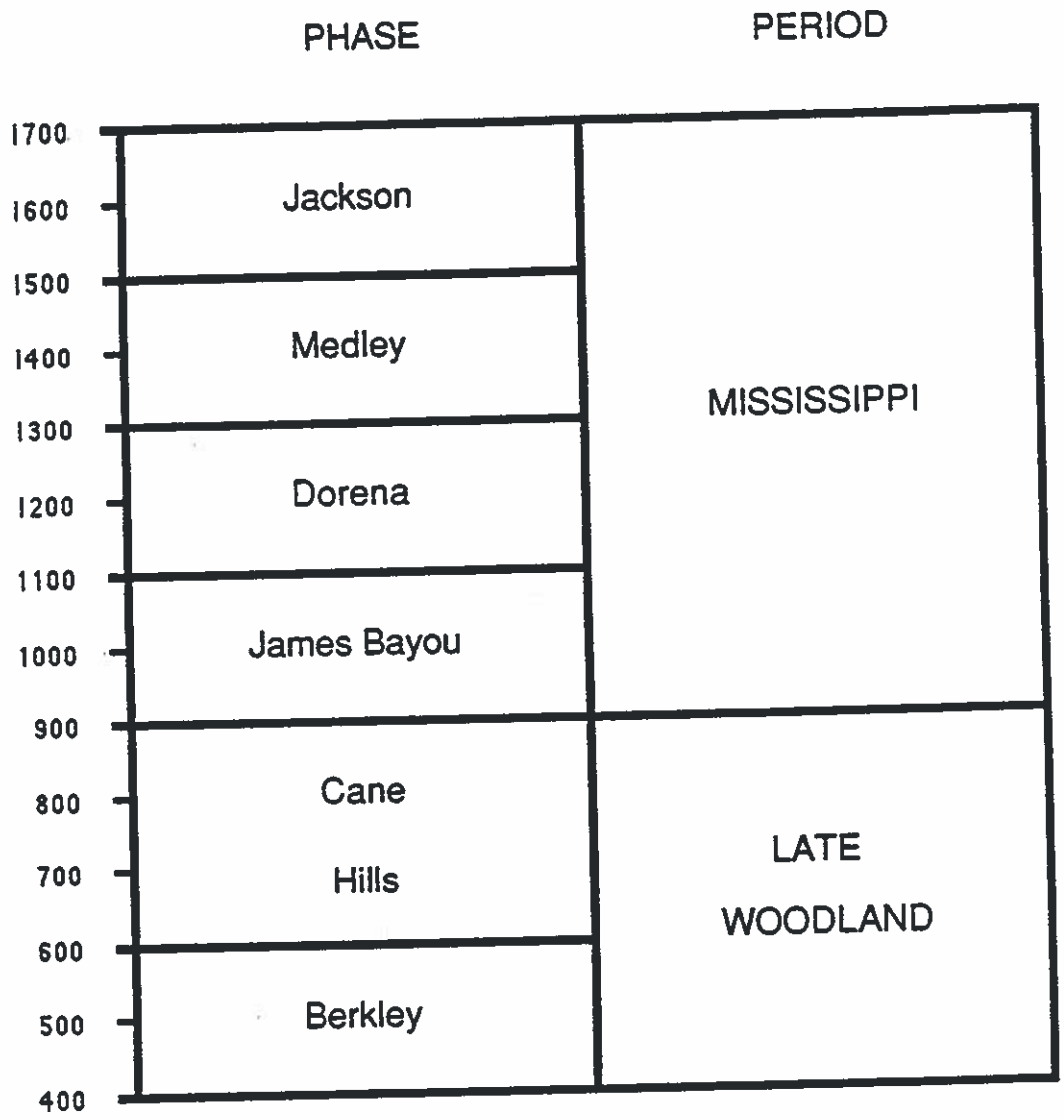

Figure 2. Western Kentucky Late Woodland and Mississippi period chronology.

Archaeology, over 50 Late Woodland or Mississippi period sites can be identified in the Big Bottoms (Figure 3). These sites comprise the data base discussed in the remainder of this paper. Site data are primarily derived from surface collections, although excavations undertaken at a few sites will also be mentioned.

The data on Fulton County soils were obtained from the USDA Soil Survey booklet (Newton and Sims 1964). These data include soil characteristics, agricultural productivity of different soil types (as measured by modern corn yields), and the nature of the geomorphological development of the soil types.

ENVIRONMENTAL PARAMETERS

Prehistorically, the environment of the Big Bottoms would have included cottonwood-sycamore forests on natural levees of the Mississippi River, sweetgum-elm cane ridge forests on extinct river channels, and cypress forests associated with seasonal and permanent swamps, sloughs, and ponds (Lewis 1974). In addition to the forests and water sources, cultivated and abandoned agricultural fields with their secondary growth cover would have been scattered throughout the Bottoms.

In contrast to the bottoms, the bluffcrest to the east would probably have been dominated by beech-tulip forests, and the dissected uplands to the north and east by oak-hickory forests (Lewis 1974). These floral communities would have provided a variety of plant resources, and along with the water sources, would have provided habitats for a wide range of fauna including a large variety of fish species, migratory waterfowl, white-tailed deer, and small- to medium-sized mammals (Lewis 1974). The environmental parameters of the Big Bottoms would thus have provided an ample resource base for the Woodland and Mississippi period inhabitants of this region of Kentucky.

LATE WOODLAND

Two Late Woodland phases have recently been defined for western Kentucky; Berkley (A.D. 400-600) and Cane Hills (A.D. 600-900) (Sussenbach et al. 1986). The Berkley phase is represented by excavations at Indian Camp Lake (15Ce19) (Sussenbach and Lewis 1987) and the Cane Hills phase by recently completed excavations at the Rice Site (15Fu18). Both phases, as defined by Sussenbach et al. (1986) are discussed below.

Mulberry Creek Cordmarked and Baytown Plain ceramics dominate the assemblages of both phases, with a decline in cordmarking and an increase in plain surface treatment through time. Folded and non-folded rims, often with lip notches, occur on both types. Jars are the most common vessel form in these assemblages, although small bowls are also present. During these phases, there is an increase in incurved jar rim profiles. Rim profiles on bowls are vertical, everted, and constricted.

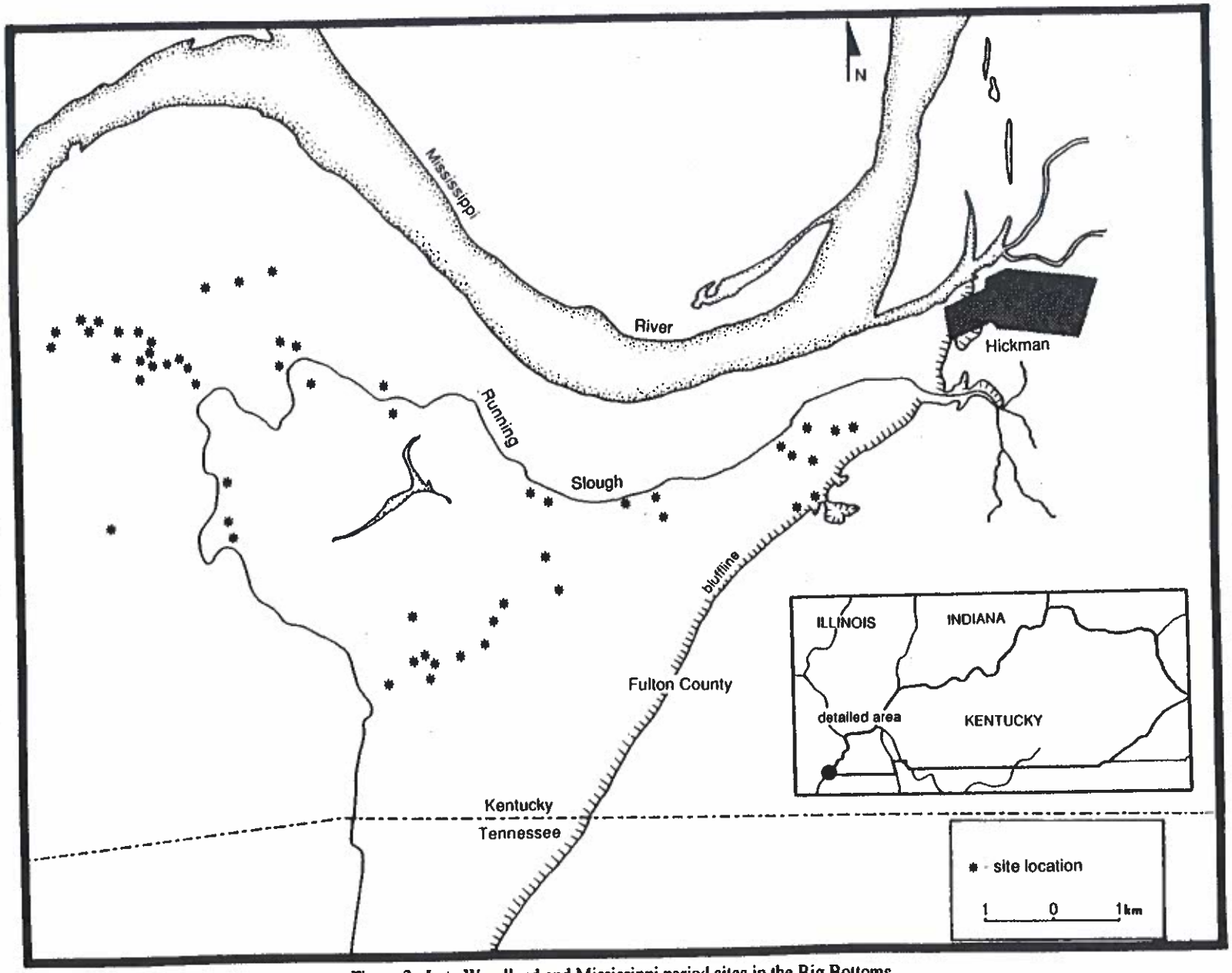

Figure 3. Late Woodland and Mississippi period sites in the Big Bottoms.

Larto Red is a minor type during both phases. During the latter part of the Cane Hills phase, regional Late Woodland assemblages began to incorporate new ceramic technologies and vessel forms. Ceramics were made using finer pastes, the number of bowl and jar forms increased, and pans, funnels, and shell tempering were introduced (Sussenbach and Lewis 1987).

Lithics associated with these phases are comprised mainly of Purchase Gravel, with Burlington, Cobden, and St. Louis cherts occurring in minor amounts. During the Cane Hills phase, Dover and Mill Creek cherts were occasionally imported into the Jackson Purchase region of western Kentucky as blanks or manufactured tools. Both notched and stemless triangular points appear to date to these phases.

Overall, the Big Bottoms Late Woodland material culture assemblage is similar to that of the rest of western Kentucky. This includes the dominance of Mulberry Creek and Baytown ceramics, the use of increasingly finer pastes, especially at the end of the Late Woodland period, and the transition to a Mississippian ceramic technology. Additional attributes which may prove useful for identifying Late Woodland sites in the Bottoms include the presence of Wheeler Check Stamped, Kersey Cordmarked Incised, Kersey Incised ceramics, and fabric impressed pans (Figure 5). Baked clay objects, which may be primarily associated with the Berkley Phase, are also found in the Bottoms. Daub is present at five sites, mostly clustered around the Rice Site. Small villages tend to have fewer chert types than the larger-sized sites dating to these phases, although this trend may be a function of longer occupations at the bigger sites.

Subsistence data for the Berkley phase indicates that maize had not yet been incorporated into the aboriginal diet. Unfortunately, subsistence data is lacking for the Cane Hills phase. In western Kentucky, the first direct evidence of maize agriculture is associated with the early Mississippi period James Bayou phase (A.D. 900-1100) but in other areas of the Southeast and Midwest, it appears that by ca. A.D. 800-900, maize had been incorporated into aboriginal subsistence systems (Caddell 1981; Johannessen 1984). Thus, it is possible that maize cultivation began in western Kentucky during the Cane Hills phase. Floral remains from the Cane Hills component at the Rice Site are currently being analyzed and the results of this study should provide important information on the Late Woodland adoption and use of maize agriculture in the Jackson Purchase region.

There is also little evidence for use of the Midwestern native cultigen starchy/oily seed complex during the Late Woodland period in western Kentucky. This complex, while relatively uncommon in the James Bayou phase deposits investigated at Marshall, is nevertheless present in the early Mississippi period deposits at this site (Sussenbach and Lewis 1987). Nutshell is the most common floral remain associated with the entire Late Woodland period in western Kentucky.

There is also a general lack of faunal data from Late Woodland contexts in the Mississippi River counties, due in part to poor preservational conditions at most of the Late Woodland sites

investigated in this region. The evidence which is available suggests that white-tailed deer were a major resource, with little exploitation of bottomland fauna such as fish and waterfowl. The data from the Rice Site, currently being analyzed, should expand our understanding of Late Woodland faunal exploitation strategies in the Big Bottoms.

SETTLEMENT PATTERNS

It appears that a site hierarchy can be identified during the Late Woodland period in the Bottoms (Figure 4). The upper level consists of villages with more than one mound. This level is represented in the study area by the Rice Site, which is about 15 ha in size, and has extensive village debris and three mounds. The spatial distribution of the mounds is similar to later Mississippian mound and plaza complexes.

The second level consists of large villages such as Sites 15Fu16, 15Fu17, and 15Fu301, which are associated with no more than one mound. Sites 15Fu16 and 15Fu17 are 3.5 and 5.9 ha in size, respectively, each may contain a single mound, and each site has extensive midden debris scattered over it's surface. Analysis of the ceramic assemblages suggests that Site 15Fu17 was primarily occupied during the Late Woodland period, while Site 15Fu16 was occupied toward the end of the Cane Hills and during the James Bayou phase. These sites are located within 100 m of each other and probably represent the developmental sequence of a single community. The third village is Site 15Fu301, which has a total surface area of just over 1 ha. Thirty-one small villages or hamlets comprise the lowest level of the Late Woodland settlement hierarchy in the study area. These sites are less than 1 ha in size and seldom have dense midden debris associated with them.

Late Woodland settlements in the Bottoms tend to be concentrated in three distinct areas. Farthest to the west, in the Sassafras Ridge district, is a cluster of 16 small hamlets and a large village site (15Fu301). To the southeast of this cluster lies the Rice Site district, consisting of the Rice Site and 10 small hamlets. To the east are two large villages (15Fu16 and 15Fu17) and four small hamlets. Each of these settlement clusters incorporates the same general pattern of a large village surrounded by numerous hamlets. As suggested by its mound and plaza arrangement, the Rice Site may have been the dominant political center for the Late Woodland settlement system in the Big Bottoms.

With one exception, all of the Late Woodland sites are located on natural levees of the Mississippi River. These levee soils are silt loams, rank high in agricultural productivity, and are well- to excessively well-drained. When specific soil types are considered, 90% of the sites are evenly distributed between Robinsonville, Buelah, Commerce, and Dubbs silt loams.

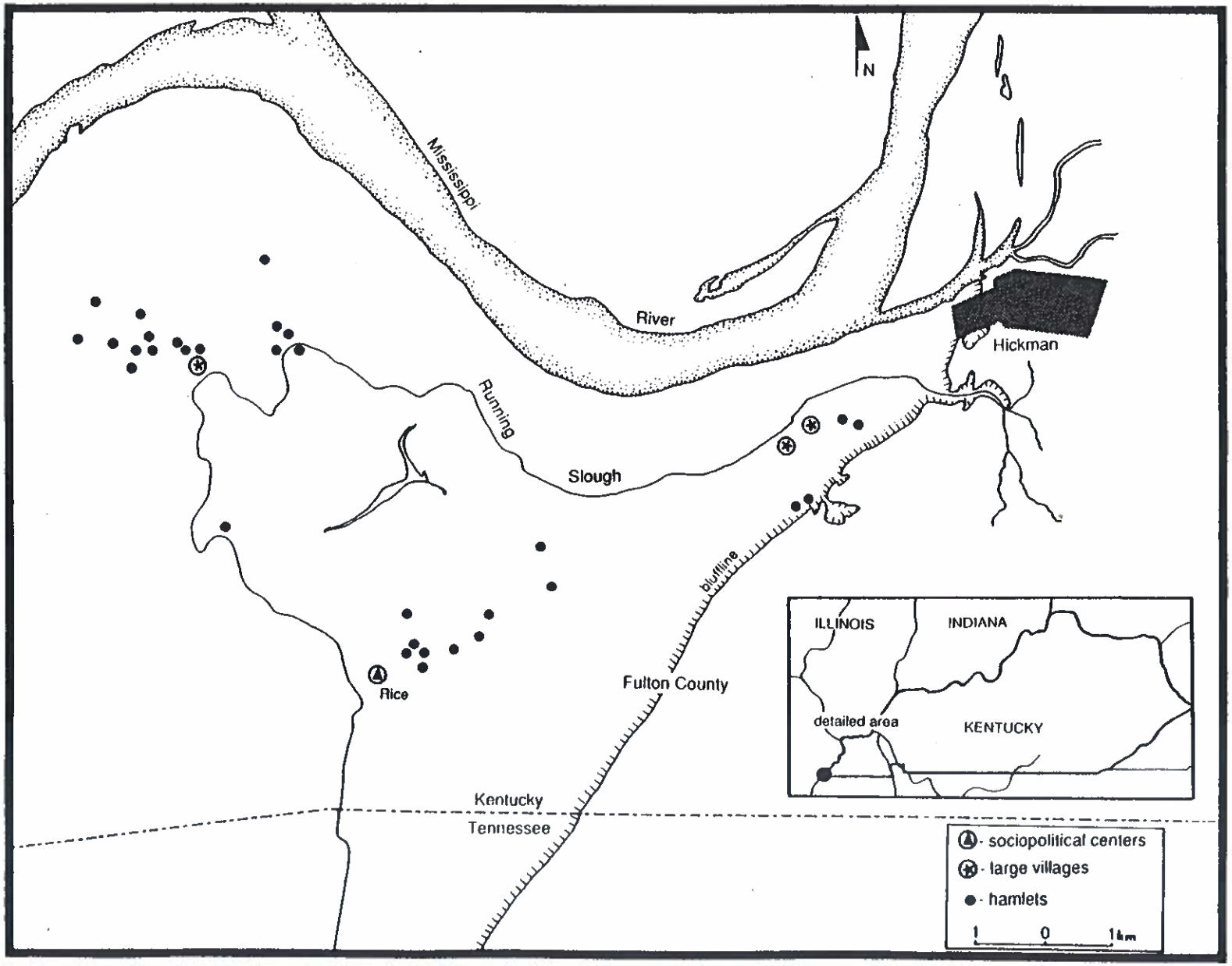

Figure 4. Distribution of Late Woodland period sites in the Big Bottoms.

The settlement pattern discussed above is suggestive of a hierarchical settlement system, although further research will need to be conducted before the nature of this system can be understood. The basic material culture inventory recovered from these sites is similar to that observed at other Late Woodland sites in the Mississippi River counties. Regional interaction appears to have increased towards the end of the Late Woodland period, as evidenced by greater frequencies of Dover and Mill Creek cherts from Cane Hills phase sites.

JAMES BAYOU AND DORENA PHASES

The James Bayou and Dorena phases, originally defined by Lewis (1983), are 200 year intervals which date between A.D. 900 and 1300. These are the first Mississippi period phases in the region. Excavations at the Marshall Site in Carlisle County uncovered a major James Bayou phase component (Sussenbach and Lewis 1987). Data from that site will be used to characterize the James Bayou phase material culture assemblage. The Turk Site, also in Carlisle County (Edging 1985), has a large Dorena phase component, and will be used to characterize the material culture assemblage from that phase.

The ceramic assemblage associated with the James Bayou phase shows a decrease in the frequency of folded rims on Mulberry Creek Cordmarked and Baytown Plain ceramic types, and an overall decrease in the use of cordmarked surface treatments when compared to the preceding Cane Hills phase. Baytown Plain, Mulberry Creek Cordmarked, and Larto Red are represented by varieties with finer pastes. Mississippi Plain and Bell Plain become the dominant ceramic types, while minor amounts of Old Town Red, Crosno Cordmarked, Kimmswick Fabric Impressed, and Wickliffe Thick are also present (Sussenbach and Lewis 1987). In general, however, decorated sherds tend not to be associated with this phase.

Mississippi Plain and Bell Plain continue to dominate ceramic assemblages in the subsequent Dorena phase. Old Town Red and Mound Place Incised are also present and Baytown Plain and Mulberry Creek Cordmarked become rare to absent in ceramic assemblages dating to this phase (Edging 1985). The Dorena phase is marked by the introduction of decorated types such as Matthews Incised and O'Byam Incised var. Adams (Lewis 1986; Lewis and Mackin 1984) and the introduction of a new vessel form, plates made with a Bell Plain paste.

As with the preceding Late Woodland phases, James Bayou and Dorena phase lithic assemblages exhibit a paucity of formal tools. The use of Purchase Gravel decreases in frequency, while the use of Mill Creek and Dover cherts increases during both of these phases. These latter types were imported as blanks or finished tools, and are often found as hoe flakes. There is also an increase in tool recycling during these phases. For instance, Mill Creek and Fort Payne chert hoes and adzes were often made into new tools when their initial usefulness ceased.

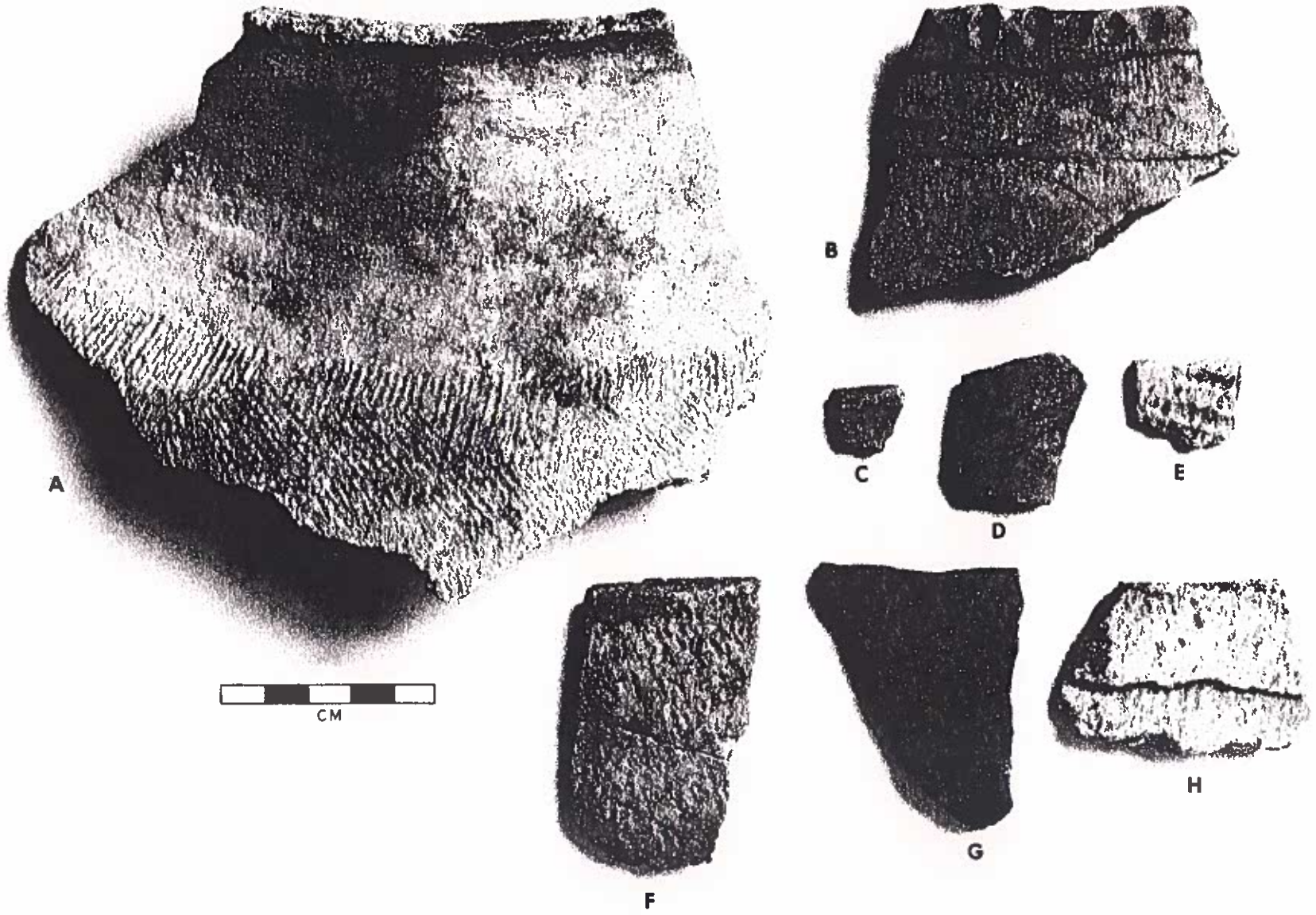

Figure 5. Late Woodland period ceramics: a,f-h, Mulberry Creek Cordmarked; b, Kersey Cordmarked Incised; c, Larto Red; d, Kersey Incised; e, Wheeler Check Stamped.

Figure 6. James Bayou and Dorena phase ceramics. Row A, left to right: Bell Plain, Baytown Plain var. Mayfield, Kimmswick Fabric Impressed, Baytown Plain pan. Row B, left to right: Old Town Red, Crosno Cordmarked, Old Town Red modeled head. Row C: O'Baym Incised var. Adams. (Rows B and C adapted from Lewis 1986).

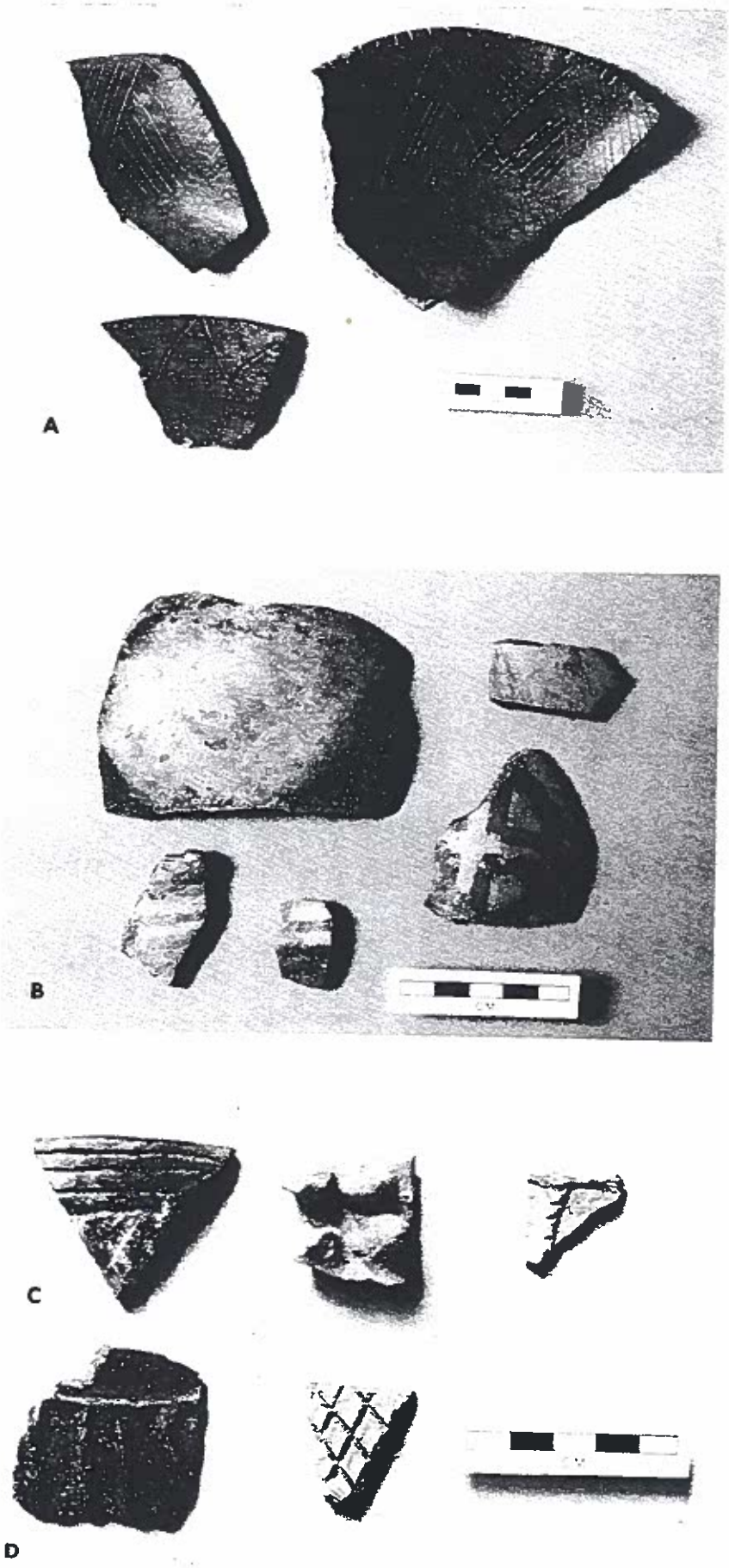

Figure 7. Medley and Jackson phase ceramics. Row A: O'Byam Incised var. O'Byam. Row B: O'Byam Incised var. Adams. Row C: Nashville Negative Painted. Row D, left to right: Mound Place Incised, Vernon Paul Applique, Campbell Applique. Row E, left to right: Barton Incised, Fortune Noded (adapted from Lewis 1986).

In most respects, sites cross-dated to these phases in the Big Bottoms have material culture assemblages similar to that found at both Marshall and Turk (see Figure 6). Mississippi and Bell Plain dominate the ceramic assemblages, with fine paste Baytown Plain and Mulberry Creek Cordmarked ceramics also common in the Big Bottoms during the James Bayou phase. Old Town Red and Kimmswick Fabric Impressed are also associated with both of these phases in the Bottoms. Crosno Cordmarked and Wickliffe Thick, however, appear to occur less frequently in the Bottoms than at other early Mississippi period sites in western Kentucky. Kersey series ceramics are absent from assemblages dating to these phases in the study area and, perhaps due to its recent definition, O'Byam Incised var. Adams has yet to be identified in the Big Bottoms. During the early Mississippi period, there is an increase in the varieties of imported cherts exploited and these cherts were recovered from all of the identified early Mississippi period sites, regardless of size. Daub is also more common at sites dating to these phases compared with the earlier Woodland phases.

The floral remains associated with the early Mississippi phases include maize, nuts, and seeds. As discussed previously, maize agriculture had been adopted in the Mississippi River counties by the James Bayou phase. Although use of the native cultigen complex is uncommon during the James Bayou phase, its exploitation appears to increase by the Dorena phase. As Edging (1985) notes, western Kentucky floral assemblages of this period represent a blend of Midwestern and Southeastern plant exploitation patterns.

To date, only limited faunal data has been recovered from James Bayou phase components in western Kentucky. The faunal information that has been collected suggests a continued reliance on white-tailed deer with little or no exploitation of fish and waterfowl during this phase. Although white-tailed deer still dominate Dorena phase assemblages, fish and bird exploitation appear to have increased. Kruger (1985) has characterized Dorena phase faunal assemblages as being essentially similar to the Mississippian faunal exploitation pattern described by Smith (1975). At present, no subsistence data for these phases are available from the Big Bottoms.

SETTLEMENT PATTERNS

Although a settlement hierarchy probably continues into the James Bayou and Dorena phases, no mound centers with associated village areas can be confidently identified in the Bottoms (Figure 8). This situation may be more apparent than real, since based on cross-dating of ceramics Sassafras Ridge probably contains both James Bayou and Dorena phase components. Whether Sassafras Ridge functioned as a socio-political center during the James Bayou phase is at present unknown. The Rice Site also appears to have been briefly occupied during the James Bayou phase, but, based on the ceramic assemblage recovered from this site, it was definitely abandoned prior to the start of the Dorena phase.

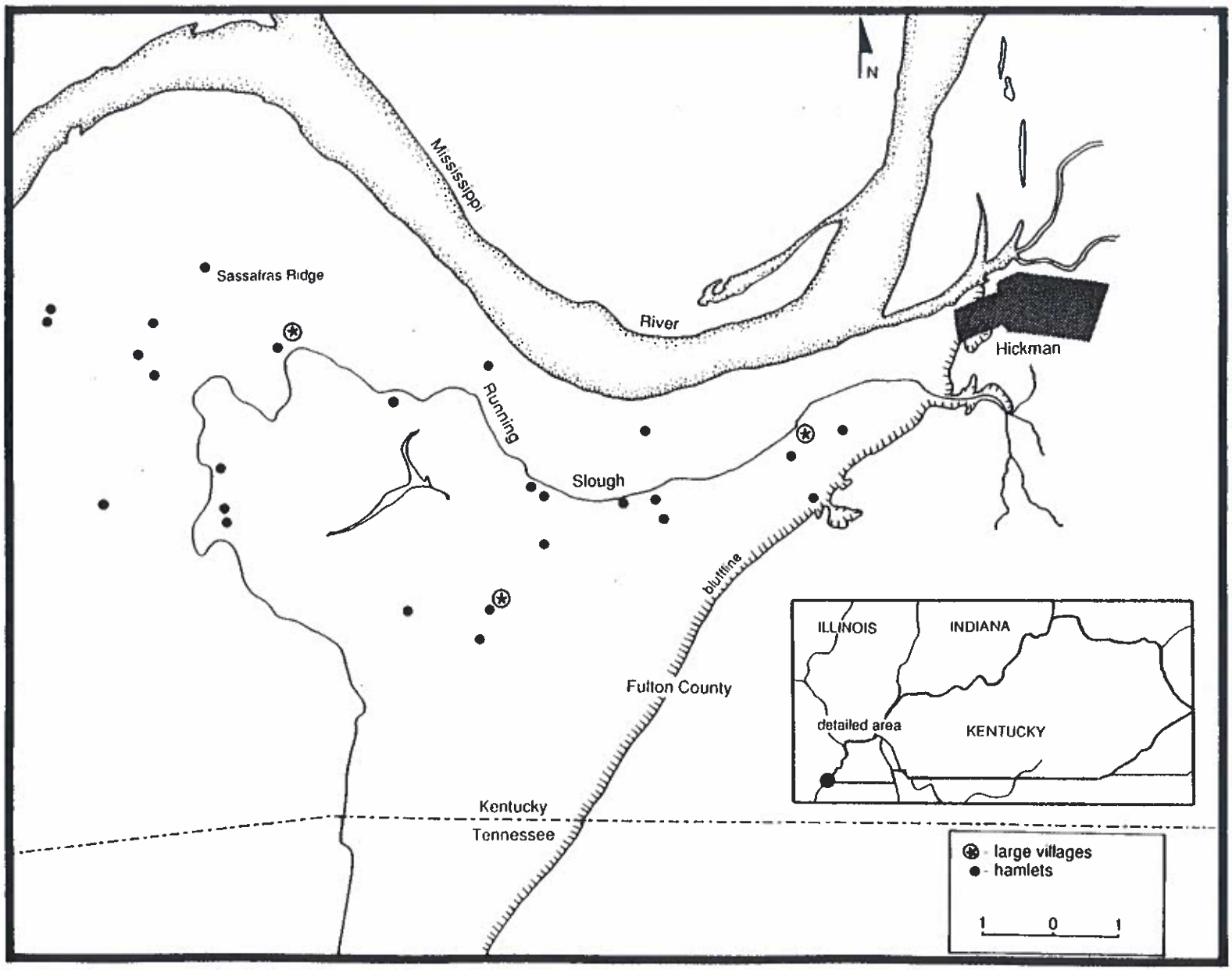

Figure 8. Distribution of James Bayou and Dorena phase sites in the Big Bottoms.

In contrast to the poor evidence for occupation of sociopolitical centers in the Big Bottoms, at least three large villages, the second level of the settlement hierarchy, were identified. These include Site 15Fu16, which also was apparently abandoned by the Dorena phase, and two other sites larger than 1 ha in size. There are 26 early Mississippian hamlets in the Bottoms, and all appear to be small farming settlements similar to those dated to the Late Woodland phases, except for the changes in ceramics and lithics discussed previously.

During the James Bayou and Dorena phases sites continue to be distributed into three clusters in the Bottoms. The Sassafras Ridge district includes a large village and seven hamlets. The Rice district consists of a large village and 12 hamlets, while the easternmost settlements on the Big Bottoms include a large village (15Fu16) and three hamlets. Four other sites, all hamlets, are located between the Rice and Sassafras Ridge districts. It appears that site distribution during these phases is more diffuse than during the preceding Late Woodland phases.

James Bayou and Dorena phase sites in the Big Bottoms are predominately located on natural levees of the Mississippi River. Their component soils are all well- to excessively well-drained. There is an increase, compared with Late Woodland site locations, in the frequency and number of sites located on Robinsonville silt loam. During these phases, half of all sites are located on this soil type, the most agriculturally-productive type in the study area. The occupation of sites on other agriculturally-productive soil types is less frequent during these phases.

Based on the evidence presented, two trends concerning early Mississippi period settlement on the Bottoms are evident. First, the material assemblages of sites dating to these phases are similar to others in the Mississippi River counties, with few exceptions. Second, the nature of the settlement hierarchy in the Big Bottoms is unclear at this time. While large villages and hamlets are present, it is uncertain if a large sociopolitical center was part of this system. If one was not, this change signals a potentially significant shift from earlier Late Woodland times and certainly differs from the later Medley phase, which is also associated with a large socio-political center. Such a transition, if it can be verified, would have interesting implications for the development of Mississippian social systems in the Big Bottoms.

MEDLEY AND JACKSON PHASES

The Medley and Jackson phases, as defined by Lewis (1983), are 200 year intervals dating between A.D. 1300 and 1700. Major components dating to these phases have been investigated at socio-political centers such as Adams (15Fu4) (Lewis 1986; Lewis and Mackin 1984), at villages including White (15Fu24) (Sussenbach and Lewis 1987), and at small villages such as Running Slough (15Fu67) (Lynne Mackin-Wolforth, personal communication 1987).

The ceramic assemblage from these phases continues to be dominated by Mississippi and Bell Plain, but there is an increase in the frequency of decorated ceramics (Matthews and O'Byam Incised) in the Medley phase as compared to earlier Mississippi period phases. These assemblages include plates, hooded or effigy bottles, and animal effigy figures often found on bowls. Other characteristic artifact types that appear to date to this period in western Kentucky include earspools, earpins, and beads.

The lithic assemblage remains essentially similar to earlier Mississippi period phases. Formal tools from these phases include triangular projectile points, drills, bifaces, and adzes. Metates are also present, and hoe flakes are common. A wide range of chert types continued in use, with Mill Creek and Dover types imported as blanks or finished tools. Other non-local cherts (Burlington and Fort Payne) were imported as cores.

In the Bottoms, sites have been placed into these phases based on the presence of decorated sherds, with Matthews and O'Byam Incised being the most common types present (Figure 7). However, at Sassafras Ridge (15Fu3), Nashville Negative Painted, Mound Place Incised and Memphis sub-area ceramics including Vernon Paul Applique, Fortune Noded, and Campbell Applique also occur (Mackin 1986). As elsewhere in western Kentucky, bowls with effigies, water bottles, and earspools are found in the Big Bottoms. These items have mainly been recover from Sassafras Ridge. Additionally, daub is very common at Medley and Jackson phase sites in the study area.

Subsistence remains are indicative of a reliance on maize agriculture. Gourds and squash were also grown, and the first indications of the inclusion of beans into the aboriginal diet are found in Medley phase deposits. Still, wild plants were an important component of the diet, as indicated by the large amounts of nuts, seeds, and fruits recovered. The native cultigen starchy/oily seed complex continued as part of the aboriginal subsistence base during these phases.

Mammals account for a smaller percentage of the identified faunal remains as compared to earlier phases, but assemblages are still dominated by white-tailed deer. The use of waterfowl, turkey, and fish appear to increase during these phases as well. Although subsistence data are lacking from the Big Bottoms at present, this situation should be remedied by Mackin-Wolforth's recent excavations at Running Slough. The subsistence data from that site is expected to be similar to that from other Mississippi River county sites in western Kentucky.

SETTLEMENT PATTERNS

Fewer sites in the Big Bottoms can be confidently dated to these phases, with only five located within the study area (Figure 9). It is apparent, though, based on C-14 dates from Sassafras Ridge, that aboriginal populations inhabited the area until A.D. 1400 and probably later (i.e., into the Jackson phase). Since surveys in the Big Bottoms have located Late Woodland and early Mississippi period sites as small as 250 m^2 , it is unlikely that small late Mississippi period sites would have been missed. Decorated sherds, which are diagnostic of the Medley and Jackson phases, rarely comprise more than 5% of ceramic assemblages from sites dating to these phases. Thus, the low number of late Mississippi period sites identified could be due, given the generally small ceramic samples obtained from sites in the Big Bottoms, to decorated sherds not being recovered from small Dorena and Jackson phase sites. Alternatively, incised ceramics which are characteristic of villages and socio-political centers may not be as common at smaller Medley and Jackson phase sites. As the western Kentucky Mississippi period chronology is refined, more hamlets may be assigned to the Medley and Jackson phases.

Sites dating to these phases indicate the continuation of a settlement hierarchy, with a mound center, villages, and hamlets represented. One mound center, Sassafras Ridge, one large village, and three hamlets date to these phases. These sites are widely scattered throughout the study area. While fewer sites date to these phases, those that can be confidently placed within the late Mississippi period tend to be larger than earlier Mississippi period sites.

All of the identified late Mississippi period sites are located on well-drained, alluvially-deposited natural levees of the Mississippi River. Although the sample is small, over half of the sites are located on Robinsonville silt loam.

In summary, during the Medley and Jackson phases, Mississippian settlement in the Big Bottoms appears to have been hierarchically organized, with a large socio-political center, large villages, and hamlets continuing as part of the settlement system. However, during these phases there is a dramatic decrease in the number of hamlets compared to the earlier James Bayou and Dorena phases. Sites continue to be located on well-drained prime agricultural land; the river levees. Ceramic types and vessel forms proliferate, with a greater variety of types typical of Memphis-area Mississippian assemblages found at Sassafras Ridge than those found at similar socio-political centers in the Mississippi River counties. The frequency of Memphis-area Mississippian ceramics at Sassafras Ridge is not unexpected, as it is the southernmost of all the Kentucky Mississippi River county towns.

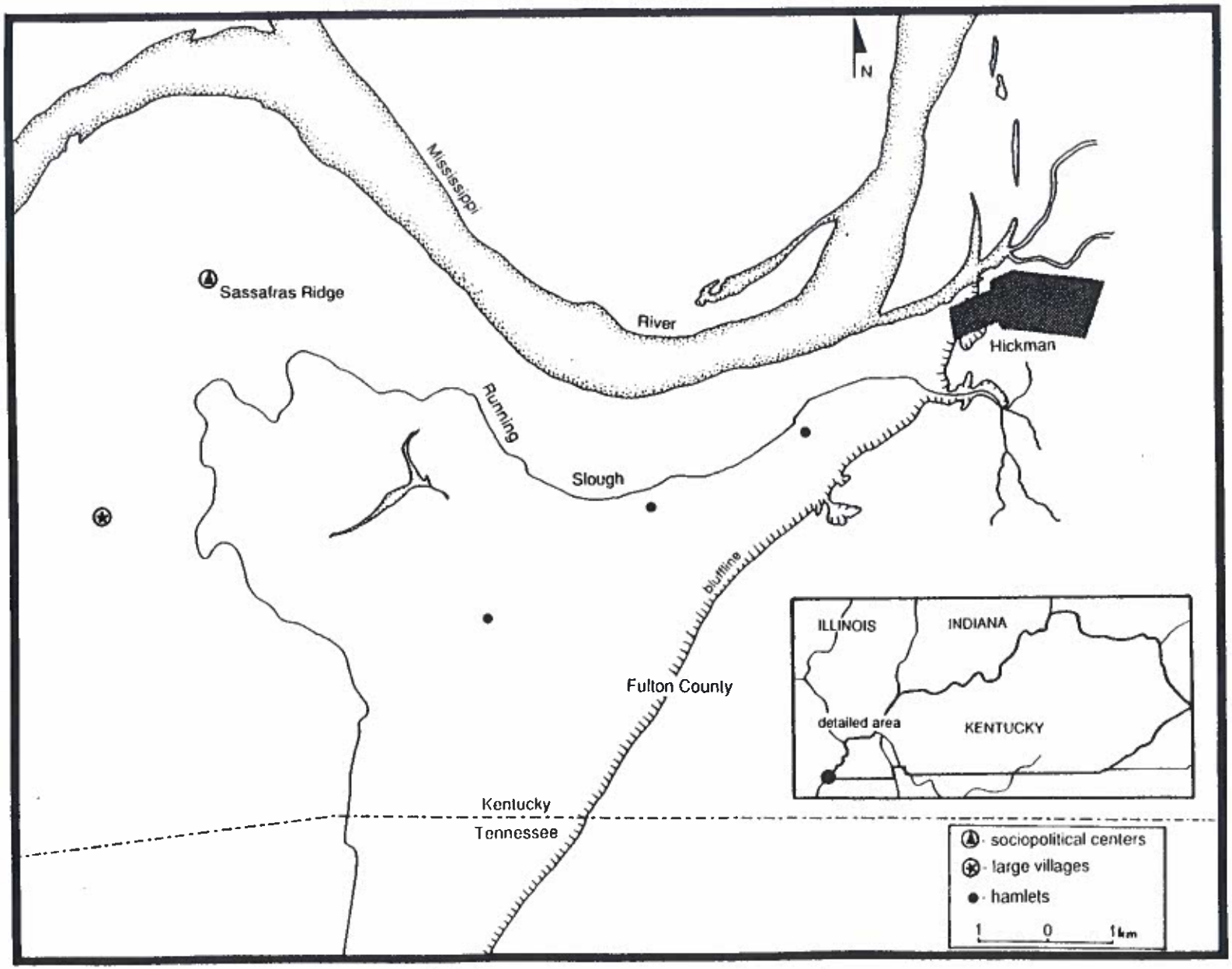

Figure 9. Distribution of Medley and Jackson phase sites in the Big Bottoms.

DISCUSSION

In reviewing the data just presented from the Big Bottoms, several trends can be identified. Average site size increases through time, while the total area inhabited in the Bottoms remains relatively stable. The median size of Late Woodland sites is .2 ha, but during the James Bayou and Dorena phases, site size increases to .5 ha. By late Mississippi period times (Medley and Jackson phases), median site size has increased to 1.3 ha. The last figure is greatly influenced by the low number of late Mississippi period hamlets identified in the study area. The data from the Big Bottom suggests that settlement patterns were relatively stable up until late Mississippi period times, when population nucleation may have occurred. A decrease in the number of sites corresponds to an increase in site size during the late Mississippi phases, and thus, the actual area occupied appears to have remained relatively stable. The difficulty of estimating the spatial extent of different occupations at multi-component sites, however, should be kept in mind. In fact, depending on how the period of occupation is interpreted, between 20 and 40% of the sites discussed in this paper contain more than one component.

The soil associations of sites in the Big Bottoms support the interpretation that they were purposely located on relict channels of the Mississippi River. During all periods discussed here, sites were associated with natural levees. No sites were located in survey areas under 95 m asl. Tunica and Sharkey clay, and Sharkey clay loam soils, all characteristic of overwash or slack water areas, predominate at these low elevations. These soil types are indicative of areas where Mississippian settlement and agriculture would not have been feasible. Given Mississippian economics, it is not surprising that the more fertile floodplain areas were selected, and that selection of these areas for habitation increased from the Late Woodland through the Mississippi period. One anomaly is the over-representation of sites on Buelah fine sandy loam soils. As this type is excessively well-drained, it may have been selected for that trait.

Finally, it is becoming increasingly apparent that in western Kentucky, settlement hierarchies developed prior to the Mississippi period, as others have suggested (Lewis 1982; Sussenbach et al. 1986), although the nature of these settlement systems are poorly understood. Once established, the local settlement system underwent a number of changes during the Mississippi period occupation of the Big Bottoms. While some of the changes discussed in this paper may be a result of biases in the data base, others may reflect the actual distribution of Mississippian sites in the Big Bottoms. The observed changes may represent cyclical settlement shifts reflecting local concerns for defense and increased production needs. These differing social demands resulted in either settlement nucleation (defense) or dispersal (increased production). Such a hypothesis may be put foreword to explain the changes seen in the Mississippian settlement of the Big Bottoms with increases in the number of settlements during the earlier Mississippi period phases to meet increased production needs followed by nucleation for defensive purposes during the late Mississippi period phases.

In either case, Mississippi period settlements in the Big Bottoms appear to have been located in such a way as to take advantage of prime agricultural soils, while at the same time maintaining adequate defensive precautions. This selection of locales for Mississippi period settlements is essentially similar to that documented by Lewis (1974) for southeast Missouri.

FUTURE RESEARCH

The analysis presented in this paper draws upon a limited data base from one environmental zone. Mainfort et al. (1986) and Sussenbach and Lewis (1987) both note the frequency of blufftop Late Woodland and early Mississippi period sites in Tennessee and western Kentucky, respectively. To better understand the Late Woodland and Mississippi period settlement of the Big Bottoms, additional surveys are needed, especially along the bluffs bordering the Big Bottoms, and to the southwest of the 1986 Running Slough survey in the area bordering Tennessee. Intensive surveys are also needed throughout western Kentucky in order to better understand Late Woodland and Mississippi period utilization of the Jackson Purchase region and to provide a context within which to compare and contrast settlement pattern data from the Big Bottoms.

In order to refine the late prehistoric chronology of the Big Bottoms region, more sites need to be excavated. The accuracy of the cross-dating used in this paper cannot be evaluated until such excavations are undertaken and a suite of radiocarbon dates obtained. The construction of a Big Bottoms chronology is imperative if archaeologists are to investigate possible settlement changes between the Late Woodland and early Mississippi period James Bayou phase and the later Mississippi period phases. An increased data base from excavations will no doubt also contribute to a better understanding of subsistence patterns in the Bottoms. As is evident from this paper, little is known at present about this topic. Given the surface data collected by the Western Kentucky Project at Sassafras Ridge (Lewis 1986), test excavations are warranted at this important late Mississippi period site.

While these problems limit our present understanding, it is evident that the archaeological resources of this region can be used to delineate not only the regional chronology, settlement pattern, and subsistence strategies but can also be used to identify factors which influenced late prehistoric culture change. Hopefully, this paper will provide an initial framework for and stimulate additional research in the Big Bottoms of western Kentucky.

ACKNOWLEDGMENTS

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SIX HOUSE-BASIN STRUCTURES: THE JONATHAN CREEK SITE AND ITS DEPOSITIONAL HISTORY

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ABSTRACT

R. Berle Clay (1979) postulated that six house-basin structures from the Jonathan Creek Site (15M14) might represent a late Mississippi period Tinsley Hill phase reoccupation of an otherwise early Mississippi period site. An analysis of ceramics from the house-basin structures and from a control group of non-basin house structures demonstrates that the former were probably not constructed during the Tinsley Hill phase.

INTRODUCTION

This paper describes the results of research focused on the testing of Clay's (1963, 1976, 1979) inference that six house-basin structures at the Jonathan Creek Site (15M14) (Figure 1) represent a late Mississippi period reoccupation of an otherwise early Mississippi period site. The test is based on an analysis of ceramics from the house-basin structures and from a control group of non-basin house structures. The house-basin structure ceramics are compared to those of the control group in an attempt to identify stylistic differences that would indicate a temporal difference between the two. The test results clarify the depositional history of the Jonathan Creek Site and are consistent with Clay's regional ceramic sequence.

Like many sites excavated in the early 1940s, the artifacts recovered from Jonathan Creek have never been fully analyzed and described. Between 1940 and 1942, William S. Webb excavated extensive areas of the site using Civilian Conservation Corps (CCC) labor. Unfortunately, World War II prematurely terminated Webb's excavations. In the early 1950s, he returned to the Jonathan Creek material and produced a report (Webb 1952) that focused on the excavated structural remains. Only cursory attention was paid to a sample of ceramic artifacts. Webb (1952) does not describe the methods he used to draw the sample nor its provenience. R. Berle Clay, the first archaeologist to analyze Jonathan Creek ceramics following Webb, analyzed another sample of ceramics. The differences between his and Webb's ceramic samples prompted Clay to search for late Mississippi period features at Jonathan Creek. Clay's sample, unlike Webb's, lacked certain stylistic attributes. It consisted of only plain ware, while Webb's included incised and decorated types such as Matthews Incised, var. Matthews and var. Beckwith, Mound Place Incised, Nashville Negative Painted, and Rhodes Incised in addition to the plain wares (Table 1).

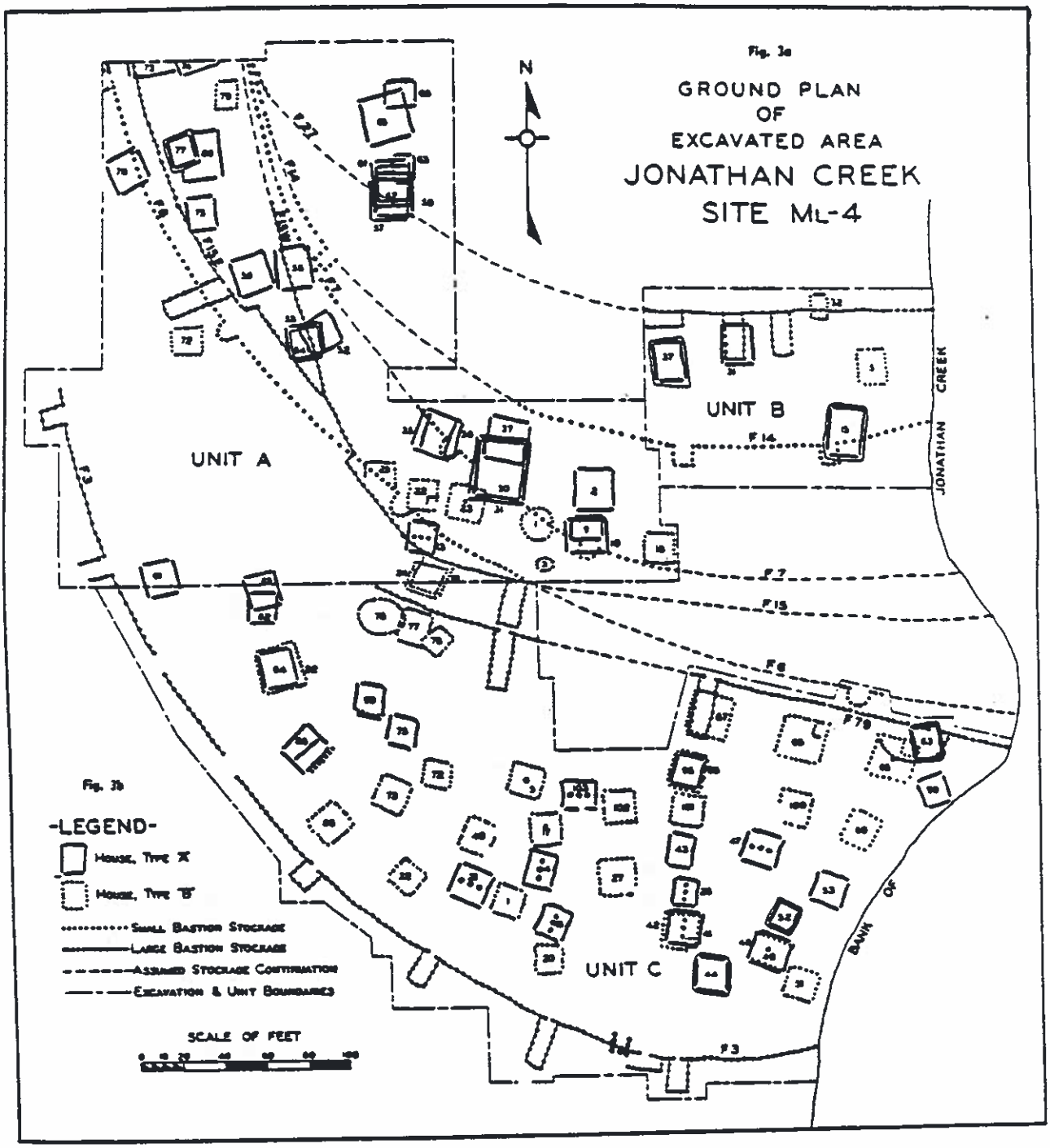

Figure 1. The Jonathan Creek Site (from Webb 1952:16-17).

TABLE 1. Ceramic Counts for Sites in the Tennessee-Cumberland Region.

	Jonathan Creek				Tinsley Hill		Goheen	Roach
	Wolforth 1987		Clay 1963	Webb 1951				
Type Name	A" Type	Other			Upper Level	Lower Level		
Mississippi Plain	1169	1229	564	1659	2694*	285	6395	1171
Bell Plain	79	91	29	151	241	29	469	54
Kimmswick Fab. Imp.	82	52	21	480	188	27	119	48
Old Town Red	26	17		1	7		10	4
Wickliffe Thick	4						2	
Nashville Neg. Painted								
var. Nashville	1			1				
var. Angel					1			
Matthews Incised								
var. Matthews				1	2			
var. Manly					7			
var. Beckwith				1	4		30	
O'Byam Inc. var. Stewart							1	
McKee Island Cordmarked					3		4	
Tolu Interior Fab. Imp.					8		9	
Mound Place Incised				1			1	
Rhodes Incised				1				
Baytown Plain	1	3	8	6		1	1	
Mulberry Creek Cord.	3					2	8	
Baumer Fab. Imp.	1			2			8	
O'Neal Plain				2			2	
Totals	1366	1392	622	2330	3155	344	7059	1277

*Includes Morris Plain.

The presence or absence of incised and decorated ceramics is crucial in distinguishing early Mississippi period components from late Mississippi period components in the regional sequence developed by Clay (1979). Decorated ceramics are not characteristic of the early Jonathan Creek phase, as defined by Clay (1979). Instead, they are characteristic of the later Tinsley Hill phase. The Jonathan Creek Site could be classified as a Tinsley Hill phase site on the basis of Webb's (1952) sample, and as a Jonathan Creek phase site based on Clay's (1963) sample. To explain this apparent discrepancy, Clay (1979) proposed that Webb's decorated types may have originated from six house-basin structures (Type A"; Figure 2) that were more recent than most of the excavated portion of the site. The structural similarity to house-basin features at the Goheen (15Ml19) and Roach (15Tr10) sites, radiocarbon dated at A.D. 1600+/-85 and A.D. 1545+/-80, respectively, suggested to Clay that the house-basins represented a Tinsley Hill phase reoccupation of the Jonathan Creek Site.

The research reported here is designed to determine if the six house-basin structures are Tinsley Hill phase features. The ceramics from the six house-basin structures and from a random sample of six non-basin house structures were collected from the University of Kentucky Museum of Anthropology in Lexington. The ceramics from each group were compared for indications of temporal placement. If there are two components represented at Jonathan Creek and the six house-basin structures are representative of a later component, then Clay's regional ceramic sequence accounts for the Tinsley Hill phase ceramics in Webb's sample. If the house-basin structures are determined not to represent a Tinsley Hill phase component, then either there are as-yet-unanalyzed Tinsley Hill phase features present in the University of Kentucky's collections from the site or Clay's regional ceramic sequence does not account for the decorated types recovered from Jonathan Creek.

This paper is organized as follows: first, background information on the environment, previous archaeological research, and the regional ceramic sequence are presented; second, the methods involved in the excavation of the Jonathan Creek Site, curation of the recovered cultural materials, and analysis of different ceramic samples from the site are reviewed; third, the current ceramic analysis and results are presented; and finally, the implications of this analysis for the depositional history and regional ceramic sequence are discussed.

GEOGRAPHY AND ENVIRONMENT

Prior to 1944, the Jonathan Creek Site was located on a second river terrace approximately 1.5 km south of the confluence of Jonathan Creek and the Tennessee River. Today, much of the site is flooded by the impounded waters of Kentucky Dam, built by the Tennessee Valley Authority during World War II. The portion of the site that remains visible today is located on the southern end of a long, narrow island within the fluctuation zone of the west side of Kentucky Lake, just north of the mouth of the Jonathan Creek embayment.

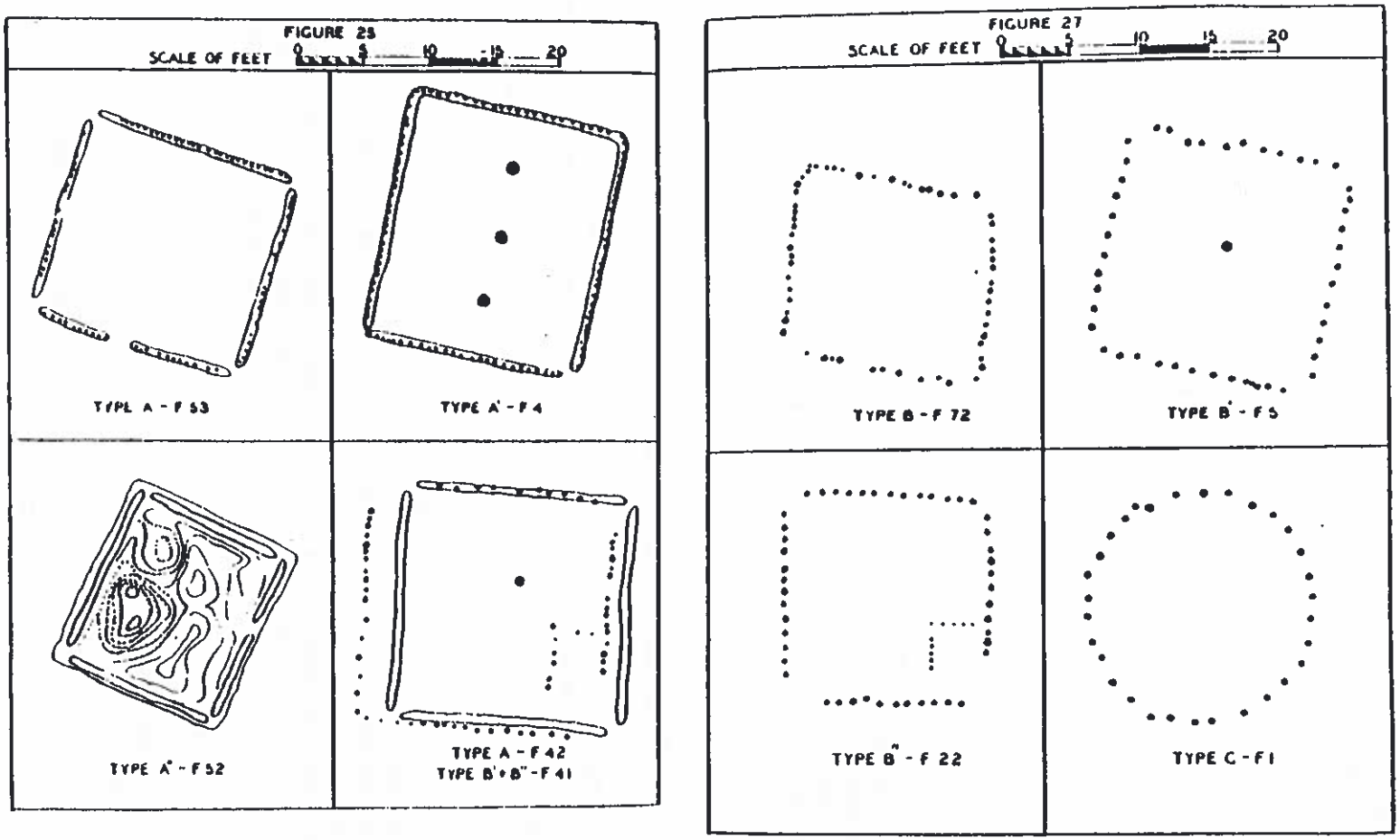

Figure 2. The seven structure types defined by Webb at Jonathan Creek (from Webb 1952:54,57).

Normal summer pool elevation on Kentucky Lake averages 109.4 m above sea level. At summer pool, only the eastern edge of the river terrace, a thin strip of land approximately 7 m wide, and the earthen mounds of the Jonathan Creek Site remain above water. Normal winter pool averages 108 m above sea level (Figure 3) and a great deal more of the site is accessible during the winter months.

Boat trips taken to the site in July 1985 and February 1986 revealed serious erosion with the remains of prehistoric house structures visibly eroding on the eastern shore (Figure 4). Also a possible mound on the eastern side of the island was being undercut. Mound A appears to be the only prehistoric structure that remains out of water year round and it showed signs of recent potting.

The Tennessee River flows through the post-Tertiary gravels and recent loess of the Jackson Purchase, making the valley soils fine grained (Clay 1963). A silt loam of the Grenada Series characterizes the soils of Jonathan Creek (Humphrey et al. 1973). The elevation of a second terrace of the Grenada series soil type can support a sweetgum-elm forest (Humphrey et al. 1973; Lewis 1974). Currently, the seasonal inundation of the site only allows for the growth of water-tolerant species of the Salicaceae family, such as Populus Deltoides (cottonwood) and Salix sp. (willow).

PREVIOUS ARCHAEOLOGICAL RESEARCH

Robert H. Loughridge (1888) and Clarence B. Moore (1915) were the first to publish information on the archaeology of the Tennessee-Cumberland region. Although these early investigations were brief, they contribute to a fuller description of the Jonathan Creek Site. Loughridge (1888) provides an excellent map (Figure 5) of the site that correlates well with Webb's (1952) topographical map. Loughridge's map gives the location of smaller mounds that had been nearly plowed away by the 1940s. Three of these are only vaguely visible on Webb's (1952) map, at the northeast corner of his excavation units. The work Moore accomplished in the area was not extensive. He visited only three sites in the region, one of which was the Jonathan Creek Site. His written description of the site makes mention of the mounds that were visible at the time as well as their relative positions and dimensions. Webb's (1952) report only locates two of the three large mounds that appear on Loughridge's map and in Moore's description of the site.

In 1930-1931, Webb and William D. Funkhouser of the University of Kentucky, conducted a systematic survey of the archaeology of Kentucky. Their report, Archaeological Survey of Kentucky (Funkhouser and Webb 1932), gives a brief and somewhat useless description of Jonathan Creek but appearing with it is a description of the site's associated stone box grave cemetery.

The next period of research at the site occurred in the 1940s in connection with the Tennessee Valley Authority's hydroelectric projects.

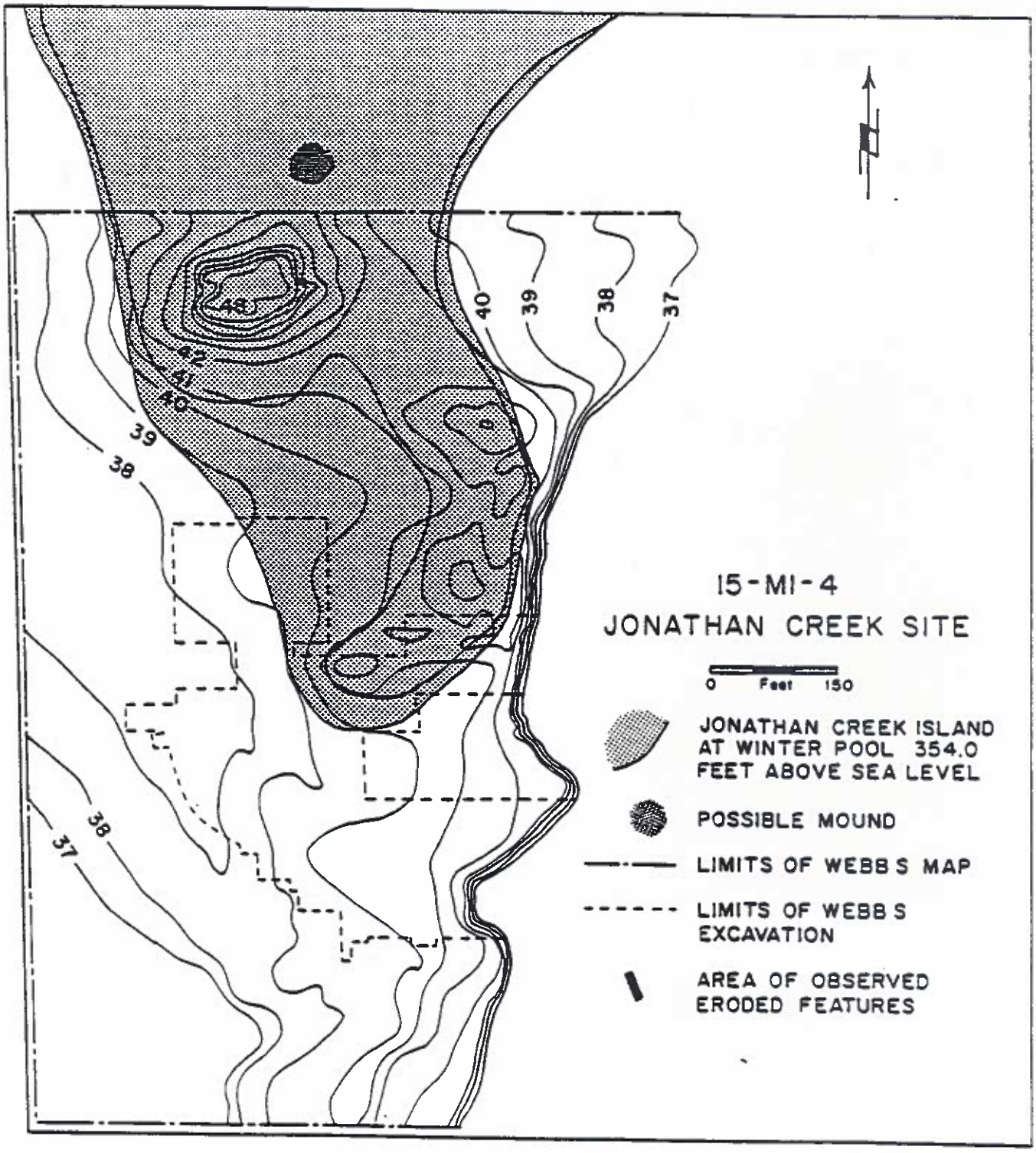

Figure 3. Jonathan Creek at winter pool (topographic map from Webb 1952:11).

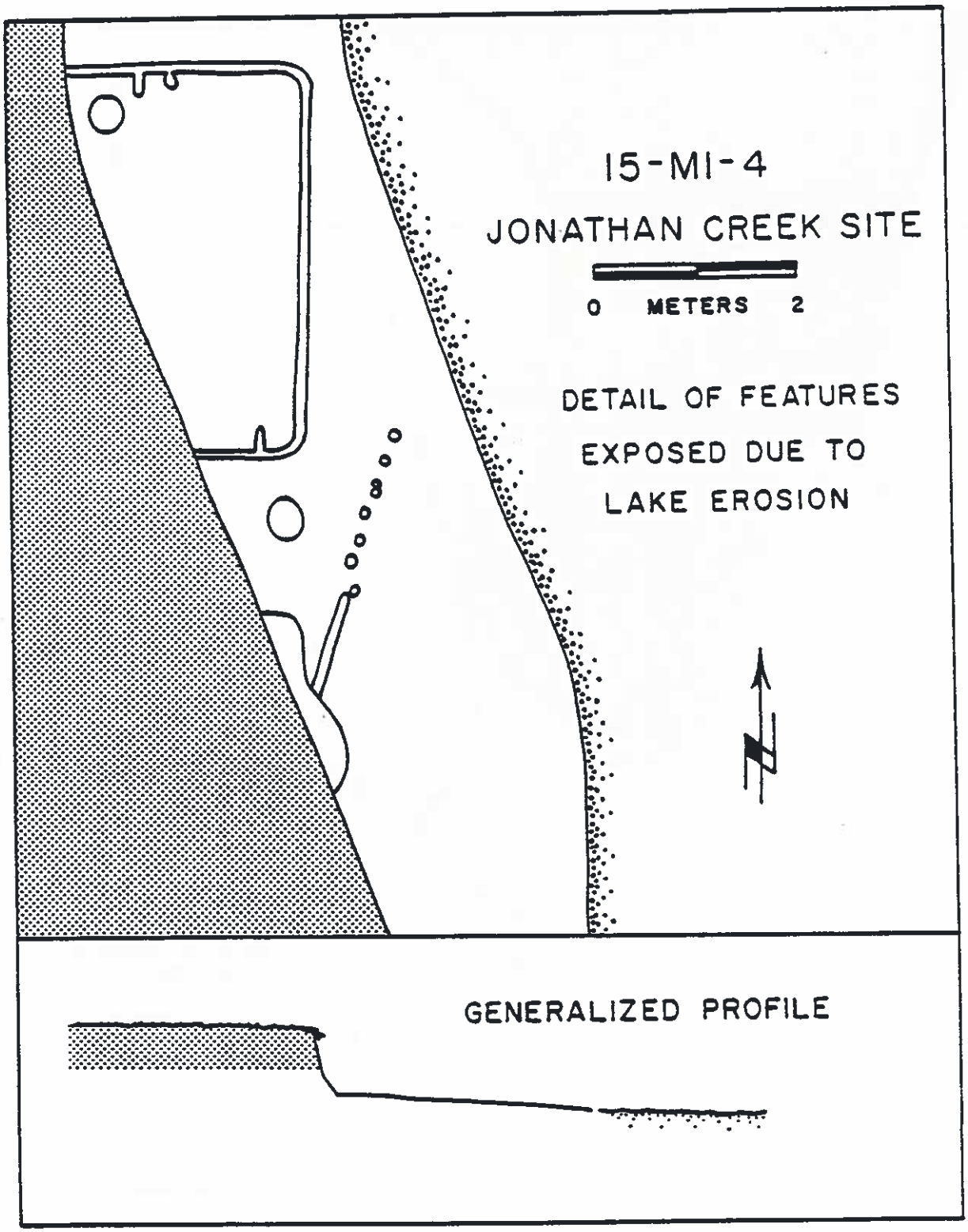

Figure 4. Features exposed by lake erosion.

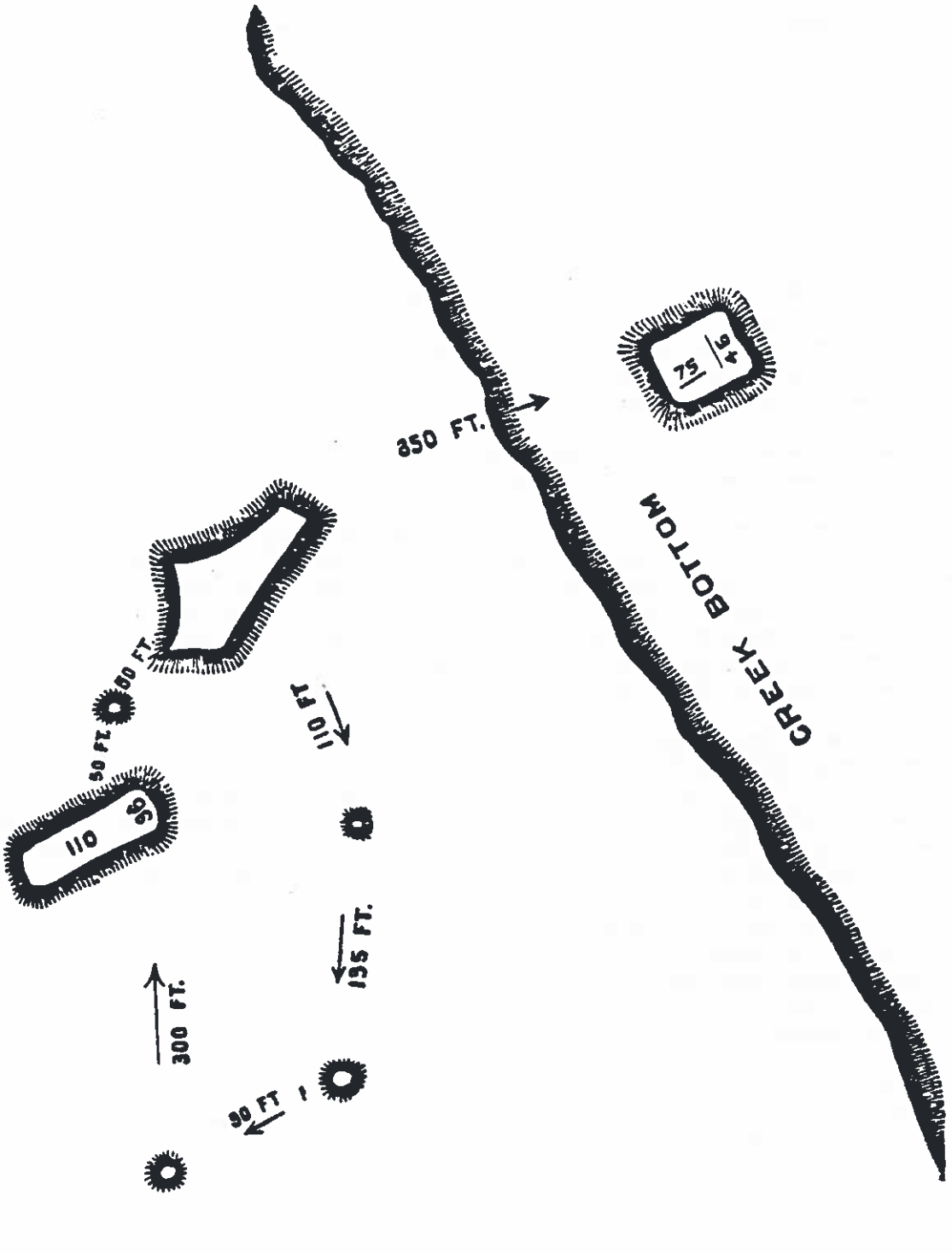

Figure 5. 1888 map of the Jonathan Creek Site (from Loughridge 1888:193).

The TVA appointed Webb coordinator of salvage archaeology in the Tennessee Valley. James R. Foster, working under Webb, was the first to actually survey the valley from Gilbertsville to the Kentucky-Tennessee border. Of the 47 sites found by Foster, 22 were in Marshall County. One of these was the Jonathan Creek Site (Clay 1963).

In 1940, the CCC established a camp at Benton, Kentucky. Supervised by Webb, excavations using CCC labors were initiated at a number of sites in Marshall and Trigg counties: Jonathan Creek (15Ml4), Birmingham (15Ml8), Root (15Ml11), Goheen (15Ml14), and Roach (15Tr10). Jonathan Creek was the first site to be investigated (October 23, 1940) and the last to be shut down (March 20, 1942). Excavations at the other sites were halted shortly after the bombing of Pearl Harbor. The rather abrupt and premature termination of excavations and site survey in the Tennessee-Cumberland region created problems in the processing and curation of artifacts and fieldnotes. The Jonathan Creek artifacts remained unwashed, uncataloged, and even unreported until the early 1950s when Webb published his report.

Both Webb and Funkhouser were trained scientists and brought the basics of scientific methodology to archaeology. However, neither researcher had any training in anthropology and both lacked the theoretical tools to deal with culture history. This is especially evident with regards to Webb's conclusions about Jonathan Creek, where he tried to match prehistoric cultures with very recent native Indian cultures described by ethnohistorians.

With the governments authorization of Barkley Dam in 1958, a new era of work was initiated in the lower Tennessee-Cumberland region. This work, which was conducted by a group of men who were professionally trained in anthropology, focused on the survey and excavation of sites along the Cumberland River. Dr. Douglas W. Schwartz, of the University of Kentucky Museum of Anthropology, directed the operations. Work in the late 1950s and early 1960s differed from that conducted before World War II. Gone were the huge CCC crews that had been put to work exposing large areas of sites. In their place were smaller crews and an emphasis on excavations designed to understand each site and its chronological position. This work resulted in more complete artifact descriptions and the development of a regional cultural sequence (Clay 1963).

Subsequent work on the archaeology of the Tennessee Valley has focused on sites other than Jonathan Creek (e.g., Fryman 1966; Rolingson and Schwartz 1966). After the Tennessee and Cumberland valleys were flooded, the Land Between the Lakes Archaeological Project continued research in the area (Nance 1976).

THE REGIONAL CULTURAL SEQUENCE

Clay (1979) divides the Mississippi period into two phases: the Jonathan Creek phase and the Tinsley Hill phase. The Jonathan Creek phase is characterized by ceramics that lack the decorative techniques of incising, engraving, punctation, negative painting, and direct painting. Ceramic types associated with this phase include Mississippi Plain, Bell Plain, Kimmswick Fabric Impressed, Old Town Red, McKee Island Cordmarked, Mulberry Creek Cordmarked, and Baytown Plain (Clay 1979). The major vessel forms are globular jars with loop handles or bifurcated lugs, saltpans, and hooded bottles (Clay 1963). The Tinsley Hill phase ceramic assemblage is comprised of the above-mentioned types and Kimmswick Plain, Nashville Negative Painted, var. Nashville and var. Angel, Matthews Incised var. Matthews, Beckwith, and Manly, O'Byam Incised, var. Stewart, and Tolu Interior Fabric Impressed (Clay 1979). According to Clay (1979), there are also differences in the types of appendages associated with jars and in the vessel forms identified for each phase. Appendages on Mississippi Plain globular jars shift from narrow loop handles to wide strap handles. During the Tinsley Hill phase the hooded water bottle becomes less common and the short and long necked water bottles appear along with the plate form.

A brief review of the data and the cross comparisons Clay (1979) used to divide the Mississippi period into two phases is important in order to fully understand the regional cultural sequence. The stratigraphy and radiocarbon dates from the Tinsley Hill village indicated to Clay that two occupations had occurred at the site. A deep trench excavated at the Tinsley Hill village revealed two levels of occupation stratigraphically separated by a layer of sterile slope wash. A radiocarbon date of A.D. 1650+/-80 was associated with a prehistoric structure from the upper component of the Tinsley Hill village. The lower stratigraphic level yielded no material for radiocarbon dating. The ceramics from the lower stratigraphic level were undecorated types, while the assemblage from the more recent occupation of the Tinsley Hill village included the decorated types.

The similarity between the ceramics from the lower levels at Tinsley Hill, Jonathan Creek, and those from the Dedmon Site (15Ml68), radiocarbon dated at 1045+/-75 and 1045+/-85, helped Clay set the approximate temporal boundary for the beginning of the Jonathan Creek phase. The ceramic assemblage from Dedmon was simple, and like the Jonathan Creek assemblage, lacked the incised and decorated types. Consequently, Clay placed the beginning of the Jonathan Creek phase at approximately A.D. 1045 and considered the simple ceramic assemblages from Dedmon, Jonathan Creek, and the lower levels of Tinsley Hill to represent Jonathan Creek phase components.

Clay could only determine one other temporal boundary at the end of his regional sequence. The end of the Tinsley Hill phase was set at approximately A.D. 1600 by the radiocarbon date from the upper component at Tinsley Hill. The transition between the Jonathan Creek phase and the Tinsley Hill phase is, as Clay (1979) mentions, presently unknown. The earliest radiocarbon date from the Tinsley Hill cemetery (A.D. 1380) is difficult to associate with a particular village midden level.

However, Clay (1979) suggests that the Angelly phase (A.D. 1100-1300), defined in the Black Bottom (Riordan 1975), represents the type of development that probably occurred between the Jonathan Creek phase and the Tinsley Hill phase. During the Angelly phase, decorated types comprised a minor portion of the assemblage, with the only representatives being Matthews Incised and Angel Negative Painted.

There are two assumptions inherent in the ceramic sequence defined by Clay for the Tennessee-Cumberland region that are relevant to this study: one, that his Jonathan Creek sample is representative of the rest of the site; and two, that the six house-basin structures are Tinsley Hill phase features. This research contributes further analysis on Jonathan Creek ceramics and provides a test of the temporal placement of the six house-basin structures.

METHODS

This section describes the methods used in Webb's fieldwork, those used in curating the collection at the University of Kentucky Museum of Anthropology in Lexington, and the methods used in this research. Webb rigorously assigned horizontal proveniences but, unfortunately, vertical proveniences were grossly defined. The whole site was divided into several large units labeled A-E (Figure 1). Horizontal provenience was assigned with reference to a 5 foot (1.5 m) grid, oriented north-south. Within each 5 by 5 foot block, features were provenienced by designating how many feet east or west, and north or south of the appropriate grid line the feature was situated.

Webb designated vertical proveniences in zones. Zone A, the plowzone, extended to between .35 feet (11 cm) and 1.3 feet (40 cm) below the ground surface. Webb averaged this to 0.6 feet (18 cm). He reported Zone B to be everything from 0.6 feet (18 cm) to 1 foot (30 cm). Despite these reported methods, vertical provenience on the artifact bags were often recorded as 1 foot (30 cm) Zone A or 1.5 feet (46 cm) Zone B.

The collection of Jonathan Creek artifacts suffers, as many WPA era museum collections do, from selective curation of artifacts and fieldnotes. A card catalog was started for the site in the 1950s but it was never completed. Early in the project workers filled out cards completely with catalog numbers and corresponding proveniences but later on, file cards were marked with a catalog number only. To further complicate matters, many of the larger sherds and rim sherds were pulled from their original bags, labeled, and curated separately. Some of these sherds were not fully labeled with unit letters. The unit letter is crucial for identifying proveniences, since Webb used the same catalog numbers within each unit. Thus, artifacts without unit letters are virtually unprovenienced.

A random sample of six non-basin structures was selected from a list stratified by structure type (Figure 2). Artifacts associated with the six randomly selected non-basin (Types A-C) structures as well as the

six house-basin (Type A") structures were collected by searching through each box of curated ceramics for bags and loose, labeled sherds with the relevant feature number or provenience. One complete search through the curated collection retrieved material from only nine of the 12 structures (Table 2). Artifacts from five of the six randomly-drawn non-basin house features and four of the house-basin structures were located in the curated collection. Of these, materials from one non-basin structure and three house-basin structures were associated with the artifact bags that had their feature number written on it. For the remaining four non-basin structures and one house-basin structure ceramics selected for analysis were from the grid block area associated with these features.

Ceramics were classified according to Phillips' (1970) type variety system. Paste and surface finish characteristics used to sort the analyzed ceramic sample followed Clay (1963) and Lewis (1986). Vessel form for rims was determined from rim shape and surface treatment. The standards followed for form classification were those developed by Lewis (1982, 1986). The characteristics of the entire ceramic sample are described in detail in Wolforth 1987.

Table 2. List of Sampled Features.

Structure Type	Feature Number	Excavation Unit
House-basin		
A"	44	Unit C
A"	52	Unit C
A"	37	Unit B
A"	15	Unit B
Non-basin		
A	9	Unit A
B	22	Unit C
B	5	Unit B
B	23	Unit A
C	1	Unit A

ANALYSIS AND RESULTS

This section presents a summary of the comparison of ceramics from house-basin structures with a control group of non-basin house structures.

Based on the cultural sequence developed by Clay (1979), ceramic assemblages from late Mississippi period Tinsley Hill phase sites are expected to include Matthews Incised vars. Matthews, Beckwith, and Manly, Mound Place Incised, O'Byam Incised, Tolu Interior Fabric Impressed, and Nashville Negative Painted. If the house-basin structures represent a Tinsley Hill phase re-occupation of the Jonathan

Creek Site, these types should be found in the ceramic assemblages associated with these structures. To test this inference, ceramic types, vessel forms, and appendage types were compared between house-basin structures and the control group.

Ceramic types associated with the house-basin and non-basin structures are presented in Table 3. This table shows that Mississippi Plain dominates both samples. None of the Matthews Incised varieties, O'Byam Incised, or any other incised types occur in either sample. Both house-basins and non-basin house structures exhibit the same basic frequencies and percentages of the four types which Clay used to characterize the Jonathan Creek phase: Mississippi Plain, Bell Plain, Kimmswick Fabric Impressed, and Old Town Red. Minor amounts of Baytown Plain are also associated with both types of structures. Wickliffe Thick, Mulberry Creek Cordmarked, and Nashville Negative Painted occur in small numbers in house-basin structures.

Table 3. Ceramic Counts and Percentages.

Type Name	"A" Type House-basin Structures		Control Group Non-basin Structures	
	Number	Percent	Number	Percent
Mississippi Plain	1166	85.50	1229	88.30
Bell Plain	79	5.80	91	6.50
Kimmswick Fabric Impressed	82	5.00	52	3.70
Old Town Red	26	1.90	17	1.20
Wickliffe Thick	4	0.30	0	0.00
Nashville Negative Painted	1	0.03	0	0.00
Baytown Plain	1	0.07	3	0.20
Mulberry Creek Cordmarked	3	0.20	0	0.00
Baumer Fabric Impressed	1	0.07	0	0.00
Totals	1366	99.91	1392	99.9

Although the house-basin structures are associated with a slightly greater variety of types than the other structures, these ceramic types are not the temporally significant incised or engraved types. On the basis of this comparison, it is inferred that the house-basin structures were occupied at roughly the same time as the other structures at the Jonathan Creek Site.

Functional differences between the ceramics recovered from the two groups of structures were also investigated. All structures were assumed to be contemporaneous, and ceramic vessel form was assumed to reflect vessel function. The minimum number of vessels for each vessel type was estimated and the counts compared between the house-basin structures and the control group. The results (Table 4) indicate that both the house-basin structures and the control group have the same MNI for almost all vessel forms: jars, bowls, saltpans, and hooded bottles. However, plates and funnels were only recovered from the house-basin structures. These differences are somewhat insignificant, because they involve, in each case, only one sherd. On the whole there is no significant difference in the range of vessel forms associated with the house-basin structures and the non-basin structures. Thus, based upon this comparison no functional differences between the two structure groups could be identified.

Table 4. Minimum Number of Individual Vessel Forms.

	Structure Type		
Vessel Form	A" Type House-basin Structures	Control Group Non-basin Structures	Total
Jar	12	16	28
Bowl	4	3	7
Hooded Bottle	2	5	7
Open Bottle	2	2	4
Plate	1	0	1
Saltpan	4	2	6
Funnel	1	0	1
Total	26	28	54

Finally, changes in the style of vessel appendages was investigated. Given that loop handles and bifurcated lugs occur more frequently at early Mississippi period sites and strap handles are more common at later sites in the lower Mississippi Valley (Phillips et al. 1951) and in the Tennessee-Cumberland region (Butler 1983; Clay 1963), loop handles and bifurcated lugs were expected to be present in non-basin house structures and strap handles in house-basin structures. Only two handles and one bifurcated lug were included in the sample (Table 5). The one strap handle originated in a non-basin house structure, while the loop handle was found in a house-basin structure. The handle associations are thus the opposite of what was predicted. However, the

bifurcated lug was associated, as expected, with the non-basin structures.

Table 5. Appendage Types.

	Structure Type		
Appendage Type	A" Type House-basin Structures	Control Group Non-basin Structures	Total
Loop Handle	1	0	1
Strap Handle	0	1	1
Simple Lug	2	4	6
Bifurcated Lug	0	1	1
Undetermined	0	1	1
Total	3	7	10

DISCUSSION AND CONCLUSIONS

The analysis of the ceramics from the house-basin structures and a control group of non-basin house structures from the Jonathan Creek Site identified no significant differences in the ceramic types, vessel forms, or types of appendages associated with basin and non-basin house structures. Judged on the basis of their ceramic assemblages, the house-basin structures were probably not constructed during a postulated Tinsley Hill phase occupation of the site. Therefore, as a result of this analysis there is no information to support Clay's inference that these structures represent a Tinsley Hill phase reoccupation of the Jonathan Creek Site.

The contemporaneity of house-basin structures and non-basin structures clarifies one aspect of the depositional history of the Jonathan Creek Site, but it also eliminates a possible explanation for the Tinsley Hill phase ceramics in Webb's sample from the site. These ceramics do not occur in large enough numbers, however, to suggest that the Jonathan Creek phase, as defined by Clay, is not representative of the ceramic assemblage as a whole. However, a new explanation is now needed to account for the occurrence of decorated ceramics at the site.

One explanation may lie in as-yet-unanalyzed Tinsley Hill phase features excavated at Jonathan Creek. To determine the contextual association of Webb's Tinsley Hill phase ceramics, an attempt was made to locate these specimens in the curated collection and to trace their

provenience. However, only one sherd could be located among the curated artifacts. It was recovered from Feature 61. Unfortunately, the ceramics associated with this pit were not included in this study. Documenting the presence of a Tinsley Hill phase component at Jonathan Creek, though not within the scope of this study, will prove to be an important project for a future researcher.

Finally, the results of the present research corroborate and support the existing regional ceramic sequence. First, the sample of Jonathan Creek ceramics analyzed as a result of this study resembles an early Mississippi period assemblage. The large percentages of plain wares, and the absence of incised and decorated ceramic types are consistent with Clay's characterization of Jonathan Creek phase ceramic assemblages. Second, the sample used for this research is larger and more reliable than Clay's 1963 sample (Table 1). Since sample size is related to sample richness in a log normal relationship (Figure 6), the lack of richness in Clay's sample may be due to sampling errors inherent in small samples and not to any significant temporal or cultural phenomenon.

The relationship between sample size and sample richness can be assessed by using a method presented by Kintigh (1984). This method can be used to compare Clay's (1963) sample to the expected diversity or richness of randomly-drawn samples of the same size. Figure 6 is a curve of expected diversity generated using Kintigh's (1984) method. Using all analyzed ceramic types and their frequencies from Jonathan Creek, random samples of 14 different sizes were drawn 200 times. The mean number of types calculated from the 200 trials was plotted against sample size. Two similar curves were drawn around the plotted means, which include 80% of the samples drawn. Webb's 1952, Clay's 1963, and Wolforth's 1987 samples were then plotted on the same graph (Figure 6).

Clay's 1963 sample (Figure 6) is less diverse than 80% of all randomly drawn samples. Wolforth's 1987 and Webb's 1952 samples are on the border of being less or more diverse than expected. This suggests that Clay's sample may not be representative of the total Jonathan Creek ceramic assemblage, still only partially analyzed. In light of this, the analyses of a larger and more reliable ceramic sample is a significant contribution to the total amount published about the Jonathan Creek ceramic assemblage and will hopefully encourage further analyses of the materials recovered from this site.

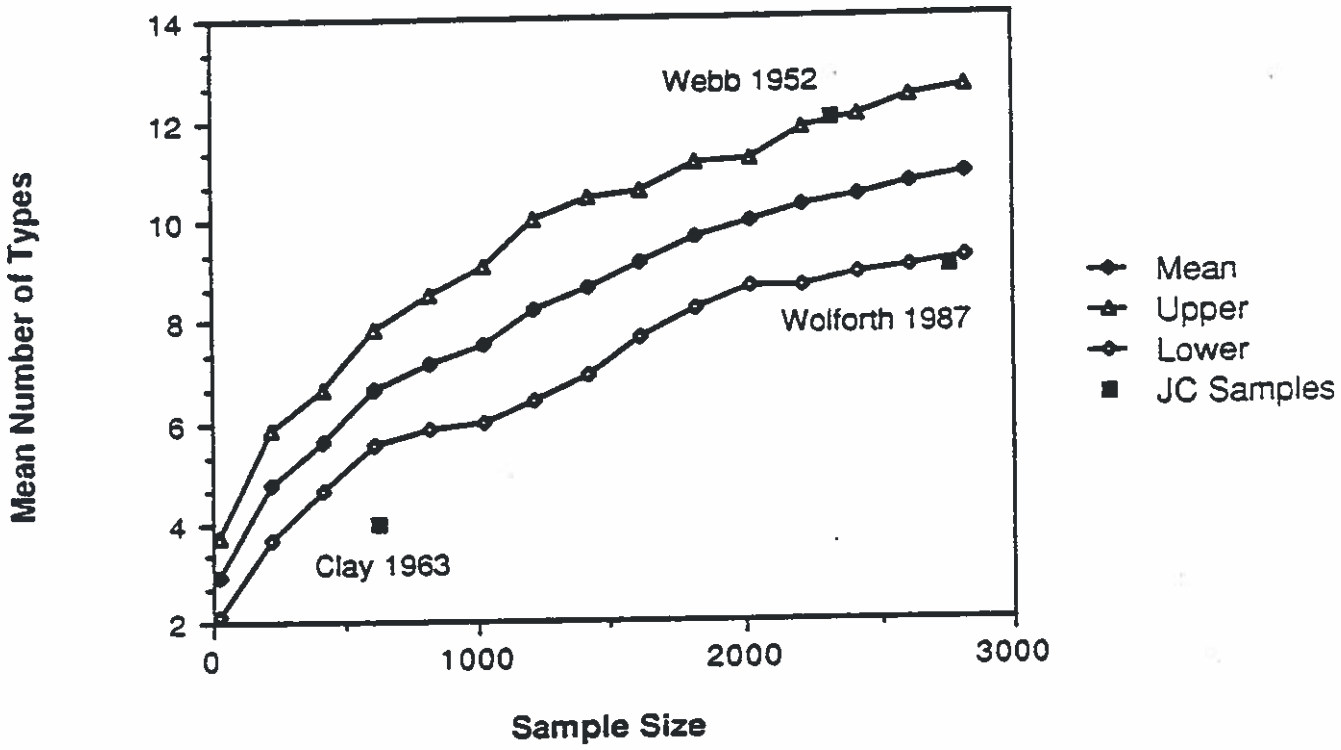

Figure 6. Curve of Expected Diversity, Jonathan Creek ceramics.

In summary, the results of this study indicate that there are virtually no differences between the ceramics from the house-basin structures and the non-basin house structures at Jonathan Creek. This clarifies one question about the depositional history of the site. The six house-basin structures probably do not represent a late Mississippi period Tinsley Hill phase reoccupation of the site. This study also corroborates Clay's 1963 reanalysis of the site's ceramics. The vast majority of the sample analyzed for this paper, as with Clay's sample, consisted of plain ware ceramics. Incised and other decorated types were not identified in either sample. Thus, no changes can be offered with regard to the current regional ceramic sequence. Further research into other uninvestigated parts of the Jonathan Creek artifact collection will be necessary in order to define a Tinsley Hill phase component at this site.

ACKNOWLEDGMENTS

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SURFACE-COLLECTED LITHICS FROM THE ADAMS SITE

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ABSTRACT

The chipped and ground stone assemblages recovered as a result of a controlled surface collection of the Adams Site (15Fu4), a large Mississippian center in western Kentucky, are described and the spatial distribution of each artifact class is examined. Analysis of the tool and debitage distributional patterns resulted in the identification of habitation and public-use areas. Nearly all of the lithic material in the collection was recovered from the habitation areas, within which tools and debris are differentially correlated with household clusters.

INTRODUCTION

In 1984, the Kentucky Heritage Council sponsored a 100% controlled surface collection and spatial analysis project at the Adams Site (15Fu4), a Mississippian town located near Hickman, Kentucky. Collection and analysis of the recovered materials were carried out by field and laboratory crews from the Department of Anthropology at the University of Illinois at Urbana-Champaign as part of its long range commitment to investigate archaeological sites in western Kentucky.

The University of Illinois' investigations at Adams and other Mississippian centers in western Kentucky (Edging 1985; Kreisa this volume; Lewis 1986) were initiated in part to fill the relative void that existed in archaeological data from this region compared with those that surround it. More importantly, it was hoped that this research would better our understanding of the Mississippian cultural tradition: its origins, variability, adaptations, and causes of its demise. Toward these ends, the objectives of the Adams Site spatial analysis were to identify and locate activity areas, determine whether spatial segmentation existed at the site, estimate the population size and variability during the site's final occupation phase, and delineate patterns of site growth and maintenance. These objectives serve as the basis for the author's doctoral thesis (Stout 1988). A report of the Adams Site investigations (Stout 1987) is also being prepared for submission to the Kentucky Heritage Council.

This paper focuses on the chipped and ground stone artifacts recovered as a result of the controlled surface collection of the Adams Site. These materials are described and their spatial distributions examined. The lithics from Adams are representative of certain sets of

activities that took place at the site and their distribution should reflect the spatial organization of the people who carried out these activities.

BACKGROUND

The Adams Site is situated on an extinct terrace remnant on the Bayou de Chien at the point where this stream opens onto the Mississippi River floodplain. The site covers about 7.3 ha and is surrounded by a seasonally inundated cypress swamp (Figure 1). It consists of seven mounds, six of which (A-F) delineate a large (1.4 ha) rectangular central plaza. This plaza/mound complex is flanked by habitation areas referred to as the East and West villages, which contain 1-1.5 m thick middens. The West Village covers approximately 2.4 ha and the East Village 1.9 ha. The seventh mound (G) lies along the northwest edge of the West Village.

Although Adams has been under row crop cultivation for at least five decades, the site's periphery and three largest mounds (A-C) are wooded and have never been plowed. (The top of Mound A was cultivated for a short time early this century.) The south-central part of the site was tiled for drainage, but the resulting site disturbance is considered minimal (Stout 1987b). Various parts of the site have been looted, but the extent of this activity is uncertain. Looting, however, is not considered to have been of sufficient intensity to affect the identification of intra-site spatial patterning at this settlement.

Both Baytown and Mississippian components are represented at Adams, however, most of the site's architecture and material culture date to the Mississippi period, particularly to the Dorena and Medley phases (A.D. 1100-1500) (Lewis and Mackin 1984).

Limited test excavations (Lewis 1986) at Adams in 1983 uncovered a complex stratigraphic sequence, with numerous intrusive and superimposed elements. Portions of house structures and associated debris were exposed, and preliminary assessments of the site's stratigraphy were made. However, a thorough and detailed examination of spatial patterning fell outside the objectives and constraints of that project, since such research would have required extensive study of the entire site. Because a controlled surface collection can provide the needed extensive site coverage at lower expense than excavation, and because a better understanding of the site organization was needed for planning and, later, interpreting block excavations at Adams, such a study was begun in 1984.

Large-scale intra-site spatial analyses have proved to be valuable research tools and within the study region they have been put to effective use (e.g., Butler 1977; Healan 1972; Leeds 1979). These projects have made use of a body of techniques for studying spatial patterning that have been developed by other disciplines, or developed by archaeologists over the past two decades. Investigations into how well the patterning of artifacts in the plowzone of a site represent the

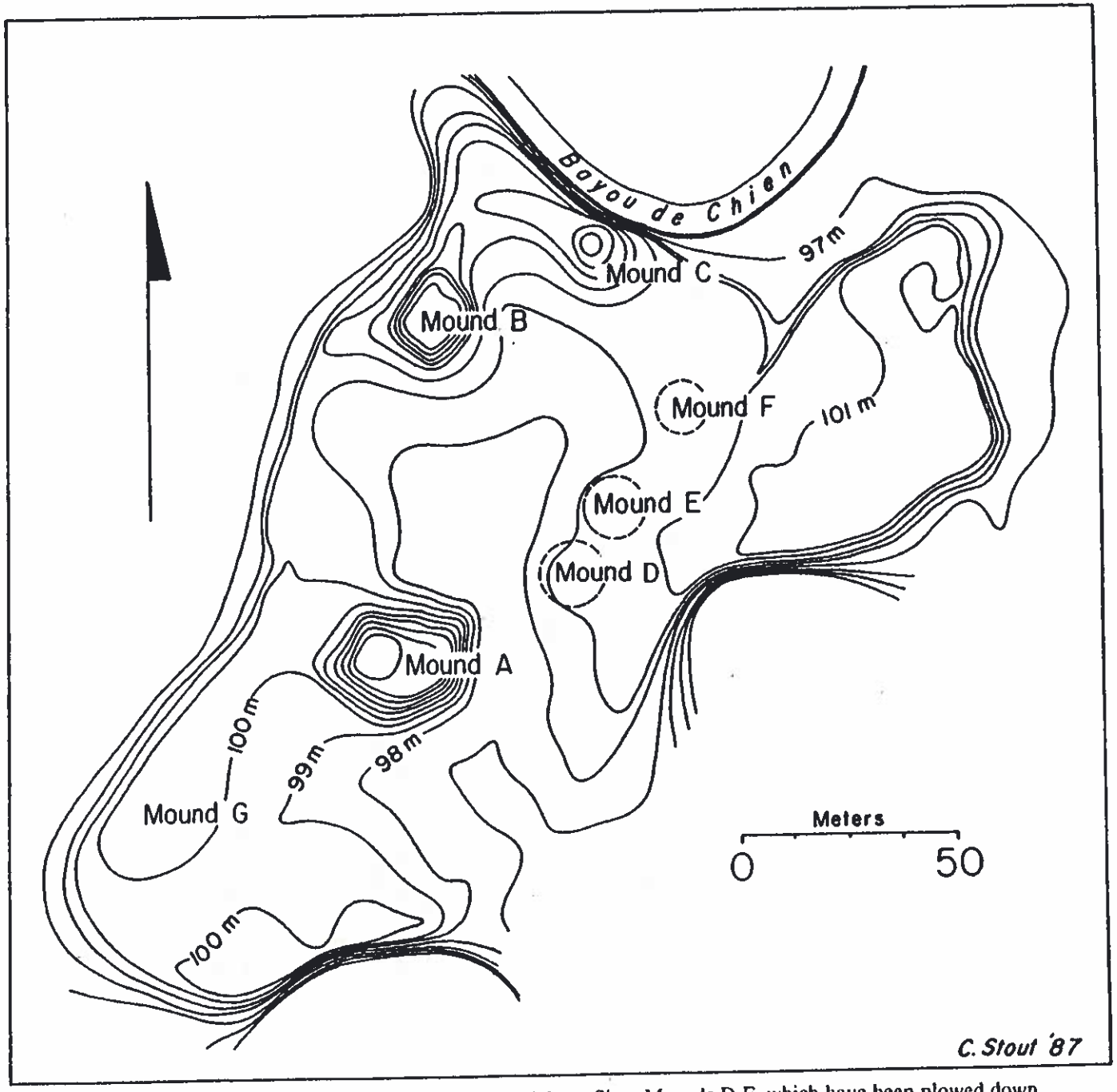

Figure 1. Topographic contour map of the Adams Site. Mounds D-F, which have been plowed down are shown with a broken line.

patterning of those artifacts that lie below in the undisturbed matrix have revealed that although some blurring of patterns appears with repeated plowing, existing patterns can be detected if viewed at a scale larger than approximately 5 m grid units (Lewarch and Obrien 1981; Redman and Watson 1970). Butler (1977) has demonstrated at late prehistoric sites in the Black Bottom in southern Illinois that materials collected from a 6 m grid provided accurate and reliable information on what lay below the plowzone within the collected area. With these practical relationships established, a site can be examined for the substantive relationships that are expected to be found there using any number of quantitative and formal methods. An expectation of this spatial analysis project was that a broad range of Late Woodland and Mississippian lifeways would be represented and identifiable at Adams within the surface-collected data.

It was anticipated that the lithic assemblages, as well as all other material culture categories, would be distributed across the site in nonrandom clusters representing patterned human behavior, and that gross segmentation of the site into open public space and habitation space would be mirrored by distributions of artifact classes besides daub, which is the only kind of artifact on the site surface representative of domestic structures.

METHODS

The entire site area was surface collected except for the perimeter of the site and Mounds A-C. The site was collected in 5 x 5 m units following preparation with a disk plow of the area to be surface collected and approximately 30 mm of rain. Collection time for each unit was limited to about five minutes, which, after experimenting with longer and shorter times, was determined to provide adequate and consistent coverage.

The lithic assemblage was sorted into chipped, ground, pecked, smoothed, and unmodified categories. Chipped stone was separated into tools and debitage. Debitage was sorted into primary, secondary, and tertiary reduction flakes, unmodified angular fragments, and cores. Utilized flakes were not identified because the source of retouch was impossible to determine in a plowed surface context without microscopic edgewear analysis.

Decortication flakes are defined here as flakes removed from the exterior of a chert cobble. Flakes bearing cobble exterior on at least 25% of the flake surface belong to this category. Secondary reduction flakes possess cobble exterior on less than 25% of their surface and are larger and less regular than tertiary flakes, but otherwise have the same basic morphology. Tertiary reduction flakes are small (flake diameter less than 2 cm) and flat with minute, obtusely-angled ridges running down their dorsal side. Angular fragments are of various sizes and probably represent the full range of lithic reduction stages.

Chert source identification was made using a type collection comprised of source and artifactual materials, and following a modified version of the flow chart for cherts commonly found in the Jackson Purchase region of western Kentucky developed by Stelle (1986:Figure 39). The term "Fort Payne" found in Stelle's flow chart is replaced in the revised version with the term "Dover".

DATA

The assemblage consists of 10,357 pieces of flaked, ground, or unmodified stone (Table 1).

Table 1. Surface Collected Lithics.

Artifact Category	Count
Chipped stone tools	
Projectile points	41
Hoe/adze fragments	453
Other chipped stone tools (whole or fragments)	236
Debitage	5,769
Modified cobbles	
Gound stone with flat faces	427
Grooved abraders	153
Hammerstones	71
Burnishing stones	33
Unmodified cobbles	
Cannel coal	10
Galena	2
Other	3,161
Other	
Gorget	1
Total	10,357

CHIPPED STONE

Projectile points are the only temporally or culturally diagnostic lithic artifacts recovered from the controlled collection. A detailed description of chipping treatments are given in Stout 1987a. Attribute descriptions of projectile points follow Binford (1963b). Of the 41 points and fragments in the collection, 28 could be classified. The 15 narrow triangular points (Figure 2a-o; Table 2a-o) are plano-convex to biconvex in cross-section, their blades are excurvate, the distal end acute, and the base thinned and nearly straight.

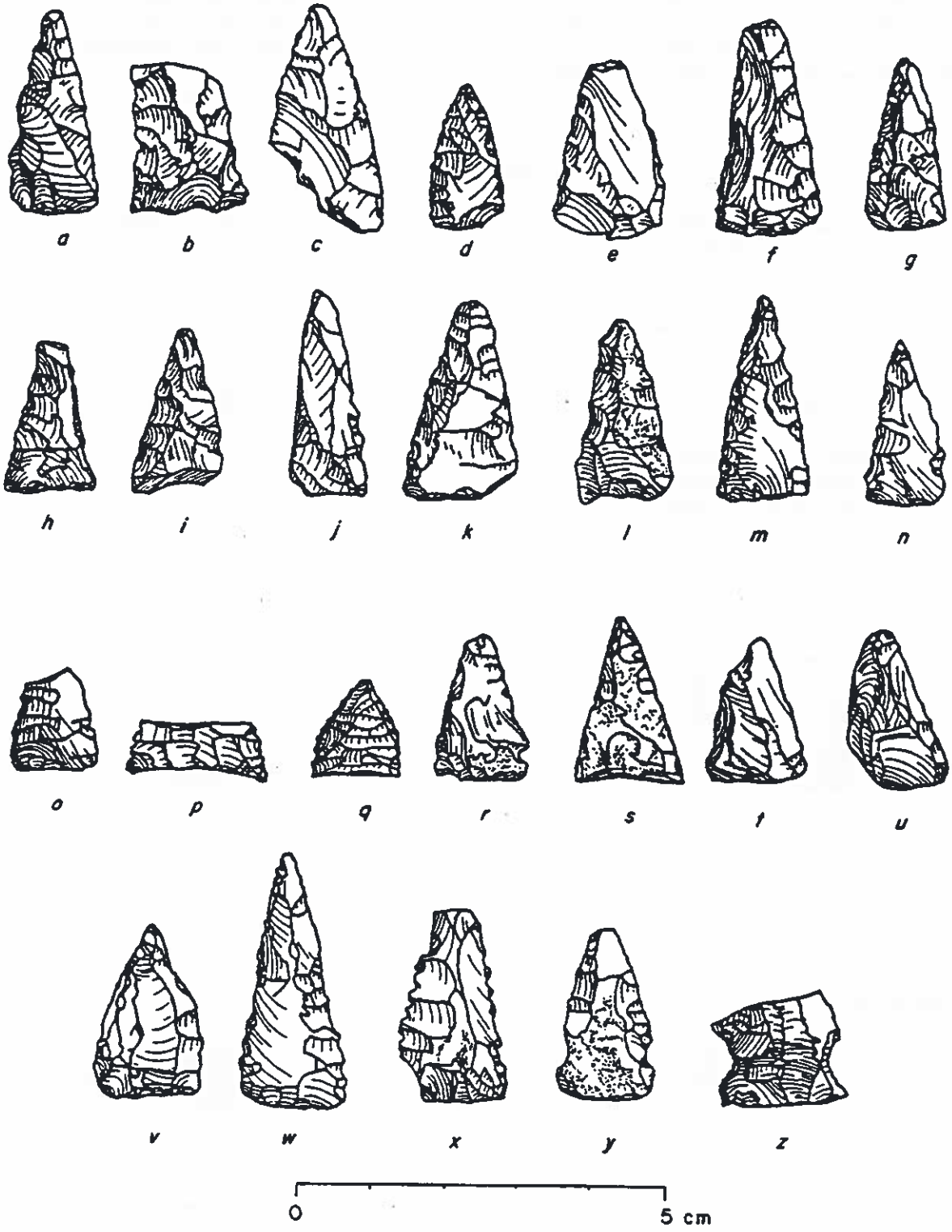

Figure 2. Projectile points: a-o, narrow triangulars; p-v, Madison; w-x, Sand Mountain; y-z, side notched.

Table 2. Projectile Point Metric and Other Attributes.*

Specimen	length total	length blade	length stem	width blade	width at blade junction	stem at base	max. thick-ness	raw mat'l	heat modif-ied
a	24	-	-	12	-	-	4	MC	no
b	-	-	-	18	-	-	7	MC	no
c	32	-	-	-	-	-	5	MC	no
d	23	-	-	10	-	-	3	MC	yes
e	(22)	-	-	15	-	-	6	MC	no
f	30	-	-	15	-	-	4	MC	no
g	24	-	-	11	-	-	4	PG	no
h	(27)	-	-	14	-	-	6	PG	no
i	23	-	-	-	-	-	6	PG	no
j	30	-	-	12	-	-	6	PG	no
k	27	-	-	(18)	-	-	5	Cob	no
l	25	-	-	(13)	-	-	6	Cob	yes
m	23	-	-	12	-	-	5	Dover	no
n	23	-	-	12	-	-	3	PG	no
o	-	-	-	11	-	-	4	PG	no
p	-	-	-	-	-	-	-	PG	no
q	16	-	-	12	-	-	3	PG	yes
r	21	-	-	14	-	-	4	?	no
s	25	-	-	12	-	-	5	?	no
t	19	-	-	14	-	-	5	MC	no
u	22	-	-	-	-	-	6	MC	yes
v	22	-	-	4	-	-	8	?	no
w	35	-	-	12	-	-	3	Dover	no
x	-	-	-	-	-	-	3	Dover	no
y	24	16	8	12	10	13	4	MC	no
z	-	-	9	17	12	18	5	MC	yes
aa	-	-	23	13	-	16	-	Dover	no
bb	-	-	14	33	13	10	11	PG	no

*Measurements in mm. Cherts: MC=Mill Creek; PG=Purchase Gravel; Gob=Cobden.

Seven of the narrow triangular points from Adams were made from Mill Creek chert flakes, one of which exhibits hoe polish. The distal end of this latter point is blunted and bears step fractures that are indicative of this tool's use as a perforator. Five other points were made from flakes of Purchase Gravel and three were made from Cobden chert.

All of the Madison points (n=7) (Figure 2p-v; Table 2p-v) recovered from Adams are small and thin, nearly biplanar in cross-section, have an acute distal end, and straight or nearly straight blades and base. This type was originally named Mississippi Triangular (Scully 1951:14) for its culture historical affiliations and was widely distributed over the eastern two-thirds of the United States.

The Adams specimens are 20-24 mm long, 12-20 mm wide, and 3-6 mm thick. Thus, with the exception of two unusually thick specimens, the Adams Site Madison points fit within the typical size range for this point type see Ritchie (1971:33) and Cambron and Hulse (1986:84). Three of these points were made from flakes of Purchase Gravel, and one each from Dover and Mill Creek cherts. One of the Purchase Gravel points is heat-modified. The remaining two Madison points were reddened and glassy, indicating heat modification. One of these was made from a flake of Mill Creek chert in its lightest range of color, or from Burlington chert. The raw material from which the remaining specimen was made could not be identified.

The two Sand Mountain points (Figure 2w-x; Table 2w-x) are thin, minimally modified Dover flakes with serrated blade edges. The dimensions of the single whole specimen fit within the range given by Cambron and Hulse (1986:112).

There are two side notched (Figure 2y-z; Table 2y-z) specimens in the assemblage, one of which is small with diminutive conchoidal chip scars. The other, an incomplete specimen, is larger with deeper and larger scars. Both points are made of Mill Creek chert, the larger of the two exhibiting the glassy texture and red hue characteristic of heat modification.

The collection contains one expanding stemmed point base (Figure 3a; Table 2aa) of Dover chert. This specimen is thick, biconvex in cross-section, and exhibits deep secondary ovate and conchoidal chip scars.

There is one contracting stemmed point (Figure 3b; Table 2bb) made from a flake of Purchase Gravel. It has deep primary chip scars partially obscured by secondary chipping and is biconvex in cross-section.

In addition to the above projectile points, the assemblage includes six flat point fragments, biplanar to biconvex in cross-section (Figure 3c-h). Two of these were made from flakes of Dover chert, one of Purchase Gravel, and one from heat-modified Mill Creek chert.

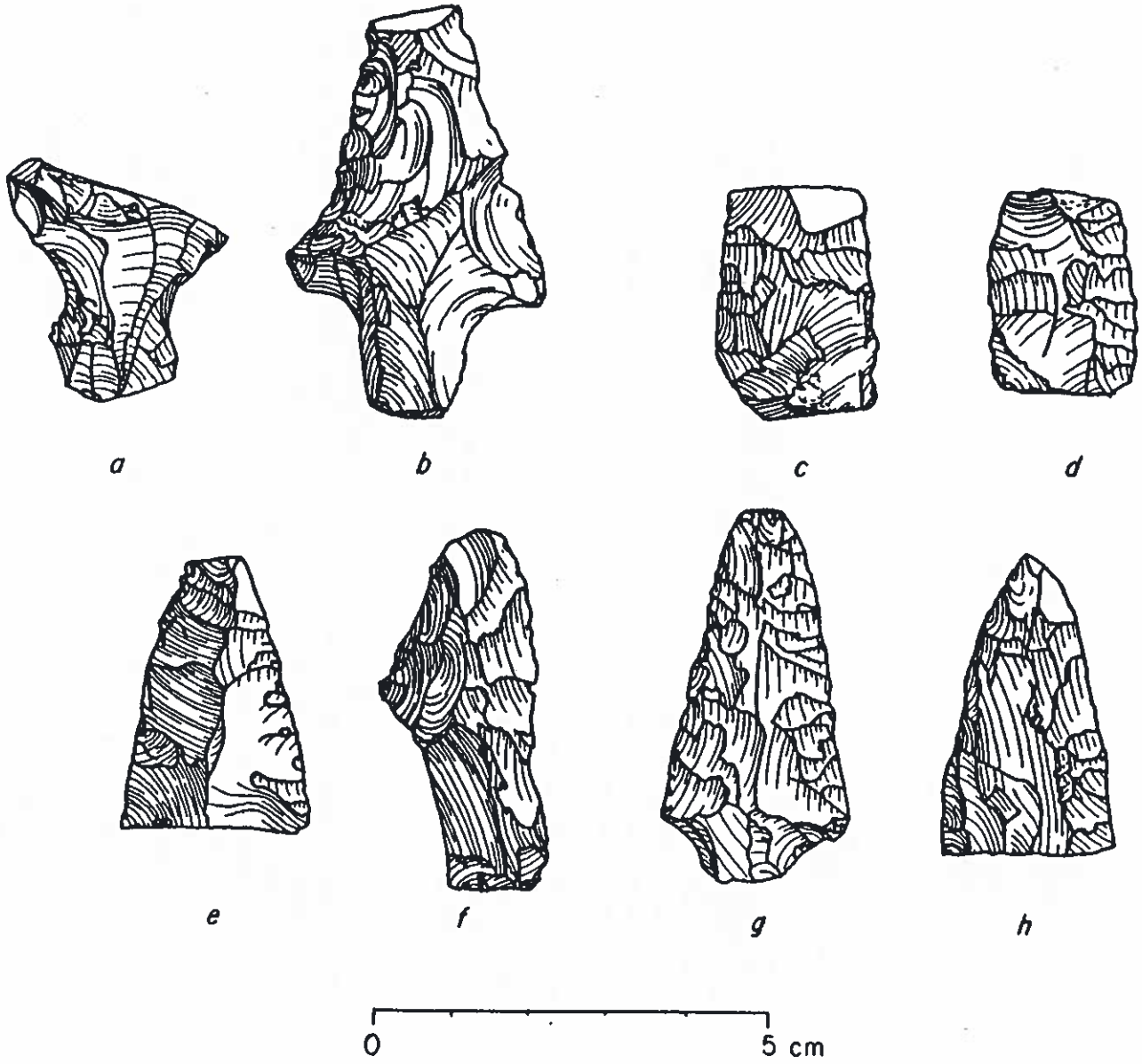

Figure 3. Projectile points: a, expanded stem; b, contracting stem; c-h, flat point fragments.

The remaining projectile point fragments could not be classified. Three of the fragments were made of Mill Creek chert, two of which were heat-modified. Two additional fragments were made of Purchase Gravel, one of which was heat-modified. Of the remaining two fragments, one was made of Dover chert and the other of heat-modified Cobden chert.

A total of 236 whole or broken flaked tools were collected from the site as a result of these investigations. These tools include one refined biface, nine scrapers, four spokeshaves, four drills/perforators, and one wedge.

One bifacially worked Dover flake (Figure 4e) appears to have been a multipurpose tool. It has two cutting edges, a scraping edge, and an acutely angled drill-like bit at the junction of the cutting edges. Chip scars along the cutting edges are diminutive and regularly spaced, while the scraping edge is steep and has a discontinuous chipping pattern. Step fractures on the drill bit indicate that the tool was twisted clockwise.

Two of the scrapers were bifacially manufactured from Dover flakes. One (Figure 4b) was hafted and has a working edge on three margins. The other (Figure 4d) exhibits crude retouch on its entire margin, but its bit appears to account for less than 20% of the tool's circumference. Deep primary chip scars cover the seven unifacial scrapers (Figure 4i-o) except along the working edge, where they are obliterated by continuous diminutive conchoidal flaking. There are two unifacial scrapers of Dover chert, two of Purchase Gravel, one each of Mill Creek and Cobden cherts, and one of an unidentified raw material.

There is one crudely manufactured bifacial spokeshave (Figure 4c) of Dover chert. Three unifacial spokeshaves (Figure 4p-r) are minimally retouched at the bit. Two of these are made of Dover chert and one of Mill Creek.

One hafted drill (Figure 4f) is a recycled projectile point or knife of Mill Creek chert, with deep conchoidal chip scars on both margins of both faces. A second bifacial drill (Figure 4s) of uncertain raw material has steep edges nearly perpendicular to its faces. Heavy use has obliterated most chip scars; and step fractures indicate that the tool was twisted back and forth. A bifacial drill bit fragment (Figure 4h) made of Dover chert, is nearly round in cross-section, and has diminutive regularly-spaced chip scars. The single unifacial drill (Figure 4g) is an angular spall of Mill Creek chert exhibiting deep conchoidal chip scars.

The wedge (Figure 4a) appears to have been a recycled cutting tool of Dover chert. Hammering along the edges, and this tool's crystalline texture have obliterated much evidence of manufacturing technique.

No whole hoe or adze specimens were collected, but 453 fragments exhibiting highly-polished surfaces were found. Only six of the hoe or adze specimens represent sharpening flakes.

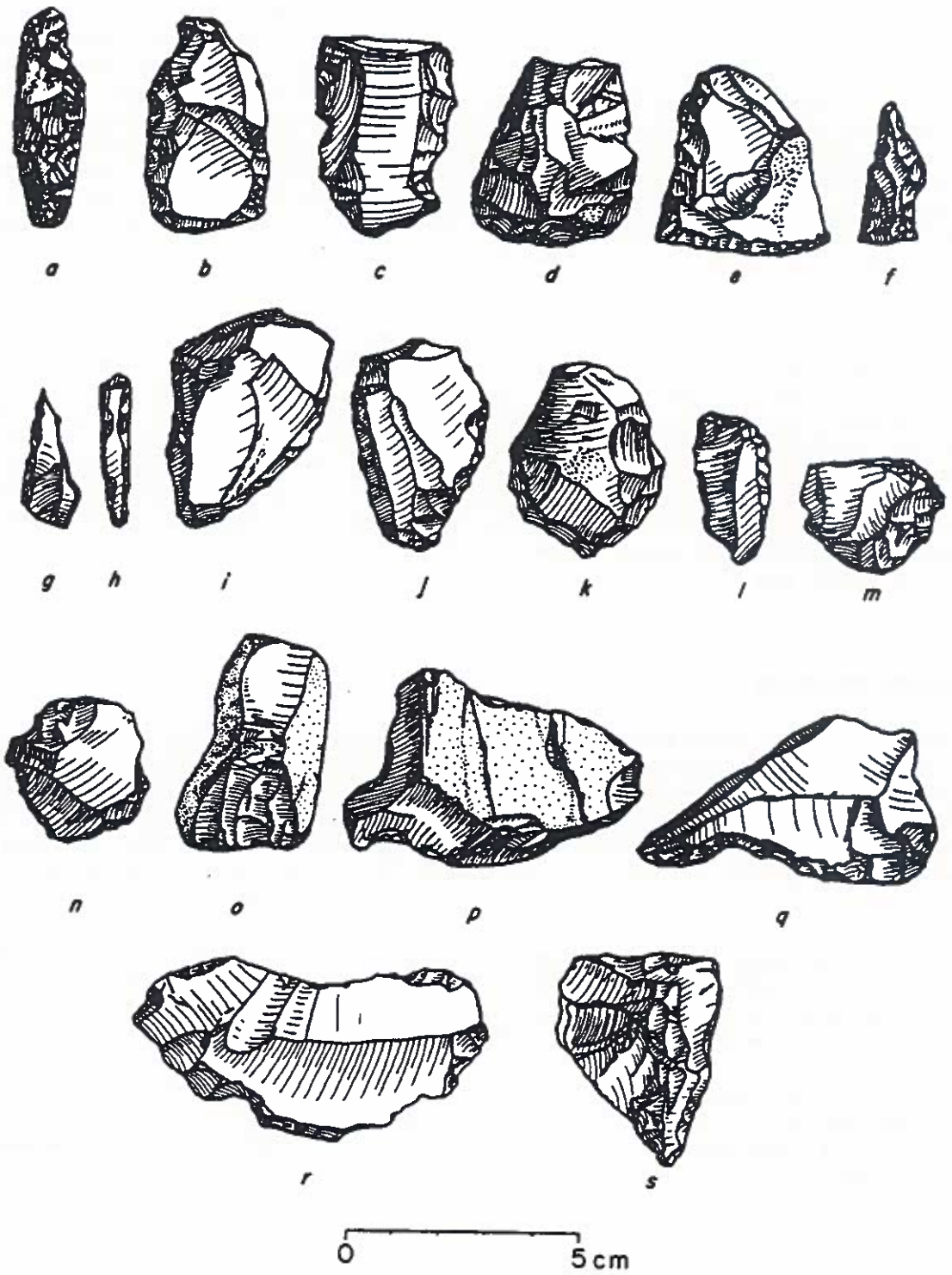

Figure 4. Other chipped stone tools: a, wedge; b,d,i-o, scrapers; c,p-r, spokeshaves; e, biface; f-h,s, drills.

There are 5,769 pieces of debitage in the collection. About 5% of these are primary reduction flakes and 41% are secondary reduction flakes. Most of the flaked stone tools appear to have been made from secondary flakes. These flakes are of a size and form that can be used effectively as expedience tools. Tertiary flakes account for only about 1% of the debitage. This may be at least partly due to collection bias against very small artifacts. However, the small number may also reflect a real lack of flaked stone tool finishing at the site. Unmodified angular fragments account for 50% of the debitage in the collection. Cores and core fragments comprise about 4% of the debitage.

The most common raw material identified in the assemblage is Mill Creek chert, followed by Purchase Gravel, Dover, and Cobden in descending order. Stelle (1986:164) has stated that Mill Creek chert commonly arrived at the site as hoe preforms or large hoes. As these tools broke, he argued, the fragments were recycled into new tools. He went to suggest that Dover (identified by him as Fort Payne) and St. Louis cherts arrived in a more advanced state of lithic reduction than did Mill Creek, and, furthermore, that Kaolin (Illinois novaculite) and Burlington cobbles reached the site unaltered, as did the quasi-local Purchase Gravel. The amounts and kinds of cherts recovered as a result of this study are consistent with Stelle's (1986) conclusions.

MODIFIED COBBLES

This class of materials includes both ground and pecked cobbles, and is divided into grinding stones possessing one or more flat surfaces, grooved abraders, hammerstones, and ornaments. The 427 pieces of ground stone with one or more flat sides probably represent a number of functional tool groups that include abraders, manos, and metates. However, due to the fragmentary condition of the recovered specimens, no attempt was made to classify these materials into functional groups.

The 153 grooved abrader fragments can be distinguished from the other ground stone tools by one or more linear scars that were formed when they were used to grind tools or other objects. They are generally made of sandstone or similarly coarse material.

Seventy-one stones exhibit battering or pecking consistent with use as hammerstones. In addition, a ground gorget fragment, which measures 7 mm at its thickest point was recovered. The edges of this specimen are rounded and it exhibits a drilled whole approximately 2 mm in diameter.

UNMODIFIED COBBLES

Whole or broken pieces of unmodified rock number 3,161. These pieces are manuports of uncertain and probably numerous functions. Strong spatial correlation with daub (Stout 1987, 1988) suggests a domestic function or functions for these cobbles.

OTHER LITHICS

Thirty-three smoothed pebbles, perhaps used to burnish pottery vessel surfaces, were recovered. Ten pieces of unmodified cannel coal and two pieces of galena were also found. Cannel coal is commonly reported at Mississippian sites in the region. Ground cannel coal objects, such as earspools and pendants, have been found at Angel (Black 1967), Kincaid (Cole et al. 1951), and Callahan-Thomson (Lewis 1982), among others. Galena is also a commonly occurring object at Mississippian sites (Farquhar et al. 1987).

DISTRIBUTION

Lithic materials at Adams are primarily restricted to the East and West villages, while the intermediate area, including the central plaza complex, is virtually devoid of material (Figure 5). Another area south of Mound G and west of Mound A is also devoid of material and may have served as a secondary plaza for the West Village. No comparable area was identified in the East Village.

Activity identification can be approached by examining the various artifact classes for spatial correlation. Artifacts that consistently co-occur may be functionally related, i.e., they may have been used in the performance of the same task or tasks. Alternatively, these artifacts may have been used for different tasks that were consistently performed in association with each other, or were performed at different times but in the same area.

Pearson's (r) correlation statistic (Nie et al. 1975) is used in this analysis to measure the degree of spatial correlation that exists between pairs of artifact categories. Values of r greater than or equal to 0.30 (p=0.001) were arbitrarily chosen to signify strong spatial correlation. Daub and Mississippian pottery, which are assumed to represent domestic activity areas at the site, are highly correlated with each other (r=0.76, p=0.001). These material categories are also strongly correlated with unmodified rock (daub: r=0.58; pottery: r=0.68), combined classes of debitage (daub: r=0.58; pottery: r=0.74), and secondary reduction flakes in particular (daub: r=0.38; pottery: r=0.55) (all p=0.001). Mississippian pottery is strongly correlated with hoe and adze fragments (r=0.39, p=0.001), but daub is less so, its r value falling below 0.30.

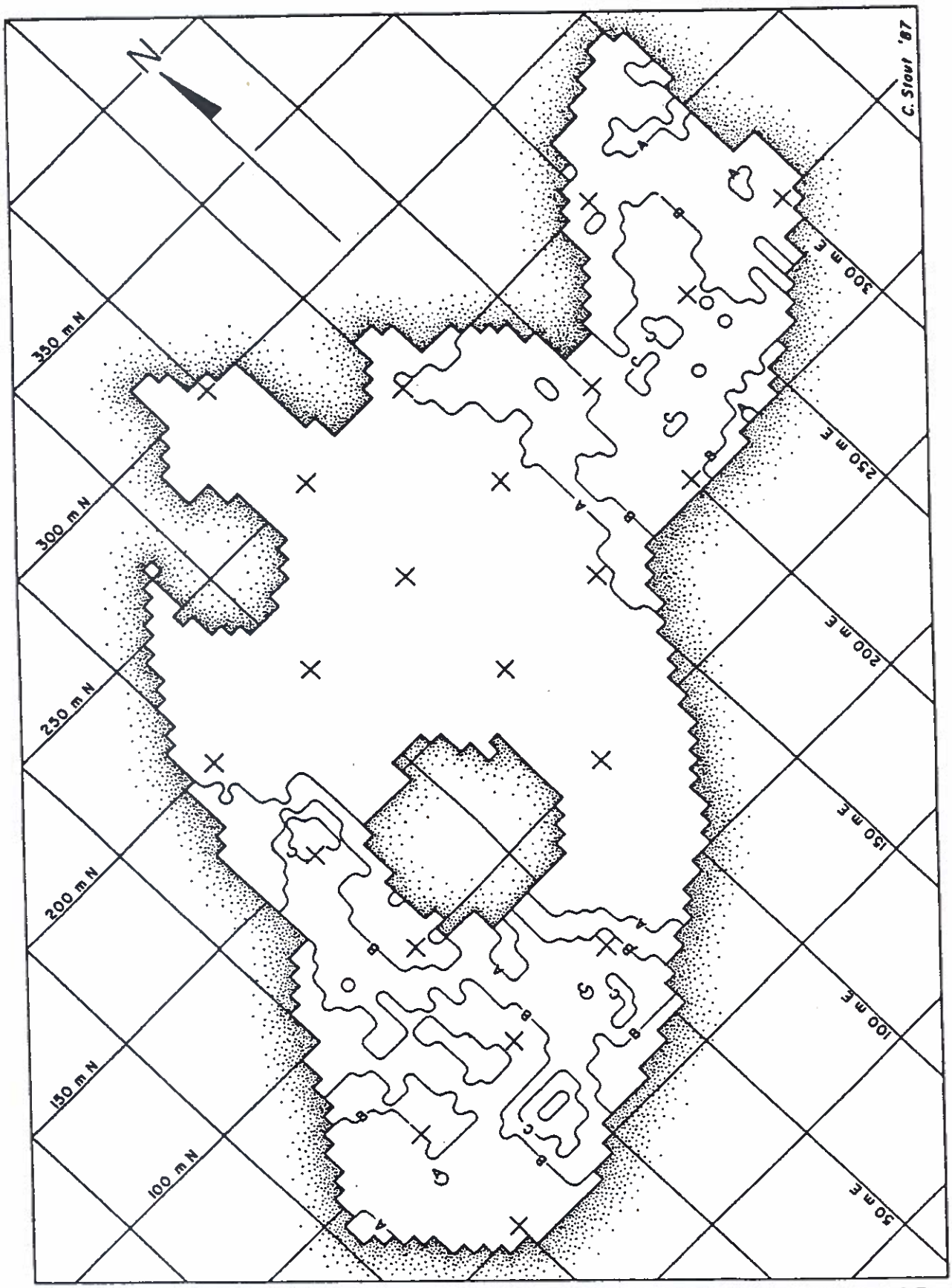

Figure 5. Contour map of combined categories of debitage. Areas between Contours A and B contained 1-3 pieces of debitage per 25 square meter collection unit; between Contours B and C, 4-6; and within Contour C, 7 or more pieces.

The relationships identified as a result of these comparisons suggest that habitual performance of certain activities may have occurred in close proximity to house structures. Chert flaking appears to have taken place in or around house structures more often than in other areas of the site. Secondary flakes that may have been used as expedient tools, produced with no special function in mind (Yerkes 1987), were also readily available in the vicinity of the house. Perhaps they were important in the carrying out of daily domestic chores, or, alternatively, other tasks that were undertaken near domestic dwellings.

Hoe and adze fragments associated with daub and pottery may represent small household horticultural plots where pieces were broken from the tools as they were used or sharpened. Some of these fragments also may have been discarded during the digging of wall trenches or house-floor burial pits, as these types of features may have been dug with chert hoes and axes. Stelle (Lewis 1986:164) reported that certain chert types were regularly recycled at Adams. Thus, it is possible that many of the hoe and adze fragments represent materials that were intended to be reworked into other types of chipped stone tools.

Unmodified rock fragments may be associated with house clusters because they were used in cooking, either as hearth linings or as boiling stones. Few, however, appear to be "fire-cracked" and any other functional explanations for these manuports will have to await further analysis.

Other artifact categories were not as strongly associated with daub or Mississippian pottery. However, this does not necessarily mean that their use was unrelated to household activities. Primary reduction flakes and cores have relatively low r values, but this may be spurious and due in reality to small numbers relative to secondary reduction flakes and unmodified rock counts.

SUMMARY AND CONCLUSIONS

Most of the tools in the Adams Site surface collection, other than projectile points, hoes, and adzes, appear to have been shaped only along their working edges. Thus, most represent minimally modified secondary flakes that were sharpened and perhaps reshaped into tools from "utilized flakes". These tools are, in general terms, scraping and cutting tools, and were probably used for a variety of tasks, including the working of wood, shell, and bone and the processing of meat and hides.

The majority of classified projectile points in the Adams Site assemblage represent variations of small triangular points that date primarily to the Mississippi period. Many of the projectile points were manufactured from Mill Creek chert. Since this chert type appears to have arrived at the site in the form of hoe preforms or large hoes, projectile points as well as other tools made from Mill Creek chert may have been manufactured from recycled hoe fragments. This suggests a pattern of curating broken hoe pieces, regardless of where they were

broken, and reworking them into other types of tools.

Nearly all lithic material was recovered from the village areas, but some materials were more highly correlated with household clusters than others. The gross distribution patterns of the lithic materials recovered from the site indicate that activities at the Adams Site were segregated into domestic or habitation areas and at least one public precinct or plaza. A second plaza may have been present in the West Village. The public areas were kept cleared of debris, while concentrations of material built up in the vicinity of residential areas.

ACKNOWLEDGMENTS

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THE MUIR SITE: AN UPLAND FORT ANCIENT COMMUNITY IN THE INNER BLUEGRASS REGION OF KENTUCKY

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ABSTRACT

Archaeological investigations at the Muir Site, an early Fort Ancient settlement in Jessamine County, Kentucky, resulted in the recovery of a large sample of Fort Ancient ceramics, lithics, and subsistence remains. This research also documented the presence of domestic activity areas consisting of structures and associated features. Based upon the results of the Muir Site investigations and other archaeological research in the Inner Bluegrass region, a new phase, Osborne (A.D. 950-1200) is proposed. During this phase, new technologies were introduced, new tools and items of personal use and adornment were incorporated into the regional material culture assemblage, and the local population appears to have become increasingly dependant on agriculture.

INTRODUCTION

The Muir Site (15Js86) was recorded as a result of an archaeological survey of the proposed right-of-way for the U.S. Route 27 By-pass around the city of Nicholasville, in Jessamine County, Kentucky. Based upon the results of the survey, further investigation of the site was recommended to determine if it was eligible for listing in the National Register of Historic Places (Janzen 1985). Prior to the initiation of testing, a portion of the site within the right-of-way was removed for fill dirt by the previous landowner. This borrow activity resulted in the identification of intact prehistoric features and gave some indication of the material culture assemblage present at the site. Features identified included pits and postholes, while the recovered ceramic and lithic artifacts indicated that the site dated to the early Fort Ancient period.

Recognizing the significance of the Muir Site, the State Historic Preservation Officer and the Federal Highway Administration concurred that the site was eligible for listing in the National Register of Historic Places. After a data recovery plan was developed and approved by all parties concerned, the Kentucky Transportation Cabinet requested that the University of Kentucky implement the plan and investigate the remaining undisturbed part of the site within the right-of-way. The Federal Highway Administration also permitted federal funds to be used

for excavations conducted on the privately-owned land adjacent to the right-of-way.

Investigation of the site was carried out from October 3 to November 23, 1985. The primary goals of the project were to 1) date the period(s) of site occupation, 2) characterize the material culture assemblage, 3) evaluate the subsistence strategies employed by site's inhabitants, and 4) identify the site plan and internal spatial organization. To accomplish these goals, field methods employed at the site included a combination of hand-excavated units and mechanical stripping of the plowzone (Figure 1).

This paper presents a description of the Muir Site and a brief overview of the results of the University of Kentucky's investigation of this site. More detailed information on the site is presented in the final site report entitled Muir: An Upland Fort Ancient Site in the Inner Bluegrass (Turnbow and Sharp 1987).

SITE DESCRIPTION

The Muir Site is located on a broad upland ridge west of the city of Nicholasville, Kentucky. This area is a part of the Inner Bluegrass Physiographic region, which is characterized by gently rolling, slightly karstic topography. The major river draining this region is the Kentucky River, located 10 km south of the site. The Kentucky River is deeply entrenched and lacks large floodplain areas. Jessamine Creek, approximately 1 km west of the site, is the nearest major stream.

Surface collections conducted by the University of Kentucky revealed scattered concentrations of artifacts along the ridgetop covering an area measuring approximately 4 ha. The distribution of surface materials did not indicate any recognizable community patterning, such as a circular midden ring that characterizes many middle Fort Ancient sites in the region.

RADIOCARBON DATES

Five wood charcoal samples recovered from features were submitted to Beta Analytic for radiocarbon dating. An additional wood charcoal sample from the borrow area was submitted by the Kentucky Transportation Cabinet. The results were corrected using Stuiver and Pearson's (1986) calibration curve and are presented in Table 1 at two standard deviations. The radiocarbon dates cluster in the eleventh and twelfth centuries indicating that Muir was a locus of occupation during the early Fort Ancient period.

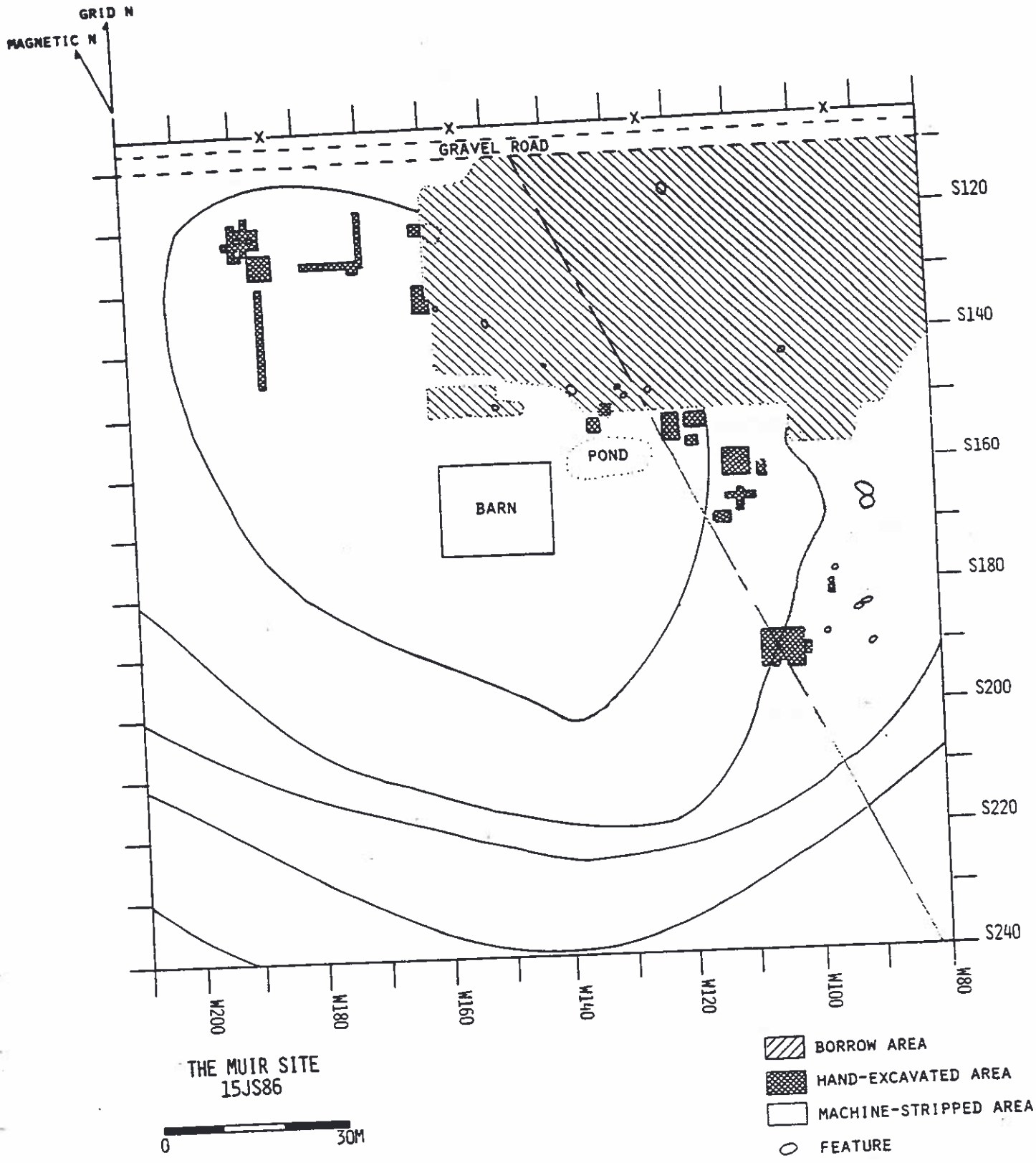


Figure 1. Machine-stripped area, hand excavated units, and borrow area.

Table 1. Radiocarbon Determinations.

Lab No.	Radiocarbon Age	Stuiver & Pearson Corrected Date Range	Provenience of Sample
Beta-14987	1010+/-80 B.P.	A.D. 880 (1015) 1210	Fea. 16 near Str. 2
Beta-14988	980+/-60 B.P.	A.D. 960 (1024) 1180	Str. 1 upper zone
Beta-14989	890+/-70 B.P.	A.D.1010 (1163) 1270	Str. 1 lower zone
Beta-14990	790+/-60 B.P.	A.D.1056 (1252) 1290	Str. 4
Beta-14991	1010+/-60 B.P.	A.D. 890 (1015) 1160	Fea. 37 near Str. 2
Beta-13296	780+/-50 B.P.	A.D.1170 (1259) 1280	Borrow Area

MATERIAL CULTURE ASSEMBLAGE

Artifacts recovered from the site include ceramic sherds and clay objects, lithic tools and debitage, and bone tools.

CERAMICS

A total of 23,328 sherds were recovered from Muir. Of these, 499 rims and 2,398 body sherds were analyzed, representing all of the recovered sherds larger than 4 cm^2 in surface area. Almost two-thirds (64%) of the analyzed sherds are tempered with limestone. The remaining sherds are tempered with a combination of limestone and shell (23%), shell (10%) or are untempered (3%). Most of the sherds are cordmarked (77%), though plain (22%), roughened (1%), checkstamped, net-impressed, and fabric impressed specimens are also present in the assemblage.

Typologically, these ceramics do not compare well with extant Fort Ancient ceramic types. This problem has been noted by other investigators dealing with ceramic assemblages from Fort Ancient sites in the Bluegrass region (Dunnell 1961; Purrington and Smith 1966; Sharp 1984). Thus, a total of 14 ceramic groups were identified in the assemblage on the basis of temper, surface treatment, and in certain cases, method of manufacture. Most of the ceramic groups were labeled with descriptive titles such as "shell tempered plain" or "limestone tempered roughened". However, four new types, Jessamine Cordmarked, Jessamine Plain, McAfee Plain, and McAfee Cordmarked, were defined.

Jessamine Cordmarked and Jessamine Plain account for 72% and 12% of the Muir Site ceramic assemblage, respectively. Both types are tempered with limestone or a mixture of limestone and shell. With the exception of one Jessamine Plain bowl, all of the vessels associated with these types are jars that exhibit vertical, recurved, or slightly flared rims (Figure 2a-b). Lips are typically flattened and almost 20% of the lips are cordmarked. Of the specimens for which cordage twist measurements

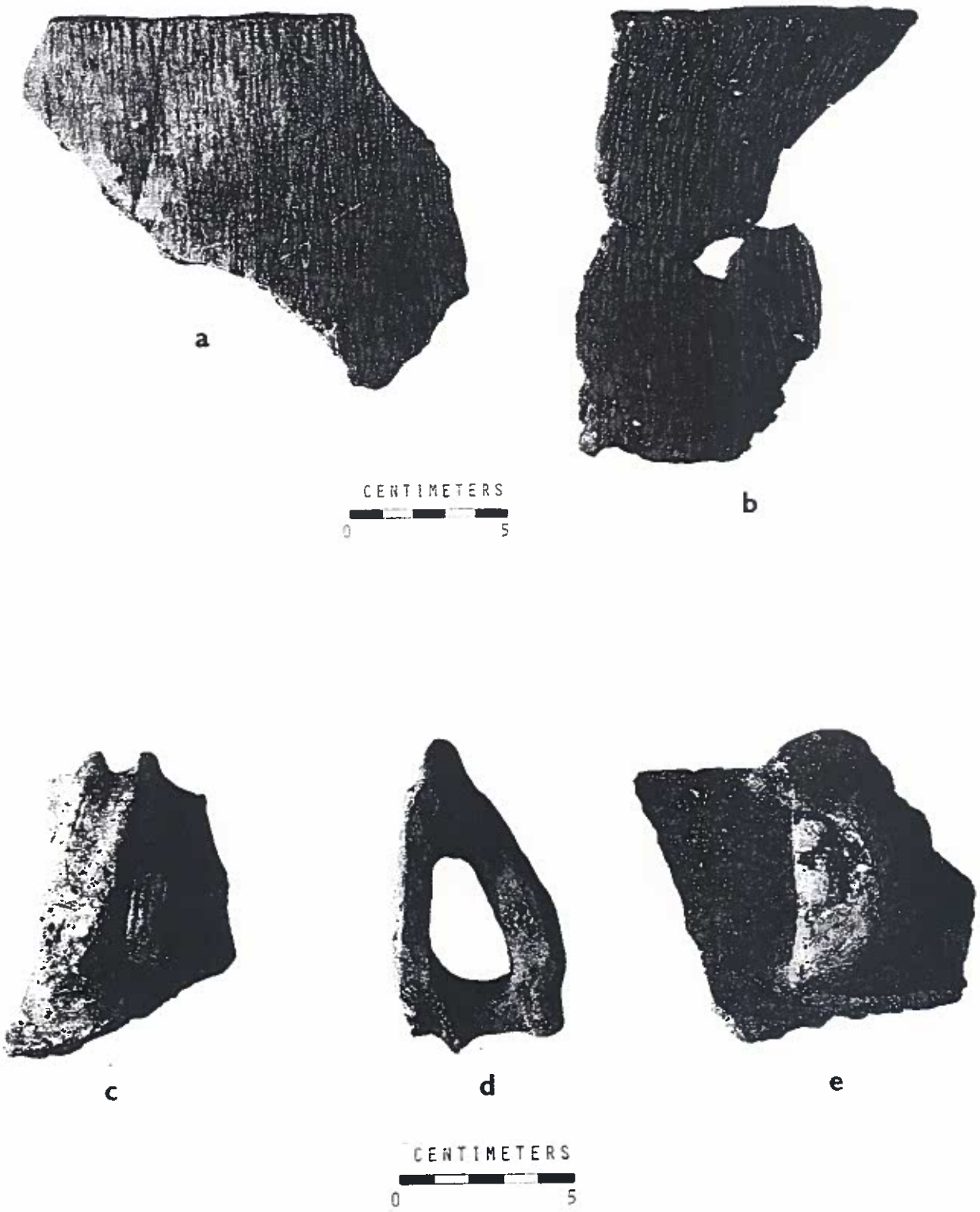


Figure 2. Ceramics: a-b, Jessamine Cordmarked rims; c-d, Jessamine Cordmarked handle with angular profile and double castellations; e, Jessamine Plain strap or loop handle with a single castellation.

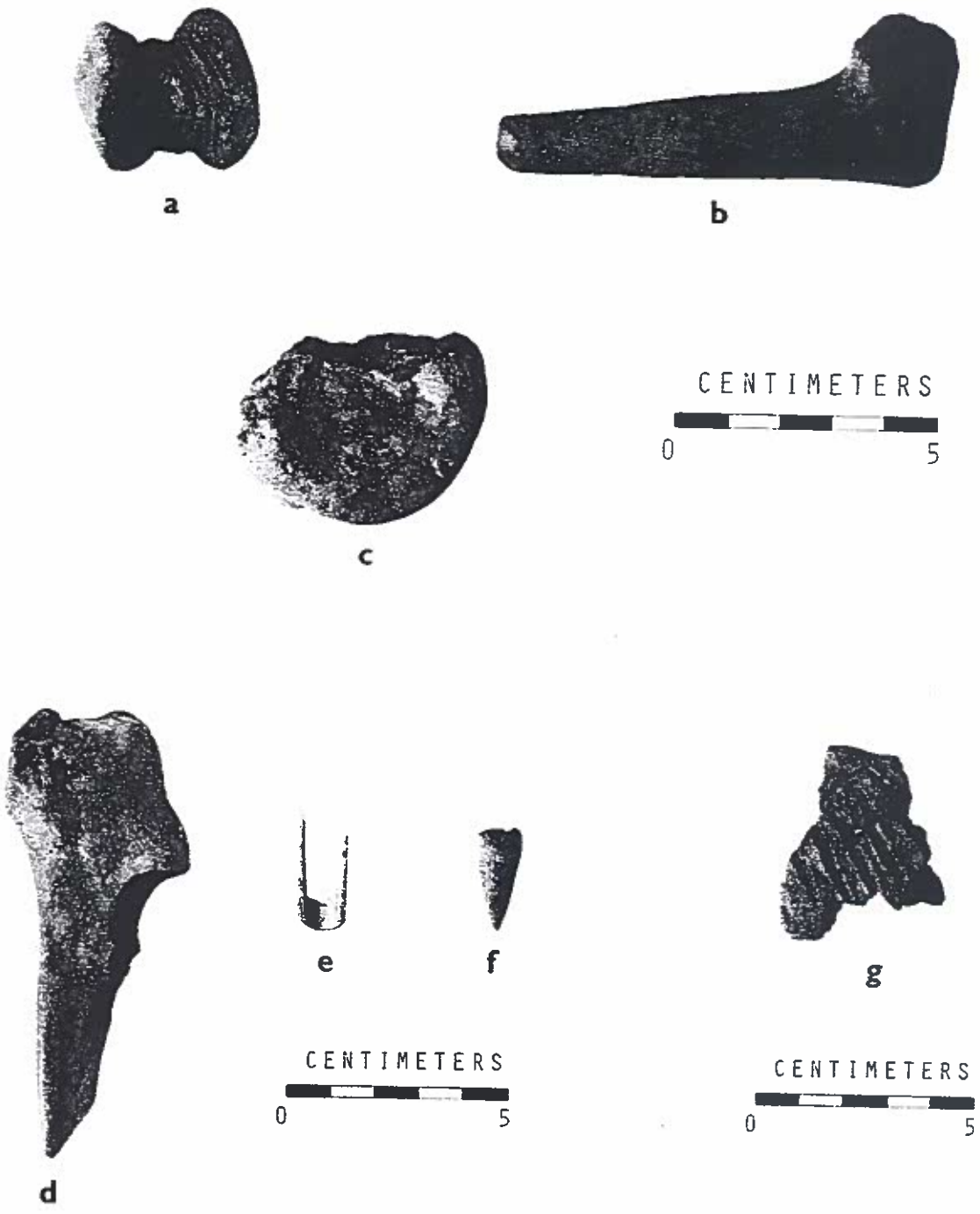


Figure 3. Ceramic and bone artifacts: a, earspool; b, pipe; c, discoidal; d, awl; e, fish hook; f, antler projectile point; e, Jessamine Plain incised sherd

could be taken, 80% were impressed with S-twist cordage and 20% were impressed with Z-twist cordage. Cord impressions on most Jessamine Cordmarked specimens are not very distinct. While this may simply indicate slight erosion of the exterior surfaces, it is possible that a wash was applied over the exterior surfaces of the vessels, blurring the sharp features of the impressions. Almost 1% of the specimens exhibit incised decoration, which is confined to the rim and neck portions of vessels. The only recognizable motif is a line-filled triangle (Figure 3g). No evidence of either curvilinear or rectilinear guilloche was noted in the collection. The majority (80%) of the handles recovered from the site are associated with these types, and include: a unique form (n=5) exhibiting a strongly angled profile associated with a pair of "ear-like" castellations directly above the lip (Figure 2c-d); thick parallel sided strap or loop handles (n=12) (Figure 2e); thinner parallel sided strap handles (n=3); and small unidentifiable fragments (n=6).

McAfee Plain and McAfee Cordmarked (5% of the assemblage) consist of small, molded, untempered, pinchpot bowls and jars with poorly smoothed or cordmarked exterior surfaces. Fine line incised decoration is slightly more common on molded vessels than on either the Jessamine Cordmarked/Plain series or the shell tempered ceramics recovered at Muir. McAfee Plain is similar to Scarem Plain (Mayer-Oakes 1955), which is found on Monongahela sites in the Upper Ohio Valley.

Shell tempered cordmarked and plain ceramics constitute about 10% of the assemblage. Except for temper differences, these ceramic groups are similar to the Jessamine ceramic series. Both are associated with the same vessel forms, decorative treatments, and handle forms and they co-occur with each other in features (Turnbow and Sharp 1987). The shell tempered pottery found at the Muir Site differs significantly from other recognized Fort Ancient types. While outwardly similar to Fox Farm Cordmarked in terms of vessel form and cordmarked patterning, the Muir pottery differs in regard to paste, lip treatment, method of smoothing the cordmarks, and appendage forms.

Minor ceramic types identified in the Muir site ceramic assemblage include: molded limestone/mixed tempered plain (n=15); Fox Farm Checkstamped (n=1); shell tempered roughened (n=10); limestone/mixed tempered roughened (n=12); limestone/mixed tempered net impressed (n=4); Fox Farm Net Impressed (n=1); mixed tempered brushed (n=2); and untempered fabric impressed (n=1). These types comprise about 1% of the total collection.

Other clay artifacts recovered from Muir include daub, potters clay, burned clay, and shaped clay objects. The latter category consists of a pipe (Figure 3b) and several pipe fragments, two earspools (Figure 3a), fragments of biconcave discoidals (Figure 3c), and a complete disk.

The Muir Site ceramic assemblage exhibits a strong affiliation with preceding local Late Woodland ceramics. Attributes identified in the assemblage that are typically associated with Late Woodland ceramics in central Kentucky include jars with vertical or recurved rims, flat cordmarked lips, and limestone temper. The presence of shell tempering,

handles, earspools, and clay discoidals, however, clearly mark the assemblage as Fort Ancient.

LITHICS

The Muir Site lithic assemblage is typical of Fort Ancient lithic assemblages in general. A total of 13,536 lithic artifacts were recovered, the majority being debitage (n=12,730), followed by flaked stone (n=752) and ground stone tools (n=54). The debitage and finished tools are predominantly made from local chert sources, much of which appears to have been derived from river cobbles and pebbles collected from the Kentucky River.

The projectile points (n=86) from Muir are overwhelmingly small triangular varieties (94%) (Figure 4a-f). With one exception, all notched or stemmed points recovered from the site are from the surface or non-feature contexts, while the triangular points were recovered from both the surface (41%) and from features (59%). The triangular points have a distinctive appearance, being very long in relation to their width. Most have straight sides and straight or convex bases. Many of the specimens exhibit basal projections or ears (Figure 4a-c). The points at Muir generally resemble Railey's (1987b; see also Henderson and Turnbow this volume) Type 2 and Type 5 Fine Triangular.

Other flaked stone tools recovered from Muir include bifaces (n=146), drills (n=12) (Figure 4g), scrapers (n=14), utilized flakes (n=478), and miscellaneous tools (n=12) such as core hammerstones, perforators, and choppers.

Muir ground stone tools were made of local limestone or sandstone. Identified ground stone tools include hammerstones and abraders, anvils, pitted stones, grinding slab fragments, and an excavating tool. Two sandstone pipe bowl fragments were found and incised decoration was present on the exterior surface of one fragment (Figure 4h).

BONE TOOLS

Of the 102 objects of modified bone recovered from Muir, most specimens represent complete or broken processing and fabricating tools. Awls (Figure 3d), beamers, and scrapers were fashioned from deer ulnae, elk antlers, bear femurs, and possibly deer tibiae. Antler projectile points (Figure 3f) occur in low frequencies. Bird bones were fashioned into awls and fishhooks (Figure 3e). Polished turtle carapace remains suggest they were used as cups or bowls.

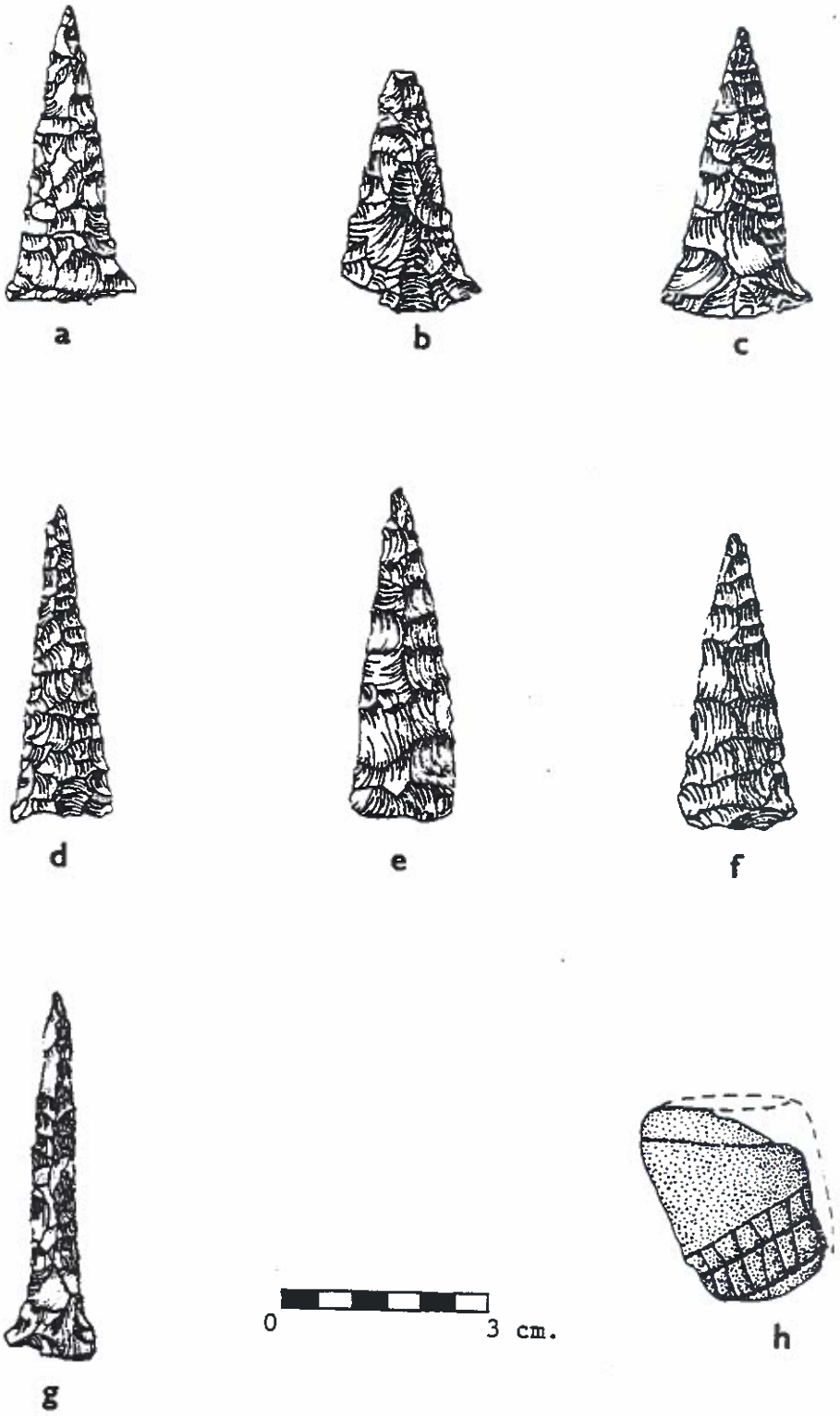


Figure 4. Lithic artifacts: a-f, triangular points; g, drill; h, incised sandstone pipe fragment.

SUBSISTENCE REMAINS

The Muir Site produced an abundance of faunal and floral remains. Hunting was very important to the subsistence economy of the inhabitants the site. Based on usable meat formula, deer accounts for 47.3% of the meat. Elk and bear remains are rare in the assemblage, but due to the size of the animals, they constitute 24.5% and 16.6% of the usable meat, respectively. A wide variety of other mammals were identified in the assemblage. The most important include beaver, raccoon, gray fox, dog, gray squirrel, woodchuck, otter, bobcat, and opossum. Turkey accounts for 99% of the bird remains recovered, and represents 6.3% of the total meat used. Fishing and mussel gathering apparently represented only a minor activity for the Muir population and apparently contributed little to the diet (Breitburg 1987a).

The Muir Site archaeobotanical remains include both cultivated and wild species. Corn was present in all flotation samples, although not usually in great quantities, and beans were recovered from eight features. Though these cultigens were grown by the inhabitants of the Muir Site, the overall contribution of these food sources to early Fort Ancient diets in the Inner Bluegrass region is not presently known. In addition to tropical cultigens, the occurrence of erect knotweed in four features and lesser quantities of sunflower suggest that components of the native horticultural complex of the preceding Late Woodland period persisted into early Fort Ancient times in the Inner Bluegrass region (Rossen 1987d). As with other Fort Ancient sites in Kentucky, very low densities of nut remains were recovered from the Muir Site (Rossen and Edging this volume).

FEATURES

Excavations revealed a total of 55 features (four structures, 44 pits, and seven hearths or fired areas) and 16 unassociated postholes. Features occurred in clusters separated by sterile areas (Figure 5). These clusters are considered to represent domestic units, since they often include a single structure surrounded by pits and hearths.

Structures at the site were small, rectangular houses with walls constructed of single-set posts (Figure 6a). The houses were built in basins, 40 to 50 cm deep and exhibited hard-packed clay floors (Figure 6b). Internal features were restricted to small, centrally-located hearths, about 30 to 40 cm in diameter. These depressions contained ash and charcoal, and the underlying soil was highly discolored and oxidized. In one instance, an interior line of postholes suggested the presence of a bench or partition. After their abandonment, some of the structure basins were used for refuse disposal.

The Muir Site structures reflect a similarity in both building technique and floor size (Table 2) to Late Woodland and early or "Emergent" Mississippian structures that have been excavated throughout the Midwest and Midsouth (e.g., Kelly et al. 1984; Sussenbach and Lewis 1987; Williams 1974;). Pithouses are also known from early Fort Ancient

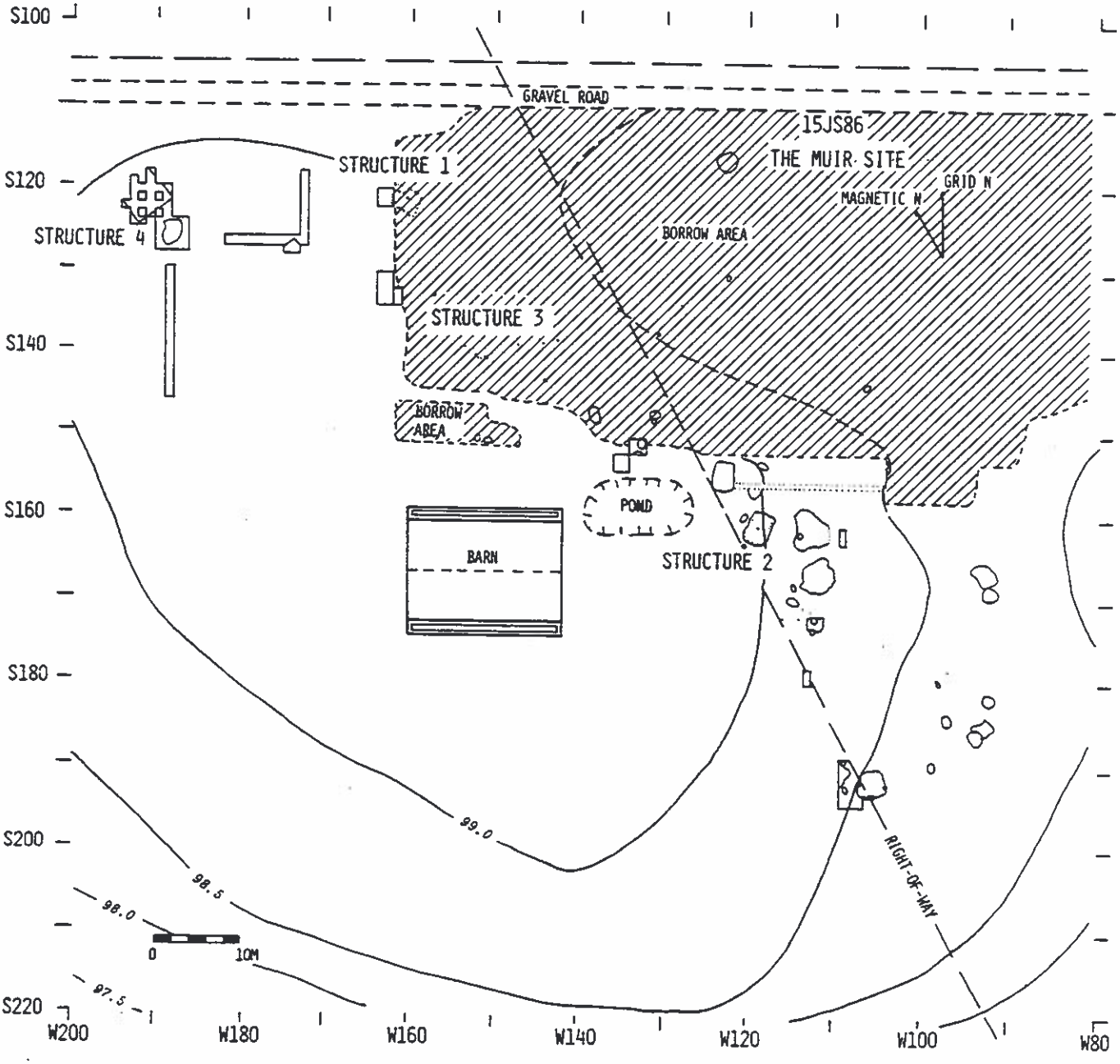


Figure 5. General location of structures and features.

Table 2. Dimensions of Muir Site Structures.

Structure No.	General Shape	Basin Dimensions		Floor Floor Area L(m)	W(m)	Internal Depth L(m)	W(m)	Basin (m^2)
1	rectangular	----	----	3.26	2.66	8.67		.45
2	rectangular	3.63	2.86	3.30	2.36	7.78		.46
3	undetermined	----	----	----	----	----		---
4	rectangular	4.22*	4.10*	----	----	15.0*		.39

* approximate dimensions based on excavated portion

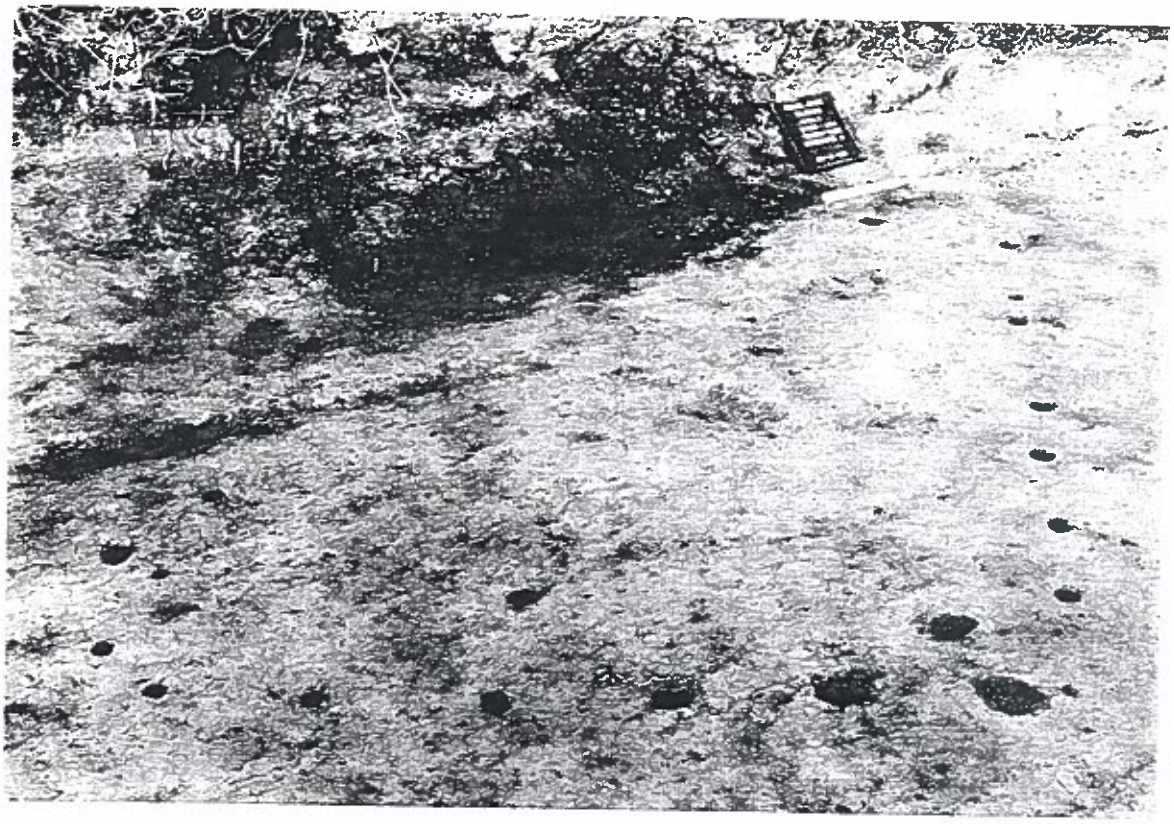
Comments

Structure 1 - Except for the southwest corner, this basin was largely destroyed by borrow activities. The floor and wall posts (n=25) were well-preserved. A fire hearth was located in the center of the structure.

Structure 2 - This structure appears to have been filled by natural erosional processes and the basin contained little refuse. A well-preserved fire hearth was identified on the floor of this structure.

Structure 3 - Except for one corner section of posts, this structure (including the floor) was completely destroyed by borrow activities.

Structure 4 - This structure was located outside the road right-of-way and



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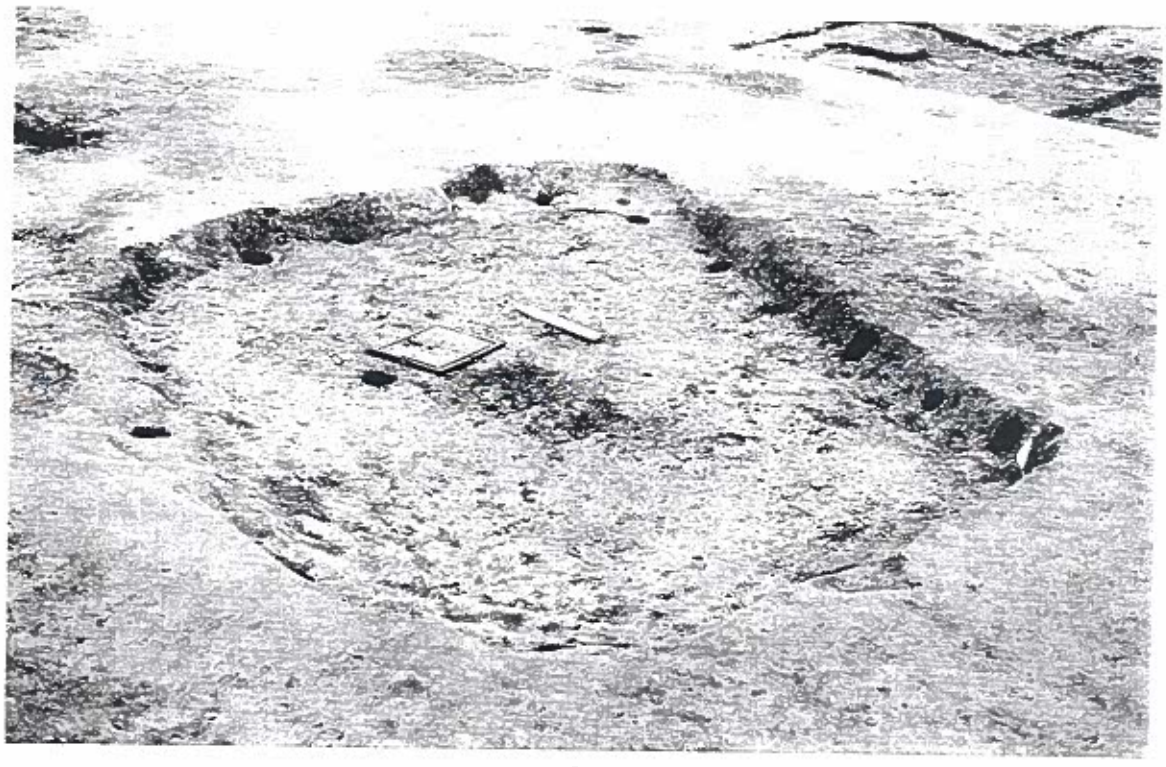

b

Figure 6. House basins: a, Structure 1; b, Structure 2.

was only partially excavated. sites in West Virginia (Graybill 1981), although the West Virginia examples have larger floor areas.

Muir pit features were generally basin-shaped and oval or round in outline. Several of the larger pits contained postholes, suggesting that they may have been covered. Pit features ranged in size from approximately 50 cm to 2.5 m in diameter.

Notable exceptions to the more common oval or round features were large pits with rectangular outlines similar to the structure basins. These pits ranged in size from 2.6 x 3.1 m to 4.4 x 5.3 m and ranged in depth from 40 to 68 cm below the surface. It is probable that some of these pits were originally structure basins that had been abandoned and subsequently reused for other purposes. None of the rectangular pits exhibited level floors or any evidence of posts having been placed around their edges, and most extended to a greater depth below the surface than the pithouses.

In addition to pit features, individual postholes and exterior hearths were often associated with domestic areas. These postholes may represent the remains of surface structures, sunscreens, windbreaks, or drying racks. Exterior hearths tended to be larger in size than interior hearths and exhibited a more diffuse shape.

COMMUNITY ORGANIZATION

The overall arrangement of households at the Muir Site is unclear due to the limits of the excavation and prior disturbance (borrow activities and construction of a barn) to the ridge; however, from the excavations and the artifact distribution, it is apparent that household units at Muir were not organized into a circular village plan. Although an open area in or around the community may have served the same purpose, no clearly demarcated plaza was recognized at the site. Additionally, no evidence of a stockade or palisade was noted along the periphery of the site.

On the basis of the data recovered at Muir, it appears that the site was inhabited by a rather small population, perhaps no more than five to six nuclear families. The limited midden development noted in association with the structures suggests that they may have been occupied for a relatively brief period of time (ca. 10 to 15 years). Some of the structures were filled with refuse after their abandonment, which suggests that not all of the structures were occupied at the same time. Based upon the available settlement data from Muir, it is not known whether the site was completely abandoned and reoccupied several times during a relatively brief time span; or if the identified patterns represent the periodic shifting of household residences and activity areas within the site during its use.

OSBORNE PHASE

The radiocarbon determinations and the artifact assemblage from Muir indicate that the site was inhabited during the early Fort Ancient period. As such, it is contemporary with the Dry Run Site (Sharp 1984) in Scott County. The sites have similar material assemblages and neither site exhibits a circular community pattern. These sites represent the earliest Fort Ancient manifestations recognized to date in the Inner Bluegrass region. In an attempt to characterize this period and to provide a framework for comparing early Fort Ancient developments in the Inner Bluegrass region to other areas, the Osborne Phase is proposed. Dated between A.D. 950 and 1200, this phase represents a period of time during which local groups became increasingly dependant on agriculture, new technologies were introduced, and new tools and items of personal use and adornment were incorporated into the regional material culture assemblage.

At the present time, differences in ceramic style (handles and decoration) and technology (the use of varying amounts of shell as a tempering agent) seem to be the primary criteria for distinguishing the Osborne phase from Late Woodland cultural manifestations. The ceramic assemblage includes Jessamine Cordmarked, Jessamine Plain, McAfee Plain, McAfee Cordmarked, and minor amounts of shell tempered plain and cordmarked pottery. Ceramic vessel forms are predominantly jars with vertical or recurved rims.

Other types of artifacts that distinguish the Osborne phase from Late Woodland sites are clay earspools and biconcave clay discoidals. The utilization of tropical cultigens and the presence of small, rectangular pithouse structures may also distinguish Osborne Phase sites from Late Woodland sites.

A number of ceramic and lithic attributes distinguish Osborne phase sites from later middle Fort Ancient sites. These include lower percentages of shell tempering, plain surface treatment, and cordmarked lips, and the absence of semicircular lugs and chipped limestone disks. Also, Osborne phase settlements may have been organized in a different manner than middle Fort Ancient settlements (see Fassler this volume). Though domestic activity areas consisting of structures, pits, hearths, and associated refuse were identified at Muir, they were not organized in a circular arrangement around a central plaza, which is the common pattern of middle Fort Ancient settlement. Whether this shift represents a change in social organization or a defensive response to increased warfare is not presently known.

CONCLUSIONS

The investigations at Muir represent the first large-scale excavations of an early Fort Ancient site in the Inner Bluegrass region. There is no evidence to support the idea that Fort Ancient in the central Bluegrass represents a migration of people into the area. New ceramic traits, such as shell tempering and handles, were incorporated into a local ceramic tradition characterized by limestone tempered cordmarked jars with direct or recurved rims.

Early Fort Ancient sites can be distinguished from earlier Late Woodland and later middle Fort Ancient sites on the basis of differences in material culture assemblages, structures, and possibly the community patterns. Finally, it is important to note that some of the trends observed in central Kentucky (i.e., the predominance of jars in the ceramic assemblage, the occurrence of minor amounts of shell or mixed tempered ceramics, and general morphology of the triangular points) are similar to trends noted for early Fort Ancient material assemblages recovered from sites in northeastern Kentucky (Henderson and Turnbow this volume). However, there are enough differences to justify assigning early Fort Ancient sites in northeastern and central Kentucky to different phases. Additional research should help clarify the nature of the differences in Fort Ancient development in Kentucky and document the level of interaction between the Fort Ancient groups living in these two areas.

GUILFOIL: A MIDDLE FORT ANCIENT VILLAGE IN FAYETTE COUNTY

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ABSTRACT

The Guilfoil Site is a ring-shaped middle Fort Ancient village with a central plaza located in Fayette County, Kentucky. Limited testing of this site documented a portion of one rectangular structure, 14 isolated postholes, and six features. The artifact assemblage and radiocarbon dates indicate that the Guilfoil Site was occupied during the latter part of the thirteenth century.

INTRODUCTION

The Guilfoil Site (15Fa167), which is situated in the southeastern portion of the Inner Bluegrass Physiographic region (McFarlan 1961:167), is located 1.5 km southeast of Athens, Kentucky. The site was first documented in 1984 at the request of the Guilfoil family, who are the present landowners (Turnbow 1984). It was listed in the National Register of Historic Places in 1985 (Railey 1985).

An initial surface reconnaissance of Guilfoil documented that the site represented the remains of a Fort Ancient ring-shaped village with a central plaza (Turnbow 1984). These types of sites, which are common in the Inner Bluegrass region, appear to date primarily to middle Fort Ancient (A.D. 1200-1400) times. For reasons that are not presently understood, however, earlier (A.D. ca. 1000-1200) and later (A.D. 1400-1750) Fort Ancient settlements rarely appear to have been organized in this manner. Other middle Fort Ancient ring-shaped middens that have been documented in the Inner Bluegrass region include Buckner (15Bb13), Goff (15Ck363), Singer (15Sc3), Florence (15Ha22), and Site 15Ha23. Prior to the recent investigation of the Guilfoil Site, however, only Buckner had been tested or excavated and none had been dated.

Based upon an examination of the materials observed in the Guilfoil's private collection, it was hypothesized that the site was occupied for only a brief period of time. As such the Guilfoil Site presented an excellent opportunity to examine questions related to Fort Ancient chronological developments and settlement and subsistence patterns.

<1> With contributions by Jack Rossen, Teresa W. Tune, and S. M. Call

Investigation of the southern periphery of the site was conducted by an archaeological field school sponsored by Transylvania University. The area investigated was selected because it was the only portion of the site that was not under cultivation. As a result of this work, a portion of a rectangular structure and six features were excavated. In addition, 14 individual postholes were documented for which no function could be determined. A relatively large quantity of faunal and floral materials, as well as ceramics and lithic artifacts, were recovered from the features. This report summarizes the results of the investigations at Guilfoil.

SITE DESCRIPTION

The Guilfoil Site is situated on a narrow, relatively level ridgetop at an elevation of approximately 290 m AMSL. The surrounding topography can be characterized as rolling uplands that are dissected by the Baughman and Boggs forks of Boone Creek. The latter empties into the Kentucky River, 6.4 km northeast of the site. The nearest permanent water source is a spring located 130 m from the site. The village midden measures approximately 100 x 125 m and covers an area of approximately 1.2 ha (Railey 1985).

At the time of the initial survey in 1984 the site had been recently plowed and rained on. The circular midden stood out clearly under these ideal conditions, and internal variation in surface coloration and artifact density was noted. In contrast to the midden ring, the central portion of the site exhibited a very low density of artifacts suggesting the presence of a plaza. Since the site was planted in alfalfa it was not possible to produce a detailed site map during the present investigation.

FIELD METHODOLOGY

Excavations at the site were undertaken from May 5 to May 20, 1986. Prior to opening up any test units, a metric grid was established in the area to be studied and surface elevation readings were taken. To determine if intact features were present at the site, several 1 x 2 m units were opened in areas of high surface artifact density. Additional units were excavated to expose structure remains and features which were encountered in the initial test units. This resulted in a large block being opened. To determine if the site contained a stockade the block was expanded to the west. However, the field season was brought to a close before the western boundaries of the site were encountered. Further work will be needed to determine if a stockade were ever constructed at the Guilfoil Site. At the completion of field work, a total of 73 m^2 had been excavated.

The plowzone (24-41 cm thick) was removed as one level without screening and no artifacts were collected from this zone. All exposed postholes and features were photographed and mapped prior to excavation.

Flotation samples (30 to 60 liters) were collected from all features and soil and radiocarbon samples were collected whenever appropriate. The remaining fill from all investigated subsurface deposits was sifted thru 6.35 (1/4 inch) mesh.

FEATURES

The remains of a section of one surface structure, 14 isolated postholes, and six features were investigated at the site (Figure 1). Based on the identified posthole pattern, the structure appeared to have been either square or rectangular with rounded corners. The postholes associated with this structure ranged in depth from 29 to 65 cm below surface with a mean depth of 43.7 cm. They were spaced somewhat irregularly with occasional gaps. There was no evidence of the posts having been set in wall trenches and no internal features were identified.

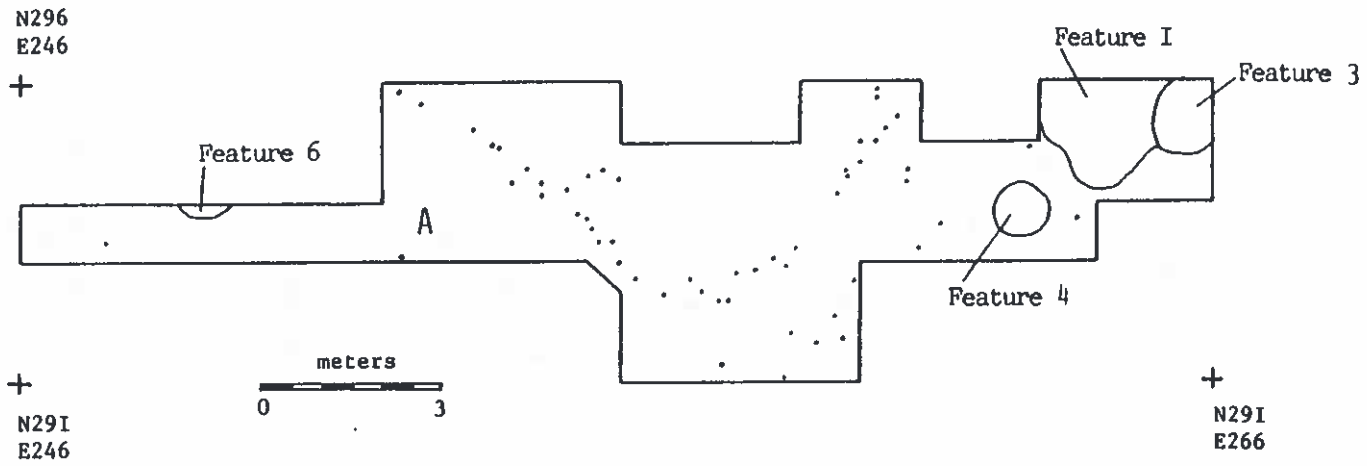
The majority of the isolated postholes were located in the vicinity of the southeastern wall of the structure. Though these postholes clustered in this area, they did not form a recognizable pattern.

All of the features were truncated by the plowzone. Features that extended into a unit wall were only partially excavated. The investigated features included an erosional gully or a series of overlapping pits (Feature 2), shallow circular pits (Feature 3-6), and a large rectangular basin-shaped pit (Feature 1).

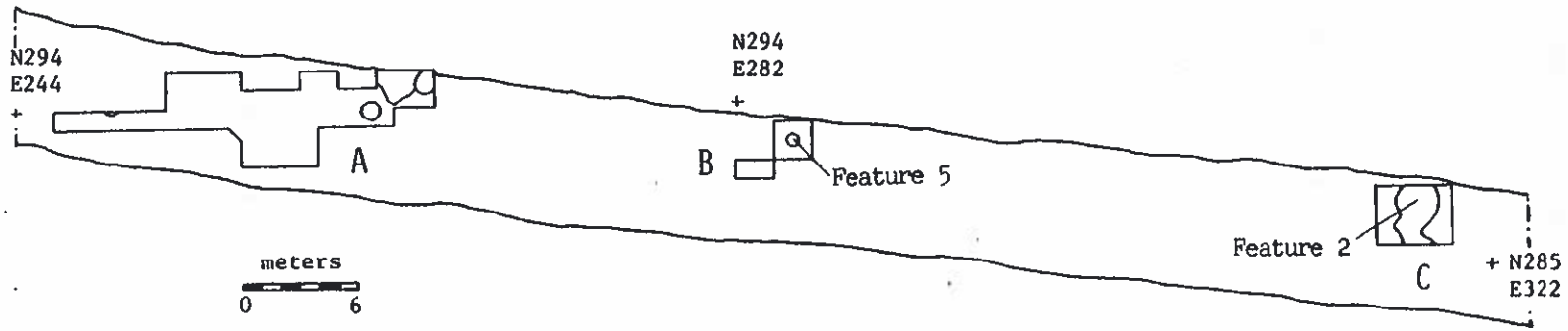
Feature 2 was irregular in shape and appeared to be an erosional gully or a series of overlapping pits. A single posthole, which extended to a depth of 11 cm below the base of the feature, was identified within Feature 2. A large quantity of cultural material was recovered from this feature and a number of ash lenses were noted during excavation. Due to its large size, only a portion (3 x 2.5 m) of Feature 2 was excavated.

The five remaining features were circular to oval in planview and all were basin-shaped. For those features that did not extend into unit walls average length was 1.17 m and an average width was .99 m (Table 1). With the exception of Feature 6, large quantities of cultural materials were recovered from all of the features.

Four of the six features were located in the vicinity of the structure and probably represent the remains of domestic activities that took place within or near the structure. The other two features were located 24 m (Feature 5) and 64 m (Feature 2) east of the identified structure, respectively (Figure 1), and are probably associated with other as yet unidentified structures at the site.



Structure One and related features



Excavation blocks at Guilfoil

Figure 1. Excavation units and features.

Table 1. Feature Characteristics.

Number	Type	Length	Width	Depth Below Surface	Depth Below Plowzone
1	Pit	*1.35 m	.99 m	76 cm	42 cm
2	?	*3.00 m	2.50 m	55 cm	25 cm
3	Pit	1.20 m	*.94 m	52 cm	24 cm
4	Pit	1.12 m	1.08 m	59 cm	29 cm
5	Pit	1.20 m	.90 m	49 cm	11 cm
6	Pit	*.94 m	*.94 m	53 cm	12 cm

? Feature 2 is either an erosional gully or a series of overlapping pits.

* Feature extended into unit wall

CHRONOLOGY

Charcoal samples from two of the excavated features were submitted to Beta Analytic, Inc. in Coral Gables, Florida. At two standard deviations (Stuiver and Pearson 1986), one sample produced a calibrated date of 1242(1279)1389 (Beta-18185; 700+/-50 B.P.) and the other a date of 1170(1262)1290 (Beta-18186; 770+/-50 B.P.).. Cross comparison of the Guilfoil Site artifact assemblage with other Fort Ancient sites coupled with the radiocarbon dates suggests that the Fort Ancient occupation of the Guilfoil site occurred sometime between A.D. 1250-1300. Thus, the site is contemporary with Manion phase sites in northeastern Kentucky (Henderson and Turnbow this volume) and Anderson phase sites in southern Ohio (Essenpreiss 1982).

CERAMICS AND LITHICS

CERAMICS

A total of 2,338 ceramic artifacts were recovered from the Guilfoil Site. Of these, only body sherds larger than 4 cm^2 and all rims and appendages were analyzed (n=549). Body sherds smaller than 4 cm^2 were simply counted and lotted by provenience.

Almost two-thirds of the specimens from Guilfoil contain a mixture of shell and limestone (64.0%) temper. The remaining sherds are tempered with shell (27.0%) or limestone (9.0%). Body sherd thickness averages 7.3 mm (range 4.5-15.0 mm) and sherd color ranges from tan to dark brown. Cordmarked (68.2%), plain (30.6%), roughened (0.8%), and net/fabric-impressed (0.4%) ceramics were identified in the assemblage. Of the 85 sherds for which cordage twist measurements were taken, 84% were impressed with S-twist cordage, 15% with Z-twist cordage, and 1% were impressed with a combination of S- and Z-tist cordage.

Decoration is present on 11 body sherds. All are incised with multiple straight, parallel, or curved lines that range from deep clear trails to shallow indistinct scratches. Though none of the sherds are large enough to determine the overall pattern of the incising, it is likely that the curved and straight lines represent curvilinear and rectilinear guilloche designs, respectively.

Rims tend to be slightly outflaring (53.%) or vertical (37.5%), but some are inslanting (9.4%) (Figure 2). Most are unmodified (Figure 3a,c) and are associated with rounded (56.3%) or flattened (43.7%) lips. A number of rims exhibit slight thickening at and just below the lip (Figure 3e), while others are associated with rolled lips (Figure 3b,d) Only two rims are decorated; one is cordmarked on the lip and the other exhibits cordwrapped dowel impressions on the lip. With the exception of one possible bowl rim, all of the rims from Guilfoil are from jars. Mean rim thickness measured (1 cm below the lip) is 6.0 mm (range 4.4 to 10.0 mm) and mean lip thickness is 6.9 mm (range 4.6 to 11.0mm).

Slightly more than 50% of the rims are cordmarked, while 40% are plain, 3.3% are roughened, and 3.3% are net/fabric-impressed. There is little or no evidence to suggest that the majority of vessels exhibited a cordmarked body and a plain neck and rim, a characteristic common in later Fort Ancient ceramic assemblages. Plain rims, however, comprise a larger percentage of the rims than plain sherds do of the assemblage in general. Thus, it is possible that a small percentage of vessels had plain rims but cordmarked bodies.

Appendages consist of handles (n=15) and two possible lugs (n=2). Handles consist primarily of thick narrow strap or loop fragments (Figure 3f). Some of the handles were riveted to the vessel wall. One complete semicircular lug handle was also recovered (Figure 3g). Similar lug handles have been recovered from the middle Fort Ancient Manion phase component at Fox Farm (Henderson and Turnbow this volume). Both of the possible lug fragments are extremely fragmentary. One specimen is round and would have protruded only slightly from the vessel wall. The other is a fragment of a thin, circular, ring-shaped object (Figure 3h) that may have been attached to a vessel wall. It is also possible that this specimen is a ceramic decorative object or personal charm.

Other ceramic objects recovered include a shell tempered pipe bowl and a small rolled untempered piece of fired clay.

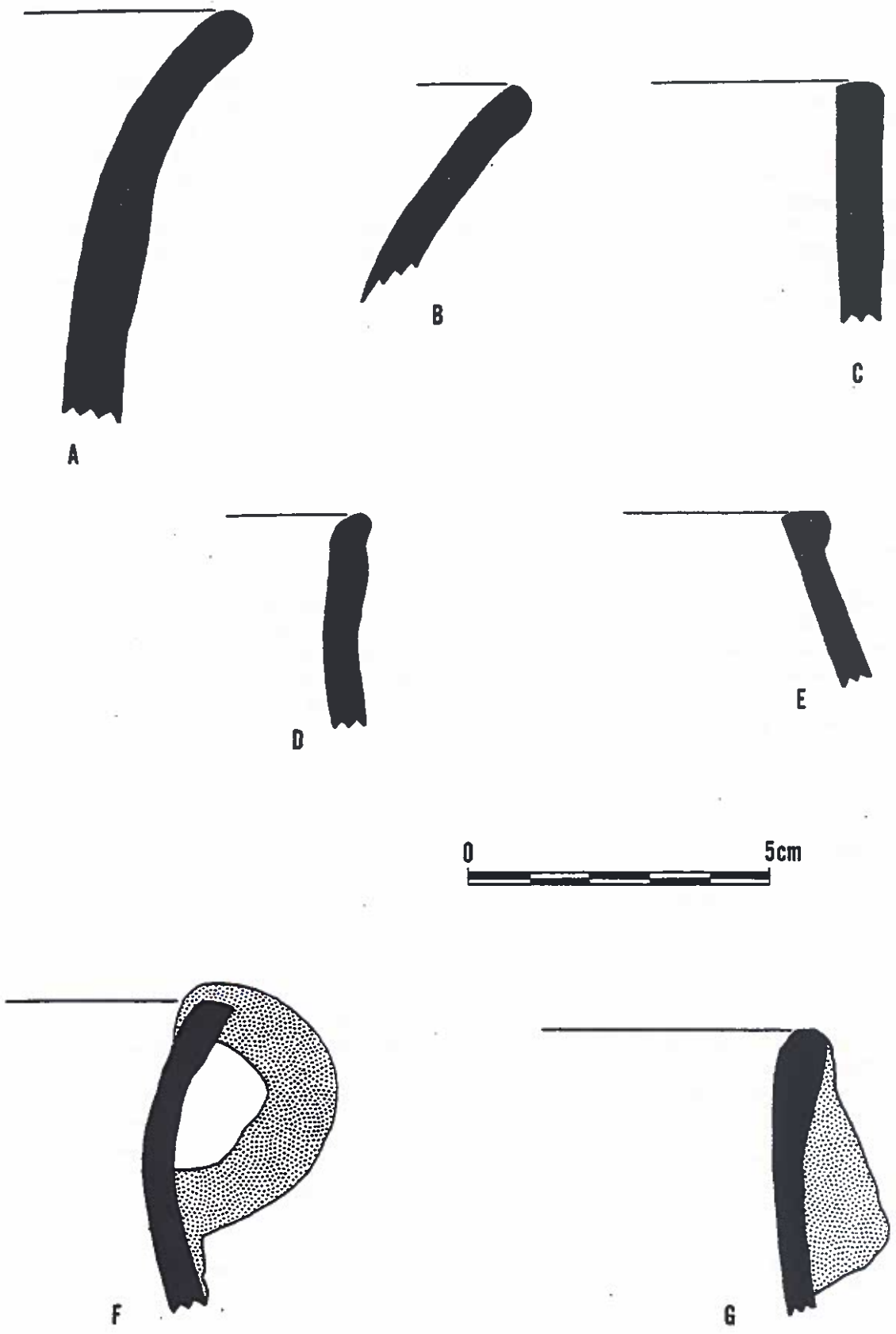


Figure 2. Ceramics profiles: a-e, rims; f, crude strap or loop handle; g, semicircular lug handle.

Typologically, the Guilfoil assemblage exhibits a great deal of similarity to Jessamine Cordmarked and Jessamine Plain (Turnbow 1987; see also Sharp and Turnbow this volume). However, these types are presently restricted to the early Fort Ancient Osborne phase (A.D. 950-1200) and the range of variation in surface treatment, temper, rim form, and appendages associated with these types has not been defined. Therefore, the author has refrained from assigning type names to the Guilfoil assemblage. Future research in the Inner Bluegrass region will undoubtedly identify sufficient variation between early and middle Fort Ancient ceramics to justify the definition of new types. Alternatively it is possible that as additional early and middle Fort Ancient sites are investigated in the region, the temporal range of Jessamine Cordmarked and Jessamine Plain will be expanded to include middle Fort Ancient ceramic assemblages dating to the thirteenth century.

LITHICS

Debitage

A total of 5,125 flakes, shatter, angular fragments (mean weight = 1.03 g) and 85 cores (mean weight = 30.3 g) were recovered. Flakes representing all stages of the reduction sequence were identified in the sample. However, no attempt was made to quantify the recovered flakes by reductive stage. Of the cores, 71% had areas of water-polished cortex on some portion of the surface, suggesting that river cobble chert was an important source of raw material.

Flaked Stone Tools

A total of 18 triangular points were recovered. These include four complete specimens, 12 basal portions, and two distal tips. Excluding the two distal tips, the points can be divided into two groups based on shape. Points in the first group (n=9) (Figure 4a-d) are shaped like isosceles triangles with basal projections. Blades are slightly incurvate or straight and bases are either convex or straight. This group is similar to Railey's (1987b; see also Henderson and Turnbow this volume) Type 2 Triangular. The second group (n=7) is characterized by specimens that lack basal projections and exhibit straight sides and bases (Figure 4e-h). This group is similar to Railey's (1987b; see also Henderson and Turnbow this volume) Type 5 Triangular. Two of the latter group are serrated (Figure 4e,g). Serrated points have been found in fairly large numbers in Manion phase (A.D. 1200-1400) deposits at Fox Farm (Railey 1987b).

A single side notched projectile point base with extensive basal grinding was collected from the surface. It is similar to Middle Archaic point styles and probably reflects earlier utilization of the site area.

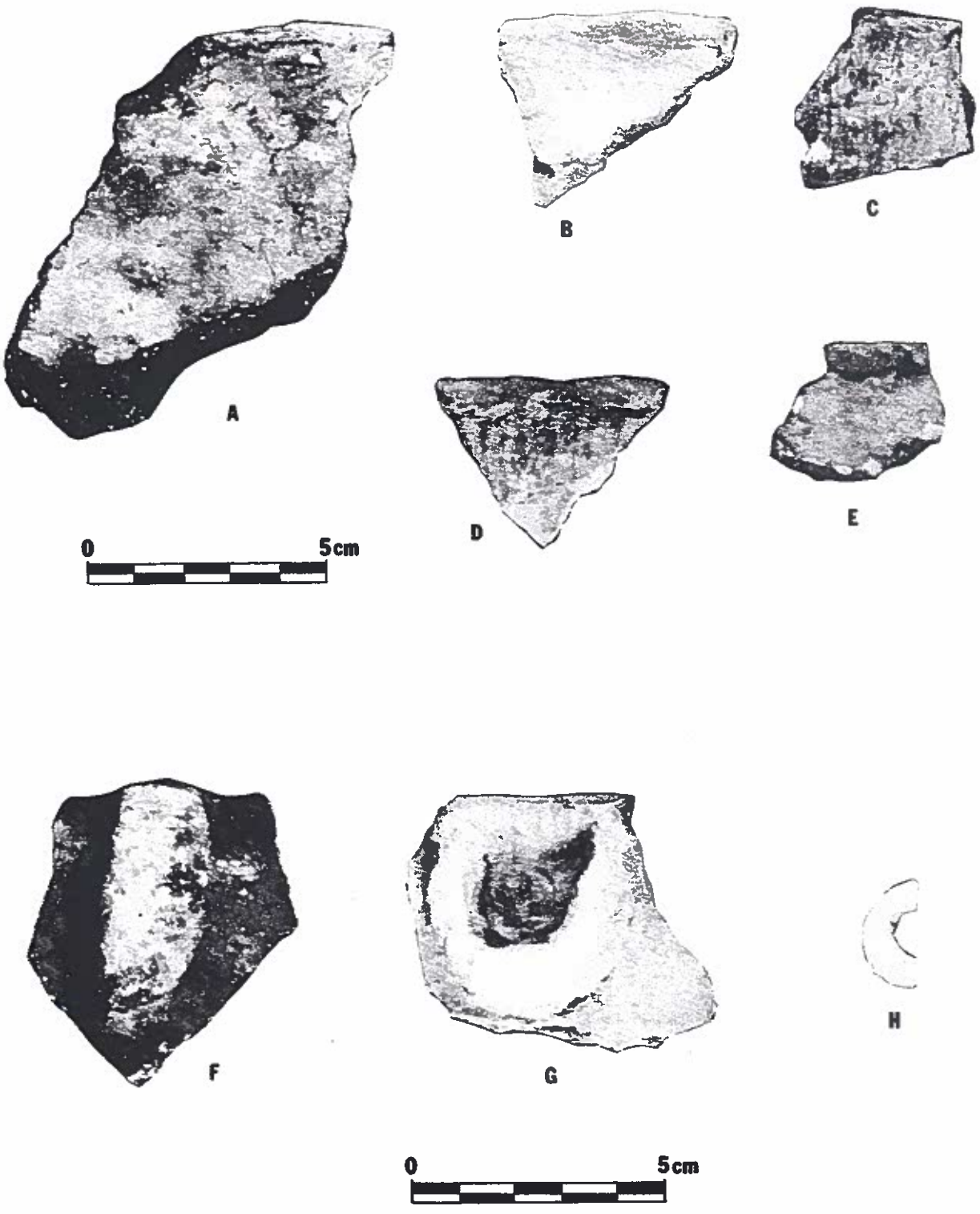


Figure 3. Ceramics artifacts. Rims: a, plain unmodified; b, plain rolled; c, cordmarked unmodified; d, cordmarked rolled; e, plain thickened. Appendages: f, crude strap or loop handle; g, semicircular lug handle; h, fragment of a circular object.

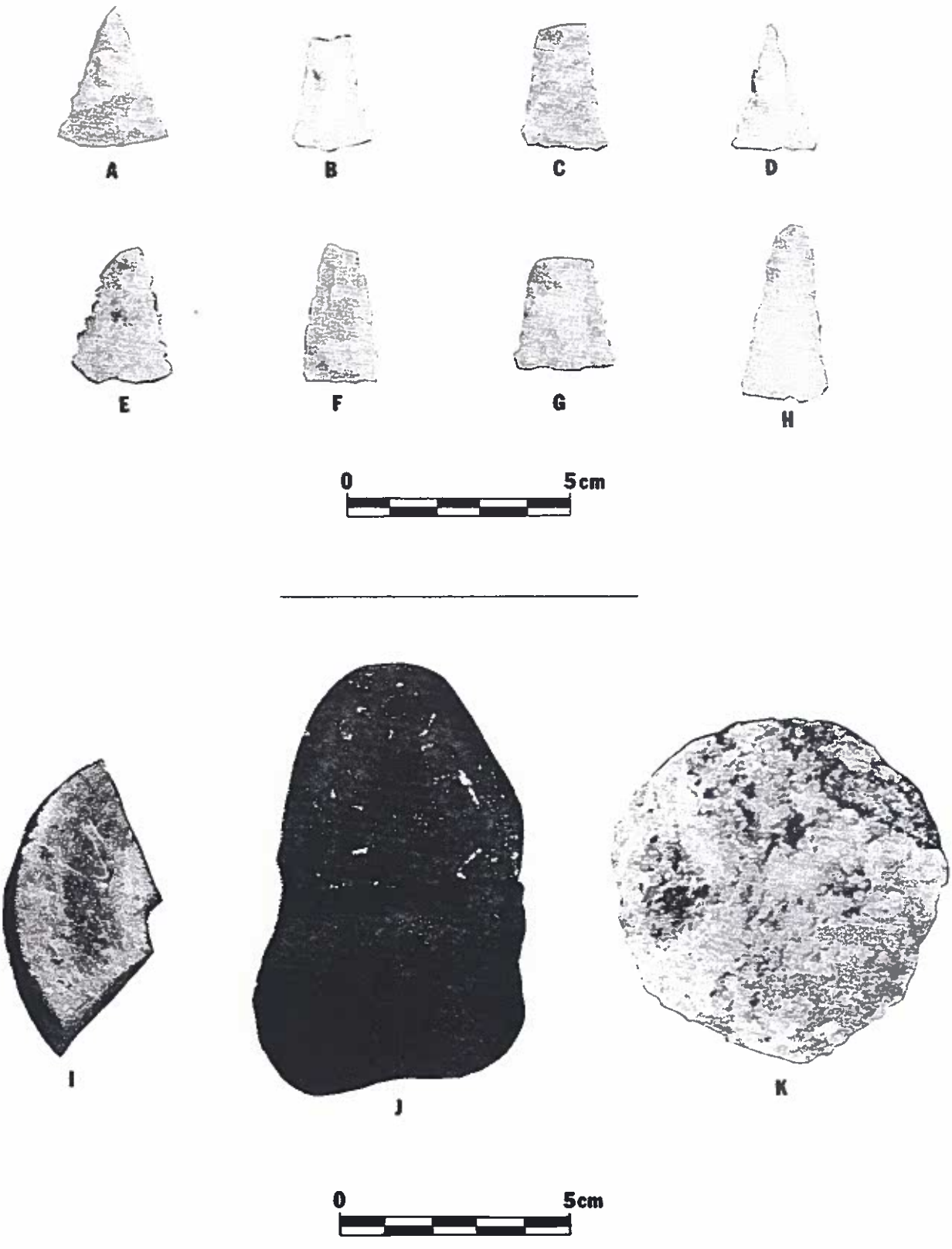


Figure 4. Lithic artifacts: a-d, Group 1 Triangular Points; e-h, Group 2 Triangular Points; i, discoidal; j, cannel coal pendant; k, limestone disk.

Other flaked stone tools recovered include four drills, 29 bifaces, two knives or cutting/scraping tools, a chert adze, and seven systematically modified flakes (one acutely tipped, two notched, and four retouched on an excurvate edge).

Ground Stone

The ground stone assemblage includes both utilitarian and non-utilitarian items. Utilitarian artifacts consist of grinding slabs (n=7), abraders (2), and celts (2). All but one of the grinding slabs and abraders were made from sandstone. The celts were manufactured from limestone. One of the two abraders was complete. It exhibits four grooves or slots, which range in depth from 5 to 8 mm and are approximately 8 mm wide.

Non-utilitarian items include a siltstone discoidal, a sandstone pipe, two cannel coal pendants, and four chipped limestone disks. The discoidal (Figure 41) is biconcave and highly polished and has estimated diameter of 80 mm. It ranges in thickness from 28 mm at the edge of the discoidal to 7 mm at the center perforation. The center perforation has a diameter of approximately 10 mm.

The pipe fragment is elbow-shaped. Examination of this specimen indicates that it was unfinished.

The complete cannel coal pendant is asymmetrical with a single hole (Figure 4j). The hole is located at the top of the specimen and appears to have been drilled from both sides. It measures 9.4 cm in length, 6 cm in width, and 3.5 mm in thickness. The other cannel coal artifact is too fragmentary to characterize.

All of the recovered chipped disks (three complete and one fragment) were made of local fossiliferous Ordovician limestone (Figure 4k). The complete specimens range in diameter from 58 to 71 mm.

DISCUSSION

Recent investigations of Fort Ancient sites in the Inner Bluegrass region provide a framework for examining general trends in early and middle Fort Ancient ceramic and lithic artifact assemblages. Sites included in this comparison are Muir (15Js86) (A.D. 1000-1200) (Turnbow and Sharp 1987; Sharp and Turnbow this volume), Guilfoil (A.D. 1250-1300), and Johnson (15Sc10) (A.D. 1350-1450) (Hockensmith 1984). These sites were selected for comparison with Guilfoil because they bracket the site in time, have been dated, and the materials recovered from Muir and Johnson have been described in the literature. The Muir Site, the type site for the Osborne phase, represents the earliest manifestation of Fort Ancient culture in the Inner Bluegrass region, while the Johnson Site was occupied towards the end of the middle Fort Ancient period and the beginning of the Madisonville Horizon.

A comparison of the ceramic assemblages from these sites documents an increase through time in the use of shell temper and the manufacture of vessels with plain surfaces. Shell temper comprises 10.0% and plain surfaces comprise 22.0% of the earlier Muir Site ceramic assemblage. These percentages increase to 27.0% and 30.6%, respectively, at Guilfoil, and 76.1% and 93.8%, respectively, at the later Johnson Site. Interesting, all of the sherds recovered from Larkin, an even later Fort Ancient site in nearby Bourbon County, are tempered with shell, and plain surfaced ceramics constitute a very large percentage of the sherds recovered from this site (David Pollack, personal communication 1987).

At all three sites the predominate vessel form is a jar with a direct or slightly outflaring rim and bowls are rare. Thickened rims are more common at Guilfoil and Johnson, than at Muir but at all three sites a very small percentage of the sherds were incised. Cordmarking on lips, which was quite common at Muir, decreases dramatically at Guilfoil and Johnson.

Handles at Muir and Guilfoil tend to be thick narrow straps or loops, while at Johnson there appears to be an increase in thin triangular and parallel-sided strap handles. Castellations are reported from only Muir and semicircular lug handles were recovered from only Guilfoil.

With regards to the lithic assemblages recovered from these three sites the triangular points from Guilfoil appear to be very similar to types recovered from both Muir and Johnson. At all three sites points with basal projections, incurvate sides, and convex and straight bases were recovered. However, points that lack basal projections and exhibit straight sides and bases appear to increase in popularity through time. These types of triangular points constitute 32% of the Muir specimens, 44% of the Guilfoil specimens, and 67% of the triangular points from Johnson. Serrated points, however, only occur at Guilfoil. As previously noted serrated points have been found in fairly large numbers in Manion phase (A.D. 1200-1400) deposits at Fox Farm (Railey 1987b). The absence of serrated points at Muir is thus to be expected but the absence of these types of points at Johnson cannot be explained at this time.

In comparison to Muir, the ground stone assemblage from Guilfoil is more varied. Artifacts such as discoidals, chipped limestone disks, and items of personal adornment that were recovered from Guilfoil were not found at Muir. The Johnson ground stone assemblage, while containing discoidals, also lacks chipped limestone disks and items of personal adornment. Ground stone items of personal adornment usually occur in low numbers if they occur at all on middle Fort Ancient sites. Thus, their absence from Johnson may be due to sampling biases. Chipped limestone disks, however, occur frequently and often in large numbers on middle Fort Ancient sites in the Inner Bluegrass region and as with the serrated triangular points their absence from Johnson presently cannot be explained.

The Guilfoil Site appears to have been occupied for a relatively brief period of time. As such the ceramic and lithic materials recovered and described in this article are representative of what ca.

1250-1300 Fort Ancient assemblages in the Inner Bluegrass region should contain. Comparison of this assemblage with earlier (Muir) and later (Johnson) assemblages has documented a number of ceramic and lithic trends (e.g., increase in the use of shell temper and plain surfaced vessels, and changes in projectile point styles) during the early and middle Fort Ancient periods. These trends reflect the presence of a local Fort Ancient developmental sequence in the Inner Bluegrass region.

BOTANICAL REMAINS

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The Guilfoil Site excavations produced an archaeobotanical collection of 22,282 specimens (Table 2). These remains were recovered from eight (30 liter) flotation samples, totalling 240 liters of floated soil. The size of this collection allowed some basic comparisons to be made between this site and other Kentucky Fort Ancient sites, especially in terms of intensity of corn and nut utilization. In particular, comparisons may be made with the larger and more complete collection from the Muir Site (15Js86), a Fort Ancient village in Jessamine County which dates approximately 100-200 years earlier than Guilfoil.

ANALYTICAL METHODOLOGY

Soil samples from six features were processed in a SMAP water flotation device similar to the one described by Watson (1976). Light fractions were collected in cotton gauze, while heavy fractions were collected from 1.59 mm (1/16 inch) screen in the flotation tank. Once dried, each sample was sieved through a 2 mm mesh prior to sorting charcoal from roots and other non-carbonized contaminants. Charcoal specimens larger than 2 mm are considered to be representative of smaller specimens, with the exceptions of acorn, squash rind, and seeds (Asch and Asch 1975). Identification of specimens larger than 2 mm is also more reliable, and thus sieving saves considerable laboratory sorting time. All materials less than 2 mm were carefully scanned for carbonized seeds and other important remains.

Samples chosen for analysis were 100% examined under a microscope at magnifications of 10 to 30x, and were sorted by species, counted, and weighed to the nearest tenth of a gram. Identification was aided by a comparative collection of both archaeological and modern specimens, along with standard seed catalogues (cf. Martin and Barkley 1961). Wood charcoal analysis was accomplished through direct comparison with wood blocks. Macroscopic wood characteristics were observed from specimen cross-sections. Changes in the visibility of macroscopic characteristics that occur during carbonization were also accounted for, to insure maximum accuracy of identification (Rossen 1985).

For all wood charcoal lots, between 20 and 40 specimens of wood charcoal were identified, until percentages of the different species present in a sample (including unidentifiable wood) could be estimated. The frequency of wood in larger lots was estimated by counting 200 specimens and weighing this sub-sample. The weight of the 200-count sample was then divided by the weight of the entire wood charcoal lot. The resulting figure was then multiplied by 200 and an estimate of the size of the wood charcoal lot derived. Because of this method,

Table 2. Guilfoil Botanical Remains.

	Feature Number								
Type	**1(L.1)**	**1(L.2)**	**2**	**2**	**3**	**4**	**5**	**6**	**Total**
Wood									
Frequency	4,352	182	3,924	5,120	1,822	2,868	1,417	770	20,445
Gram weight	45.5	1.9	56.9	60.7	20.6	45.9	18.9	7.6	258.0
Corn kernel									
Frequency	94	4	75	88	63	32	141	17	514
Gram weight	0.3	0.1	0.6	0.7	0.4	0.1	0.8	0.2	3.2
Corn cupule									
Frequency	75	3	14	73	39	44	126	18	392
Gram weight	0.8	0.0	0.1	0.7	0.4	0.2	0.9	0.2	3.3
Bean									
Frequency	0	1	0	1	2	0	8	0	12
Gram weight	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.2
Hickory									
Frequency	26	0	12	56	15	4	219	2	334
Gram weight	0.3	0.0	0.2	0.8	0.1	0.0	4.7	0.0	6.1
Black walnut									
Frequency	56	2	4	44	31	8	261	10	416
Gram weight	2.5	0.1	0.1	1.1	0.7	0.1	10.6	0.2	15.4
Hazelnut									
Frequency	0	0	1	0	0	0	0	0	1
Gram weight	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1
Acorn									
Frequency	0	0	0	0	1	0	0	0	1
Gram weight	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1
Junglandaceae									
Frequency	0	2	0	0	8	0	72	3	85
Gram weight	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.7
Sumac									
Frequency	0	0	0	2	3	2	3	0	10
Grape									
Frequency	0	0	0	1	0	2	2	0	3
Pawpaw									
Frequency	0	0	1	0	0	0	0	0	1
Bedstraw									
Frequency	4	0	0	0	0	0	0	0	4
Unidentified Seed									
Frequency	0	0	1	1	0	1	2	0	5
Unidentified General									
Frequency	7	0	5	12	4	6	12	0	46
Unidentified Rind									
Frequency	0	0	0	0	0	3	0	0	3
Total frequency									22,282
Total weight									287.1

frequencies and relative percentages of different wood species presented here represent carefully constructed estimates and not exact, quantified figures. This is believed to be an efficient and realistic method for handling large lots of wood charcoal.

PRESERVATION

The preservation of archaeobotanical remains at Guilfoil shares several characteristics with the Muir Site. Both site samples 1) contain a large number of spherical manganese concretions in the smaller than 2 mm sievings, 2) contain relatively high corn frequencies that correspond to very low gram weight values, and 3) include relatively low numbers of carbonized seeds. Together these three characteristics suggest that substantial mechanical grinding of botanical remains has occurred at both Guilfoil and Muir.

WOOD CHARCOAL

Wood charcoal from nine genera were present in the collection (Table 3). Four species (white oak, black locust, hickory, and black walnut) were present in 75% of the samples. These species (also important at the Muir site) are thought by Campbell (1985) to have been the dominant species of late prehistoric and early historic central Kentucky mixed hardwood forests. The particular case of black walnut will be further discussed in the nutshell section of this report. Other tree species represented in the Guilfoil Site's wood charcoal assemblage are American elm (in 50% of the samples), sycamore (37.5%), hackberry (37.5%), honeylocust (12.5%), and hard maple (12.5%).

NUTSHELL

Recovered nutshell consists of black walnut and hickory, plus single specimens of hazelnut and acorn. This collection, small as it is, is unusual in containing more black walnut than hickory by both frequency (416 to 334) and weight (15.4 to 6.1 g). In contrast, black walnut constitutes only 25.7% and 30.9%, respectively, of the Muir Site nutshell assemblage by frequency and weight. The composition of the Guilfoil Site nutshell assemblage supports the hypothesis presented by Campbell (1985) that central Kentucky prehistorically contained an unusually high percentage of black walnut trees.

Guilfoil nut frequency (3.5 per liter) and gram weight density values (.093 g per liter) (Table 4) are well within the range of values reported from other Kentucky Fort Ancient sites such as Muir (15Js86) (Rossen 1987d), Fox Farm (15Ms1), Thompson (15Gp27), and Snag Creek (15Bk2) (Rossen 1987a). In comparison, western Kentucky Mississippian sites such as Chambers (15Ml109) (Rossen 1987b), Adams (15Fu4) (Edging and Dunavan 1986), and Turk (15Ce6) (Edging 1985) contain substantially

Table 3. Identifiable Wood Charcoal Estimates.

	Frequency	Weight in grams
White oak group (*Quercus* sp.)	5076	68.6
Black locust (*Robinia pseudoacacia*)	2261	27.9
Hickory (*Carya* sp.)	1625	21.6
Black walnut (*Juglans nigra*)	966	13.0
Sycamore (*Platanus occidentalis*)	613	8.2
American elm (*Ulmus americana*)	526	6.0
Honeylocust (*Gleditsia triacanthos*)	171	1.7
Hackberry (*Celtis* sp.)	164	3.7
Hard maple (*Acer* sp.)	26	0.7
Total	11428	151.4

Table 4. Kentucky Fort Ancient Nutshell and Corn Densities.+

Site	Nutshell		Corn	
	Frequency/ liter	Gram/ liter	Frequency/ liter	Gram/ liter
Guilfoil (15Fa167)	3.5	.093	3.8	.027
Muir (15Js86)	4.5	.072	4.0	.034
Fox Farm (15Ms1)	2.3	.057	8.4	.262
Thompson (15Gp27)	1.4	.026	4.3	.059
Snag Creek (15Bk2)	2.4	.027	3.6	.031

+ frequency and gram weight per liter of floated soil

greater nutshell densities. Thus, the Guilfoil collection lends further support to the hypothesis that nut collecting was a relatively minor subsistence activity for Kentucky Fort Ancient people (Rossen and Edging this volume).

CULTIGENS

Cultigens recovered include corn and beans. Corn (Zea mays) was recovered in high frequencies but low weights from all of the features excavated at the Guilfoil site, an indicator of the fragmentary nature of the assemblage. Both kernel fragments and cupules were recovered. Two instances of cupules connected at perfect 90 degree right angles indicate the presence of 8 row corn, but little else can be stated concerning the morphology of this corn.

Corn density per liter of floated soil from Guilfoil is relatively low for Kentucky Fort Ancient sites (Table 4). Interestingly, the density values are almost identical to those recorded for the Muir Site collection. This may possibly indicate that corn-use did not gradually increase during the 200 year interval between the Muir and Guilfoil occupations. Scholars dealing with contemporary Mississippian sites have previously stated their belief that extensive corn-use began suddenly, early in the Mississippi period, then remained relatively stable as a major dietary staple (cf. Lynott et al. 1986).

A small sample of domesticated beans (Phaseolus vulgaris) was recovered, consisting of one unbroken and 11 fragmentary specimens. Beans are also present in the Muir collection, which indicates a relatively early introduction of this domesticate into central Kentucky. The single complete Guilfoil specimen, which is reniform in shape and flat in cross-section, measures 8.6 mm by 4.9 mm, with a length to width ratio of 1.7:1 mm. This shape and size conforms closely to other typical Fort Ancient beans, which are commonly recovered in small amounts and occasionally in great numbers at Fort Ancient sites [cf. Campbell Island, Ohio (33Bu2); Fox Farm, Kentucky (Wagner 1984, 1986; Rossen 1987a)].

Width measurements were taken on five fragmentary beans. These measurements (4.3, 4.4, 5.9, 6.3, 6.6 mm) vary substantially, and may reflect the range of variability in shrinkage or expansion that can occur in beans during carbonization.

WILD PLANTS

The 18 carbonized seeds recovered from Guilfoil represent a wild plant collecting subsistence component. Sumac (Rhus sp., n=10), bedstraw (Galium sp., n=4), grape (Vitis sp., n=3) and paw-paw (Asimina triloba, n=1) were recovered. All are commonly found at Fort Ancient sites where flotation techniques are employed (Wagner 1983).

Sumac produces storable vitamin C-rich berries that may be eaten or used to make a tea. The common and occasionally abundant presence of sumac in Fort Ancient sites has previously led this author to speculate on the possible prehistoric manipulation or even cultivation of the plant (Rossen 1987a). Bedstraw is noted for its edible leaves and use as a bedding material (Gail Wagner, personal communication 1986). Because its seeds readily stick to hair and clothing, its presence at other sites has been dismissed as fortuitous (cf. Asch et al 1972). However, the widespread archaeological presence of this plant in Eastern U.S. sites, and its common presence in Fort Ancient collections suggests the possibility that bedstraw was indeed a utilized plant. Grape and paw-paw are both edible fleshy fruits eaten either fresh, or in the case of grape, in a fire-dried state.

As with the botanical assemblage recovered from the Muir Site, the low number of wild plant seeds in the Guilfoil assemblage is probably due to the fragmentary nature of the botanical assemblages recovered from these sites. It most likely is not due to the lack of a substantial wild plant collecting component in the diet, a trait commonly indicated by most Fort Ancient botanical assemblages (Rossen 1987a; Wagner 1983).

CONCLUSIONS

The Guilfoil Site displays typical Fort Ancient and in particular, typical central Kentucky patterns of plant utilization. The ubiquity of corn, the presence of domesticated beans, the relatively small amount of nutshell, and the represented wild plants appear to fit Kentucky Fort Ancient plant utilization patterns defined elsewhere (Rossen and Edging this volume). The proportion of black walnut to hickory may be a specific central Kentucky pattern that will require further research to illuminate. From the perspective of central Kentucky subsistence patterns, the Guilfoil archaeobotanical collection is an important link between the large, early Fort Ancient Muir Site collection and the recently excavated, late Fort Ancient Larkin Site assemblage.

VERTEBRATE FAUNA

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The vertebrate assemblage (n=6,569) was recovered by dry screening in the field and from flotation samples processed in the laboratory. Examined faunal materials included specimens from six features and two postholes. Analysis of these remains resulted in the identification of 657 elements representing 44 taxa. Approximately 10% of the assemblage was assignable to order, family, genera, or species (Table 5). When possible, all specimens were identified as to species, anatomical element, side, and bone portion. The remaining specimens were identified to the class level (i.e., mammal, bird, reptile, amphibian, and fish) or were classified as indeterminate vertebrate.

Table 5. Identified and Unidentified Faunal Remains by Taxonomic Class.

Class	Number of Identified Elements	Percent of Identified Elements	Number of Unidentified Elements	Total	Percent of of all Elements
Vertebrate	-	-	1,822	1,822	27.7
Mammal	524	78.8	2,977	3,501	53.3
Bird	76	11.4	983	1,059	16.1
Reptile	46	6.9	31	77	1.2
Fish	2	0.3	89	91	1.4
Amphibian	17	2.6	2	19	0.3
Total	665	100.0	5,904	6,569	100.0

Faunal remains were identified by comparison with specimens curated at the University of Kentucky and Transylvania University, Lexington. Dr. J. Hill Hamon aided in the identification of the avian remains and Eric Fernandez assisted with the reptile identification. All faunal specimens were examined under a 10x magnification lamp or standard microscope for signs of burning, rodent or carnivore gnawing, butchering cuts or cultural modifications.

Minimum number of individuals (MNI) determinations were calculated for the entire assemblage as a whole rather than by individual features. MNI estimates were derived for each species by counting the most frequently occurring element per side.

Edible meat yield values for mammals and birds were calculated using MNI determinations and meat weight estimates published by Smith (1975). Meat ranks were assigned for the animals in each class of mammals and birds which contributed the greatest potential meat value. Recognizing

the various problems inherent in arriving at reliable meat weight estimates (Grayson 1984:172-174), meat ranks can nevertheless provide a useful basis for the comparison of faunal resource utilization within and between sites.

VERTEBRATES

A total of 23 mammal, five bird, 14 reptile, one amphibian, and one fish taxa are represented in the faunal assemblage (Table 6). Mammal remains account for 53.3% of the material, with bird (16.1%), reptile (1.2%), fish (1.4%), amphibian (0.3%), and indeterminate vertebrates (27.7%) present in varying quantities. Evidence of burning occurs on 42.2% of the bone; 9% of the specimens exhibit indications of butchering; 148 have signs of rodent or carnivore gnawing; while 73 are modified as a result of tool manufacturing processes or by use.

Large Mammals

White-tailed deer specimens (n=364) are the most common large mammal elements present in the assemblage, accounting for 54.7% of the identifiable material. An estimated minimum number of 11 deer are present in the collection, determined by the left distal tibia. Deer also contributes the major portion of usable meat (48.6%). The skeletal composition of identified deer remains includes cranial and antler (25%), forelimb (23.8%), hindlimb (28%), and axial (16.2%) elements. Miscellaneous phalanges and metapodial elements account for 7% of the remaining material. The representation of all major body portions indicates that entire carcasses were frequently returned to the site for processing. This appears to be a consistent pattern in the use of deer by Fort Ancient peoples in Kentucky (Breitburg 1987a, 1987b).

A minimum of four juvenile individuals are represented at the site. Deer elements from immature individuals were recovered from all but one feature and include 26 specimens. The occurrence of a newborn individual, coupled with the presence of shed antler beam portions and a frontal element with attached antler, suggests that deer hunting was a year-round activity.

Of the deer remains, 6.6% are burned. Butchering cuts occur on 10 specimens and are present in five instances on the distal humerus and once each on axis, ulna, innominate, femur, and astragalus remains. Indications of carnivore/rodent gnawing are present on 53 specimens.

Culturally modified deer specimens are plentiful in the assemblage, accounting for 46 of the 73 modified faunal remains recovered from the site. Of these, 27 are antler tines severed by the score and snap technique and five are tools manufactured from portions of antler. These implements are described in detail in the modified bone section.

Table 6. Summary of Faunal Remains.

Vertebrate Taxon	Number of Identified Specimens	MNI	Meat Rank
Mammal			
Odocoileus virginianus White-tailed Deer	364	11	1
Ursus americanus Black bear	27	2	2
Cervus canadensis Elk	16	1	3
cf. Mustela vison Mink	1	1	10
Procyon lotor Raccoon	22	3	5
Urocyon cinereoargenteus Gray fox	5	2	7
Canis spp. Dog species	2	1	9
Canis lupus Gray wolf	1	1	4
Carnivora Carnivore	2	1	
Microtus spp. Vole	2	1	
Sciurus spp. Squirrel species	18	3	6
Sciurus niger Fox squirrel	1	1	6
Sciurus carolinensis Gray squirrel	20	3	6
cf. Glaucomys volans Southern flying squirrel	1	1	6
Marmota monax Woodchuck	8	2	9
Tamias striatus Eastern chipmunk	1	1	
Sylvilagus floridanus Eastern cottontail	1	1	10
Scalopus aquaticus Eastern mole	1	1	
Didelphis virginiana Opossum	2	1	8
Cricetidae Mouse/vole/rat	20	1	
Rodentia Rodent species	6	1	
cf. Neotoma floridana Eastern wood rat	2	1	
Peromyscus spp. Mouse species	1	1	
Total Mammals	524		

Table 6. Continued.

Birds			
Meleagris gallopavo Wild turkey	58	9	1
Ectopistes migratorius Passenger pigeon	13	2	3
Cathartes aura Turkey vulture	3	1	2
Accipiter cooperii Cooper's hawk	1	1	4
Colinus virginianus Bobwhite quail	1	1	5
Total Birds	76		
Reptiles			
Serpentes Snakes	7	-	
Crotalidae Poisonous snake family	13	-	
cf. Agkistrodon Copperheads/Cottonmouths	1	1	
Agkistrodon cf. contortrix Copperhead	3	1	
cf. Crotalus Rattlesnakes	4	2	
Colubridae Nonpoisonous snake family	2	-	
Heterodon phatyrhinos Eastern hognose snake	4	2	
Lampropeltis spp. Kingsnake/Milk snake	2	1	
Elaphe spp. Rat snakes	1	1	
Coluber cf. constrictor Racers	2	1	
Trionyx spinifer Eastern spiny softshell turtle	1	1	
Terrapene carolina Eastern box turtle	3	1	
Chelydra serpentina Eastern snapping turtle	2	1	
Lacertilia Lizard	1	1	
Total Reptiles	46		
Amphibian			
Rana/Bufo spp. Frog/toad species	17	1	
Total Amphibian	17		
Fish			
Centrarhid Bass family	2	1	
Total Fish	2		

Black bear is the second most common large mammal identified in the Guilfoil faunal assemblage and is represented by a minimum of two individuals determined from the left femur. Bear elements were recovered from three of the six features. Of the 27 identified specimens, most are metacarpals, with dental, cranial, forequarter, and hindquarter remains also present in the assemblage. As a meat contributor, bear is second only to deer, accounting for about 22.8% of the edible meat yield. Burning occurs on 6.7% of the specimens, with butchering marks present on one element. Gnawing is present on four specimens. Modified bear elements include two femora, which represent portions of beamers.

Although only one elk is present in the assemblage, its large size makes it the third most important source of meat (19%). Elk is represented by 11 elements, consisting of seven antler portions, three metapodial elements, and one frontal section with antler. Butchering cut marks, burning, or gnawing are not in evidence on any of the remains, although seven antler tines are modified by grooving and snapping.

Small Mammals

Recovered smaller species include carnivores (wolf, fox, raccoon, and mink), rodents (woodchuck, scuridae, and cricetidae), opossum, rabbit, and mole (Table 6). All of the identified species are common to the area at present (Barbour and Davis 1974) with the exception of wolf.

Wolf is represented by a single nearly complete mandible (Figure 6c). The specimen is unburned and contains carnivore punctures and gnaw marks. Butchering cuts occur posterior and below the mandibular condyle and on the lower portion of the horizontal ramus. A comparison of the length of the first lower molar of the Guilfoil specimen (28.2 mm) with three specimens from the Eschelman Site in Lancaster County, Pennsylvania (29.0 mm, 28.2 mm, and 26.4 mm) (Guilday et al. 1962:64) indicates that the species is a large Gray wolf. In Kentucky, wolf has been tentatively identified from the Thompson (15Gp27) and Fullerton Field (15Gp3) sites (Breitburg 1987b; Griffin 1943:374). Wolf remains have also been recovered from Fort Ancient sites in Ohio (Griffin 1943:374) and West Virginia (Guilday 1971:10).

Gray fox (n=5) and raccoon (n=22) remains were recovered from four of the six features. Although domestic dog could not be specifically identified, elements of canis and unidentified carnivore may represent this species.

Other small mammal specimens recovered from the Guilfoil Site include squirrel (n=40), woodchuck (n=8), opossum (n=2), and rabbit (n=1). Squirrels were the most commonly recovered members of the rodent group and include species of gray, fox, and possibly flying squirrel. The dominance of gray squirrel over other squirrel species suggests that heavily forested areas were once present in the site vicinity. The occurrence of woodchuck indicates summer-hunting activities, since this species hibernates in Kentucky during cold weather (November-February)

(Barbour and Davis 1974). All of the small mammal species account for only 5.4% of the edible meat yield.

Mouse, vole, rat, mole, and chipmunk species are not considered in the meat yield estimates, since they are often intrusive in archaeological sites. About 9% of the small mammal specimens are burned; none of the specimens are modified or gnawed and only one raccoon element exhibits indications of butchering.

Bird

Bird remains account for 11.4% of the identifiable vertebrate collection. Of these, 76 could be identified to the species level. Wild turkey dominates the assemblage in terms of the minimum number of individuals (MNI=9) and number of identified specimens (n=58), followed by passenger pigeon (MNI=2) (n=13). Other identified species, represented by one to three elements, include bobwhite, turkey vulture, and Cooper's hawk. The latter two species may have been food sources (the distal portion on one turkey vulture element is burned), or they may have been sought for their plumage and talons. Ethnographic accounts of Indian groups in the Eastern United States indicate that hawk feathers were used to fletch arrows, cleanse wounds, and were prized as decorative elements. The skins from complete hawks were sometimes used in headdresses, while the claws were occasionally used to fasten breechcloths (Swanton 1979).

Aquatic and semi-aquatic avifauna are absent from the collection. This is not surprising, given the site's location away from major migratory flyways (Bellrose 1969) and the lack of abundant wetland habitat in the vicinity of the site.

Of the identified bird remains, 31.1% are burned and less that 1% exhibit butchering cut marks. A total of 10 bird bones are modified.

Reptiles

Reptiles comprise 6.9% of the identified faunal material. Turtle remains include three specimens of box turtle, two specimens of snapping turtle, and one element of softshell turtle. Thirty-nine snake vertebrae were recovered and one lizard specimen is present in the collection. Evidence of cultural modification is not present on any of the reptile remains; 37.3% of the specimens are burned.

Amphibians

Toad/Frog specimens comprise less than 1% of the identified fauna (n=17). Burning or indications of cultural modification are not present on any of the specimens.

Fish

Excavation yielded 91 fish elements, of which two were identified as members of the bass family. Fish scales were not recovered from screened materials or from flotation samples, although numerous small vertebrae and rib elements were present. About 2% of the fish remains are burned and none exhibit evidence of manufacture or use.

MODIFIED BONE

Modified bone objects (n=73) were recovered from both feature and posthole contexts. Over 63% of the these objects are made from deer, a large portion of which are composed of antler tool manufacturing debris. The remaining modified materials are elements of bear, turkey, and unidentifiable large mammal and bird species.

Most of the antler residue, including specimens of both elk and deer, are portions of tines approximately 4-6 cm long that were severed toward the distal tip by scoring and snapping. The proximal ends of these specimens are not scored and appear to have been severed by chopping. Tools manufactured from antler include a projectile point (Figure 5g), a flaker or drift (Figure 5p), fragments of a hafting element (Figure 5h-i), and miscellaneous fragments exhibiting signs of polish or use wear.

Modified deer bone recovered from the site includes three ulnas, a mandible, a phalanx, and a scapula. Of the three ulnas, one exhibits a gnawed proximal end and a polished broken shaft, while another is represented by the distal portion (Figure 5b,e). The third specimen, which also exhibits a gnawed proximal portion, was fashioned into a needle-like point and its distal tip exhibits polish (Figure 5f). All three artifacts are interpreted as awls. The configuration of the third implement and the presence of polish on its distal tip suggest that this artifact functioned as a punch for perforating hides or other materials.

A complete deer mandible (Figure 5o) that was modified by cutting and smoothing a portion of the ascending ramus was recovered. The specimen is discolored by a reddish brown stain and a high degree of polish is evident on the horizontal ramus and buccal aspects of the dentition. Ethnographic accounts of Eastern North American groups indicate that deer mandibles were used to shell corn or were utilized as sickles. However, wear patterns evident on the Guilfoil specimen suggest that it was used like a drawknife to clean and process hides. Two similar specimens were recovered from the Muir Site, a twelfth century Fort Ancient village recently investigated in Jessamine County (Breitburg 1978a).

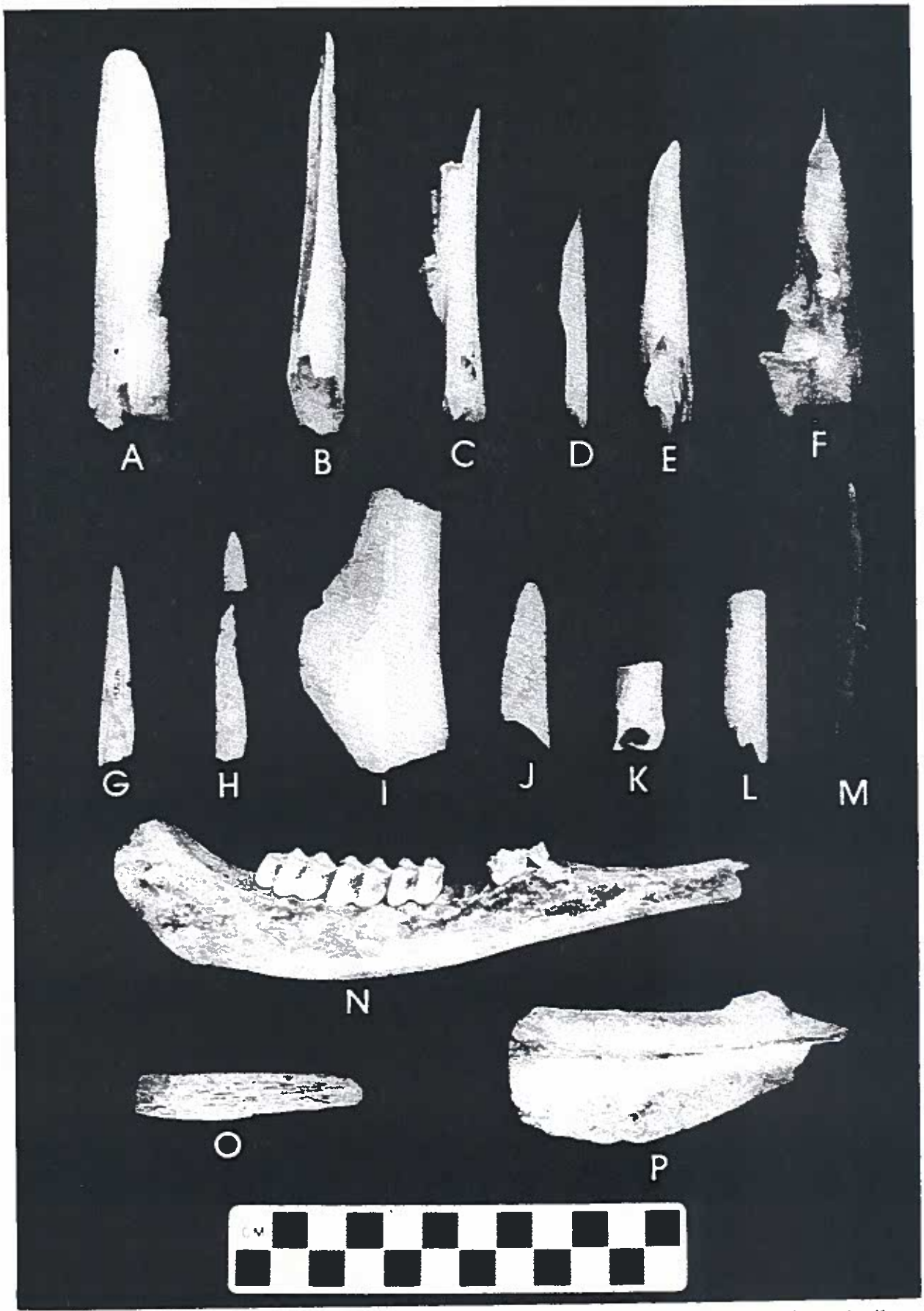

Figure 5. Modified faunal remains: a,k, spatulate-shaped implements; b-f,n awls; g, antler projectile point; h-i, hafted antlers; j, modified antler; l, perforated phalanax; m, modified bird bone; o, modified mandible; q, modified scapula; p, flaker or drift.

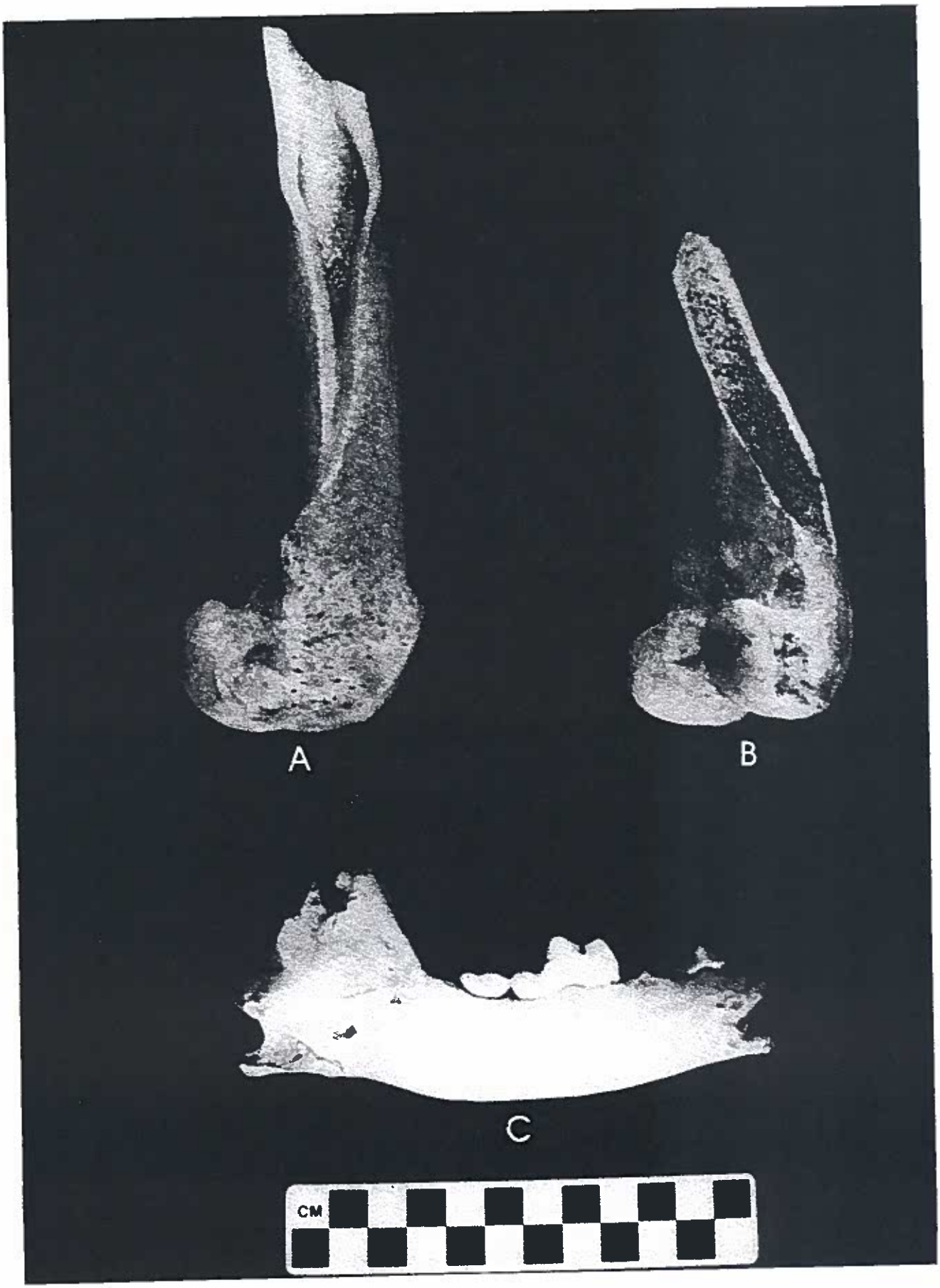

Figure 6. Modified faunal remains: a-b, Black bear beamers; c, Gray wolf mandible.

The deer phalanx (Figure 51) is longitudinally perforated at the distal end and the proximal end has been removed. Heat was used during the manufacturing process, as evidenced by the burning of the proximal area. Similar artifacts recovered from Fort Ancient sites in Kentucky and Ohio have been interpreted as tinklers, jinglers, or gaming objects (Breitburg 1987b; Griffin 1943; Hanson 1975; Oehler 1973; Prufer and Shane 1970). Guilday (1963), however, has argued that they are part of the cup-and-pin game which still survives among the Ojibwa and Cree.

A deer scapula (Figure 5q) recovered from the site is modified by cutting. Several longitudinal striations, oriented parallel to the spine of the scapula, can probably be attributed to the removal of a 6 cm long portion of bone.

Two Black bear femora were modified (Figure 6a-b). Bear femora were commonly utilized by prehistoric peoples to make beamers for working hides. Both of the recovered specimens are highly polished from long use as defleshing tools. These specimens appear to have been discarded after thinning from extensive wear caused breakage.

Modified indeterminate mammal remains include two spatulate-shaped implements that are highly polished over their entire surface. One specimen is broken and is represented only by the distal portion; the other specimen is complete and measures 10.1 cm in length (Figure 5a,k). The shape of these objects, coupled their completely polished surfaces, suggest that they were used as weaving implements. A third specimen, possibly an awl, is fashioned from the longbone of a large mammal. It is broken toward the distal end and exhibits polish from use. Another implement (Figure 5n) is cylindrical in shape and burned. This specimen is oval in cross-section and tapers to a blunt distal tip. The remaining modified materials represent miscellaneous fragments of bone exhibiting polish, or evidence of shaping or use.

Modified bird bones include two awls (Figure 5c-d) manufactured from elements of turkey and seven shaft portions of indeterminate species. Six specimens represent portions of splintered awls and tip fragments. One specimen (Figure 5m) is scored on one end and exhibits several longitudinal striations. No indication of burning is apparent on any of the specimens.

In summary, the modified bone assemblage consists of tools produced from large mammal and bird species, with no evidence of modified small mammal, reptile, or fish remains. These tools were used for a variety of activities including hide processing (awls and beamers), weaving (spatulate objects), and hunting (projectile points). Noticeably absent are items of personal adornment, such as bone beads, perforated animal canines, and incised or engraved bone artifacts. These types of artifacts are extremely common on Fort Ancient sites in northeastern Kentucky such as Fox Farm (15Ms1) and Thompson (15Gp27) (Breitburg 1987b).

COMPARISON WITH EARLY FORT ANCIENT SITES IN CENTRAL KENTUCKY

At present, only two Fort Ancient faunal assemblages from sites in the Inner Bluegrass region have been analyzed and the results reported. These sites consist of two early Fort Ancient Osborne phase (Turnbow and Sharp this volume) villages: Dry Run (15Sc10) in Scott County (Sharp 1984) and Muir (15Js86) in Jessamine County (Turnbow and Sharp 1987). Limited excavations at the Dry Run Site produced slightly less than 400 faunal remains and thus substantive comparisons are difficult to make. On the other hand, the faunal assemblage from the Muir Site included approximately 12,500 specimens and important comparisons between it and Guilfoil can be made.

Represented in the Dry Run assemblage are deer and elk, as well as various smaller mammals, birds, fish, and turtle. Bear is not present in the collection. However, this is possibly a result of the small sample size. Based on the presence of all major body portions, complete deer carcasses were returned to the site for processing.

The Muir Site faunal assemblage (Breitburg 1987a) indicates a pattern of animal resource procurement and utilization, that is identical in all essential respects, to that of the Guilfoil Site. Procurement strategies at both sites can be characterized as diversified and adapted to the taking of large game animals, including deer, elk, bear, and turkey. At both sites limited use was made of semi-aquatic, riparian, and aquatic resources. These similarities are undoubtedly due to the upland location of these two sites and the access their inhabitants had to similar Bluegrass environments. Similar exploitative strategies for large game and turkey can also be documented between the two sites (Table 7). Other similarities include the hunting of deer on a year-round basis and similar butchering patterns. The ubiquitous occurrence of bone tools in both assemblages, particularly those used for hide processing activities, and the paucity of ornamental bone objects reflect further similarities between the sites.

Table 7. Comparison of Guilfoil and Muir Faunal Assemblages.

Species	Guilfoil	Muir
Deer	48.6%	47.3%
Elk	22.8%	24.5%
Bear	19.0%	16.6%
Turkey	4.2%	6.3%
Other	5.4%	5.3%
Total	100.0%	100.0%

Comparison of the Guilfoil, Dry Run, and Muir faunal assemblages indicates that Fort Ancient faunal exploitation patterns initiated during the early Fort Ancient Osborne phase continued into middle Fort Ancient times. At present, it is not known whether this pattern continues into late Fort Ancient times, in the Inner Bluegrass region,

due to the lack of comparable faunal assemblages that date to this period.

SUMMARY

Analysis of the vertebrate fauna remains from the Guilfoil Site indicates that the Guilfoil inhabitants animal use focused primarily on the procurement of deer, bear, and elk, supplemented by turkey, squirrel, and a variety of smaller species. The site's upland location, at the interface of the Lexington Plain and the dissected terrain bordering the deeply entrenched Kentucky River, allowed these people to focus their animal exploitation strategies on both heavily forested and forest-edge environments. Faunal resources from aquatic and semi-aquatic habitats from nearby Boone Creek and the Kentucky River were utilized to a lesser extent.

Deer was apparently hunted on a year-round basis, with complete specimens often returned to the site for processing. The diversified assemblage of small game, reptiles, and fish, suggests opportunistic hunting activities and the exploitation of species during periods of seasonal availability and abundance. The recovery of large quantities of modified bone reflects a well-developed bone tool industry. Several tool types suggest that extensive hide processing activities took place at Guilfoil. Antler was utilized for the manufacture of projectile points and stone fabricating tools. Bone implements associated with domestic activities, such as weaving, and gaming activities are also present. Bone was apparently not modified into objects of personal adornment.

FRESHWATER MUSSEL FAUNA

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Analysis of the shell remains recovered from the Guilfoil Site resulted in the identification of 15 species of freshwater mussels (Table 8). These species are indicative of medium to large rivers, which suggests that they were collected from the nearby Kentucky River.

Freshwater mussels typically inhabit shoal areas of streams since they need running water to feed and reproduce. The substrate is typically composed of sand and gravel. Five of the identified species are extremely rare today (Pleurobema clava, Pleurobema rubrum, Fusconaia maculata, Cyprogenia stegaria, and Epioblasma rangiana). These species have been eliminated either through habitat destruction, by the construction of impoundments, excessive siltation, and by pollution. None of the specimens had been culturally modified.

Table 8. Mussel Remains.

Taxon	Number of specimens
Fusconaia ebana	2
Fusconaia flava	1
Fusconaia maculata	6
Elliptio dilatata	10
Pleurobema clava	2
Pleurobema cordatum	3
Pleurobema rubrum	3
Pleurobema sintoxia	2
Actinonaias ligamentina carinata	13
Lampsilis ovata	12
Ligumia recta	4
Cyprogenia stegaria	1
Ptychobranchus fasciolaris	2
Epioblasma rangiana	1
Plagiola lineolata	4
Unidentified fragments	458
Total	524

CONCLUSIONS

Investigations at the Guilfoil Site generated important information on middle Fort Ancient material culture and subsistence patterns. This research also demonstrated that many of the patterns established in early Fort Ancient times continued into the middle Fort Ancient period. The ceramic and lithic assemblages exhibit the types of changes that would be expected in a local developmental sequence. Subsistence patterns identified at Guilfoil are virtually identical to those reported from early Fort Ancient Osborne phase contexts in the Inner Bluegrass region.

While archaeologists are beginning to develop a local Fort Ancient chronology and have gained some insight into regional settlement and subsistence patterns, little is known about Middle Fort Ancient site structure. Most middle Fort Ancient sites are circular villages with a central plaza and many are associated with mounds. However, few of these sites have been tested or excavated. Future investigations of these sites should focus on determining if these settlements were stockaded, the size and shape of domestic structures, and the degree of variability in interand intra-site mortuary patterns. Research should also focus on identifying the factors which led people to organize themselves in circular villages with a central plaza and why, in the Inner Bluegrass region, this type of settlement does not appear to have been favored by early or late Fort Ancient peoples.

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PRELIMINARY STUDY OF MORTUARY PATTERNS AT THE LARKIN SITE, BOURBON COUNTY, KENTUCKY

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ABSTRACT

The Larkin Site is a large late Fort Ancient village located in Bourbon County, Kentucky. Recent investigations at this site resulted in the excavation of a number of burials and a domestic trash disposal area. Burials were found to occur in clusters that may represent kin groups. Mortuary patterns identified at the site include selective removal of certain bones, the use of limestone slabs to cover and mark graves, ritual feasting, and the deliberate breaking of ceramic vessels at the conclusion of the burial ceremony.

INTRODUCTION

The Larkin Site (15Bb13), located on Stoner Creek 12.5 km north of Paris, Kentucky, has been known to archaeologists since the 1820s, when the site was described and mapped by Constantine Rafinesque (Figure 1). However, with the exception of William S. Webb's surface collection of the site and James B. Griffin's (1943:179-181) analysis of the recovered materials, Larkin has received little professional attention. Griffin assigned the site to the Madisonville phase of the Fort Ancient aspect and noted a close resemblance between the artifact assemblages from Larkin and Fox Farm (15Ms1).

Rafinesque's map of the site published by Squier and Davis (1848:Plate XIII) shows several clusters of rectangular structures enclosed by a roughly hexagonal earthwork, bordered on the east by Stoner Creek. Another cluster of structures is located just north of the earthwork. Rafinesque interpreted these as "remains of dwellings", and Squier and Davis noted that the earthworks "seems incontestably of a defensive character". (The earthworks is probably associated with an as-yet-uninvestigated Woodland utilization of the site area.) Contact period materials (reworked brass and copper) have been recovered by local collectors, who have described the site as containing a number of small midden areas scattered throughout a karst bottom (Henderson et al. 1986:114-115). It is possible that these small midden areas correspond to the clusters of structures noted by Rafinesque.

The recent investigations at Larkin were undertaken prior to the construction of a gas transmission pipeline across a portion of the site by Columbia Gas of Kentucky, Inc. It should be noted that although not

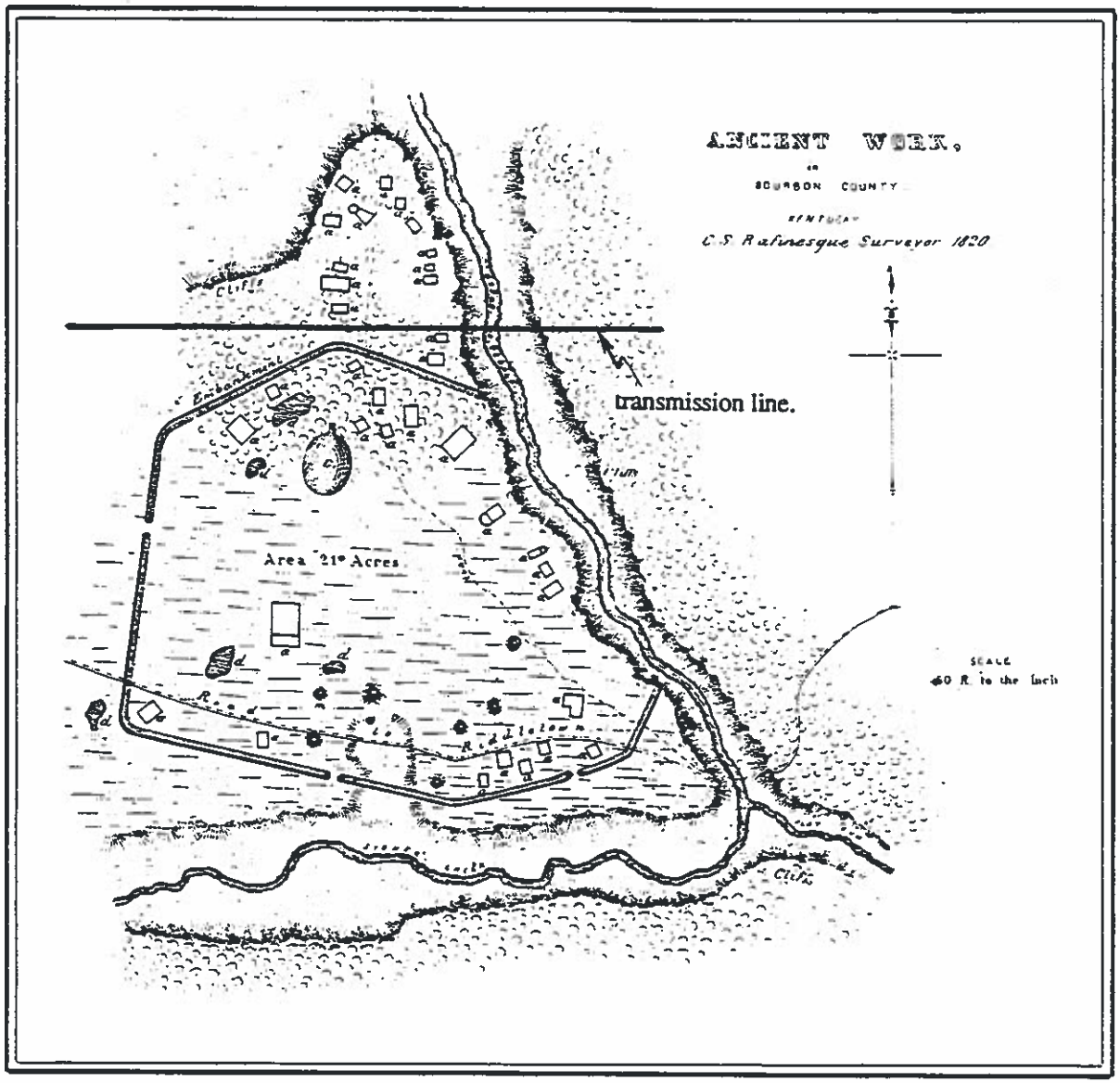

Figure 1. Rafinesque's map of Larkin (taken from Squire and Davis 1848:Plate XIII) showing approximate location of gas transmission line.

required by law to fund these investigations, Columbia Gas chose to do so because construction of the pipeline could potentially impact significant archaeological resources. The pipeline is located near what is probably the northern edge of the hexagonal earthwork but south of the northern cluster of "dwellings" that appear on Rafinesque's map (Figure 1).

DESCRIPTION OF FIELDWORK

Fieldwork was conducted in two phases. Two weeks were spent at the site in late August with a crew of five and a number of volunteers. The landowners, Mr. and Mrs. Buck LeBus, not only gave permission for the excavations, but also actively participated in the field investigations. Because of a prolonged drought, the soil was very dry and compacted, making it impossible to use a split spoon core to locate subsurface deposits as originally planned. Mr. LeBus volunteered the use of his posthole digger, and posthole tests were excavated throughout the pipeline right-of-way, as were six 1 x 2 m hand excavated units (Figure 2), in an attempt to identify intact subsurface deposits. Posthole tests were also placed in selected areas of the site adjacent to the transmission line right-of-way (Figure 2).

Although the initial hand excavated test units failed to locate intact deposits, the posthole digger encountered limestone rock in two locations below the plowzone. Because local collectors had reported that many burials at Larkin were covered with limestone slabs, it seemed likely that these rocks might indicate the presence of burials. Two 1 x 2 m test units were excavated in these locations to further expose any associated cultural deposits. One concentration of limestone rock turned out to be a rock chinked posthole, but the other yielded a burial. A 24 m^2 block was opened in the vicinity of the identified burial, and two additional burials, a surface hearth, and a posthole were identified. Five other 1 x 2 m units were also excavated near the block, but yielded only one additional feature, a shallow pit.

In December, the senior author and a field crew consisting of a number of volunteers returned to the site to monitor excavation of the ditch for the gas transmission line. At this stage of the investigations, the soil was very moist from much rainfall, unlike the dry soil conditions encountered in August. Prior to the cutting of the ditch, the plowzone was removed with a bulldozer from an 8 m wide east-west transect across the site. The field crew closely observed this operation at every stage. Six additional burials, a trash disposal area, and a shallow pit which may represent the remains of a house basin were located during stripping and subsequent shovel scraping. Only the burial features will be described in this paper; the remaining features will be described in the final report which is currently being prepared.

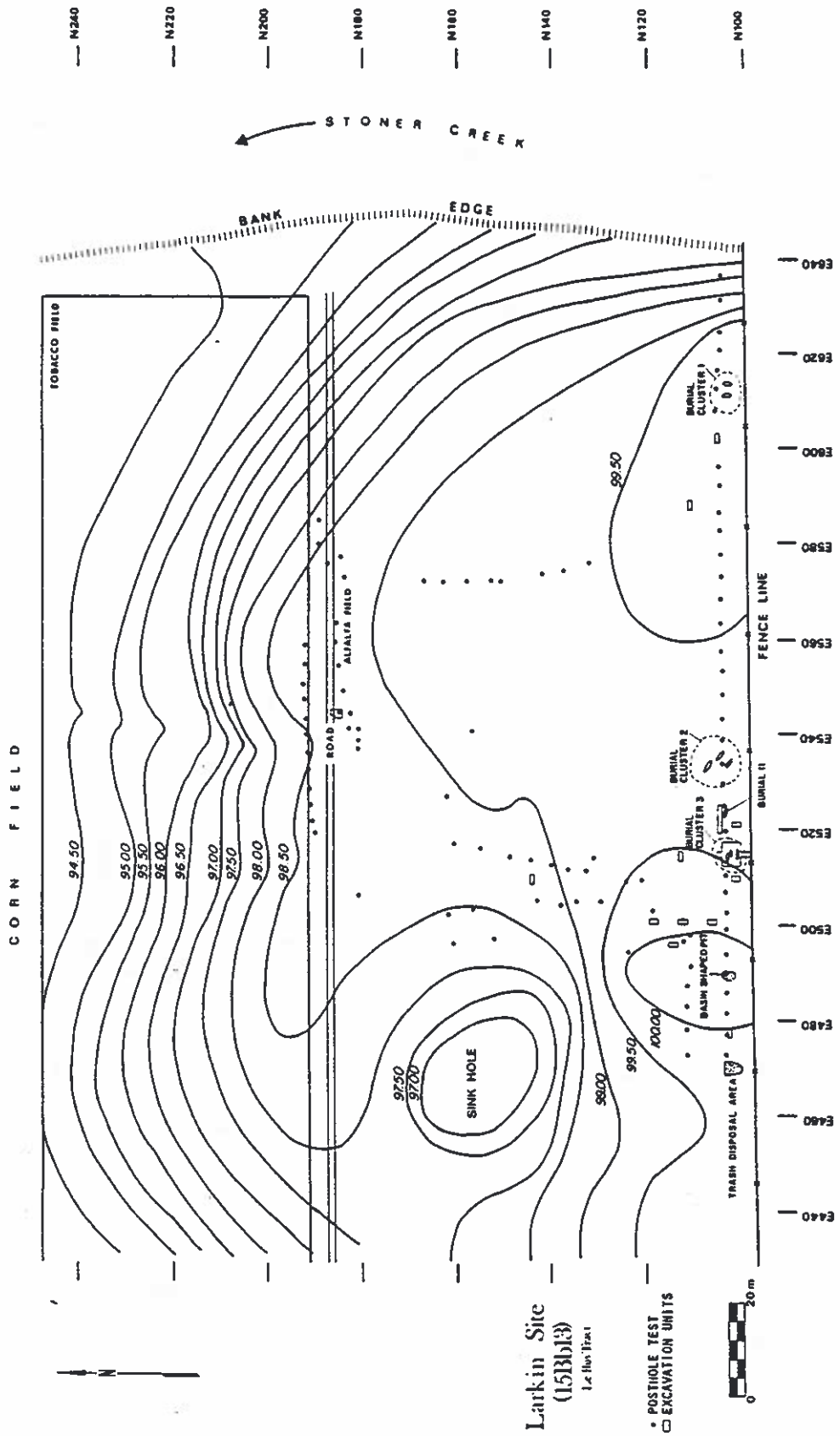

Figure 2. Location of posthole tests, test units, and burials.

SITE CHRONOLOGY

Not all the materials recovered from Larkin have been completely analyzed, but the lithic and ceramic artifacts are indicative of a very late Fort Ancient occupation. The projectile points are all small triangular points with concave bases similar to the Type 6 Fine Triangulars described by Railey (1987b; see also Henderson and Turnbow this volume), and the ceramics resemble late Madisonville horizon vessels recovered from Montour phase sites in northern Kentucky (Henderson and Turnbow this volume). The ceramic assemblage is characterized by plain globular jars with outflaring rims. On the few recovered cordmarked vessels the neck is smoothed. Lip notching and broad flat strap handles are present. Other vessel forms include bowls (some with notched lips), saltpans, and colanders.

Historic artifacts include one piece of a copper tube bead fragment and two lead shot. The copper has been identified as a Contact period artifact, but it is not clear at present if the lead shot dates to the late Fort Ancient occupation or is more recent.

Two radiocarbon samples were submitted to Beta Analytic in Coral Gables, Florida. One sample yielded a calibrated date (at two standard deviations) of A.D. 1410(1480)1660 (Beta-19068; A.D 370+/-80 B.P.) and the other a date of A.D. 1510(1663)1955 (Beta-19067; A.D. 210+/-70 B.P.) (Stuiver and Pearson 1986).

Both the artifact assemblage and radiocarbon determinations indicate that Larkin represents a late Fort Ancient community and is contemporaneous with the Goolman Site (15Ck146) in Clark County (Turnbow and Jobe 1984) and Montour phase sites in northern Kentucky (Henderson and Turnbow this volume). As such, it represents a village that was occupied during the initial period of contact between aboriginal populations and Euro-americans in the Ohio Valley.

DESCRIPTIONS OF BURIALS

Of the 12 features assigned burial numbers in the field on the basis of the presence of limestone slabs, three (Burials 2, 8, and 10) were determined during excavation not to contain human interments. A concentration of artifacts (a small limestone slab, a sandstone abrader, and shell tempered plain ceramics) provisionally designated Burial 2 turned out to be materials placed in the fill of the burial pit associated with Burial 4. Burial 8 was identified by a cluster of three small limestone slabs located southwest of, and oriented in the same direction as, Burial 7. Upon excavation it was determined they were not associated with human remains or a burial pit. Possibly they are associated with some type of mortuary activity which took place in the vicinity of Burial 7. Unlike the limestone slabs typically found in direct found with burials, which were usually set at an angle, the slabs labeled Burial 8 were all laid horizontal. Burial 10 was defined on the basis of a single large limestone slab. This slab, located northwest of

Burial 11, was not associated with any other slabs or human bone.

The remaining nine graves, arranged in three distinct clusters (Figure 2), contained 10 individuals. Cluster 1 (Burials 5 and 6) was located closest to Stoner Creek near the edge of the terrace and consisted of two adjacent graves oriented north-south. Cluster 2 (Burials 7, 9, and 12) was located approximately 48 m west of Cluster 1 and consisted of three graves oriented southeast-northwest. Cluster 3 (Burials 1, 3, and 4) was located approximately 26 m west of Cluster 2, and consisted of three graves oriented east-west. Between clusters 2 and 3 lay Burial 11 (Figure 2). This burial, which was oriented southsoutheast-northnorthwest, was the only burial that contained disarticulated rather than articulated human remains.

These clusters may represent family group cemetery areas, as they appear to be located near Rafinesque's "dwellings" (Figure 1). The placement of these cemeteries differs somewhat from the pattern observed by local collectors, who have reported that in the main section of the village located south of the project area, cemetery areas are almost always found along the western edge of the village. These cemeteries are reported to contain from 3 to 11 graves with all of the graves oriented east-west with the head to the west (Foley and Lipscombe 1961; Phil Foley, personal communication 1986).

The nine burials investigated at Larkin are described below. Estimates of age and sex in the following descriptions are based upon observations of skeletal and dental features according to accepted methods of demographic analysis (Bass 1979; Krogman 1973; Ubelaker 1978).

CLUSTER 1

Burial 5 contained the complete, articulated skeleton of a 30-35 year-old male in a single, primary inhumation. The head lay towards the north, the legs extended, and the arms crossed on the pelvis. The skeletal position was supine with the head facing upward. Bone preservation was not good, because of excessive soil moisture at the time of excavation.

During excavation, a small triangular projectile point was noted between ribs 3 and 4 on the right side. A second similar point was found inside the posterior cranial vault, with a third point just beneath the occipital. The point inside the cranium had probably slipped in through a post-mortem break in the vault at that area. Examination of the skull after cleaning in the laboratory revealed evidence of traumatic injury to the outer table of the superior cranial vault. A series of short distinct cut marks are clearly visible on the squamous portion of the frontal bone, at the level of the hairline (Figure 3). Two more cut marks appear on the left parietal, superior to the location of the ear, and several others extend across the superior posterior cranial vault. A careful comparison with osteological data

Figure 3. Skull from Burial 5 showing scalping cut marks.

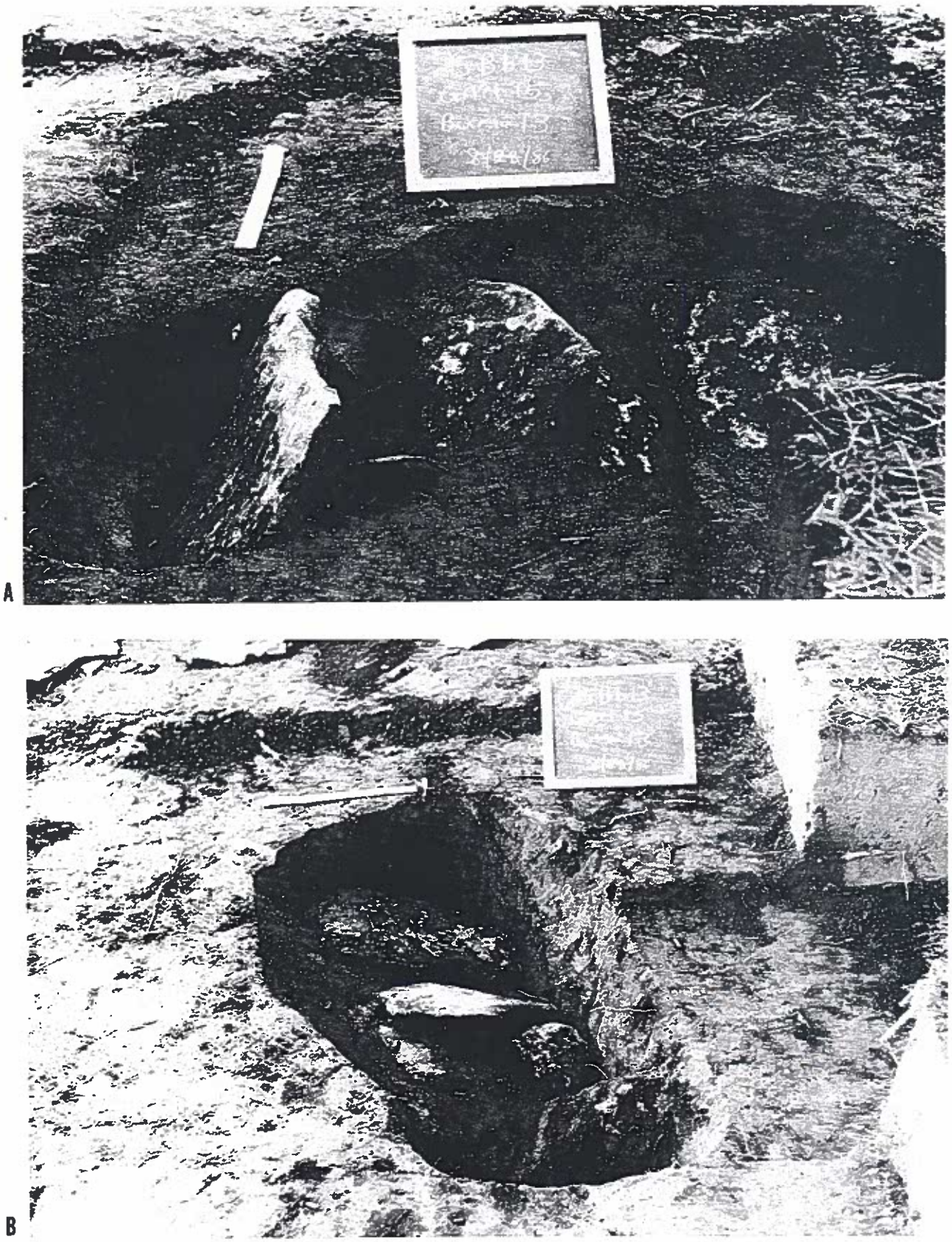

Figure 4. Burial 3: a, upper layer of limestone slabs; b, lower layer of limestone slabs.

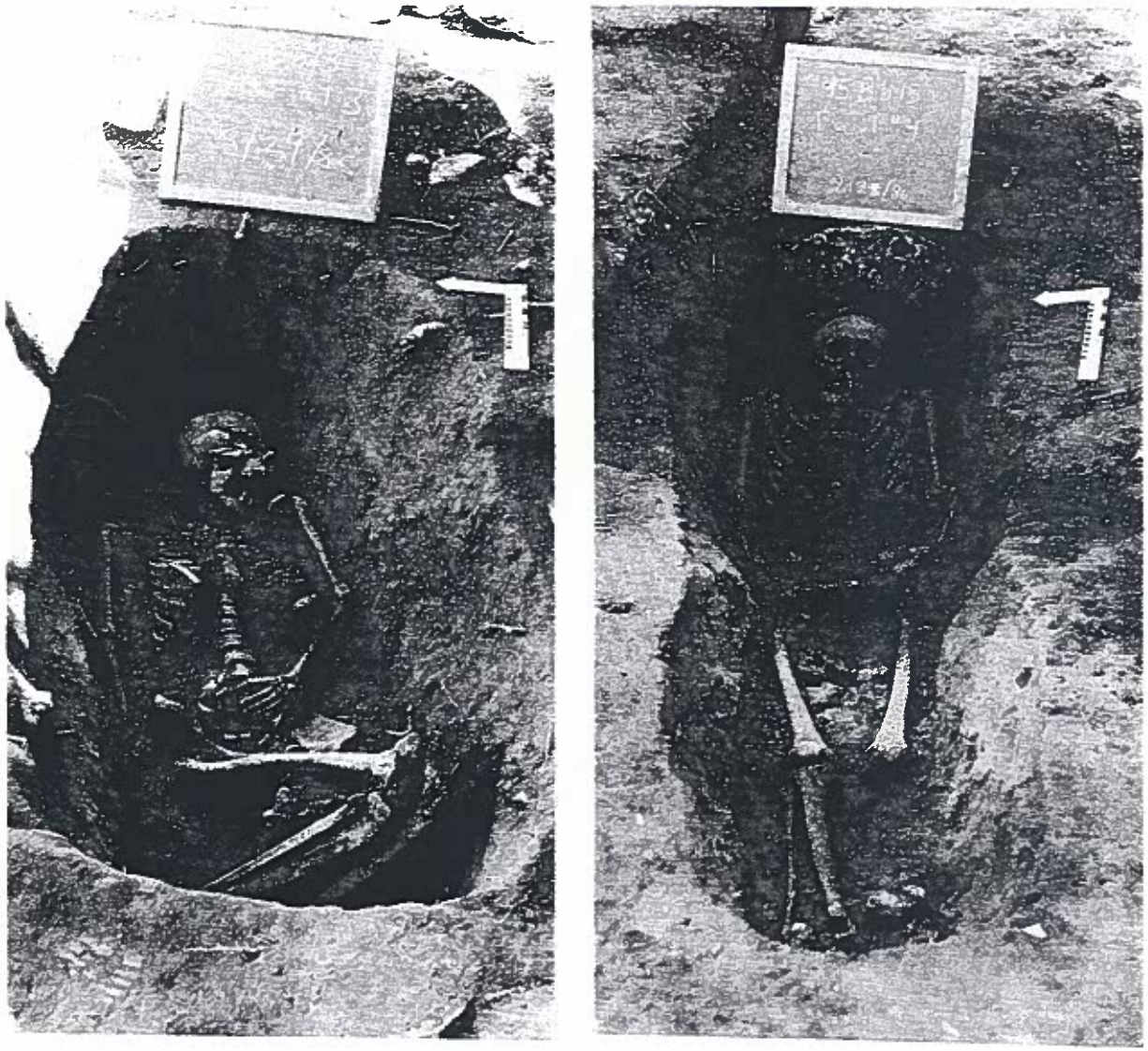

Figure 5. Burials 3 and 5: a, Burial 3; b, Burial 4 (note left tibia and fibula are missing).

from two late prehistoric population samples that include numerous scalped and otherwise mutilated individuals, the Norris Farms series from Illinois (Milner 1987) and the Crow Creek massacre series from South Dakota (Zimmerman et al. 1981), indicated that the observed pattern of cutmarks represents perimortem scalping. This particular traumatic injury has not been previously documented in Fort Ancient skeletal series. In The History of the American Indians, James Adair (1775:387-388) described the typical pattern of scalping among Eastern Woodlands Indians in the mid-eighteenth century:

> "They seize the head of the disabled, or dead, person, and placing one of their feet on the neck, they with one hand twisted in the hair, extend it as far as they can - with the other hand, the barbarous artists speedily draw their long-pointed scalping knife out of a sheath from their breast, give a slash round the top of the skull and with a few dexterous scoops, soon strip it off. They are so expeditious as to take off a scalp in two minutes."

Zimmerman et al. and Milner both note that in their series, the cut marks are most abundant across the central frontal bone, and less so along either side and across the back of the vault. It seems reasonable to assume that the head of the unfortunate male in Burial 5, who was probably unconscious or dead, was seized from behind and the first cuts made across his forehead in an arc extending from right to left, the scalp being pulled backwards and upwards with sufficient force to detach it from the underlying membranes as the cuts progressed across the left side of the head so that few additional cuts were necessary to sever it at the back. Such a series of actions would produce the observed pattern of cutmarks without necessitating further trauma to the skull.

Other cultural materials recovered include a concentration of ceramic sherds which were located toward the center of the burial pit above a layer of limestone slabs. The latter, which were set at about a 45 degree angle sloping towards the west, covered most of this burial pit. Flotation samples recovered from this burial have not yet been processed, but carbonized corn kernels and beans were recognized in the field in the vicinity of the upper torso.

Burial 6 contained the articulated skeleton of a 30 year-old female in a single primary interment oriented toward the north. The individual was supine with legs semi-flexed and arms extended along the sides. The absence of the skull and the left femur were noted during excavation. A single large slab was placed on end along the west wall of the pit near the spinal column, wedged between several smaller slabs laid flat across the chest. A large number of sherds were recovered from the upper level of the burial pit.

CLUSTER 2

Burial 7 contained the articulated skeleton of a 40-45 year-old female, with her legs semi-flexed and her arms folded on her chest. The burial position was supine, with the orientation southeast-northwest. The cranium was absent except for a few fragments from the right side of the face, but the complete mandible was present. Three limestone slabs were placed over the body, sloping to the southeast. A fourth slab was set on end in the southeastern corner of the pit, in the place that would have originally been occupied by the cranium. No artifacts were directly associated with the body. However, a large number of sherds, including fragments comprising approximately one-third of a shallow bowl, were recovered from the upper level of the burial pit.

Burial 9 was the primary inhumation of a 35 to 45 year-old individual, possibly a male. The bones were poorly preserved and very fragmentary, making the estimation of sex difficult. The remains were partially articulated in a supine position, with the legs crossed at the ankles, the arms extended along the sides, and the head facing upward. Upright stone slabs had been placed on either side of the skull. The bulldozer had unfortunately removed the top level of the pit while uncovering the burial, and thus no materials were recovered from the grave fill.

Burial 12 was defined on the basis of an upright limestone slab and a well defined burial pit. Excavation of this feature, however, failed to reveal any evidence of human remains. The feature does not appear to have been disturbed by relic hunters and it is possible that the bones had completely decomposed.

CLUSTER 3

Burial 1 was a double interment containing two young children. Both were covered with a single limestone slab. The older child, 1.5-2.5 years of age, lay with legs extended in an east-west orientation and was only partly covered by the limestone slab. The bones directly under the slab were in good condition, but those that extended beyond the slab (the cranium, lower legs, and feet) were in poor condition. The other individual was an infant (newborn - 5 months of age) who had been placed in a semi-flexed position on the chest of the older child. The infant exhibited some disarticulation resulting apparently from post-depositional settling.

The artifacts associated with this burial include one shell bead and five drilled dog canines. The shell bead was found directly above the older child's pelvis, while one canine was found near the infant's skull. Three of the remaining canines were found under the mandible of the child, suggesting that a necklace had been present. The last canine was found close to the mandible of the older child.

Burial 3 (Figures 4a-b,5a) was a single primary inhumation containing a female between 35-40 years of age. The skeletal remains were in good

condition. This individual was extended supine along an east-west axis with her head facing south. The skeleton was articulated with the arms stretched along either side and the legs in a semi-flexed position. The absence of the left femur was noted in the field. The partial skeletal remains of a fetus 5 to 6 months of developmental age were subsequently discovered during laboratory processing of matrix recovered from the pelvic region for flotation. At this particular stage of pregnancy, premature separation of the placenta with subsequent severe hemorrhaging represents a major threat to maternal health (Danforth 1982 and this woman may have died as a result of that unfortunate development.

Two layers of stone slabs covered the burial pit, with the upper layer consisting of two large slabs set at a 45 degree angle sloping towards the west (Figure 4a), and the lower layer consisting of four slightly smaller slabs set at a 45 degree angle sloping towards the south (Figure 4b). A portion of a large jar and an abrader were recovered from between the upper slabs (Figure 4a), and chert debitage, a burned proximal deer ulna, and fish bones were recovered from the pit fill matrix. A mussel shell was found near the left hand. A copper tube bead represents the only artifact which may have been directly associated with the skeleton. This artifact was recovered from a flotation sample collected as the skeletal remains were being removed and prepared for transportation back to the laboratory. Botanical remains recovered from above and below the limestone slabs include carbonized corn kernels and beans.

Burial 4 was a single, primary inhumation of a male 40-45 years of age. The skeletal remains were not covered by large stone slabs as were Burials 1 and 3 and, as a result, the bones were not in a good state of preservation. A limestone slab had been placed on end next to the skull. This individual was extended supine along an east-west axis, with his arms alongside the torso and the face upwards. It was noted in the field that the left tibia and fibula were missing, and that the left foot was still articulated but located closer to the knee than in normal anatomical position (Figure 5b).

A small triangular projectile point was recovered from the pelvic cavity of Burial 4 immediately superior to the sacrum. If the location of the point resulted from an arrow penetrating the abdomen, death would have occurred quickly by loss of blood or more slowly from peritonitis. As previously noted, a small limestone slab, a sandstone abrader, and the base of a large shell tempered globular plain jar were recovered from the top of the burial pit. Below this artifact concentration, another section of this vessel was identified (approximately one-fifth of the body and a portion of the rim). Since the base of this vessel was found above the rim and body, it is quite probable that this vessel was broken as part of the mortuary ceremony. Botanical remains recovered from the burial pit fill include carbonized corn kernels and beans.

BURIAL 11

This burial contained the disarticulated, incomplete remains of an adult aged 30 to 40 years at death. Estimation of sex was not attempted because the skeleton was represented only by portions of the upper torso, with the cranium, lower torso, legs, and most of the spinal column and ribs missing. Two layers of limestone slabs covered this burial. The upper layer consisted of four large slabs set at approximately a 45 degree angle and two small limestone rocks, while the lower layer consisted of four horizontal limestone slabs that had been placed directly above the burial. The right and left humeri, right clavicle, and right scapula lay in approximate anatomical order, but the other bones (a few vertebrae, and ribs) were scattered throughout the pit. The orientation of the intact upper body elements was southsoutheast-northnorthwest.

Portions of a ceramic colander were recovered from between the two layers of limestone slabs associated with this burial. A broken jar was discovered beneath the lower layer of slabs in the northwest corner of the pit, the only ceramic vessel found in such a location during the excavations. Two fragments of a cannel coal pendant were also recovered near the skeleton. Numerous fragments of charred beans and corn kernels were identified in the upper pit fill.

MORTUARY PATTERNS AT LARKIN

The majority of burials identified at Larkin in 1986 were single, primary inhumations of articulated adults. The most common burial position was supine and extended, with some degree of variation noted in the placement of the arms and the feet. However, three adults had been buried in pits whose short length necessitated flexing the legs in a vertical position, so the knees of these individuals were first encountered at a higher elevation than the remainder of their skeletons.

Limestone slabs were associated with all of the burials, but these were rarely laid flat over the bodies, being most often laid at sloping angles or set on end near a wall of the pit. Considerable variation was noted in both the number and the placement of slabs within the graves. For example, Burial 4 contained only a small upright slab at the eastern end of the burial pit, while Burials 3 and 11 each contained two layers of stone slabs, with larger ones on top and smaller ones beneath.

Grave goods associated directly with the skeletons include five drilled dog canines and a shell bead (Burial 1), a copper tube bead (Burial 3), and a broken jar and a cannel coal pendant which was recovered in two pieces (Burial 11). At other late Fort Ancient villages such as Hardin Village, Madisonville, and Bentley, whole ceramic vessels were placed in graves (Hanson 1966; Hooton and Willoughby 1920; Pollack and Henderson 1984). However, the vessel recovered from within the pit of Burial 11 appears to have been broken intentionally only a short time before it was placed in the bottom of the grave. The handles of the vessel were found in different locales

within the pit in differing preservational environments (i.e., the temper had been leached out of one handle but not out of the other). The cannel coal pendant recovered in the vicinity of this ceramic vessel also appears to have been intentionally broken.

All of the other ceramic vessels were recovered from the upper levels of the burial pits, above the initial layer of limestone slabs. These vessels were intentionally broken, as well, as evidenced by the vessel wedged between two upright slabs in Burial 3 and the vessel whose base was recovered from a higher elevation than the body and associated rim in Burial 4. In contrast to the large number of sherds recovered from the upper levels of the burial pits few sherds were recovered from below the limestone slabs.

Four projectile points were recovered from two burials (4 and 5) at Larkin. Their location in relation to the skeletons strongly suggests that they were associated with traumatic injuries resulting in the deaths of the individuals, both adult males in the prime of life.

The age distribution of the 10 skeletal individuals from Larkin does not conform to a normal demographic profile (Weiss 1973), and therefore does not represent a true cross-section of the community's inhabitants. The subadult segment includes a fetus, an infant, and a very young child, but no one between the age of 3 years and late adolescence. By contrast, at Hardin Village 24% of the sample of 296 individuals examined by Cassidy (1972) died during that particular 17 year period. The seven Larkin adults are all aged between 30 and 50 years, with most of them falling between 30 and 40 years. Late adolescents and young adults are not represented, although that age category comprised 25% of the Hardin Village series. Altogether, a 27-year span is missing from the Larkin profile. This omission probably represents sampling error, considering the very small size and restricted spatial distribution of the burial sample.

Another pattern of incomplete representation is clearly evident, this time with regard to the anatomical completeness of the adult individuals. Five of the seven adults, but neither the infant nor the young child, are missing major skeletal elements from their otherwise complete and articulated skeletons. These elements were apparently removed at some time after the original interment of the body, presumably after decomposition of the soft tissues. The excavation records attest to the preserved articulation of adjacent skeletal regions, e.g., the articulated left foot of the male in Burial 4. The missing elements were non-randomly selected: the skull from Burial 6, the cranium (but not the mandible) from Burial 7, and various long bones from the left (but not the right) side of the body - the left femur from Burials 3 and 6, the left tibia and fibula from Burial 4, and the left clavicle from Burial 9.

Two adult burials deviate from this pattern, one by its extremely sparse representation and the other by its completeness. Burial 11 occupied a full-sized pit but contained only an adult's left and right humeri, right clavicle and scapula, and a few scattered ribs and vertebrae. The upper body elements were in approximate anatomical

relation to one another in one end of the pit, but the remaining elements were scattered along its length. The good preservation of the bones suggests deliberate removal of the missing elements, rather than differential disintegration in situ.

The skeleton of the adult male in Burial 5, who had been shot with three arrows and scalped, is perfectly complete except for minor postmortem fragmentation of fragile bones. He clearly met a violent death but his body was recovered intact and given a normal burial alongside others from the community. It is tempting to hypothesize some connection between his mode of death and the lack of evidence for subsequent manipulation of his bones, but the male in Burial 4 may also have died from an arrow wound and his grave was later re-opened to retrieve the left lower leg bones.

Evidence of graveside mortuary ritual, probably immediately following the removal of one or more bones, is provided by the botanical remains and ceramic sherds recovered from the burial pits. Concentrations of ash, burned soil, and carbonized beans and corn kernels were identified in the pit matrix, typically from the vicinity of the upper torso. Above these materials were the layer(s) of stone slabs and additional matrix, which also contained ash, burned soil, and carbonized botanical remains. Still higher towards the surface of the ground lay the fragments of one or two ceramic vessels. Except for the broken vessel associated with Burial 11, all of the sherds were recovered from the uppermost levels of the burial pits.

Botanical remains associated with the Larkin burials appear to have been deposited as the direct result of graveside mortuary rituals and do not appear to represent village midden refuse backfilled into the pits. This is supported by the fact that the midden in the vicinity of the burials is extremely light and flotation of midden samples produced little in the way of carbonized remains. Also, in contrast to the flotation samples from both the midden adjacent to the burials and from the burial pits themselves, the samples processed from a trash disposal area away from the cemetery areas yielded different types of carbonized materials. For example, carbonized nut remains were common in the trash disposal area but were rarely recovered from burial contexts. Corn remains from the trash disposal area consisted almost entirely of cupules, while the corn from the burials primarily consisted of kernels (Rossen 1987c).

Local collectors (Foley and Lipscombe 1961:129) have suggested that the Fort Ancient people at Larkin built mortuary fires above the bodies, reporting that they had encountered large amounts of charcoal and charred wood above the limestone slabs and had observed skeletal remains that appeared to have been charred. Though carbonized botanical remains were recovered from the burial pits excavated during these investigations, no evidence of burning within any of the pits was observed. A surface hearth, however, was discovered between Burials 1 and 3, and a burned area was identified in the vicinity of Burial 11. These discoveries indicate that some or all of the carbonized plant materials recovered from the Larkin burials were prepared in the immediate burial locale.

The graveside rituals which produced these carbonized plant food remains may have taken place at the same time that the missing bones were removed from the skeletons within the pits. Ethnographic accounts of multi-stage mortuary ceremonies, frequently note that they are concluded with ritual feasting and the removal of selected elements from the graves for the purpose of freeing the spirit from its earthly surroundings (Bloch and Parry 1982). The mortuary data from the Larkin burials strongly suggests such a cultural context: the duties owed by the reverent living to the respected dead.

CONCLUSION

Investigation of the Larkin Site indicates that burials are not distributed randomly throughout the village. Rather, they tend to occur in clusters which may represent family groups, but the absence of older children, adolescents, and young adults from the three clusters sampled here is puzzling.

The bodies of the dead were typically placed in shallow pits and covered with large limestone slabs, perhaps to protect them from scavengers. At some point in time after the original interment, the graves were re-opened for the removal of selected skeletal elements. The slabs were then replaced over the remaining bones. This act was accompanied by the preparation of a ritual meal or offering of food, the carbonized remains of which were deposited in the grave fill, along with deliberately broken ceramic vessels. It is suggested that these activities were performed as the final event in a multi-stage mortuary program aimed at regulating the spiritual bonds between the living and the dead in this late Fort Ancient community.

ACKNOWLEDGEMENTS

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FORT ANCIENT DEVELOPMENTS IN NORTHEASTERN KENTUCKY

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ABSTRACT

In the past, Fort Ancient research in Kentucky has been hampered by the lack of explicitly defined regional developmental sequences. Recognizing this need, limited excavations were conducted in 1984 at five Kentucky Fort Ancient sites located in a fairly circumscribed region along the Ohio River in northeastern Kentucky. As a result of these investigations, temporally sensitive ceramic and lithic attributes were identified, and a chronological sequence was proposed for the region.

INTRODUCTION

The purpose of this paper is to summarize the results of investigations conducted in 1984 at five Fort Ancient sites in northeastern Kentucky. These investigations represent the second phase of a two phase research project focused on developing a better understanding of how Native American culture in northern and eastern Kentucky was affected by contact with Europeans. This period of contact, encompassing the region's protohistoric and Historic Indian cultural expressions, is considered to have commenced with the entrance of De Soto into the Southeast in 1540 and concluded with the signing of the Treaty of Greenville in 1795 (Henderson et al. 1986:10-17).

Phase I of the project consisted of synthesizing available archival and archaeological baseline data concerning Contact period occupation in the region (Henderson et al. 1986). A number of Contact period sites or potential Contact period sites were identified during this phase of research, but it became clear that in order to be able to understand the effect European culture had on Indian culture, a better understanding of Indian culture was required. Therefore, Phase II was initiated to collect more information about aboriginal culture.

The area selected for investigation during Phase II was restricted to four Ohio River counties in northeastern Kentucky (Bracken, Mason, Lewis, and Greenup). The a priori assumption was that this region represented a meaningful culture area or interaction sphere, and that any changes documented in the material culture would reflect the

indirect or direct influence of European culture on Native culture. The major research goal for Phase II was to document material culture change through time and identify attributes of artifacts or artifact assemblages that were reliable indicators of that change. In this manner, a local chronology could be established and thus a perspective would be gained regarding aboriginal cultural developments in the region. A secondary research goal was to investigate aspects of Fort Ancient subsistence.

In the summer of 1984, limited excavations were conducted at five sites (Figure 1) selected from a list of several sites determined to contain Contact period deposits as a result of the Phase I investigations. These excavations were directed specifically at recovering temporally sensitive data in a controlled, systematic manner, so that the site occupations and therefore the material culture changes could be correctly ordered. Minimal data requirements included 1) stratified as well as single component sites; 2) materials that could produce reliable absolute dates; and 3) good preservation environments for organic debris (i.e., flora and fauna). The sites investigated during Phase II satisfied all these requirements, and the data needed to address the research goals were recovered. Stylistic and morphological changes through time could be documented in the ceramic and lithic assemblages, and good preservation environments at most sites produced excellent floral and faunal data.

Sites don't always cooperate with the archaeologists' research goals, however, and in our case, a project targeted on the period 1540 to 1795 developed into one that embraced the entire Late Prehistoric period (i.e., A.D. 1000 to 1750). Although our research goals underwent minor adjustments due to the realities of the data, the recovery of early, middle, and late Fort Ancient materials provided an opportunity to develop a chronological sequence for the entire Late Prehistoric period in a region where an explicitly defined sequence had not existed before.

This paper begins by providing brief descriptions of each site investigated during Phase II. Next, chronological trends in the ceramic and lithic data are discussed, since the stylistic and morphological changes in these two data sets proved to be the most useful in developing the regional chronological sequence. The results of investigations pertaining to the second research goal, that of examining Fort Ancient subsistence, will follow the discussion of the ceramic and lithic developments. The paper concludes with a discussion of the regional chronology proposed for the study area.

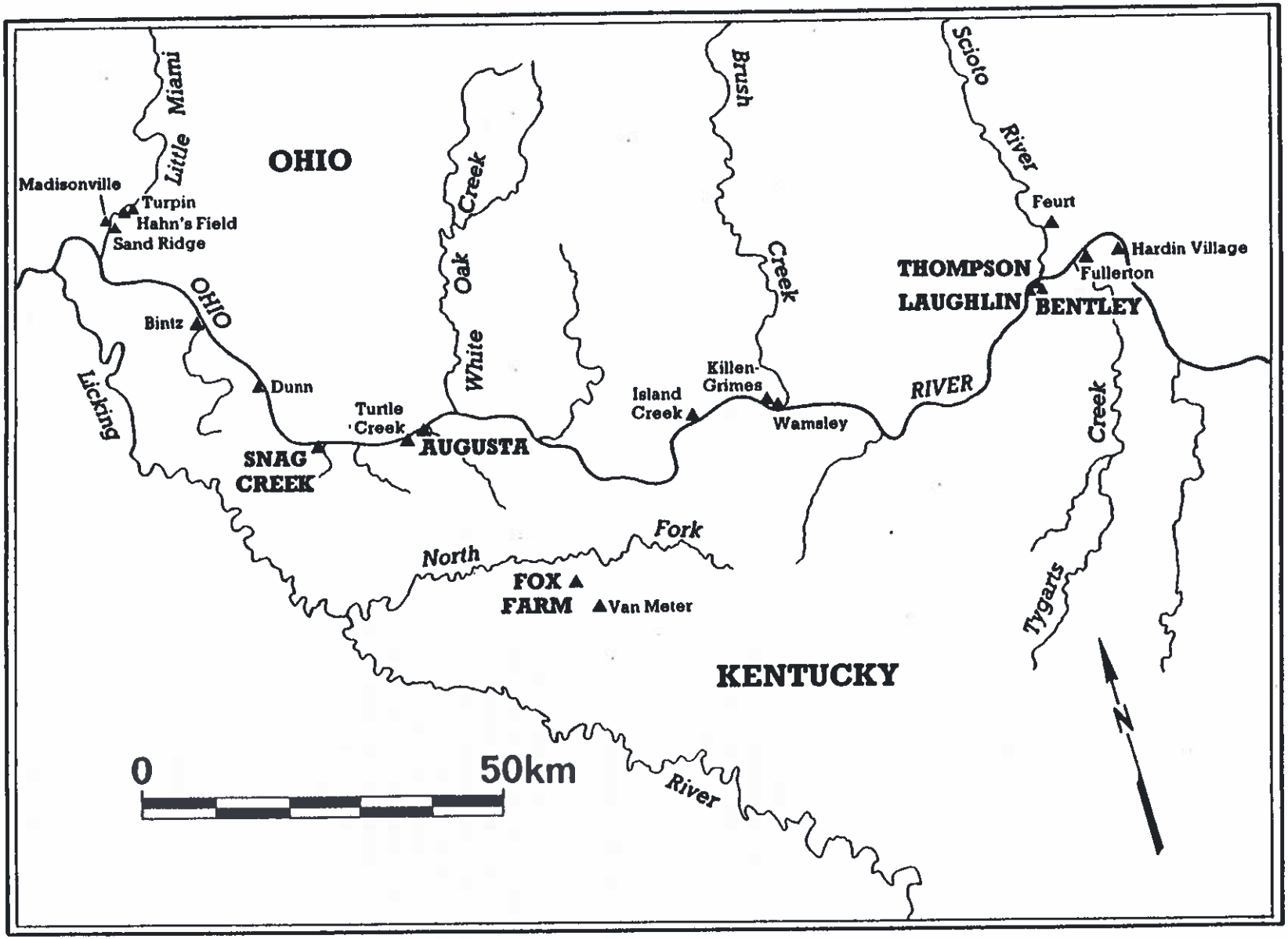

Figure 1. Fort Ancient sites in study area.

SITE DESCRIPTIONS

Six sites were originally chosen for investigation during Phase II. The westernmost site investigated was the Snag Creek Site (15Bk2). The site of Augusta (15Bk200) was located 15 km upstream from Snag Creek. The Fox Farm Site (15Ms1), the only component located in an upland setting, was the central site, and three of the Lower Shawneetown site complex sites, Laughlin (15Lw13), Thompson (15Gp27), and Bentley (15Gp15) (Henderson et al. 1986:131) represented the easternmost sites. Unfortunately, due to extenuating circumstances, the Contact period deposits at the Bentley Site could not be investigated. Thus only five sites were actually examined during Phase II.

A total of seven Fort Ancient components were identified at these sites on the basis of recognizable differences in their artifact inventories. Snag Creek, Augusta, and Laughlin each contained only one component, while Thompson and Fox Farm each contained two. Thompson and Fox Farm probably contain three components, but only limited evidence of the third component was recovered as a result of this research. The components were dated (Table 1) by a suite of 16 radiocarbon and 10 thermoluminescence dates assayed by Beta Analytic, Coral Gables, Florida, and by Dr. Ralph Rowlett, Department of Anthropology, University of Missouri-Columbia, respectively.

SNAG CREEK (15BK2)

The Snag Creek Site is located adjacent to the mouth of Snag Creek on the second terrace overlooking the current Ohio River floodplain. Information collected during Phase I indicated that an Indian raiding party may have camped in this locality in 1791, and local collectors reported the recovery of a copper/brass tinkling cone from the site (Henderson et al. 1986:122). Though artifacts are scattered over the entire length of the site, they appear to be concentrated on small rises on the terrace. Both Late Woodland and Fort Ancient occupations have been documented at the site, which was first reported in 1960 (Clay and Galloway 1960). Five 1 x 2 m units were excavated at the site and a 25 cm thick midden, pit features, and a single extended burial (Jobe 1987b) were identified. The Fort Ancient occupation documented at Snag Creek during these investigations dates to the 1400s.

AUGUSTA (15BK200)

The site of Augusta is located beneath the modern town of the same name on the Ohio River floodplain between Turtle and Bracken creeks. References consulted during Phase I investigations suggested that historic artifacts had been recovered from burials, and local collectors reported the recovery of copper artifacts from the site (Henderson et al. 1986:115-117). Although a number of professional investigations had been conducted at Augusta prior to our research (Granger and DiBlasi 1983; Hale 1981; Webb 1955; Woodbury 1955), no Euroamerican artifacts

Table 1. Radiocarbon and Thermoluminescence Determinations.

Beta Lab. No.	Component	Radiocarbon Age B.P.	Stuiver and Pearson Correction (1986) at Two Standard Deviations
Thompson			
11851	M?	110+/-60	A.D.1660(1703,1718,1824, 1833,1878,1917,1955)1955
11852	G	490+/-50	A.D.1321(1427)1470
11853	G	400+/-70	A.D.1410(1460)1650
13367	C	810+/-60	A.D.1042(1230)1280
13368	C	920+/-100	A.D.900(1047,1091,1118, 1143,1153)1270
Fox Farm			
11856	G	390+/-70	A.D.1410(1468)1650
11857	G	530+/-70	A.D.1280(1409)1470
13363	N	790+/-70	A.D.1043(1252)1290
13364	N	590+/-60	A.D.1280(1322,1340,1392)1430
Snag Creek			
11858	G	360+/-70	A.D.1420(1486)1660
11859	G	520+/-70	A.D.1290(1414)1480
13366	G?	890+/-80	A.D.990(1163)1270
18184	G	390+/-70	A.D.1410(1468)1650
Augusta			
11855	M	470+/-90	A.D.1290(1434)1640
13365	M	210+/-60	A.D.1519(1663)1955
18183	M	470+/-70	A.D.1305(1434)1630

Thermoluminescence Dates

Missouri Lab. No.	Component	Date
Thompson		
85-5-T113	G	A.D.1490+/-40
85-5-T47	C	A.D.850+/-60
85-5-T173	C	A.D.1090+/-80
85-5-T180	C	A.D.1200+/-40
Fox Farm		
85-5-FF76	N	A.D.1375+/-40
85-5-FF60	N	A.D.1035+/-40
85-5-FG20		Greater than 41,000 B.C.
Snag Creek		
85-5-SN13		B.C.800+/-135
85-5-SN13		B.C.550+/-170
Augusta		
85-5-AU25		B.C.1260+/-330

M=Montour Phase; G=Gist Phase; N=Manion Phase; C=Croghan Phase

were ever recovered in direct association with aboriginal material. Two of the three 1 x 2 m units excavated at the site during these investigations documented intact aboriginal deposits (Jobe 1987a). In one of these units, a 50 cm thick midden was encountered, containing two distinct cultural deposits separated by a nearly sterile zone. The other unit contained pit features, a posthole, and a burial. The Fort Ancient occupation documented as a result of these investigations at Augusta dates from the late 1400s to the 1600s.

FOX FARM (15MS1)

Fox Farm is located a little over 10 km south of the Ohio River on Lees Creek, a tributary of the North Fork of the Licking River. Fox Farm is perhaps the best known of the sites investigated during this project. However, good contextual information is lacking for the vast majority of cultural materials previously recovered from it.

The site was excavated first by Smith in 1895 (Smith 1910), and later by Webb and Funkhouser in the 1920s (Webb 1927). Materials recovered from Fox Farm also figured prominently in Griffin's (1943) Fort Ancient research. A copper tube and other copper artifacts were recovered from Fox Farm (Griffin 1943:166,Plate CXX) as a result of these professional investigations. Information learned from local collectors during Phase I indicated that copper artifacts had been found in burials at the site (Henderson et al. 1986:157-158).

Phase II investigations conducted at this large (ca. 16 ha) site were directed at recovering a sample of the general midden deposits. The four 1 x 2 m units that were excavated documented the presence of up to 80 cm of dense midden deposits and a few pit features (Turnbow 1987). An 8-12 cm thick ash layer encountered in one unit produced, in addition to ceramic and lithic artifacts, large quantities of well-preserved organic remains, especially beans and corn cobs. The Fort Ancient occupation documented in the area of Fox Farm investigated during this research began around A.D. 1200, and continued until about A.D. 1500. Other sections of Fox Farm were apparently occupied into the early 1600s, although this could not be determined conclusively from the data recovered as a result of this study.

LOWER SHAWNEETOWN SITE COMPLEX

The Laughlin Site (15Lw13) and the Thompson Site (15Gp27) are located in the same floodplain bottom, adjacent to the Ohio River and across from the former mouth of the Scioto River. Laughlin is situated on a long, low rise that runs parallel to the Ohio. Thompson, located upstream from Laughlin, is situated partially on the same rise. Both sites were first documented as a result of Phase I investigations (Henderson et al. 1986:131-137,149-150).

According to the eighteenth century documents, a large Indian village of mixed tribal affiliation known as Lower Shawneetown was situated in this locale from 1750 to 1758 (Henderson et al. 1986:21-62). Artifacts recovered from Old Fort Earthworks (15Gp1) (Henderson et al. 1986:132-134) and from the Bentley Site (15Gp15) (Pollack and Henderson 1984) support these documents. Together with Laughlin and Thompson, the Old Fort Earthworks and Bentley represent the archaeological manifestation of this historic Indian village. Late Fort Ancient and Contact period artifacts had been recovered from the surface of both sites as a result of Phase I investigations.

Three 1 x 2 m units and one 1 x 1 m unit were excavated at Laughlin. These units documented the presence of a very diffuse 30 cm thick midden at the site (Henderson and Pollack 1987a). Due to a poor preservation environment, no materials were available for radiocarbon dating, but relative dating of the diagnostic artifacts recovered from the site indicated that Laughlin was occupied in the early 1700s.

Four units excavated initially as 2 x 2 m units at Thompson were completed as 1 x 2 m units due to time limitations. Stratified deposits about 45 cm thick were documented, as were several pit features and a hearth (Henderson and Pollack 1987b). One unit contained a 15 cm thick dense concentration of unburned mussel shells, well-preserved bone and floral materials, as well as other artifacts. As a result of Phase II investigations, occupation at Thompson was documented as having occurred first from around A.D. 1050 to 1200, and again ca. 1400 to 1500. Only limited evidence of an early 1700s occupation of the site was recovered as a result of these investigations.

CHRONOLOGICAL TRENDS IN THE CERAMIC AND LITHIC DATA

The major goal of the Phase II investigations was to recover artifacts and artifact assemblages that could be used to identify changes in material culture through time. In this section, attributes of the ceramic and chipped stone data sets determined to be temporally sensitive as a result of this study will be discussed.

CERAMIC TRENDS

The ceramic analysis sought to identify the most reliable temporal indicators (Turnbow and Henderson 1987). Attributes examined included temper, surface treatment, decoration, and rim and lip form. As a result of the analysis, some adjustments were made to the existing Fort Ancient ceramic typology: new types were proposed (Lees Plain, Todd Plain, and Kenton Fabric Impressed) and some of the previous types were abandoned (Fox Farm Bowl and Fox Farm Saltpan). Temporal changes identified as a result of this study can be discussed in two parts, with A.D. 1400 serving as the watershed. Figure 2 presents a generalized schematic representation of the ceramic developments documented in the study area.

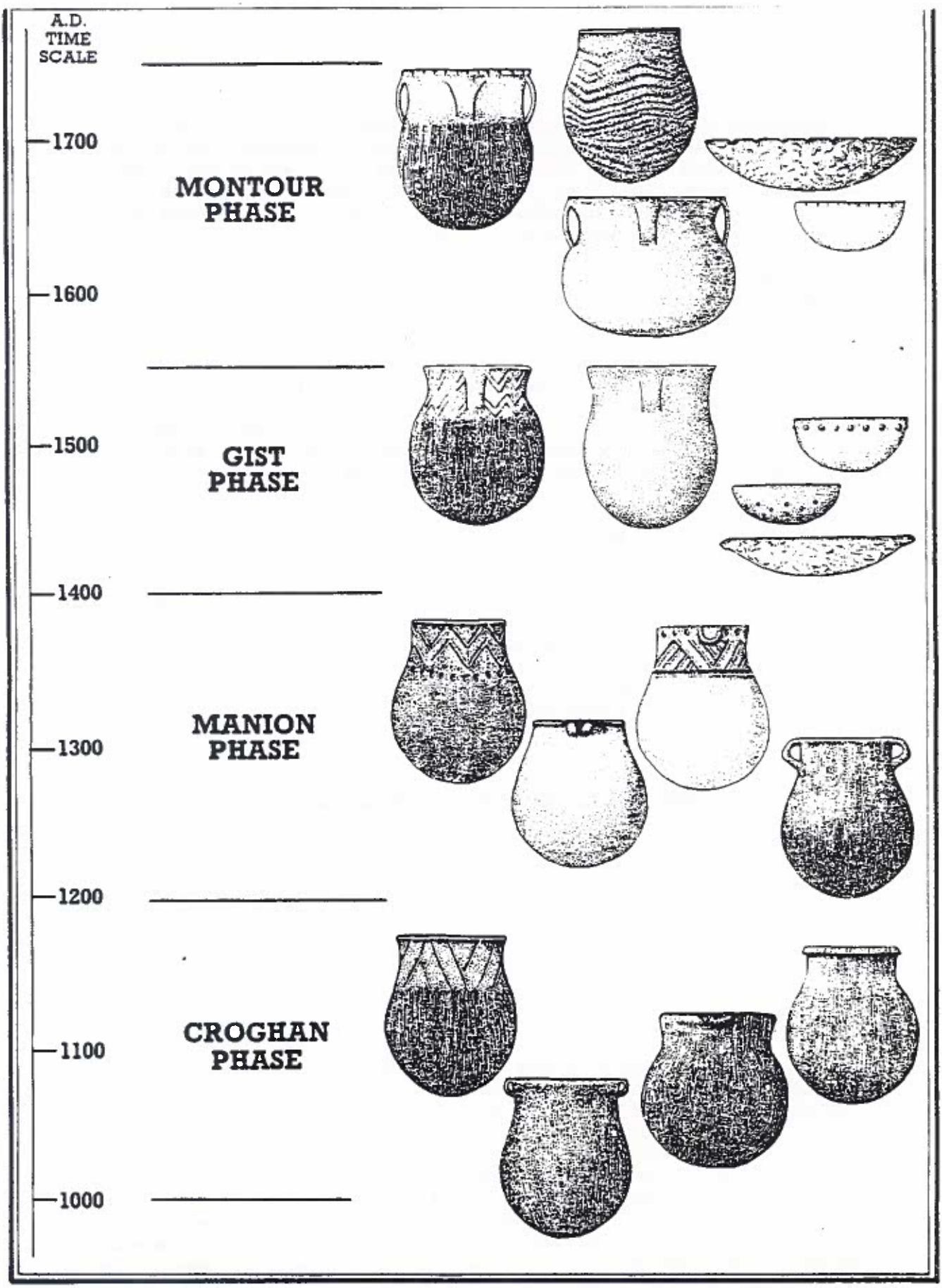

Figure 2. Fort Ancient ceramic stylistic and vessel form developments.

[See Turnbow and Henderson (1987) for more detailed descriptions of the ceramic assemblages recovered as a result of these investigations.]

Ceramic assemblages dating before A.D. 1400 reflect a developmental continuum from the preceding Late Woodland period, supporting the suggestion that in this study area, Fort Ancient culture developed out of a local Late Woodland cultural tradition. Baum Cordmarked Incised (Prufer and Shane 1970), which is associated with the early Fort Ancient (A.D. 1000-1200) components, and Fox Farm Cordmarked (Griffin 1943), which is associated with middle Fort Ancient (A.D. 1200-1400) components, characterize these ceramic assemblages.

As with the preceding Late Woodland period (cf. Ahler this volume; Henderson 1987; Henderson and Pollack 1985; Railey 1987; Riggs 1986), early and middle Fort Ancient ceramic vessels are almost exclusively jars. Jars with vertical or recurved rims and conoidal bases are the most common form, but flared rims are also present. Similar vessel forms have been identified at contemporary sites in central Kentucky (Fassler this volume; Sharp and Turnbow this volume) and in the Little Miami drainage in Ohio (Riggs 1986). Most exterior surfaces are cordmarked to the lip. Lips are generally flattened, with some Baum examples exhibiting cordmarking, another Late Woodland carry-over.

The use of crushed shell as temper, as well as the presence of appendages, rimstrips, and decoration, clearly mark these assemblages as Fort Ancient. Temper can be either crushed rock (either limestone or grit, depending on locally available resources and/or cultural preference), rock and varying amounts of shell, or shell alone. There is an increase in the use of shell tempering throughout this period of time. Loop or thick strap handles are associated with both early and middle Fort Ancient ceramic assemblages, as are semicircular lugs, though stylistic changes through time can be documented for these types of lugs. Double lugs, however, are only associated with middle Fort Ancient (Fox Farm Cordmarked) ceramics, while applied rimstrips occur as decoration only on early Fort Ancient Baum Cordmarked Incised rims. Incised designs, such as line-filled triangles and curvilinear incised lines, appear on Baum Cordmarked Incised and Fox Farm Cordmarked vessel necks, but are more complex and prevalent on the latter.

The character of the study area's ceramic inventory changes after about A.D. 1400 (Figure 2). Middle Fort Ancient ceramics are replaced by a number of new types that reflect changes in vessel form and surface treatment. These new types include Madisonville Cordmarked, Madisonville Plain, Madisonville Grooved Paddle, Todd Plain, and Kenton Fabric Impressed.

The most dramatic ceramic difference between pre- and post-A.D. 1400 ceramic assemblages relates to vessel form. Jar forms of the pre-1400s continue, but a new jar form, the Fort Ancient globular jar is added to the ceramic inventory, as are shallow pans. Simple hemispherical bowls dramatically increase in frequency after A.D. 1400.

Temper at all sites, regardless of location, is exclusively shell, and lip shape becomes mainly rounded. Appendages include thin parallel-

sided or convergent-sided (triangular) strap handles and horizontal lugs. Decoration, in the form of incised rectilinear or curvilinear lines on jars, and beaded bowls occur most commonly in components dating before A.D. 1550. Decoration on lips is primarily restricted to post-1550 components and consists of notching. Simple stamped (grooved paddle) exterior surfaces are also restricted to post-1550 components.

CHIPPED STONE TRENDS

The search for key differences and temporal markers in the chipped stone tool inventory focused on the chipped stone tool with the most potential to reflect temporal differences: the triangular projectile point. Key attributes of triangular projectile point morphology that could be shown to be most sensitive to change through time included length, basal convexity/concavity, and the presence or absence of serration. Overall diversity of chipped stone tool inventories also proved to be temporally sensitive (see Railey 1987b). Differences in chipped stone artifacts could be correlated with the temporal developments identified in the ceramic data. Figure 3 presents the stylistic developments in triangular projectile points documented in the study area. [See Railey (1987b) for more detailed descriptions of the lithic assemblages recovered as the result of these investigations.]

Three of the seven triangular projectile point types were clearly temporally and/or regionally sensitive for the study area. Flared Base Triangular Points (Type 2) were found to be stylistically distinctive and temporally diagnostic for the time period A.D. 1000-1200. Coarsely Serrated Triangular Points (Bell 1960:40) (Type 3) were found to be tightly restricted, both temporally and spatially. These points are very diagnostic for the period A.D. 1200-1400 and their distribution appears to be restricted to the middle Ohio Valley. Concave Base Triangular Points (Type 6) are clearly diagnostic of post-A.D. 1400 components, and persist in their manufacture into and are most diagnostic of the Contact period (i.e., post A.D. 1550).

Two other point styles may be diagnostic, but this will require more research. Straight Sided Triangular Points (Type 5) are not as temporally diagnostic as the other types, because they occur throughout most of the investigated deposits. This point type appears to be more common after A.D. 1400 than before that date, however, and appears to have achieved its height of popularity around A.D. 1400-1500. Short Excurvate Sided Triangular Points (Type 4) may represent resharpened Straight Sided or Concave Base points, though more evaluation of this possibility is necessary. A post-A.D. 1400 temporal association, with the period of greatest popularity extending from A.D. 1400-A.D. 1500, can be suggested for the Short Excurvate Sided points. The seventh triangular projectile point type, Small Tri-incurvate Triangular Points (Type 1), was determined to be non-diagnostic for the study area due to its low frequency of occurrence and temporally variable distribution (Railey 1987b).

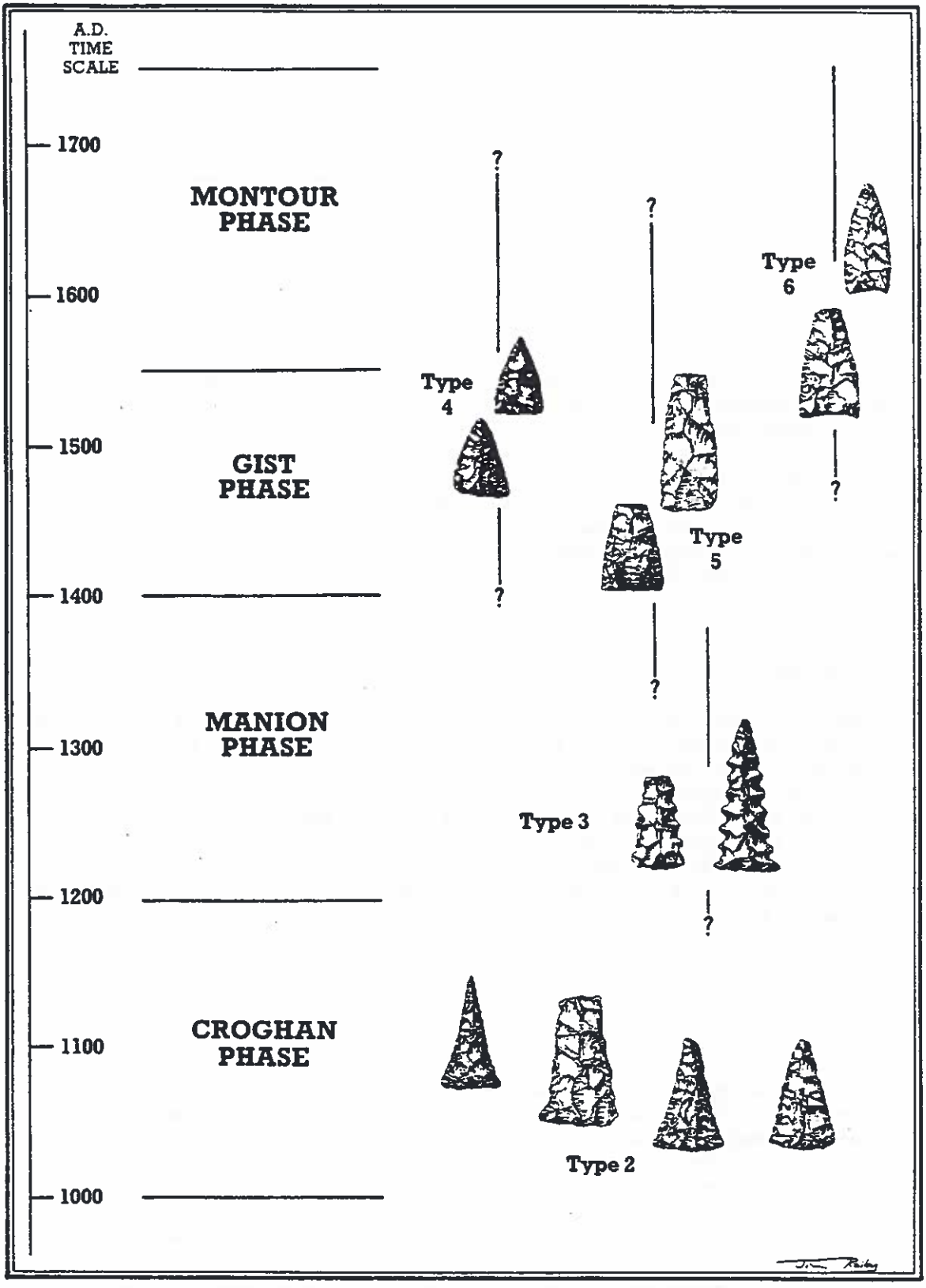

Figure 3. Stylistic developments in triangular projectile point morphology.

Endscrapers were another class of chipped stone tool that was found to be temporally sensitive. Both unifacially- and bifacially-flaked ("tear-drop shaped") endscrapers were recovered mainly from post A.D. 1400 deposits. Bifacially-flaked endscrapers were clearly associated with the latest, (i.e., post A.D. 1550) Contact period components. General trends in Fort Ancient chipped stone tool assemblages through time reflect an expanded inventory recovered from components dating after A.D. 1400.

SUBSISTENCE PATTERNS

The second goal of this project was to collect a sample of floral and faunal remains that could be used to investigate Fort Ancient subsistence patterns. The results of the floral and faunal analyses document the kinds of resources available and utilized at the site localities. However, due to the manner in which these data were analyzed, and given the small samples that would have resulted if these data had been further subdivided and analyzed by component, no attempt was made to identify temporal developments in subsistence strategies within the study area.

FLORAL DATA

Though some variability in plant utilization could be documented between the investigated sites, in general they all exhibited similar botanical inventories. Overall, the data document a high diversity in plant-use by these Fort Ancient peoples (Rossen 1987a). Thompson and Fox Farm contained the most diverse floral assemblages, due in part to the fact that remains from these sites were the most well-preserved and because more cubic meters of deposits were excavated at these two sites. [See Rossen (1987a) for more detailed descriptions of the floral remains recovered as a result of these investigations].

Three distinct plant-oriented dietary components could be identified: nut collecting, wild plant collecting, and plant cultivation. Nut remains were not very abundant at these sites and nut collecting appears to have been only a minor subsistence activity. Most of the recovered nut remains were identified as hickory, with other nut species (black walnut, butternut, hazelnut, and acorn) comprising only a minor percentage. The relative scarcity of nut remains at these Fort Ancient sites contrasts dramatically with the heavy utilization of nut resources documented from Ohio Valley Late Woodland and western Kentucky Mississippian contexts (Rossen and Edging this volume).

Wild plants such as pawpaw, grape, bedstraw, smartweed, pokeberry, and morning glory appear to represent an important secondary Fort Ancient food resource. These plants would have been collected from a variety of environmental contexts (woodland, wetland, and disturbed land habitats).

Cultivated plants appear to have been a major food source. The cultivated plant inventory suggests a heavy reliance on corn, as evidenced by its ubiquitous recovery from all of the investigated sites. That this reliance on corn was established early in the Late Prehistoric (or late in the Late Woodland) is documented by the fact that corn was recovered in substantial quantities from the earliest deposits documented as a result of this research. Its use continues on throughout the Late Prehistoric period. Carbon isotope studies also suggest a heavy reliance on corn by Fort Ancient peoples (Broida 1983; see also Rossen and Edging this volume). The remains of other cultivated plant species, such as beans, squash, and tobacco, were also recovered.

Chenopodium is the only member of the starchy-oily seed complex of Eastern North America that was documented during these investigations. It was recovered from Fox Farm and has only been recovered from one other Fort Ancient site in the Ohio Valley (Wagner 1983; Rossen and Edging this volume). For some as-yet-unknown reason, the Fort Ancient inhabitants of the study area apparently abandoned the use of native North American cultigens almost wholesale.

The archaeobotanical data recovered as a result of these investigations present an image of relatively diverse plant exploitation and a multiple-plant oriented subsistence strategy for the Fort Ancient people in the study area. The use of nuts and native cultigens decreased relative to the previous Woodland and contemporary Mississippian populations, given the paucity of nut remains and the near absence of native cultigens such as chenopodium and maygrass from these sites. Reliance on corn and beans increased, and the use of wild plant resources continued. These data indicate that the Fort Ancient people in the study area made conscious decisions concerning which plants to exploit, and did not simply shift from the use of wild plants to domesticated plants relative to the preceding periods (Rossen 1987a; Rossen and Edging this volume). Rather, they intensified the exploitation of some wild and domesticated species and rejected certain others.

FAUNAL DATA

The faunal assemblage recovered as a result of these investigations is typical for the eastern deciduous forest and northern biome (Breitburg 1987b). Only four out of the five sites provided good faunal data (Thompson, Fox Farm, Augusta, and Snag Creek), however, since bone preservation at Laughlin was very poor. The Thompson and Fox Farm site assemblages exhibited the largest percentage of identifiable remains. [See Breitburg (1987b) for more detailed descriptions of the faunal assemblages recovered as a result of these investigations.]

Based on the skeletal and taxonomic composition of the faunal materials, the assemblage reflects an animal procurement system geared to the exploitation of large terrestrial species (deer, elk, and bear) and the wild turkey. Other mammal species were also exploited,

including carnivores and rodents, although not with the same intensity. Little use of aquatic and semi-aquatic avifauna could be documented. A limited inventory of fish and amphibian/reptilian fauna was also present. A variety of freshwater mussels were included within selected site assemblages (Call 1987), although these constituted only a very small percentage of the faunal assemblage.

The existing model of Fort Ancient animal exploitation, which predicts unusually high reliance on deer, may apply to other Fort Ancient sites, but it apparently does not apply to the Kentucky Fort Ancient sites examined as part of this study. This led Breitburg (1987b) to propose an alternative model to explain the observed pattern of Fort Ancient animal use and exploitation in the study area. The data collected as a result of these investigations document almost equal exploitation of deer (28.9%), elk (30.4%), and bear (30.7%), with turkey (3.4%) and other species (mainly small mammals) accounting for the remaining 6.6%. This regional pattern of exploitation differs quantitatively and qualitatively from that seen at most other Fort Ancient sites (cf. Breitburg 1987b) and from Mississippian sites (Smith 1975), and was clearly an adaptation to the uplands of the Outer Bluegrass region. Acquisition of critical resources was conducted throughout the year and was geared to natural movements of ungulates within a complex ecosystem that included floodplain, rugged forested slope, and upland semi-forested areas containing essential mineral deposits (licks) and seasonably available food sources. Seasonal flushes in fish, bird, and other available animals in floodplain habitats were minor and served as supplemental food sources.

CHRONOLOGY

With the preceding overview of the Fort Ancient ceramic and lithic trends identified, and features of the regional subsistence patterns summarized, what remains to be discussed is the four phase chronological sequence that has been proposed for northeastern Kentucky as the result of these investigations. Changes reflected in the ceramic data and the relationship of these changes to the suite of chronometric dates for each site formed the foundation for the development of this chronological sequence. Ceramic data were used primarily in developing this framework in keeping with the methods by which Fort Ancient phases and regional sequences have been traditionally created, i.e., focused mainly on delimiting differences in regional ceramic sequences (Cowan 1987; Graybill 1981; Griffin 1943; Prufer and Shane 1970; Riggs 1986). Developments in the chipped stone tool assemblage interfaced with the identified ceramic differences.

At this point, these phases should not be considered to represent "cultural" phases, since information regarding settlement patterns, site size, characteristic features and their configurations, house style and size, burial attributes, and the like are lacking or are meager at best. Instead, they should more correctly be referred to as temporal units that characterize the ceramic trends. These trends, however, are considered to be directly related to and indicative of the more

archaeologically difficult-to-identify socio-cultural, economic, or religious changes that occur through time in all cultures. The authors are confident that as more work is undertaken in this region, other aspects of the cultural systems will be identified and the proposed phases will come to be viewed as "cultural" phases. Similarly, it is fully expected that as more data are collected on the Fort Ancient occupation of this region, the temporal and spatial boundaries of these phases will be modified.

CROGHAN PHASE

This is the earliest phase defined for the study area, dating from A.D. 1000 to A.D. 1200. The lower component at the Thompson Site served as the source of data for this phase. Characteristic artifacts include Baum ceramics and Flared Base (Type 2) Triangular Projectile Points.

The Baum ceramics recovered from the Thompson Site are very similar to the Baum ceramics recovered from the nearby Feurt Site (Mills 1917; Griffin 1943:76-78,Plates XX-XXIII) situated on the Scioto River only about 8 km north of Thompson, and may be similar as well to the ceramic assemblage recovered from the recently investigated Scioto County Home Site, which is located across the Ohio River from Thompson (Bowen 1986). The Thompson Site Baum ceramics also resemble the Baum ceramics recovered from Blain (Prufer and Shane 1970) and Kramer (Ullman 1985) (Turnbow and Henderson 1987). Flared Base (Type 2) Triangular Projectile Points are also the most common point type at Blain (Prufer and Shane 1970:79-81).

Although the ceramic and lithic attributes of the artifact assemblage recovered from the lower deposits at Thompson compare favorably with those recovered from the more northerly Baum phase sites in Ohio (Turnbow and Henderson 1987), Thompson is located 65 km south of the Baum phase heartland of Ross County, Ohio (Church 1987). Therefore, it was felt that the concept and integrity of the Baum phase would have been unnecessarily diluted if it was applied to the Thompson materials. This situation coupled with the distinct similarities that exist between the Thompson Site's Baum ceramic assemblage and that of the Feurt Site and the geographic proximity of these sites to one another, led the authors to assign a new phase name, Croghan, to the early Fort Ancient component investigated at Thompson. The Croghan phase thus should be viewed as a southern Ohio/northern Kentucky manifestation of the Scioto River valley's early Fort Ancient Baum phase (Prufer and Shane 1970). It is anticipated that the Croghan phase will remain confined to the lower Scioto River valley/Scioto River-Ohio River confluence area. If this turns out to be the case, another early phase may have to be developed for Fort Ancient components dating between A.D. 1000-1200 found in Bracken and Mason counties, Kentucky, in order to distinguish them from the Croghan phase occupations further upstream on the Ohio River.

MANION PHASE

This phase dates from A.D. 1200-1400. The materials recovered from the lowest deposits of the Fox Farm midden represent the assemblage from which this phase was defined. Characteristic artifacts include Fox Farm Cordmarked, Lees Plain, Fox Farm Net Impressed, and Serrated (Type 3) Triangular Projectile Points.

Subtle changes have been documented in Manion phase ceramics (i.e., temper, decoration, vessel wall thickness, and handle styles) through time. Early Manion phase ceramics exhibit a close similarity to Baum Cordmarked Incised, while later Manion phase ceramics are more similar to Feurt Incised ceramics. Serrated triangular points were recovered from the Manion phase deposits at Fox Farm and from the Feurt Site. These factors indicate that the later Manion phase occupation at Fox Farm is probably contemporary with the Feurt phase component identified at the Feurt Site. This period of occupation at Feurt was apparently more intensive than the Croghan phase occupation at that site, judging from Mills (1917), Griffin (1943), and our inspections of ceramic collections from the Feurt Site housed at the Ohio Historical Center and the University of Kentucky, Museum of Anthropology. This similarity in both ceramics and lithics may also suggest that there was some degree of interaction between the Manion phase occupants of Fox Farm and the Feurt phase occupants of the Feurt Site.

The Manion phase is contemporary with other middle Fort Ancient manifestations such as an as-yet-unassigned phase of occupation documented at the Guilfoil Site in Fayette County (Fassler this volume) and the Florence Site in Harrison County (William E. Sharp, personal communication 1987). Materials recovered from Wamsley (Brose 1982) in Ohio and Fullerton Field in Kentucky (Griffin 1943) also share ceramic and lithic similarities to the Manion phase assemblage documented at Fox Farm and may be contemporary with it.

MADISONVILLE HORIZON

A number of archaeologists actively conducting Fort Ancient research in the middle Ohio Valley were invited to Adams County, Ohio in mid-August 1986 to attend an informal roundtable discussion of various Fort Ancient research issues. One of the main issues discussed was the question of chronology and the "Madisonville phenomenon". All of the participants recognized that at around A.D. 1400, changes in ceramics, as well as other aspects of Fort Ancient culture, could be noted throughout the middle Ohio Valley, and they concluded that these changes signalled an end to the regional cultural expressions (i.e, Anderson, Baum, Feurt, and Manion phases) documented in the area prior to 1400. Though these changes brought an end to pre-1400 regional cultural expressions, they do not represent a migration of people into the area, and neither should they be taken to mean that regional differences did not exist between post-1400 sites. However, it was felt that the use of the term "Madisonville phase" to refer to all late Fort Ancient cultural manifestations throughout the Middle Ohio Valley tended to obscure

potentially different regional cultural expressions and assemblages that might otherwise be identified. Thus at this meeting, a consensus decision resulted in the replacement of the term "Madisonville phase" (Griffin 1943; Prufer and Shane 1970:242) with the term "Madisonville horizon". Changes in the artifact assemblages documented as a result of our investigations in northeastern Kentucky occur around A.D. 1400 and reflect the pattern noted by the Adams County Conference participants.

The Madisonville horizon in our study area can be divided into two phases, one early and one late, on the basis of relatively subtle differences expressed within the ceramic and lithic assemblages. The magnitude of difference between these two phases does not resemble the degree of difference that exists between the Gist phase and the Manion phase artifact assemblages, however. The differences documented in the artifacts and artifact assemblages between the two Madisonville horizon phases in our study area is one of degree rather than kind.

GIST PHASE

This earliest phase of the Madisonville horizon dates from A.D. 1400 to A.D. 1550, and is expressed at the Snag Creek Site and in the upper deposits at Fox Farm. Although the radiocarbon dates suggest that a Gist phase occupation also occurred at Thompson, the generally poor condition of the Madisonville ceramics recovered from this site makes this phase assignment tenuous. Characteristic artifacts include Madisonville Cordmarked, Madisonville Plain, Todd Plain, var. Fox Farm, Fox Farm Colander, and Kenton Fabric Impressed. Straight Sided (Type 5) or Short Excurvate (Type 4) Triangular Projectile Points occur with more frequency than the Concave Base (Type 6) Triangular Projectile Point type. A greater diversity of ceramic vessel forms, including the appearance of the globular jar, simple hemispherical bowls, and pans, and a greater diversity in the chipped stone inventory accompanies the actual differences in the kinds of artifacts recovered in comparison to the preceding phases. Other sites in the region that may also contain Gist phase deposits include the Turtle Creek Site and Fullerton Field (Turnbow and Henderson 1986:2).

MONTOUR PHASE

This phase encompasses the entirety of the Contact period, the span of time that was the initial focus of this project. The Montour phase extends from A.D. 1550 to 1750 and represents the period of time during which intensive culture change, population reduction, acculturation/assimilation, and the final destruction and removal of the study area's native inhabitants occurred. Although Montour phase occupations were conclusively documented only at Augusta and Laughlin, each of the sites selected for testing were expected to exhibit materials that dated to this period of time, based on the information recovered from the Phase I investigations. It is probable that such a component is present at Thompson, given the late radiocarbon date (Table

1) and the presence of diagnostic artifacts such as bifacially-flaked (tear-drop shaped) endscrapers, but only limited evidence for such an occupation was recovered. The reports of Contact period materials from most of these sites primarily consisted of Euroamerican metal ornaments recovered from burials (Henderson et al. 1986). Since only one burial was completely excavated during the course of this study [from Snag Creek (cf. Fouts 1987)], it is entirely likely that the data which were collected were biased against the recovery of such artifacts.

During this phase, Madisonville ceramics continue in use, but subtle stylistic and morphological differences can be identified that serve to differentiate between Montour and Gist phase ceramics, such as a dramatic increase in lip notching on bowls and different rim shapes on pans. Two new ceramic types, Madisonville Grooved Paddle and Todd Plain, var. Augusta, appear during this phase. Concave Base (Type 6) Triangular Projectile Points become the dominant form, and Straight Sided (Type 5) and Short Excurvate (Type 4) Triangular Projectile Points diminish in frequency. Bifacially-flaked, "tear-drop shaped" endscrapers become common.

Trends identified as a result of this research, when considered along with the results of a previous study (Pollack and Henderson 1983), clearly indicate that the material culture trajectory that began in the Gist phase in the 1400s continued into the 1750s. The Madisonville ceramic assemblages recovered from the protohistoric Hardin Village Site (Hanson 1963, 1966) and the Historic Indian Bentley Site (Pollack and Henderson 1984) exhibit the same characteristics as the Montour phase Madisonville ceramic materials recovered from Augusta and Laughlin. One difference, that of the lack of pans at Bentley, suggests that by the eighteenth century, Euroamerican containers may have replaced pans (Pollack and Henderson 1983:20). The morphology of the triangular projectile points recovered from Bentley (Pollack and Henderson 1984) and the abundance of bifacially-flaked "tear-drop shaped" endscrapers in the Bentley Site lithic assemblage reflect the characteristics of a Montour phase lithic assemblage. These data indicate that the Montour phase material culture assemblage of the Protohistoric period, a time of indirect contact with Europeans (i.e., disease), was utilized into the Historic Indian period as well, a time during which the direct arrival of European culture, in the form of large quantities of trade goods, traders and explorers, and eventually settlers, led to the gradual replacement of native material culture.

Late Fort Ancient ceramic assemblages that resemble those recovered from the sites investigated during this study have been recovered from contemporary sites in central Kentucky, including Larkin (see Pollack et al. this volume) and Goolman (Turnbow and Jobe 1985). There are sufficient ceramic differences between central and northeastern Kentucky sites, however, to justify assigning the components to different phases.

CONCLUSION

Limited excavations conducted at five Late Prehistoric sites in northeastern Kentucky (Snag Creek, Augusta, Fox Farm, Laughlin, and Thompson) documented Fort Ancient deposits dating from A.D. 1000 to 1750. Analysis of the recovered materials resulted in the identification of temporally sensitive ceramic and chipped stone trends that could be used to develop a four phase chronological sequence: Croghan (A.D. 1000-1200), Manion (A.D. 1200-1400), Gist (A.D. 1400-1550), and Montour (A.D. 1550-1750).

Prior to the development of this chronological sequence, Kentucky Fort Ancient researchers lacked a regional temporal framework within which to place site occupations, and were forced to rely on cultural historical sequences developed for other areas. It is clear from this research that those sequences were not directly applicable, due to the unique characteristics of the Kentucky data. As a result of this study and the work of others in the central Bluegrass (Fassler this volume; Pollack et al. this volume; Sharp 1984; Sharp and Turnbow this volume; Turnbow and Jobe 1984; Turnbow and Sharp 1987), archaeologists are developing a better understanding of Fort Ancient chronology in Kentucky and can now begin the process of developing and testing models that explain and interpret Fort Ancient culture as it is expressed in Kentucky. The subsistence patterns identified as a result of this study and the four phase chronology proposed for this region make a very significant contribution to Kentucky Fort Ancient research and to Fort Ancient research in general, enabling site occupations to be temporally ordered, thereby providing a foundation for future studies directed at answering more substantive research questions.

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EAST MEETS WEST: PATTERNS IN KENTUCKY LATE PREHISTORIC SUBSISTENCE

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ABSTRACT

Recent research in western, central, and northeastern Kentucky has resulted in the recovery of a number of Mississippian and Fort Ancient botanical assemblages. Comparative analysis of five key constituents (corn, beans, native cultigens, nuts, and wild plants) has resulted in the identification of a number of important differences between Kentucky Mississippian and Fort Ancient plant utilization patterns. Based upon these differences a number of questions for future research are presented in the hope of stimulating further investigation and interpretation of Late prehistoric subsistence patterns.

INTRODUCTION

Recent research by the University of Illinois and the University of Kentucky has resulted in the collection of large botanical assemblages from the western (Mississippian) and central and northeastern (Fort Ancient) portions of the state (Edging, ed. 1985; Fassler this volume; Henderson and Turnbow this volume; Lewis 1986; Pollack and Railey 1987; Sharp and Turnbow this volume; Sussenbach and Lewis 1987; Turnbow and Sharp 1987). In addition, Mississippian and Fort Ancient overviews commissioned by the Kentucky Heritage Council have summarized previous late prehistoric research in the state (Lewis 1987; Sharp 1987). As a result of these projects, a new body of archaeobotanical data have been collected and summarized. This information has greatly expanded archaeologists' knowledge of late prehistoric adaptations in Kentucky and allowed comparisons to be made between Mississippian and Fort Ancient subsistence patterns.

This paper attempts to synthesize these new data sets and to identify patterns in Kentucky plant utilization. More specifically, it attempts to compare and contrast western Kentucky Mississippian botanical assemblages with central and northeastern Fort Ancient assemblages. Although this paper focuses on an east-west dichotomy in Kentucky archaeobotanical data, it is recognized that interaction spheres and influences should ideally be considered in four directions in order to draw complete comparisons and contrasts (Figure 1).

Mississippian-Fort Ancient comparisons have moved beyond trait-based perspectives such as ceramic or lithic technology to include more

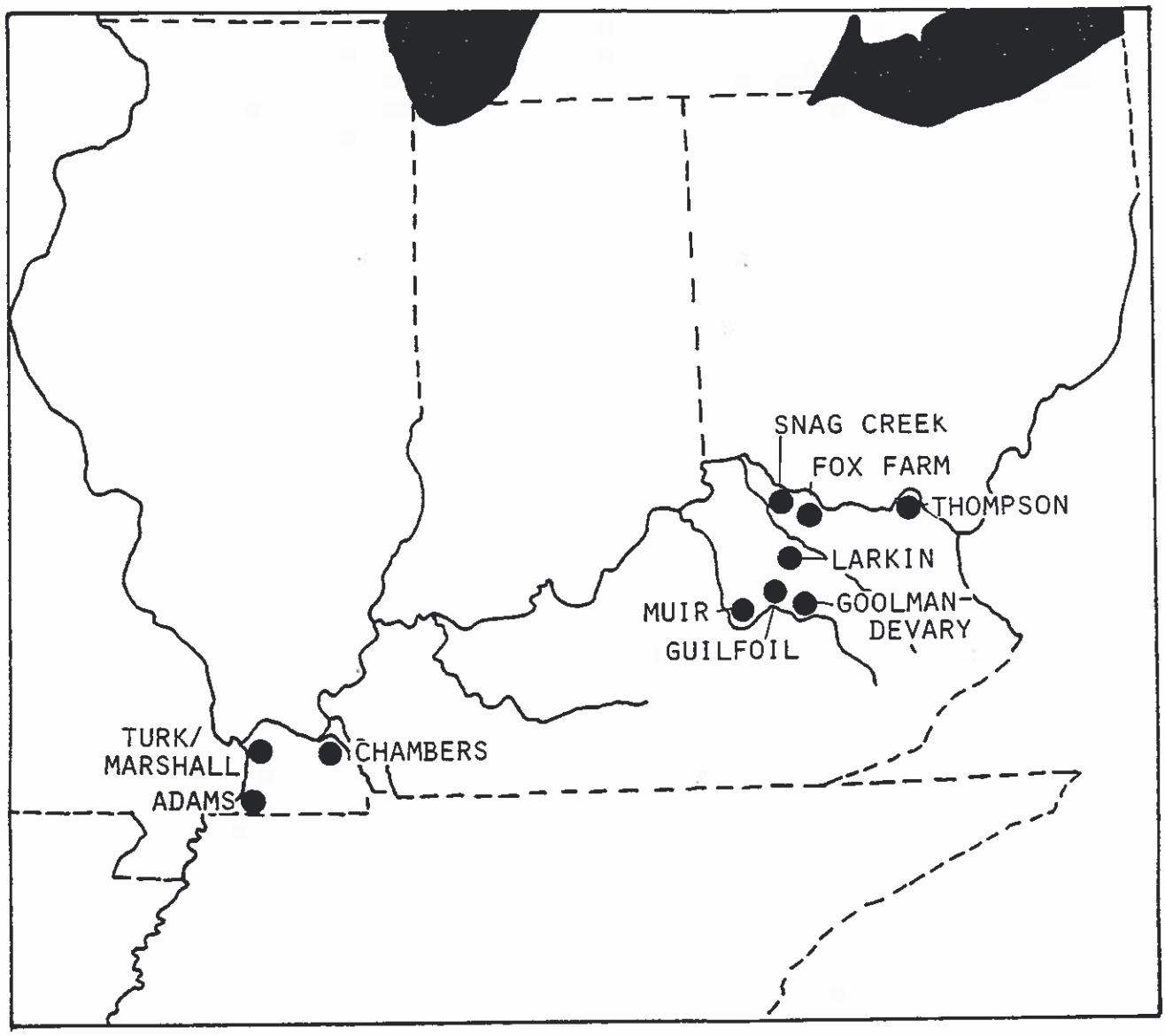

Figure 1. East meets west: Kentucky Fort Ancient and Mississippian sites discussed in text.

holistic comparisons such as social organization, subsistence, and settlement patterns. Central to the Mississippian-Fort Ancient discussion is whether or not these archaeological manifestations represent distinctive cultural systems. For example, Muller (1986:259) has offered a succinct statement of the major differences between the two cultures:

> "It is clear that Fort Ancient society lacked the degree of centralization characteristic of Mississippian while (ironically) perhaps exceeding many Mississippian societies in the degree of nucleation, that is, the degree to which significant portions of the populations lived in the central town of their society. If these differences are responses to different environments, what are these differences?"

It has been clearly shown that Mississippian and Fort Ancient cultures are roughly contemporary and share certain economic imperatives (Essenpreis 1978; Muller 1986). Both Late prehistoric cultures exploited a variety of environments, made the transition to increasing dependence on horticulture, and built fortified, nucleated villages. Despite these similarities, there are important differences in their level of social complexity. That is, Fort Ancient groups lacked the strongly hierarchical, centrally located elites present in Mississippian groups. One hypothesis used to explain this difference states that Fort Ancient environments did not stimulate or require the existence of ranked societies (Muller 1986:261). In this paper, an archaeobotanical perspective is used to compare Mississippian and Fort Ancient cultures. An evaluation of methodology, a statement of data trends, and a discussion of questions for future research in Kentucky Late prehistoric archaeobotany are presented in the hope of stimulating further contrasts and comparisons.

METHODS

In order to avoid concern with sampling biases in individual site archaeobotanical assemblages, sites included in any comparison of different cultures should ideally contain botanical assemblages collected from at least several hundred liters of soil recovered from both midden and feature contexts. The archaeobotanical assemblages from Muir and Chambers are good examples of large flotation samples that produced both varied collections and the quantity of carbonized remains which avoid sampling problems. Several assemblages used in this paper fall below the volume range of these two sites (900-1400 liters). These collections came from test excavations where a few hundred liters have produced substantial, if less complete, comparative data.

The authors found that density per liter of soil floated is the single most important index of plant utilization intensity. This density measurement must be determined in both frequency and gram weight values. A comparison of frequency and weight densities indicates the level of fragmentation of botanical remains at a site, and helps to isolate preservation biases in the data. Also, various ratios, such as

nut to wood and nut to corn which have been used for several years by Illinois archaeobotanists (Asch and Asch 1981; Johannessen 1984), have proven useful in evaluating sites with unusually high or low overall archaeobotanical densities. With exceptions, these ratios tend to corroborate data produced by simple density indices, although they can be skewed by the differential preservation of wood, nuts, corn, etc., which may occur at any site. In this paper, frequency and gram weight densities per liter are utilized. Unless a certain amount of standardization in both the collection and analysis of archaeobotanical remains is achieved, even preliminary comparisons such as the ones presented in this paper will be impossible.

THE ARCHAEOBOTANICAL DATA

The comparison of Kentucky Mississippian and Fort Ancient plant subsistence patterns focused on following five key constituents:

1. corn,
2. domesticated beans,
3. native cultigens,
4. nuts, and
5. wild greens, fruits and berries.

CORN

Throughout Kentucky and neighboring states, corn is scarce or absent at sites dating to the preceding Late Woodland period (Ahler this volume; Cowan 1979a, 1979b, Johannessen 1984; Rossen 1985; Wymer 1986). By the Late Prehistoric period, corn appears as a highly visible archaeological constituent in virtually all Fort Ancient and Mississippian flotation samples and it occurs early in their respective cultural sequences. It appears in large amounts early in both Mississippian and Fort Ancient cultural sequences. The volume of corn present at Muir and in the lower levels of Thompson and Fox Farm, all Fort Ancient sites, reinforce the now popular idea of an extremely sudden widespread acceptance of the plant (cf. Lynott et al. 1986; Rossen 1987a, 1987c). The morphology of Mississippian and Fort Ancient corn, however, tends to be very different. At western Kentucky Mississippian sites such as Adams, Turk, Chambers, and Marshall, corn is primarily a larger-rowed variety known as "Midwestern 12" (Edging 1985; Edging and Dunavan 1986; Woodward 1987). Fort Ancient corn tends to be a lesser-rowed variety known as "Eastern 8", and historically as "Northern Flint" (Cutler and Blake 1976; Wagner 1986).

Table 1. Mississippian and Fort Ancient Botanical Densities and Ratios.

Nutshell and Corn Density.

	Nutshell		Corn	
	Frequency/ Liter	Grams/ Liter	Frequency/ Liter	Grams/ Liter
Mississippian				
Chambers (15Ml109)	18.9	.375	2.5	.017
Adams (15Fu4)	12.8	.261	6.5	---
Turk (15Ce6)	8.3	.182	2.9	.043
Marshall (15Ce27)	1.7	.020	1.5	.016
Fort Ancient				
Thompson (15Gp27)	1.4	.026	4.3	.059
Snag Creek (15Bk2)	2.4	.027	3.6	.031
Fox Farm (15Ms1)	2.3	.057	8.4	.262
Muir (15Js86)	4.5	.072	4.0	.034
Guilfoil (15Fa167)	3.5	.093	3.8	.027
Larkin (15Bb13)	0.8	.017	1.0	.010

Nut:Wood and Nut:Corn Ratios.

	Nutshell: Wood		Nutshell: Corn	
	Frequency:1	Grams:1	Frequency:1	Grams:1
Mississippian				
Chambers (15Ml109)	0.67:1	0.80:1	7.50:1	22.1:1
Adams (15Fu4)	0.25:1	0.33:1	2.00:1	------
Turk (15Ce6)	0.13:1	0.15:1	2.90:1	3.3:1
Turk (15Ce27)	0.16:1	0.24:1	0.17:1	3.3:1
Fort Ancient				
Thompson (15Gp27)	0.03:1	0.05:1	0.34:1	0.08:1
Snag Creek (15Bk2)	0.09:1	0.02:1	0.71:1	1.08:1
Fox Farm (15Ms1)	0.03:1	0.05:1	0.33:1	0.13:1
Muir (15Js86)	0.09:1	0.09:1	0.91:1	0.80:1
Guilfoil (15Fa167)	0.04:1	0.09:1	0.92:1	3.41:1
Larkin (15Bb13)	0.04:1	0.07:1	0.79:1	1.63:1

Corn densities per liter vary greatly among both Mississippian and Fort Ancient sites (Table 1), probably reflecting both preservation and the idiosyncrasies of a plant which produces a large inedible waste product and therefore is unusually visible in the archaeological record. Despite this, other lines of evidence may be used to evaluate and compare relative intensities of Mississippian and Fort Ancient corn use. Radiocarbon isotope studies have been undertaken on several Mississippian and four Fort Ancient sites, including Hardin Village (15Gp22) and Slone (15Pi11). These data show a range of 26 to 49% use of corn in the Mississippian diet and a range of 48 to 79% use of corn in the Fort Ancient diet (Broida 1983, 1984; Conard 1983; Lynott et al. 1986; Tieszen 1978). Though there is some question about whether stable carbon isotope analysis can be used to estimate the total percentage that maize contributed to the diet, it is safe to say that this type of analysis indicates a greater reliance on maize by Fort Ancient than Mississippian peoples to the west.

A comparison of the percentage corn comprises of Mississippian and Fort Ancient food remains supports the radiocarbon isotope data. Corn ranges from 17.7% (Chambers) to 39.7% (Adams) of the food remains by frequency at western Kentucky Mississippian sites. As sample sizes increase at the Mississippian sites, the percentage of corn in the food remains becomes lower. On the other hand, excluding Larkin and its unusual burial contexts, corn ranges from 44.6% (Muir) to 69.8% (Thompson) of the subsistence remains by frequency at Fort Ancient sites. In general, these values represent a surprisingly close correlation with the radiocarbon isotope data (Edging 1985; Edging and Dunavan 1986; Rossen 1987a). If Fort Ancient people were indeed utilizing corn more intensively than Mississippians, there must be a reevaluation of the preconception that more socially complex people with higher population densities (i.e., Mississippians) relied more heavily on corn as a staple.

DOMESTICATED BEANS

Domesticated beans occur commonly in Fort Ancient sites, and occasionally in great numbers, such as at Fox Farm and Larkin (Rossen 1987a, 1987c). One of the earliest collections of beans in the eastern United States comes from an early Fort Ancient site (Muir - ca. A.D. 1000-1200) (Rossen 1987d). The Muir collection demonstrates that beans had a long developmental history in central Kentucky, which led to their intensive use during middle and late Fort Ancient times (Rossen 1987a, 1987c). In comparison, domesticated beans are relatively rare in western Kentucky from early through late Mississippian times (Edging 1985; Edging and Dunavan 1986; Woodard 1987). The 43 beans recovered from 904 liters of soil at the Chambers Site represents a small amount compared to Fort Ancient sites (Rossen 1987b). The relative paucity of beans at western Kentucky sites reflects subsistence practices similar to those documented for non-Kentucky midwestern Mississippian sites (Johannessen 1984).

NATIVE CULTIGENS

Three native cultigens, maygrass (Phalaris caroliniana), erect knotweed (Polygonum erectum), and chenopod (Chenopodium berlandieri) have been recovered from western Kentucky Mississippian sites (Edging 1984; Edging and Dunavan 1986; Johannessen 1984; Woodard 1987). For example, 438 maygrass seeds were recovered from 18 different samples at the Chambers Site (Rossen 1987b), and these native cultigens were recovered at the Adams, Turk, and Marshall sites. This use of native cultigens appears to represent a continuation of a Woodland period subsistence pattern, as inferred from limited Kentucky data and from sites in neighboring Illinois, Ohio, and Tennessee (Ahler this volume; Cowan 1979a, 1979b; Chapman and Shea 1981; Johannessen 1984; Lopinot 1983; Wagner 1986).

In comparison, Kentucky Fort Ancient sites tend to lack native cultigens (Wagner 1983, 1986). Only two exceptions exist: the domesticated chenopod from one feature at Fox Farm, and erect knotweed at Muir (Rossen 1987a, 1987d). Maygrass is totally absent from Fort Ancient sites. However, it has been recovered from Late Woodland contexts at the Bentley and Hansen (Ahler this volume) sites in northeastern Kentucky, and in eastern Kentucky rockshelters like Rogers and Haystack (Cowan 1979a, 1979b). Thus, it would appear that native cultigens made a greater contribution to Mississippian than to Fort Ancient diets.

NUTS

Density indices are particularly helpful in distinguishing Mississippian and Fort Ancient nut utilization. Nut densities at Fort Ancient sites are dramatically lower than at Mississippian sites (Table 2). Weight densities average .209 at Kentucky Mississippian sites and only .048, less than one-fourth the Mississippian value, at Fort Ancient sites. In part, this may represent seasonal differences in the Fort Ancient settlement pattern (Turnbow et al. 1983). The Fort Ancient winter campsites of Goolman (0.183) and DeVary (0.162) contain greater nut densities than the Fort Ancient villages (Wymer 1983). However, even these figures fall far below the Mississippian site densities at Adams and Chambers, as well as values recorded for non-Kentucky Mississippian sites (Edging 1985; Edging and Dunavan 1986; Johannessen 1984; Lopinot 1983; Rossen 1987a; Woodard 1987). These trends reflect Mississippian-Fort Ancient differences in nut use. They also indicate that Munson's (1986) hypothesis concerning hickory silviculture, or the active management of tree resources through selective tree girdling, is a possibility to be considered at western Kentucky Mississippian sites.

WILD GREENS, FRUITS AND BERRIES

The intensity of wild greens, fruit, and berry exploitation is also different between Kentucky Mississippian and Fort Ancient sites. Wild plants such as grape, sumac, bedstraw, and paw-paw are present in virtually all Fort Ancient sites, and presumably represented an important secondary food source. Wild plant seeds are relatively well-represented at Fort Ancient sites in terms of frequency per liter of soil. Fox Farm (0.95), Snag Creek (0.54), Larkin (0.25), and Thompson (0.22) all contain substantial, well-distributed numbers of wild seeds. In comparison, Mississippian sites such as Marshall (0.18), Turk (0.16), and Chambers (0.06) have lower wild seed densities. There are exceptions to this trend, such as Adams (0.85), which contains numerous persimmon seeds, and Muir (0.05) and Guilfoil (0.08), two Fort Ancient sites with poor botanical preservation. While not as obvious as other differences described in this paper, the basic trends in the wild plant contents of Mississippian and Fort Ancient botanical assemblages have also been noted by researchers in neighboring states (Johannessen 1984:205-6; Wagner 1986b).

SUMMARY AND DISCUSSION

To summarize the trends discussed above, recent research has identified important differences between Kentucky Mississippian and Fort Ancient plant utilization patterns (Figure 2). Corn is a major staple of both groups, but may actually have been more intensively used by Fort Ancient people. Domesticated beans were the major secondary staple for Fort Ancient people, while native cultigens may have filled that role for Mississippian groups. Nuts were intensively utilized and perhaps actively managed by Mississippian populations, while they were relatively ignored by Fort Ancient groups. Wild fruits and berries were important to Fort Ancient people, but were only a minor food source to Mississippian people.

It bears repeating that these statements are meant to be a "straw person", which need to be tested and refined by future research efforts. However, if the generalizations discussed are confirmed by future archaeobotanical research, some important questions must be addressed:

1) Why did Fort Ancient people rely more heavily on corn than Mississippian people? How, then, can archaeologists re-formulate the traditional view of the relationships between intensity of corn use, surplus production, and the need for control by ranked hierarchies?

2) Why did Fort Ancient people decide not to use native cultigens? Conversely, why did the Mississippian people continue to use them?

3) Why were beans so much more important to Fort Ancient people than Mississippian people?

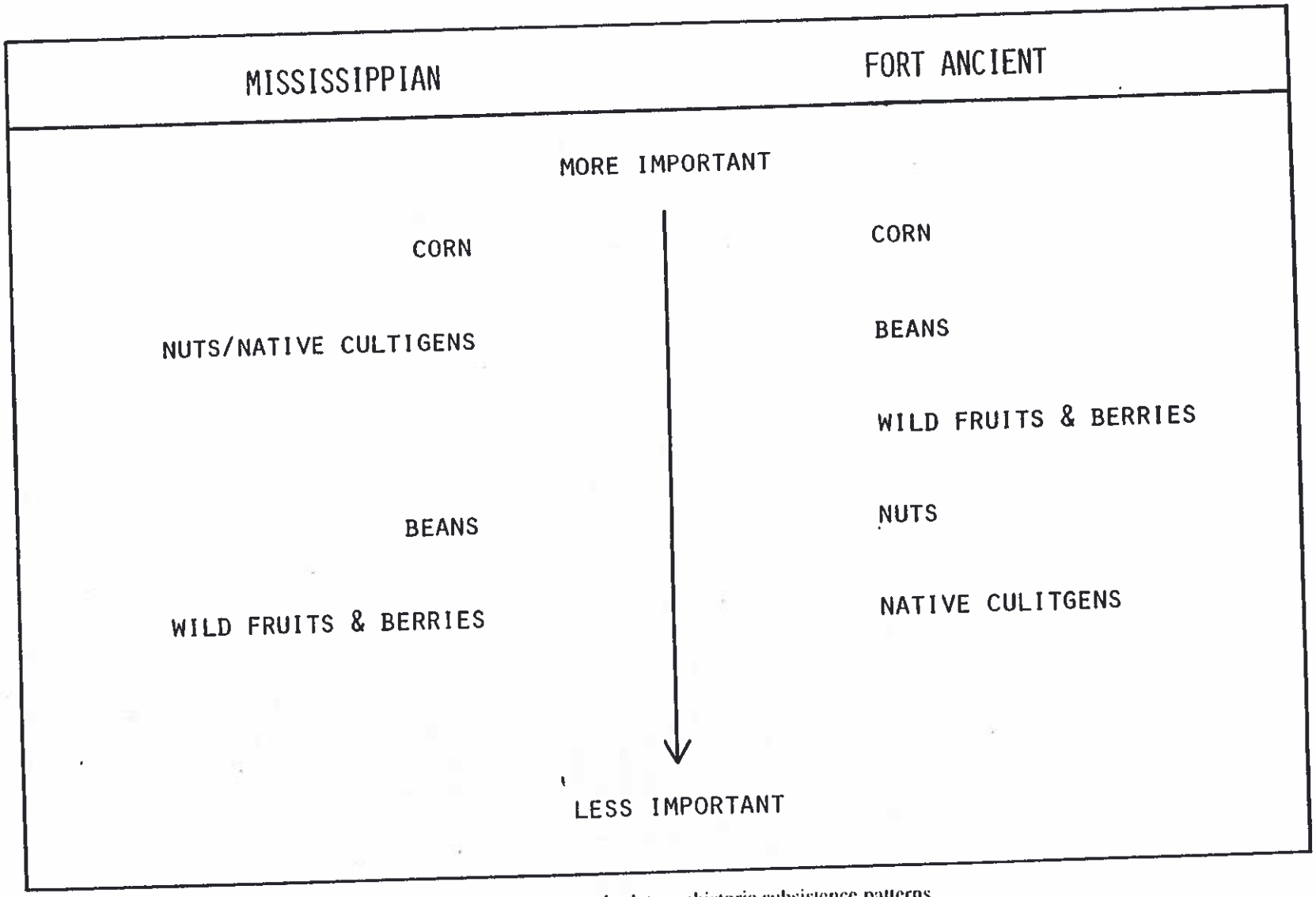

Figure 2. Schematic of Kentucky late prehistoric subsistence patterns.

4) What other evidence can be brought to bear on the question of hickory silviculture among Mississippian people? What factors so drastically limited the use of nuts by Fort Ancient people?

While this paper depicts trends within the archaeobotanical data, understanding the causes of these trends is more difficult. The basic nature of the Mississippian/Fort Ancient interaction has still not been well-defined, and it is still not known whether or not these two archaeological manifestations geographically and culturally grade into each other. This may be due in part to a lack of late prehistoric research in the Green River drainage in the Western Coalfield region of Kentucky. Further complicating future discussion will be the emergence of regional dietary variations within both Kentucky Mississippian and Fort Ancient territories. Mississippian sites like Chambers, situated away from the main river channels, exhibit minor differences from sites located along the Mississippi River, and Fort Ancient sites in central Kentucky likewise exhibit minor differences from their Ohio River counterparts.

Despite these problems, some issues may be discussed that can help guide the search for answers to the above-stated questions. First, an environmentally-oriented theory of cultural behavior cannot by itself explain the observed difference in Mississippian and Fort Ancient subsistence patterns. Rather, it is apparent that instead of simply shifting from wild to domesticated foods, Mississippian and Fort Ancient peoples intensified exploitation of different wild and domesticated plant foods while decreasing their utilization of some plants and rejecting others. Thus it appears that late prehistoric peoples were making conscious decisions that resulted in the selective exploitation of both wild and domesticated plants.

The second issue that needs to be raised is how the trends depicted in this paper relate to Mississippian and Fort Ancient cultural developments. By comparing earlier Late Woodland assemblages from each region, as well as environmental variables and settlement and subsistence data from the later prehistoric periods, numerous hypotheses may be generated to explain how Mississippian and Fort Ancient systems evolved into unique cultural entities. As noted above, from a plant subsistence perspective, it is unsatisfying to state that the differences between Mississippian and Fort Ancient cultures merely reflect different environments and resource options. Based upon the trends identified in this paper and the emerging social and settlement pattern data, it is becoming increasingly apparent that the archaeological constructs of Mississippian and Fort Ancient reflect real cultural entities with important distinguishing characteristics. The differences between Mississippian and Fort Ancient subsistence strategies identified in this paper are indicative of distinctively different social systems. Research aimed at determining how these systems evolved, how they were maintained, and what their level of interaction was promises to provide new insights into late prehistoric adaptations.

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